RECOGNIZED BY:

HIGHER EDUCATION COMMISSION OF PAKISTAN

INDEXING


Crossref


ORCID
Connecting Research
and Researchers


OPEN ACCESS


Google
Scholar


OCLC
WorldCat®


EuroPub
Directory of Academic and Scientific Journals


ASIAN
Research Index


World Health
Organization
Regional Office for the Eastern Mediterranean


IMEMR
INDEX MEDICIUS
FOR THE EASTERN MEDITERRANEAN REGION


LOCKSS


ICMJE
INTERNATIONAL COMMITTEE of
MEDICAL JOURNAL EDITORS

Aims and Scope

The aim of the Pakistan Journal of Health Sciences (PJHS) is to provide an advanced forum for studies related to the areas of public health, applied medicine, study of microbes, molecular and cellular biology, basic mechanisms of biology, genetic studies, cancer biology, molecular medicine, pharmacology, virology, chemical biology, immunology, chemical biology, basic and clinical human physiology, pathology and population studies. PJHS is a scholarly, peer-reviewed, international, and open-access bi-annual journal that assures timely publication of manuscripts. In all cases, the key findings in multi-disciplinary articles must address some innovative or controversial practices related to health sciences. PJHS is committed to maintaining the highest standards of professional ethics, accuracy and quality in all matters related to the handling of manuscripts and reporting of scientific information. The journal welcomes empirical and applied research, viewpoint papers, conceptual and technical papers, case studies, meta-analysis studies, literature reviews, mini reviews and letters to editors, which take a scientific approach to the topics related to health sciences.

Types of Articles

- Research papers
- Short communications
- Review or mini-reviews
- Commentaries
- Perspectives, opinion
- Meta-analysis
- Case reports
- Case studies
- Case-control studies

Reviews on recent progress in health sciences are commissioned by the editors. The purpose of the Pakistan Journal of Health Sciences is to publish scientific and technical research papers to bring attention of international researchers, scientists, academicians, health care professionals towards recent advancements in health sciences. The articles are collected in the form of reviews, original studies, clinical studies. It may serve as a global platform for scientists in relevant fields to connect and mutually share ideas. This journal is open to all the research professionals whose work fall within our scope. Submissions are welcome and may be submitted here:

editor@thejas.com.pk

Title
The title of the paper should provide a concise statement of the contents of the paper. A good title is very important and will attract readers and facilitate retrieval by online searches, thereby helping to maximize citations. The title should include topical keywords and allude to the interesting conclusions of the paper. A title that emphasizes the main conclusions, or poses a question, has more impact than one that just describes the nature of the study.

Running Head
Running head should be added in the header along with the page numbers.

Type of Article
Research Article/ Case Report/ Review Article/ Opinion/ Short Communication/ Mini Review/ Letter to Editor

Running Title: A short version of the paper title.
Keywords The major keywords used in the article have to be mentioned.

Authors
List here all author names Author[1], Author[2] and Author[3]
[1]Author department, University, Country
[2]Author department, University, Country
[3]Author department, University, Country

*Corresponding Author
Author name, Affiliation, Department Name, University Name, Address, City, State, Country, E-mail:

Abstract
Abstract should include a brief content of the article. It should be structured not more than 250 words. It should include following sub headings: Objective, Methods, Results and Conclusions.

Abbreviations
If there are any abbreviations in the article they have to be mentioned.

INTRODUCTION
Provide a context or background for the study (i.e.,the nature of the problem and its significance). State the specific purpose or research objective of, or hypothesis tested by, the study or observation; the research objective is often more sharply focused when stated as a question. Both the main and secondary objectives should be made clear, and any pre-specified subgroup analyses should be described. Give only strictly pertinent references and do not include data or conclusions from the work being reported.

METHODS
The methods section should include only information that was available at the time the or plan of the protocol. All information gathered during the conduct of study should be included in the result section.
Study Design, Inclusion / Exclusion Criteria, Data collection Procedure, Statistical analysis.

RESULTS
Present your results in logical sequence in the text, tables and illustrations, giving the main or most important findings first.

Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observations. When data are summarized in the Results section, give numeric results not only as derivatives (for example, percentages) but also as the absolute numbers from which the derivatives were calculated, and specify the statistical methods used to analyze them. Table font should be 10 and caption should be below table and figure.

Data should not be duplicated in both figures and tables. The maximum limit of tables and figures should not exceed more than 4. Mention the findings of the study in paragraph, while mentioning figure and table number in text in sequential order.

TABLE

Table should not be copy pasted or in picture form

DISCUSSION

Discuss your findings by comparing your results with other literature

REFERENCES

References should not be less than 20.
In text references should be in number style. For Example [1]
Follow the Pubmed Referencing style
Provide the DOI link

Example

Cook NR, Rosner BA, Hankinson SE, Colditz GA. Mammographic screening and risk factors for breast cancer. American Journal of Epidemiology. 2009 Dec;170(11):1422-32. doi: 10.1093/aje/kwp304.

If there are more than six authors, write *et al*. after the first six names.

CONCLUSION(S)

Conclusion should elucidate how the results communicate to the theory presented as the basis of the study and provide a concise explanation of the allegation of the findings.

ACKNOWLEDGEMENT

Provide the list of individuals who contributed in the work and grant details where applicable

Plagiarism policy

Similarity index should be less than 19%, and less than 5% from individual sources.

Authorship Letter

Signed authorship letter by all authors including there current department, University, City, Country, Email.

Declaration Form

Signed declaration form submit by corresponding author.

The submission of article should include: manuscript according to journal guidelines, authorship letter, declaration form. It should be submitted to the following email id: editor@thejas.com.pk

ISSN (E) 2790-9352
ISSN (P) 2790-9344

PJHS
Pakistan Journal of Health Sciences

TABLE OF CONTENTS

VOLUME 03 ISSUE 05

Editorial Team

Editorial Board

Published by:
CrossLinks International Publishers

VOLUME 03 ISSUE 05

TABLE OF CONTENTS

PJHS
Pakistan Journal of Health Sciences

ISSN (E) 2790-9352
ISSN (P) 2790-9344

Published by:
CrossLinks International Publishers

ISSN (E) 2790-9352
ISSN (P) 2790-9344

PJHS
Pakistan Journal of Health Sciences

TABLE OF CONTENTS

VOLUME 03 ISSUE 05

Published by:
CrossLinks International Publishers

VOLUME 03 ISSUE 05

TABLE OF CONTENTS

PJHS
Pakistan Journal of Health Sciences

ISSN (E) 2790-9352
ISSN (P) 2790-9344

Published by:
CrossLinks International Publishers

ISSN (E) 2790-9352
ISSN (P) 2790-9344

PJHS
Pakistan Journal of Health Sciences

TABLE OF CONTENTS

VOLUME 03 ISSUE 05

Published by:
CrossLinks International Publishers

VOLUME 03 ISSUE 05

TABLE OF CONTENTS

PJHS
Pakistan Journal of Health Sciences

ISSN (E) 2790-9352
ISSN (P) 2790-9344

Published by:
CrossLinks International Publishers

ISSN (E) 2790-9352
ISSN (P) 2790-9344

PJHS
Pakistan Journal of Health Sciences

TABLE OF CONTENTS

VOLUME 03 ISSUE 05

Published by:
CrossLinks International Publishers

VOLUME 03 ISSUE 05

TABLE OF CONTENTS

PJHS
Pakistan Journal of Health Sciences

ISSN (E) 2790-9352
ISSN (P) 2790-9344

Published by:
CrossLinks International Publishers

DOI: https://doi.org/10.54393/pjhs.v3i05.302

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Climate change: A Global Crisis

Fridoon Jawad Ahmad[1*]

[1]University of Health Sciences, Lahore, Pakistan
drfridoon@yahoo.com

ARTICLE INFO

How to Cite:

Jawad Ahmad, F. .(2022). Climate change: A Global Crisis. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.302

Climate change is affecting people's lives and health in many different ways. Clean air, safe drinking water, a plentiful supply of nutrient-rich food, and a safe place to live - key elements of good well-being are all at risk, and it may undo decades of progress in world health. Climate change is predicted to result in an increase in yearly mortality from starvation, malaria, diarrhea, and heat stress. The areas least equipped and with limited health infrastructure, such as developing nations like Pakistan, will be less able to deal with this crisis. The mining and burning of fossil fuels produces greenhouse gas emissions, which play a significant role in both climate change and air pollution. Numerous programmes and individual decisions about how to utilize energy, food, and transportation have the potential to cut greenhouse gas emissions and have a significant positive impact on people's health, especially by reducing air pollution. Examples of strategies that might reduce carbon emissions and ease the burden of indoor and outdoor air pollution include the phase-out of polluting energy systems or the promotion of active lifestyles and public transportation. The increase in death and illness from increasing extreme weather effects, food-, water-, and vector-borne illnesses, as well as mental health problems are all significant effects of climate change on health. Extreme weather events like heatwaves, storms, and floods are also becoming more often. In addition, many of the social factors that influence health, such as access to healthcare, equality, and livelihoods, are being deteriorated by climate change. The most vulnerable are people, such as women, children, ethnic minorities, impoverished communities, migrants or displaced people, elderly populations, and those with underlying health issues, as they are disproportionately affected by these climate-sensitive health concerns.

Climate change has had a significant impact on Pakistan, as seen by the recent devastating floods that claimed thousands of lives and left millions homeless. People who were impacted by flood waters contracted several illnesses, including malaria and dengue. Recent severe weather occurrences in Pakistan include heat waves that melt glaciers and cause devastating floods, smog, and air pollution posing serious health problems to people. If necessary steps are not taken, these effects of climate change might worsen. To address this crisis, significant decisions must be made, including coordinating reviews of the scientific evidence on the relationships between climate change and health; determining a nation's readiness for and needs in the face of climate change; enhancing national capacities and enhancing the resilience and adaptive capacity of health systems to address the negative health effects of climate change; developing expertise on the links between climate change and human health; and reducing the risk of global warming.

DOI: https://doi.org/10.54393/pjhs.v3i05.301

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Oral Health Assessment in Pakistan

Sana Hassan[1*]

[1]Punjab Health Care Commission, Lahore, Pakistan
sana.hasan@phc.org.pk

ARTICLE INFO

How to Cite:

Hassan, S. . (2022). Oral Health Assessment in Pakistan. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.301

Oral health is a standard that contributes to the general well-being of individuals and comprises all oral and linked problems that permit them to speak, eat and socialize without embarrassment, discomfort, and active disease. Dental diseases are key public health concerns worldwide due to their substantial social impact and high prevalence. Oral health has a substantial effect on the overall well-being of individuals through morbidity, pain, mortality, and diminished capacity to perform work, study, and economic and social activities. Oral diseases such as dental caries affect individual lives significantly and pose hindrances in performing daily activities. Tooth loss is mainly caused by periodontal diseases and dental caries and causes major functional impairment and limitation. A high prevalence of oral diseases is seen globally as World Health Organization (WHO) reports 60–90% of school-going children globally have experienced caries and the highest prevalence was seen in Latin American and Asian countries [1]. Pakistan is also facing dental caries as a serious oral public health concern and approximately 60% of the population have dental caries [2]. A variety of variable risk factors cause oral diseases including the use of tobacco and alcohol, sugar consumption, poor hygiene, and their fundamental commercial and social elements. The major principle underlying is the development of acid from dietary carbohydrates that bacteria ferment in plaque and saliva. Healthy plaque and saliva usually contain relatively small amounts of possible cariogenic bacteria. However, in some environmental and biological disorders like low pH environments and an increase in consumption of fermentable carbohydrates, the proliferation of acid-tolerant bacteria is seen. Oral health in populations like Pakistan is poor and their attitude and practice towards oral health hygiene is often neglected. Diet full of carbohydrates and sugars makes the problem worse. High costs of checkups and oral health treatments make it difficult for people in developing countries like Pakistan to go to the dentist. Most of the studies on dental caries contain bias and are of poor quality. Therefore, in Pakistan assessing the level of oral diseases and dental caries should be a precedence, and investments in the oral health care department should be dedicated to the development of oral health programs and policies. This will enhance the quality of life regarding oral health in this demographic area of the world.

REFERENCES

[1] Dixit LP, Shakya A, Shrestha M, Shrestha A. Dental caries prevalence, oral health knowledge and practice among indigenous Chepang school children of Nepal. BMC Oral Health. 2013; 13(1):20. doi: 10.1186/1472-6831-13-20

[2] Siddiqui AA, Alshammary F, Mulla M, Al-Zubaidi SM, Afroze E, Amin J, et al. Prevalence of dental caries in Pakistan: a systematic review and meta-analysis. BMC oral health. 2021 Dec; 21(1):1-2. doi: 10.1186/s12903-021-01802-x

DOI: https://doi.org/10.54393/pjhs.v3i05.220

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Review Article

Diagnosis of Acute Appendicitis: Ultrasound as First-Line Imaging Modality

Waiz Chaudhary[1], Muhammad Adnan Ahsan[1], Muhammad Hashim[2*], Rana Muhammad Ather Azeem Shams[3], Muhammad Arslan Haider[2], Syeda Iman Zahra[2], Warda Zahid[2], Fizza Kazmi[2], Zainab Arshad[2] and Anosh Zainab[2]

[1]College of Allied Health Professionals, Government College University Faisalabad, Faisalabad, Pakistan
[2]University Institute of Radiological Sciences and Medical Imaging Technology, The University of Lahore, Lahore, Pakistan
[3]Department of Allied Health Sciences, Superior University, Lahore, Pakistan

ARTICLE INFO

Key Words:
Acute appendicitis, Abdominal pain, Gastrointestinal surgery, Anorexia

How to Cite:
Chaudhary, W., Ahsan, M. A., Hashim, M. ., Ather Azeem Shams, R. M. ., Haider, M. A. ., Zahra, S. I., Zahid, W., Kazmi, F., Arshad, Z., & Zainab, A. (2022). Diagnosis of Acute Appendicitis: Ultrasound as First-Line Imaging Modality: Diagnosis of Acute Appendicitis. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.220

***Corresponding Author:**
Muhammad Hashim
University Institute of Radiological Sciences and Medical Imaging Technology, The University of Lahore, Lahore, Pakistan
hashimmuhammadch226@gmail.com

Received Date: 11th October, 2022
Acceptance Date: 25th October, 2022
Published Date: 31st October, 2022

ABSTRACT

The most prevalent abdominal emergency is acute appendicitis. Atypical manifestations may lead to diagnostic uncertainty and a delay in therapy, even if the clinical diagnosis may be simple in patients who exhibit conventional signs and symptoms. When laboratory results are presented, they often show a left shift and an increased leukocytosis. The chance of increased C-reactive protein measurement is high. Imaging modalities have become extremely important in the diagnostic work-up of patients with suspected acute appendicitis in order to maintain the low rate of negative appendectomy because the clinical diagnosis of acute appendicitis continues to pose a challenge to emergency physicians and surgeons. Ultrasound, computed tomography and magnetic resonance imaging modalities are used in diagnosis but we feel that all patients with suspected appendicitis should get an ultrasound. Because ultrasound has outstanding specificity, readily available, no ionizing radiation and cost is low.

INTRODUCTION

The Latin term appendix and the suffix -itis are the roots of the English word appendicitis, which denotes appendix inflammation. In the 1540s, the word "appendix" was used to denote an internal organ's prolonged extension. Metiever initially reported appendicitis in 1759, all at once, this was assumed that the appendix was not the cause of the illness; as a result, it was also known as peri-typhlitis, para-typhlitis, typhlitis, or extra-peritoneal abscess of the right iliac fossa. Appendicitis has been associated with fluid production by the appendix since the early twentieth century. By inserting a manometric recording device, an early investigation indicated that increased forces produced a drainage form that was linked with appendicitis, histopathological demonstrable hypercellularity, and other symptoms [1]. On the posteromedial wall of the cecum, 1.7 cm from the ileocecal valve, where colon's taenias meet, is a long tube known as the vermiform appendix. Mean sizes for males and women are approximately 91.2 mm and 80.3 mm. Mucosa, submucosa, muscularis externa and serosa are the components of the appendix wall [2]. One of the most prevalent illnesses treated by emergency surgery is acute appendicitis. In their everyday practice patients who have this illness are seen by surgeons along with doctors from a range of medical disciplines, such as internal medicine and pediatrics. When it has usual symptoms it's simple to

DOI: https://doi.org/10.54393/pjhs.v3i05.220

identify and manage. Youngsters, old age individuals, and people having numerous unusual symptoms, however, the diagnosis can be not on time and treatment may also become difficult [3]. The primary complaint of individuals with severe acute appendicitis is abdominal discomfort. Only 50% of sufferers have the characteristic combination of colicky focal stomach pain, and pain transfer to the right iliac fossa and vomiting. Usually, the patient describes a periumbilical colicky discomfort that worsens over the course from the initial 24 hours, develops into a constant, severe pain, and tends to move to the right iliac fossa. Due to the midgut's visceral involvement, the first pain is a referred sensation, and the focal pain results from the parietal peritoneum's inclusion following the onset of the inflammatory process [4]. Someone who has acute appendicitis usually experience a low-grade fever. Every time the temperature rises above 38.3 degrees Celsius, perforation must be feared. If perforation does occur, the terminal ileum, caecum, and omentum will be in a position to block the inflammation, leading to periappendiceal phlegmon or an abscess. If there is a potential for a loose hole into the stomach cavity, peritonitis frequently occurs [4, 5]. The most common cause of gastrointestinal emergencies is appendicitis. Appendicitis has a 7% lifespan probability of developing and is often treated surgically. Approximately 11 incidences of this condition are reported in the general population for every 10,000 people annually. The peak incidence of appendicitis often occurs between the ages of ten and twenty, and the male to female ratio is 1.4:1. Men have a lifetime hazard of 8.6%, while women have a risk of 6.7% [1]. Ultrasound has excellent specificity but has limited sensitivity in evaluating patients with acute appendicitis. Until the invention of real-time ultrasonography with high resolution, this was impossible to consistently access appendicitis. Because of the transducers with high frequency provide improved or better resolution, it is now simpler to identify appendicular diseases. In situations of suspected simple acute appendicitis, graded compression sonography is very beneficial [6]. Computed tomography (CT) is a specific and sensitive technique for evaluating acute appendicitis, the requirement for thin sections, which typically demands a more concentrated inspection, raises the risk of missing abnormalities beyond the FOV (field of view). This is a costly procedure that frequently necessitates the use of contrast agents which can be given orally or IV line. Furthermore, computed tomography is not specific nor sensitive for detecting gynecology related illness, which is a common sign of acute appendicitis [7]. MRI show high exactness in the recognition of acute appendicitis. The purpose of this study is basically to describe different methods for the diagnosis of acute appendicitis to decrease the rate of negative appendectomy and ultrasound should be considered as primary imaging procedure in diagnosis of acute appendicitis because there is no risk of ionizing radiation to the patients and expenditure will be low.

Imaginological Diagnosis

Ultrasound

Puylaert was the first to develop real-time compression ultrasonography in 1986 [8]. On ultrasonography, the appendix looks like an elongated, lamellar, blind-ending structure. Appendix readings are taken on a maximum compression. Traditionally, appendicitis is diagnosed at the time the appendix is wider than 6 millimetres. The non-resilient, thick-walled appendix, on the other hand, will be visible because the compressing transducer keeps it in place.When the appendix has an uneven outline, it is diagnosed or when the detection of periappendiceal fluid accumulation found [4]. Recent studies showed that the normal anteroposterior appendix diameter ise 4.4 ± 0.9mm and transverse 5.1 ± 1.0 mm [9]. AL Ajerami studied 180 patients. Patients with appendicitis identified by ultrasonography throughout the research period [n = 180] had their appendix surgically removed. With just 4.4% [8/180] false positives, the rate of negative appendectomy was low. Female patients had a considerably greater erroneous diagnostic rate [false negatives + false positives] than male patients: 38.5% versus 6.2%. A large percentage of erroneously diagnosed patients [82.1%] had abnormal value of weight [obesity or overweight]. The overall specificity and sensitivity of ultrasound were 83.3% and 84.8%, respectively, using surgical outcome as the gold standard, correspondingly 93.3% and 66.7% for the negative and positive predictive scores. Males had higher specificity and sensitivity than females [95.7% and 88.2%, correlatively] [84.6% and 71.4%, respectively] [10]. Hahn *et al.*, [11] Puylaert *et al.*, [12] Skanne *et al.*, [13] Tarjan Z *et al.*, [14] Joshi *et al.*, [15] studies have sensitivity values ranges from 70-95% and specificity values from 90-98%.

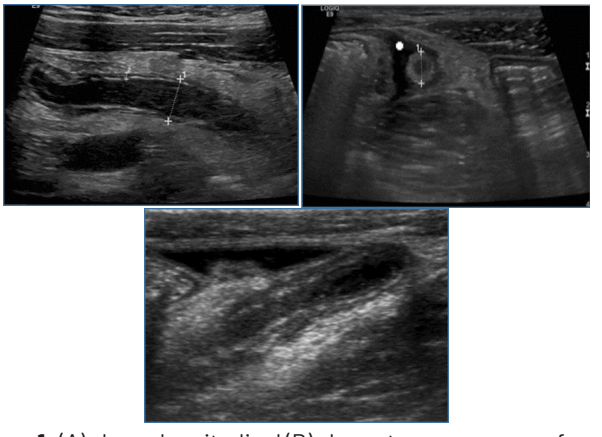

Figure 1: (A) shows longitudinal (B) shows transvere scan of acute appendicitis detected by US (C) shows abdomen ultrasonography

DOI: https://doi.org/10.54393/pjhs.v3i05.220

displaying a thick-walled, dilated appendix

Computed Tomography (CT)

Stroman *et al.*, [16] examined 107 patients with a history of possible acute appendicitis.. A total of 107 individuals, 44 men and 63 females (41% and 59%) with an average age of 33 years ranging from 13 to 89 years, scan was performed using Routine contrast-enhanced computed tomography (CECT) to assess probable appendicitis. 11 false-positive readings and three false-negative readings were present in 107 CECTs done, resulting in a specificity of 85 percent, sensitivity of 92 percent, negative predictive value (NPV) of 95%, positive predictive value (PPV) of 75 %, and an average accuracy rate of 90%. CECT demonstrated considerably greater sensitivity and accuracy (30% against 92% and 68% versus 88%), respectively, than ultrasonography in 43 patients. In terms of clinical therapy, appendectomy was performed on 100% (36/36) of patients with appendicitis and 4.2% (3/71) of patients without appendicitis. As a result, 7.6% (3/39) of appendectomy procedures were found to be negative. A statistical analysis from 31 investigations which comprised 4341 indiviuals which include both adults and children, the overall specificity and sensitivity in children was 95% and 94% for CT scan and 94 and 88% for ultrasound for acute appendicitis diagnosis, respectively. In adults for acute appendicitis diagnosis, combined specificity and sensitivity for ultrasound tests were 93% and 83%, respectively, and 94%, respectively, for CT scans [17]. In CT findings if appendicitis is probably not present or ambigous appendix is present then patients were advised to seek ultrasound re-evaluation. Sim *et al.*, [18] studied that patients with equivocal findings in CT should go for ultrasound re-evaluation.They studied 869 patients, 71 (8.2%) of the 869 individuals exhibited equivocal appendicitis results, whereas 63 (7.2%) were categorised as probably not appendicitis. The CT results combined with Ultrasound re-evaluation group's sensitivity and specificity (100% and 98.1%, respectively) outperformed the CT alone group's (93% and 99%; equivocal group considered as negative appendicitis, 100% and 89.9%; as positive, respectively). After including ultrasound re-evaluation the average rate of negative appendectomy was dropped from 3.4 to 2.3%. Ultrasound re-evaluation could enhance diagnosis accuracy and reduce the proportion of negative appendectomies in individuals with equivocal CT results of acute appendicitis.

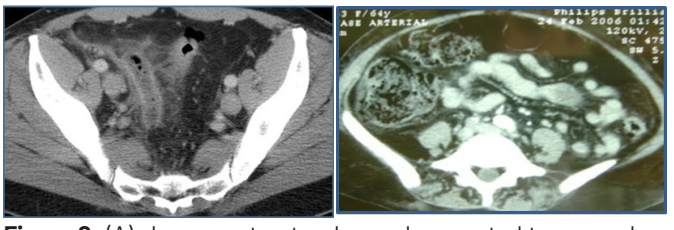

Figure 2: (A) shows contrast-enhanced computed tomographgy with inflammed appendix (B) shows CT scan with acute appendicitis.

Magnetic Resonance Imaging (MRI)

MRI is becoming more popular as a problem-solving tool or when US results are equivocal, especially in populations where radiation protection is a concern [17]. Israel et al., [19] studied the sensitivity and specifity of MRI and ultrasound in suspected acute appendicitis during pregnancy. 33 pregnant patients were examined under US and MRI and their results were compared. 5 of the 33 individuals had appendicitis that had been diagnosed pathologically. 4 of the 5 patients with appendicitis had their appendicitis identified correctly on MRI, while 1 was deemed uncertain (appendix not seen). One was accurately identified, 1 was misdiagnosed as normal, and three were read as uncertain in the United States (appendix not seen). An MRI revealed a normal appendix in 13 individuals, none of whom had appendicitis. At US, a normal appendix was found in 3 patients, 1 of whom had appendicitis. The sensitivity, specificity, positive predictive value PPV, and negative predictive value NPV for diagnosing appendicitis when the appendix was seen at MRI were all 100%. When the appendix was seen by ultrasound, the sensitivity, specificity, PPV, and NPV for diagnosing appendicitis were 50%, 100% and 100%, 60% respectively. Diagnosing suspected acute appendicitis in children without ionizing radiation,ultrasonography can be used first followed by MRI in some cases is feasible and can be compared to CT, in terms length of stay in hospital and negative appendectomy rate.

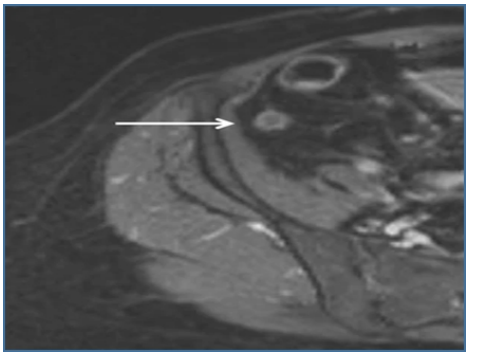

Figure 3: Contrast enhanced MRI of acute appendicitis

DISCUSSION

The clinical evaluation of a patient with suspected appendicitis is still difficult because nonsurgical conditions that resemble appendicitis make matters worse [20]. To prevent the repercussions of a missed or belated diagnosis, the clinical choice to operate in ambiguous situations leads to the elimination of 20% of normal appendices. That was viewed as the best possible compromise between the two variables negative

DOI: https://doi.org/10.54393/pjhs.v3i05.220

appendicitis and rate of perforation and they inversely connected according to the previous beliefs [6]. The clinical diagnosis is made with around 80% accuracy, which leads to a negative appendectomy rate of about 20%. Since it was prioritized to execute an early procedure, this diagnostic accuracy defect has historically been allowed. The objective of quality control was perforated appendicitis rather than low appendectomy rates. For a number of reasons, this approach has lost favor. The costs and morbidity of a failed appendectomy are significant [19]. Low negative appendectomy rates can be achieved by incorporating novel diagnostic modalities into clinical decision-making without raising perforation rates. Clinical assessment alone is insufficient to effectively manage patients with who have the risk of acute appendicitis. The patients suffering with acute abdominal pain, a diagnostic route using routine US, CT, and MRI yielded outstanding outcomes in the identification and treatment of appendicitis. Despite the fact that CT and MRI showed greater diagnosis accuracy, we feel that all patients with suspected appendicitis should get an ultrasound [8]. Until the invention of real-time ultrasonography with high resolution, this was impossible to consistently access appendicitis. However, appendicular disorders are now simpler to diagnose. In situations of suspected simple acute appendicitis, graded compression sonography is very beneficial [5]. Computed tomography (CT) is a specific and sensitive technique for evaluating acute appendicitis, the requirement for thin sections, which typically demands a more concentrated inspection, raises the risk of missing abnormalities beyond the FOV (field of view). This is a costly test that frequently necessitates the use of contrast agents. Aside from that, CT is not specific or sensitive for diagnosing gynecology related illness, which is common symptom of acute appendicitis. In some ways, CT is better than ultrasonography since its results are much more precise and intestinal gas has no impact on them. Unlike ultrasonography, CT scan is able to show the elongated appendix but is unable to describe the wall's anatomy. As a result, depending on the mural alterations, ultrasonography is preferable to CT for determining the severity of appendicitis [9]. If we talk about MRI imaging, although it reduces the use of ionizing radiation, it has various drawbacks, including a large cost, extensive study durations, and restricted availability on an emergency basis. According to some writers, MR imaging is only used in pregnant women whose ultrasound results are unclear. Although MRI imaging has not been associated with any negative effects during human pregnancy, but the safety of it has yet to be demonstrated clearly. Acoustic stimulation has the ability to injure the fetus, despite tissue heating from radiofrequency pulses. So, MRI is avoided during the first trimester [8].

CONCLUSIONS

For nearly a century, researchers have been studying appendicitis. Clinical evaluation and Imaging results are used to make a diagnosis. Clinical assessment alone is insufficient to effectively manage patients with suspected acute appendicitis. For patients with acute abdominal pain, a diagnostic route using routine US, CT, and MRI yielded outstanding outcomes in the identification and treatment of appendicitis. Despite the fact that CT and MRI showed greater diagnosis accuracy, we feel that all patients with suspected appendicitis should get an ultrasound. Because ultrasound is readily available, no ionizing radiation and cost is low.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Krzyzak M and Mulrooney SM. Acute Appendicitis Review: Background, Epidemiology, Diagnosis, and Treatment. Cureus. 2020 Jun; 12(6):e8562. doi: 10.7759/cureus.8562

[2] Kraemer M, Franke C, Ohmann C, Yang Q. Acute appendicitis in late adulthood: incidence, presentation, and outcome. Results of a prospective multicenter acute abdominal pain study and a review of the literature. Langenbecks Archives of Surgery. 2000 Nov; 385(7):470-81. doi: 10.1007/s004230000165

[3] Di Saverio S, Podda M, De Simone B, Ceresoli M, Augustin G, Gori A, et al. Diagnosis and treatment of acute appendicitis: 2020 update of the WSES Jerusalem guidelines. World Journal of Emergency Surgery. 2020 Apr; 15(1):27. doi: 10.1186/s13017-020-00306-3

[4] Petroianu A. Diagnosis of acute appendicitis. International Journal of Surgery. 2012 Jan; 10(3):115-9. doi: 10.1016/j.ijsu.2012.02.006

[5] Rybkin AV and Thoeni RF. Current concepts in imaging of appendicitis. Radiology Clinics of North America. 2007 May; 45(3):411-22. doi: 10.1016/j.rcl.2007.04.003

[6] Mardan MA, Mufti TS, Khattak IU, Chilkunda N, Alshayeb AA, Mohammad AM, et al. Role of ultrasound in acute appendicitis. Journal of Ayub Medical College Abbottabad. 2007 Sep; 19(3):72-9

[7] Abu-Yousef MM. Ultrasonography of the right lower

DOI: https://doi.org/10.54393/pjhs.v3i05.220

quadrant. Ultrasound Q. 2001 Dec; 17(4):211-25. doi: 10.1097/00013644-200112000-00003
[8] Puylaert JB. Acute appendicitis: US evaluation using graded compression. Radiology. 1986 Feb; 158(2):355-60. doi: 10.1148/radiology.158.2.2934762
[9] Coyne SM, Zhang B, Trout AT. Does appendiceal diameter change with age? A sonographic study. AJR American Journal of Roentgenology. 2014 Nov; 203(5):1120-6. doi: 10.2214/AJR.13.12205
[10] Al-Ajerami Y. Sensitivity and specificity of ultrasound in the diagnosis of acute appendicitis. East Mediterranean Health Journal. 2012 Jan; 18(1):66-9. doi: 10.26719/2012.18.1.66
[11] Hahn HB, Hoepner FU, Kalle T, Macdonald EB, Prantl F, Spitzer IM, et al. Sonography of acute appendicitis in children: 7 years experience. Pediatric Radiology. 1998 Mar; 28(3):147-51. doi: 10.1007/s002470050316
[12] Puylaert JB, Rutgers PH, Lalisang RI, de Vries BC, van der Werf SD, Dörr JP, et al. A prospective study of ultrasonography in the diagnosis of appendicitis. The New England Journal of Medicine. 1987 Sep; 317(11):666-9. doi: 10.1056/NEJM198709103171103
[13] Skaane P, Amland PF, Nordshus T, Solheim K. Ultrasonography in patients with suspected acute appendicitis: a prospective study. The British Journal of Radiology. 1990 Oct; 63(754):787-93. doi: 10.1259/0007-1285-63-754-787
[14] Sidler S, Heim D, Negri M, Stricker U. The value of ultrasound diagnosis in "acute appendicitis" patient admission. Swiss Surgery. 2003; 9(6):297-306. doi: 10.1024/1023-9332.9.6.297
[15] Debnath J, Ram S, Balani S, Chakraborty I, Gupta PD, Bindal RK, et al. Ultrasonography in Patients with Suspected Acute Appendicitis. Medical Journal Armed Forces India. 2005 Jul; 61(3):249-52. doi: 10.1016/S0377-1237(05)80166-2
[16] Stroman DL, Bayouth CV, Kuhn JA, Westmoreland M, Jones RC, Fisher TL, et al. The role of computed tomography in the diagnosis of acute appendicitis. The American Journal of Surgery. 1999 Dec; 178(6):485-9. doi: 10.1016/s0002-9610(99)00223-8
[17] Mostbeck G, Adam EJ, Nielsen MB, Claudon M, Clevert D, Nicolau C, et al. How to diagnose acute appendicitis: ultrasound first. Insights Imaging. 2016 Apr; 7(2):255-63. doi: 10.1007/s13244-016-0469-6
[18] Sim JY, Kim HJ, Yeon JW, Suh BS, Kim KH, Ha YR, et al. Added value of ultrasound re-evaluation for patients with equivocal CT findings of acute appendicitis: a preliminary study. European Radiology. 2013 Jul; 23(7):1882-90. doi: 10.1007/s00330-013-2769-2
[19] Israel GM, Malguria N, McCarthy S, Copel J, Weinreb J. MRI vs. ultrasound for suspected appendicitis during pregnancy. Journal of Magnetic Resonance Imaging. 2008 Aug; 28(2):428-33. doi: 10.1002/jmri.21456
[20] Van Breda Vriesman AC, Puylaert JB. Mimics of appendicitis: alternative nonsurgical diagnoses with sonography and CT. AJR American Journal of Roentgenology. 2006 Apr; 186(4):1103-12. doi: 10.2214/AJR.05.0085

DOI: https://doi.org/10.54393/pjhs.v3i05.146

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Review Article

Social Autopsy: A Tool for Maternal and Perinatal Death Surveillance and Response (MPDSR) Reporting in Pakistan

Fahmeeda Idrees[1*], Saeed Ahmad[2], Eman Waheed[3], Bisma Rubab[3] and Faiza Abbas[3]

[1]Health Services Academy, Islamabad, Pakistan
[2]TEPHINET, Islamabad, Pakistan
[3]Fatima Jinnah Women University, Rawalpindi, Pakistan

ARTICLE INFO

Key Words:
Social autopsy, Maternal death, Perinatal death

How to Cite:
Idrees, F. ., Ahmad, S. ., Waheed, E. ., Rubab, B. ., & Abbas, F. . (2022). Social Autopsy a Tool for Maternal and Perinatal Death Surveillance and Response (MPDSR) Reporting in Pakistan: Social Autopsy: A Tool for Maternal and Perinatal Death. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.146

***Corresponding Author:**
Fahmeeda Idrees
Health Services Academy, Islamabad, Pakistan
fahmeedaidrees@gmail.com

Received Date: 22nd September, 2022
Acceptance Date: 11th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Social autopsy is a relatively new technique to report non-biological causes of death along with biological causes, which accounts for 12/15 maternal deaths in Pakistan, through direct interaction with the community. Pakistan had a highest neonatal mortality in the entire world. A significant number of unreported cases contributed to the high prevalence of neonatal and maternal mortality. Pakistan is one of the top 10 nations that contribute to 60% of maternal and perinatal deaths worldwide which demands social autopsy adoption in Pakistan. Information acquired by social autopsy will therefore be useful in developing any efforts to stop or treat causes linked with death. Social autopsy is a way of health promotion as it encourages individual and communal behavioral change and contributes in achieving United Nations Sustainable Development Goal (SDG) 3.1 by reducing maternal and perinatal death mortality by 2030 and 2035 respectively. In discussion with the family of a woman and community, health workers examine the social reasons of death and pinpoint reforms that are required. In Bangladesh, Brazil, Tanzania, India and Nigeria, maternal and perinatal deaths have been lowered due to adoption of social autopsy. Pakistan has embraced verbal autopsy, but it is an ineffective technique which just deals with the medical cause of death. Maternal and perinatal deaths are not just because of medical causes, it is also the result of interactions between several social, cultural and economic factors. Government of Pakistan is just spending 0.8% of its GDP on health. Standard of primary maternity care is generally unsatisfactory. Only 25% basic health units have qualified staff. Government of Pakistan should create a provincial MPDSR committee, strengthen the health care network and pilot social autopsy in Pakistan to meet SGD goal 3.

INTRODUCTION

The better knowledge of the social process, the timing and nature of care-seeking attitudes, and pre-death treatments are essential to identify the changeable traits that are addressed through new legislation or better resource planning can go. In this study, we propose combining these techniques under a single, standardized heading called social autopsy (SA). Social autopsy, which asks a variety of extra sociocultural and behavioral question [1]. In addition to verbal autopsy questions, aims to ascertain the social, behavioral, and health systemic factors that result in deaths. Utilized to avoid deaths from injuries like traffic accidents, drownings, and infectious diseases as well as deaths from other types of injuries [2]. Social autopsy is a crucial primary healthcare strategy that is focused on the community and plays a significant part in tackling the socioeconomic determinants of mortality which are the root of 12/15 maternal deaths. Social autopsy of maternal and neonatal deaths is an intervention platform for discussion and interaction between the community government health workers [3]. Pakistan is one of the nations with high rates of child mortality and one of the highest rates of newborn mortality with an estimated 42 newborn fatalities for every 1,000 live births. Pakistan has one of the highest neonatal mortality rate in the entire world [2]. 186 deaths are recorded for every 100,000 live births nowadays. According to Pakistan Demographic and Health Survey (PDHS) 2017–2018, there were 42 neonatal deaths for every 1000 live births. Additionally, a significant

DOI: https://doi.org/10.54393/pjhs.v3i05.146

number of unregistered patients contributed to the high prevalence of neonatal and maternal mortality [4]. Pakistan is one of the top 10 nations that account for 60% of maternal deaths worldwide, ranking 53rd on the list of countries with the highest maternal mortality rates [4]. Nigeria has also high mortality rate, it has also facing one of the highest rates of under-five mortality in the world [5]. Child mortality rates are too high, with Northern Nigeria reporting some of the highest rates in the world [6]. There are some countries in the world which have high mortality rates than Pakistan in starting but after adopting Social Autopsy mortality rate successfully decreased, for example, Brazil is one such nation that is successful in decreasing the rate of maternal and perinatal mortality through social autopsy [7]

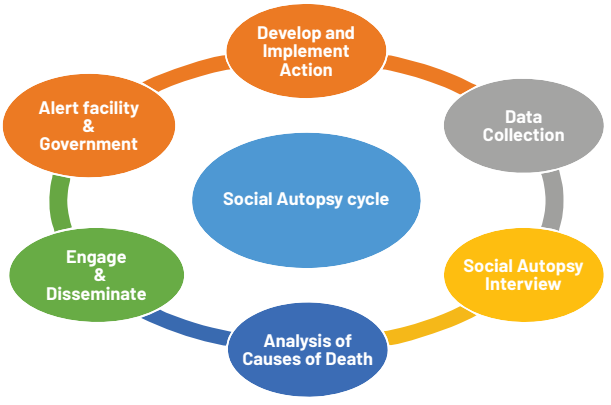

Figure 1: Cycle of Social Autopsy

Social Autopsy: a way of health promotion & SDG 3

Maternal mortality in low-income nations is still too high, despite major worldwide improvements. Social autopsy is a potential benefit for promoting health. It makes easier to identify modifiable social and cultural elements that reduce the rate maternal mortality and promotes "community self-diagnosis" [8]. The global maternal mortality ratio must be brought down to 70 per 100,000 live births. This is the focus of Sustainable Development Goal 3.1. (140 per 100,000), so in this context, tracking accurate and timely maternal mortality data is essential [9]. Pakistan wants to decrease maternal and perinatal fatalities [10]. By 2030, these goals call for a stillbirth rate of no more than ten per 1,000 live births [11]. SDGs stress equity in health across populations to further reduce maternal mortality by focusing on their motto, "leave no one behind". The two complementary goals of social autopsy are to raise public awareness of maternal and infant mortality in order to engage communities in health programs and increase their responsiveness and accountability, as well as to provide extensive population-level data to support advocacy and the acquisition of the resources required to address these issues [12].

Success stories of social autopsy

Bangladesh: Bangladesh has experience with Social autopsy as a community-based intervention to prevent deaths from injuries including traffic accidents, drowning, and also deaths from infectious diseases. In light of previous experiences, Social autopsy was implemented in 2010. The Social autopsy program was first tested in Thakurgaon to reduce maternal, neonatal, and stillbirth mortality. The Government of Bangladesh expanded it to other districts during the 2011–2012 periods after seeing the program's success in lowering stillbirths, maternal, and neonatal mortality. Positive outcomes provided a framework and platform for the system to be expanded to 10 districts in Bangladesh from 2013 to 2015, and then to 14 districts in Bangladesh in 2015. The newly renamed "Maternal and Perinatal Death Surveillance and Response" (MPDSR) program has now been expanded by the government to 22 districts, with ambitions to eventually include all districts in Bangladesh. In order to reduce preventable maternal and newborn mortality and help Bangladesh meet the SDG's, Social autopsy has been introduced into the MPDSR system [13].

Brazil

Brazil is one of the nations that are successful in lowering the rate of maternal and fetal mortality through social autopsy [14]**.** There is rapid decrease in maternal deaths in Brazil since 1990. In Brazil, hypertensive pregnancy disorders were the leading cause of maternal deaths between 1990 and 2000, with a discernible shift to mortality owing to indirect causes, which include a variety of conditions ranging from diabetes to infectious infections. After the adoption of SA, Brazil has become successful to decrease the average maternal mortality rate by 10% from 1997-2000 (58.92/100,000) to 2001-2004 (52.77/100,000). Early and late neonatal mortality rates decreased by 33% (to 7.36/1000) and 21% (to 2.29/1000) between 1997 and 2012, respectively [15].

Gap analysis in Pakistan to achieve Social Autopsy

Non-registration system and maternal and perinatal deaths

The nation lacks information on crucial factors that affect child mortality. The systems for civil and vital registrations are inadequate [16]**.** Both the health management information system and the civil registration management system in Pakistan are ineffective**.** This is because of a number of factors. The first reason is that there are many child deaths here that take place outside of medical facilities and that are not associated with any medical records (including death certificates). Nearly two-thirds of deliveries in Pakistan still take place at home on a communal basis [17]**.** When the majority of low-income citizens die at home in absence of any health care personal, then their deaths are not frequently documented, and their

DOI: https://doi.org/10.54393/pjhs.v3i05.146

causes of death aren't always determined [18]. Second, even data on deaths that happened inside medical facilities lacks information on the cause of death and its contributing factors, or if it does, its veracity is always questioned. In low- and middle-income nations, the governmental health authorities do not keep track of maternal and perinatal death [19]. Health professionals confirm less than a third of the 7 600 000 child fatalities and 350 000 maternal deaths that occur each year around the global [20]. Thirdly, there is no reliable system in place to collect data on deaths that take place outside of medical institutions, particularly those that happen in remote places or even in urban slums, and the vital registration system is inadequate. As a result, a significant portion of child fatalities are not reported nor certified as to the cause of death. Less than 30% of births and nearly no fatalities are recorded by Pakistan's vital registration systems, and the majority of newborn deaths take place outside of the country's established healthcare infrastructure [21].

Lack of government's efforts

There are no organized data on routine health outcomes in rural Pakistan. The standard of primary maternity care is generally unsatisfactory. The goal of Lady Health Workers at primary health centers is to provide primary health including services for maternity and pediatric health. Their education is only 10 years of schooling, the women lack any medical degree or master's in nursing [22]. Only 25% of Basic Health Units have qualified female medical staff. These basic level health facilities are usually situated far from the population and have limited operating hours. Only one in twenty women who experience pregnancy or labor problems find an institution that offers emergency obstetrical treatment. A Pakistani woman's lifetime chance of dying from pregnancy-related causes is 1 in 80, compared to 1 in 61 for underdeveloped countries overall and 1 in 4,085 for industrialized nations [23].These issues highlight the flaws of the public healthcare system [24].

MPDSR journey in Pakistan

A credible source for identifying, quantifying, and preventing maternal and perinatal mortality is the Maternal and Perinatal Death Surveillance System. MPDSR encourages routine detection and prompt notification of maternal and perinatal deaths and functions as a type of ongoing surveillance connecting local to national health information systems and processes for quality improvement. The MPDSR will help to enhance vital registration, count maternal and perinatal mortality more accurately, and give better information for taking action and tracking advancements in maternal and newborn health [25]. The idea was developed during the Millennium Development Goals (MDG) era and has gained widespread acceptance throughout the world, particularly with the release of comprehensive technical guidelines in 2013. Guidelines for M/PDSR have been developed by international organizations like the WHO, and they are urging low middle income countries to begin implementing them. Even though MPDSR is a relatively recent methodology, its constituent parts have been developed over many years. The main function of the system, maternal death reviews (MDR), gave rise to the MDSR. Due to the MDSR's young development and the lack of regular data collecting, comprehensive information regarding the scope and caliber of implementation in each country has been mostly unavailable. Despite the fact that many nations have approved the national MPDSR principles, only a small number of countries worldwide have robust MPDSR systems [26]. In Pakistan, MPDSR began in 2015 at the local level in the province of Punjab through female health professionals (LHWs). However, in Baluchistan, it started in 2017. Punjab began the ongoing MPDSR process at the community level in a few districts in 2015 with assistance from UNFPA [27].To enhance mother and child health, the Pakistani government and numerous international donors have launched a number of initiatives and policies [28].

- The supply of a chlorhexidine kit for preventing cord infections and Kangaroo Care to the infant are two examples of preventative interventions and programs that have been recognized as being concentrated in this area [28].
- 2000s: Decentralized management and the renovation of the healthcare infrastructure were attempts to enhance the healthcare delivery system [29].
- Improve emergency obstetric care with the WRLH project in 2000–2004 by the donation of Bill and Melinda Gates Foundation of 1.6 Million dollars [30].
- National program for maternal and neonatal health puts in place a variety of maternity and neonatal care services which started in 2007 and still ongoing. This program was initiated by collaboration of Government of Pakistan and Department for International Development. This project costs 300 million dollars [31].
- With a proposed allocation of Rs. 19.994 billion, the UN joint program component on maternity, neonatal, and child health envisions boosting the execution of the National MNCH program (2007–12) [32].
- WHO has developed national guidelines on MPDSR in 2018 [33].
- Ministry of National Health services regulation and coordination has launched a mobile application on MPDSR in 2022 [34].

DOI: https://doi.org/10.54393/pjhs.v3i05.146

CONCLUSIONS

Current study concluded that it is crucial to pinpoint the social factors that contribute to women dying during pregnancy and after giving birth. In Pakistan, the Social Autopsy (SA) approach is not used in its true letter and spirit. To better understand the socioeconomic factors that contribute to child mortality, the social autopsy should be piloted in Pakistan. Social autopsy is an opportunity to stop preventable maternal and newborn deaths by utilizing community contact and a participatory decision-making process. By holding a social autopsy, the society may admit its mistakes and act to stop similar tragedies from happening again. This strong commitment has the potential to affect and spread the essence of good practice across the communities nearby.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Kalter HD, Salgado R, Babille M, Koffi AK, Black RE. Social autopsy for maternal and child deaths: a comprehensive literature review to examine the concept and the development of the method. Population Health Metrics. 2011 Aug; 9:45. doi: 10.1186/1478-7954-9-45

[2] Waiswa P, Kalter HD, Jakob R, Black RE; Social Autopsy Working Group. Increased use of social autopsy is needed to improve maternal, neonatal and child health programmes in low-income countries. Bulletin of the World Health Organization. 2012 Jun; 90(6):403-403A. doi: 10.2471/BLT.12.105718

[3] Irangani L, Prasanna IR, Gunarathne SP, Shanthapriya SH, Wickramasinghe ND, Agampodi SB, et al. Social determinants of health pave the path to maternal deaths in rural Sri Lanka: reflections from social autopsies. Research Sqaure. doi: 10.21203/rs.3.rs-1585439/v1

[4] Rahman KM, Olsen A, Harley D, Butler CD, Mondal D, Luby SP, et al. Kala-azar in pregnancy in Mymensingh, Bangladesh: a social autopsy. PLoS Neglected Tropical Diseases. 2014 May; 8(5):e2710. doi: 10.1371/journal.pntd.0002710

[5] Perin J, Koffi AK, Kalter HD, Monehin J, Adewemimo A, Quinley J, et al. Using propensity scores to estimate the effectiveness of maternal and newborn interventions to reduce neonatal mortality in Nigeria. BMC Pregnancy Childbirth. 2020 Sep; 20(1):534. doi: 10.1186/s12884-020-03220-3

[6] Siddiqui MB, Ng CW, Low WY, Syed S, Ahmed S, Noushad S, et al. A Verbal/Social Autopsy (VASA) Child Mortality Inquiry to Investigate Under-Five Mortality Determinants in Slums of Karachi, Pakistan: A Mix Methods Interventional Study. 2016

[7] Koffi AK, Maina A, Yaroh AG, Habi O, Bensaïd K, Kalter HD. Social determinants of child mortality in Niger: Results from the 2012 National Verbal and Social Autopsy Study. Journal of Global Health. 2016 Jun; 6(1):010603. doi: 10.7189/jogh.06.010603

[8] Mahato PK, Waithaka E, van Teijlingen E, Pant PR, Biswas A. Social autopsy: a potential health-promotion tool for preventing maternal mortality in low-income countries. WHO South East Asia Journal of Public Health. 2018 Apr; 7(1):24-28. doi: 10.4103/2224-3151.228424

[9] Zain S, Jameel B, Zahid M, Munir M, Kandasamy S, Majid U. The design and delivery of maternal health interventions in Pakistan: a scoping review. Health Care for Women International. 2021; 42(4-6):518-546. doi: 10.1080/07399332.2019.1707833

[10] Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, et al. Global health 2035: a world converging within a generation. Lancet. 2013 Dec 7;382(9908):1898-955. doi: 10.1016/S0140-6736(13)62105-4

[11] Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, et al. Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals. Lancet. 2016 Dec; 388(10063):3027-3035. doi: 10.1016/S0140-6736(16)31593-8

[12] Mackie J and Allwood G. The implementation of the 2030 Agenda's principles of 'leaving-no-one-behind'and 'addressing the needs of those furthest behind first'in the EU's development policy. 2022

[13] Biswas A, Ferdoush J, Abdullah ASM, Halim A. Social autopsy for maternal and perinatal deaths in Bangladesh: a tool for community dialog and decision making. Public Health Reviews. 2018 Jul; 39:16. doi: 10.1186/s40985-018-0098-3

[14] Rodrigues NC, Monteiro DL, Almeida AS, Barros MB, Pereira Neto A, O'Dwyer G, et al. Temporal and spatial evolution of maternal and neonatal mortality rates in Brazil, 1997-2012. Jornal de Pediatria. 2016 Dec; 92(6):567-573. doi: 10.1016/j.jped.2016.03.004

[15] Leal LF, Malta DC, Souza MFM, Vasconcelos AMN, Teixeira RA, Veloso GA, et al. Maternal Mortality in Brazil, 1990 to 2019: a systematic analysis of the Global Burden of Disease Study 2019. Revista de Sociedade Brasileira de Medicina Tropical. 2022 Jan;

DOI: https://doi.org/10.54393/pjhs.v3i05.146

55(suppl 1):e0279. doi: 10.1590/0037-8682-0279-2021

[16] World Health Organization. Reaching the every newborn national 2020 milestones: country progress, plans and moving forward. 2017

[17] Demographic P. Health Survey 2006-07. National Institute of Population Studies, Pakistan; and, Macro International. 2007

[18] Fottrell E, Kahn K, Tollman S, Byass P. Probabilistic methods for verbal autopsy interpretation: InterVA robustness in relation to variations in a priori probabilities. PLoS One. 2011; 6(11):e27200. doi: 10.1371/journal.pone.0027200

[19] Ki-Moon B. Global strategy for women's and children's health. New York: United Nations. 2010.

[20] Bhutta ZA, Chopra M, Axelson H, Berman P, Boerma T, Bryce J, et al. Countdown to 2015 decade report (2000-10): taking stock of maternal, newborn, and child survival. Lancet. 2010 Jun; 375(9730):2032-44. doi: 10.1016/S0140-6736(10)60678-2

[21] Mikkelsen L, Phillips DE, AbouZahr C, Setel PW, de Savigny D, Lozano R, et al. A global assessment of civil registration and vital statistics systems: monitoring data quality and progress. Lancet. 2015 Oct; 386(10001):1395-1406. doi: 10.1016/S0140-6736(15)60171-4

[22] Källander K, Kadobera D, Williams TN, Nielsen RT, Yevoo L, Mutebi A, et al. Social autopsy: INDEPTH Network experiences of utility, process, practices, and challenges in investigating causes and contributors to mortality. Population Health Metrics. 2011 Aug; 9:44. doi: 10.1186/1478-7954-9-44

[23] Jokhio AH, Winter HR, Cheng KK. An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan. The New England Journal of Medicine. 2005 May; 352(20):2091-9. doi: 10.1056/NEJMsa042830

[24] Islam A and Tahir MZ. Health sector reform in South Asia: new challenges and constraints. Health Policy. 2002 May; 60(2):151-69. doi: 10.1016/s0168-8510(01)00211-1

[25] Afzal U and Yusuf A. The state of health in Pakistan: An overview. Inthe State of Health in Pakistan: An Overview" with Anam Yusuf, paper presented at the Ninth Annual Conference on Management of the Pakistan Economy, Lahore School of Economics. Paper published in the Lahore Journal of Economics: Special Edition 2013 Sep.

[26] St Pierre A, Zaharatos J, Goodman D, Callaghan WM. Challenges and Opportunities in Identifying, Reviewing, and Preventing Maternal Deaths. Obstetrics and Gynecology. 2018 Jan; 131(1):138-142. doi: 10.1097/AOG.0000000000002417

[27] World Health Organization. Time to respond: a report on the global implementation of maternal death surveillance and response. 2016

[28] World Health Organization. Strategies towards ending preventable maternal mortality (EPMM). 2015

[29] Arif A, Sherani A, Uzma Q, Alam B, Thom E, Abro A, et al. Maternal and Perinatal Death Surveillance and Response in Balochistan, Pakistan-Causes & Contributory Factors of Maternal Deaths. Journal of Gynecology and Obstetrics. 2022; 10(1):1-5. doi: 10.11648/j.jgo.20221001.11

[30] De Bernis L, Kinney MV, Stones W, ten Hoope-Bender P, Vivio D, Leisher SH, et al. Stillbirths: ending preventable deaths by 2030. The lancet. 2016 Feb; 387(10019):703-16. doi: 10.1016/S0140-6736(15)00954-X

[31] Mahmud G, Zaman F, Jafarey S, Khan RL, Sohail R, Fatima S. Achieving Millennium Development Goals 4 and 5 in Pakistan. BJOG. 2011 Sep; 118 Suppl 2:69-77. doi: 10.1111/j.1471-0528.2011.03114.x

[32] Hussein J, Newlands D, D'Ambruoso L, Thaver I, Talukder R, Besana G. Identifying practices and ideas to improve the implementation of maternal mortality reduction programmes: findings from five South Asian countries. BJOG. 2010 Feb; 117(3):304-13. doi: 10.1111/j.1471-0528.2009.02457.x

[33] Chishtie J, Chishtie F, Jaglal S. Exploring knowledge translation practices in a global health program: case study on the establishment of the Pakistan National Maternal, Neonatal, and Child Health Program. Journal of Public Health. 2021 Feb; 29:215-28. doi: 10.1007/s10389-019-01115-y

[34] https://phkh.nhsrc.pk/knowledge-article/national-guidelines-mpdsr-pakistan-who-2018pdf

DOI: https://doi.org/10.54393/pjhs.v3i05.192

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Review Article

The Zingiber officinale Roscoe Combat H. Pylori Infection in human GIT Identification and Management

Waqar Ahmad Khan[1*]

[1]Sarhad University of Science and Information Technology, KPK Peshawar, Pakistan

ARTICLE INFO

Key Words:

H. Pylori Bacteria, Ginger, Management, Identification, Stomach

How to Cite:

Ahmad, W. . (2022). The Zingiber Officinale Roscoe Combat Helicobacter Pylori Infection in Human Gastrointestinal Tract Diagnosis and Treatment: Zingiber officinale Roscoe to Combat H. Pylori Infection. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.192

***Corresponding Author:**

Waqar Ahmad Khan

Sarhad University of Science and Information Technology, KPK Peshawar, Pakistan

waqarahmadkhan1990@gmail.com

Received Date: 5th October, 2022

Acceptance Date: 13th October, 2022

Published Date: 31st October, 2022

ABSTRACT

Twenty years after the initial culture of HP, there has been a substantial change in the finding and treatment of upper gastroduodenal disease. A growing number of stomach cancers are caused by Helicobacter pylori infection, and researchers are also looking into how this infection affects other upper gastric tract inflammation. There has been significant progress in our understanding of the pathogenesis of this infection. Although there are powerful anti-microbial medications on the market, there is still no perfect treatment and the therapeutic indications are constantly evolving. Following the discovery of an HP infection, the clinician assesses the patient's clinical condition to determine whether therapy is necessary. Typically, HP eradication is suggested for the treatment and prevention of the infection. The microorganism that is introduced into the human stomach cancer that develops in the gastrointestinal tract causes the HP disease. In addition to gastrointestinal issues like belching, bloating, vomiting, indigestion, and constipation, it has been used for a long time to treat a variety of disorders. The purpose of the current study's findings was to assess how supplementing with ginger powder affected patients who had the HP infection's eradication and the relief of their dyspeptic symptoms.

INTRODUCTION

The stomach is the typical location for the negative gram, microaerophilic, spiral-shaped HP formerly recognized as HP [1]. It was assessed that more than 50% of the world's populace had HP in their upper digestive tracts, with colonization (or infection) occurring more frequently in developing countries [2]. Its helical form is thought to have developed through time to enable it to puncture the mucoid lining of the digestive tract and disseminate disease. The name "helicobacter" comes from this form. [3, 4] The bacterium was initially found in 1982 by the Australian physicians Robin, Barry, and Warren Marshall [5-7]. Extra nodal marginal zone lymphoma B-cell of the aforementioned organ, which is malignance of the (MALT) in the rectum, stomach, colon, esophagus, tissue soft around the eye, has been linked to Helicobacter Pylori (HP) and in the lymphoid tissue of the intestines (diffuse lymphoma B-cell) [8]. Helicobacter Pylori that affects the first part of the small intestine [9]. A lot of theories have been put up by researchers that Helicobacter Pylori affects or guards against a wide range of diseases, although various of these relations are still up for debate. According to several studies, HP significantly affects the stomach's natural ecology, including the kinds of microbes that live there [9, 10] Further studies have suggested that non-pathogenic Helicobacter Pylori strains can regulate hunger by regulating stomach acid output [11].

Zingiber officinale Roscoe

One of the most well-liked therapeutic herbs in the entire globe is the ginger rhizome (Zingiber officinale Roscoe, family Zingiberaceae). It has been used for a long time to

DOI: https://doi.org/10.54393/pjhs.v3i05.192

treat a range of diseases, including gastrointestinal problems like belching, bloating, vomiting, indigestion, and constipation. Scientific research also supports some of its gastro-protective properties, such as the reduction of symptoms associated with dyspepsia. Additionally, according to the findings of certain experimental research, ginger administration appears to reduce H. pylori growth12–16 and stop the development of stomach ulcers. As a result, the current study ginger supplementation powder on the elimination of HP and the amelioration of symptoms dyspeptic in HP-positive patients[12].

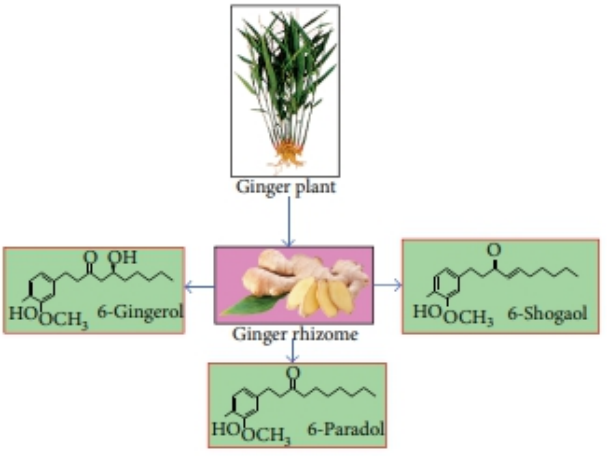

Figure 1: Zingiber officinale Roscoe[13]

Helicobacter Pylori Analysis Tests

Nonedoscopic: Blood tests Breath tests, Stool tests

Endoscopic: Polymerase Chain Reaction Histology**,** Rapid Urease Testing**,** Culture[14].

H. Pylori signs

Most persons with chronic gastritis or duodenitis don't show any symptoms. Duodenal or stomach ulcers are examples of more serious problems that some people deal with. The following are some of the most common ulcer signs and symptoms: Upper abdominal pain, bloating, Low blood counts, weariness, and feeling full after only a small quantity of food can all be symptoms of bleeding ulcers. Nausea, Lack of appetite and tarry stools[14].

H. Pylori Control

If a person has an infection with Helicobacter Pylori, they should get treatment if they have current stomach or duodenal ulcers or if they have a history of ulcer peptic disease. Successful Helicobacter Pylori treatment can reduce the risk of ulcer complications, stop recurrent ulcers, and hasten the healing process (like bleeding). These medicinal herbs, which include the ones listed below [15, 16], can help control H.P. ulcerative peptic disease.

Therapeutic herbs combat H. Pylori disease

There is antibiotic drug nominated at the following which is used for against H. Pylori disease.

Zingiber officinale Roscoe, family Zingiberaceae.

Patient with Helicobacter pylori Disease treatment and avoidance

To give a fresh strategy to treating HP infection and related diseases, it has taken a lot of work to develop efficient vaccinations. [17-19] At least in the Netherlands, it was discovered that the introduction of a potential HP vaccination for baby use was an affordable method of preventing stomach cancer [18, 19]. As of late 2019, there was just one vaccine in a vaccine which protects children from HP infection. Furthermore, the creation of a vaccination against HP is not being given great attention by significant pharmaceutical companies [20-21]. Studies show that when HP is entirely eliminated from the stomach, these therapies can reduce the inflammation of the infection and some histological abnormalities[22]. Similar debate surrounds the preventative effectiveness of antibiotic-based treatment plans for stomach cancer[23]. The incidence of the disease, however, significantly dropped after the bacterium was eradicated, according to two subsequent prospective studies on high-risk in Taiwan and China [24] as well as a meta-analysis that was also released in 2016 that included 24 studies on individuals with various levels of disease risk[25].

Type	Duration	Efficiency
First Line Standard Triple Therapy PPI+Two antibiotic (Clarithromycine+ Metrodiazole or amoxicillin	7-14 days	70-85%
Second Line Bismuth +Quadrupole Therapy PPI+Bismuth salt+ Tetracycline+Metronidazole	14 days	75-90%
PPI+Clarimthrocyin+ amoxicillian+Methronidazole levofoxiane. Triple Therapy PPI+Amoxicillian+ Levofioxacine	14 days	74-71%
Salvage regiment Rifabutin based therapy PPI+Rifabutin+amoxicillian	10 days	66-70%

Table 1: H. Pylori Treatment Medication List

Concerns with H. Pylori risk

Most likely, H. pylori spreads by the consumption of feces-contaminated food or drink. HP (the initial part of the intestine tiny) (the first part of the intestine small) The bacterium infects the protective tissue lining the gastrointestinal. This results in the release of particular enzymes and poisons as well as the activation of the immune system[26].

DOI: https://doi.org/10.54393/pjhs.v3i05.192

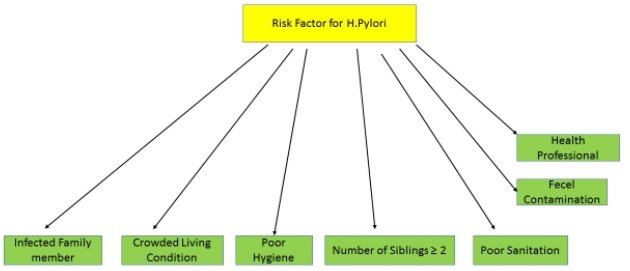

Figure 2: Risk Factor for H. Pylori

H. Pylori infection Human to human transmission

H. Pylori is contagious Oral-oral contact, such as fecal-oral contact, kissing, are the most likely routes of transmission. [27, 28] Some of the infected people's faeces, saliva, and tooth plaque have been found to be free of the bacteria, which is consistent with these possible transmit channels. H. pylori spreads more easily through stomach mucous than through saliva, according to studies [29]. Transmission often occurs within families in wealthy nations, while it can also spread through public contact in less developed ones [30-31]. A clean atmosphere may help lower the incidence of HP infection. HP can also spread orally through faeces when people drink water that has been contaminated with excrement [29].

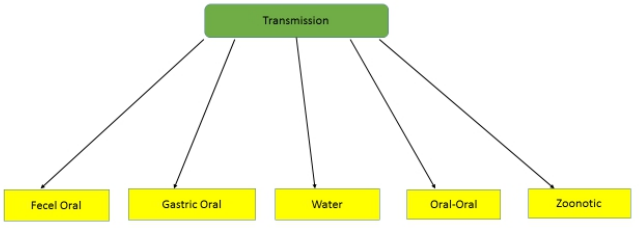

Figure 3: H. Pylori Transmission [14].

DISCUSSION

Stomach cancer is the third most prevalent cancer-related cause of passing universal. The goal of this appraisal is to summarize the numerous elements that contribute to the slow transformation of healthy gastrointestinal tissue into gastric cancer. This evaluation helps medical personnel identify infected persons who have a high risk of getting stomach cancer and perform the necessary examinations and treatments on them [32]. This review will concentrate on the most HP infection, including oxidative stress autophagy, endoplasmic reticulum stresses, inflammation, the unfolded protein response. This review will also highlight new Therapeutic possibilities for non-invasive risk control in stomach cancer [33]. There are several important issues that need to be clarified about the relationship between HP and stomach cancer. Three of them are the subject of this article: (1) the explanation for why H. pylori infection, which results in inflammation of both the stomach and the duodenum, is solely linked to gastric cancer [34]. If H. pylori treatment is given to someone who has first-degree relatives who have had the disease, their risk of developing stomach cancer may be reduced, but this is not known [35]. Inflammatory tumors caused by HP infection account for the bulk of stomach cancers. Due to epigenetic changes and DNA damage, HP has also been linked to neoplastic transformation and genetic instability. Vomit, stool, and saliva are the primary ways that H. Pylori is passed from one person to another. Water, food, and other sources may be contaminated with H. Pylori [36]. However, there is inadequate evidence to support the claim that flies exposed to human faeces carrying H. pylori can transmit the infection to humans. The notion is intriguing, though, because flies are known to transmit a variety of other infectious diseases. The spread of HP is crucial for halting the spread of the infection. This is especially true in areas where stomach cancer, stomach ulcers, and gastrointestinal lymphoma are prevalent [37]. SThe disease will probably pass from person to person, especially within the same family, even though the exact route of transmission is unknown. Environmental contamination is another potential. Reinfection from an effective eradication therapy nearly never happens, and eradication without a precise therapeutic regimen is extremely rare. The chance of reinfection will increase if there are affected family members [38]. Disease is most often passed from person to person, though there is a risk of transmit by an external source, such the water supply. Arguments for and against faecal-oral, oral-oral, and gastric-oral transfer have been offered [39]. In people with functional dyspepsia and HP positive, they were to assess the effects of supplementing with ginger Ginger powder on the removal of HP and the amelioration of dyspeptic symptoms (FD). According to our research, Z. officinale is an effective FD supplementary treatment. However, due to the lack of clinical trials in this field, more meticulously conducted clinical trials are necessary in order to properly examine its efficacy, particularly with relation to the eradication of HP [40]. In addition to a total of 48 "statements" and associated 6 components, the HP infection in specific populations, gastric cancer, eradication, diagnosis, and treatment, and gastrointestinal microbiota are all covered [41]. It is contagious to have HP infection. Given the alarmingly developing drug resistance in HP, gastroenterologists should abandon the empiric HP treatment paradigm in favour of antibiotic susceptibility testing-guided precision treatment. Local, regional, and national antimicrobial stewardship programmes for H. pylori should be developed to monitor the pattern of antibiotic resistance [42]. Experimental research has demonstrated that the active ingredients in ginger, such as 6-gingerol and 6-shogaol, have anticancer properties that are effective against GI cancer. Ginger's capacity to

DOI: https://doi.org/10.54393/pjhs.v3i05.192

regulate multiple signaling molecules, including NF-B, STAT3, MAPK, PI3K, ERK1/2, Akt, TNF-, is thought to be the cause of its anticancer properties. Other proteins that control cell proliferation include COX-2, cyclin D1, cdk, MMP-9, survivin, cIAP-1, XIAP, Bcl-2, and caspases. Here's a review, using in vitro studies to demonstrate the chemo preventive and chemotherapeutic effects of ginger extract and its constituent ingredients Patients and animal models have both been mentioned [43]. As an alternative, this study provides a well referenced perspective on herbal treatments for H. pylori, emphasizing the use of nanotechnology in creating fresh methods for treating H. pylori infection [44].

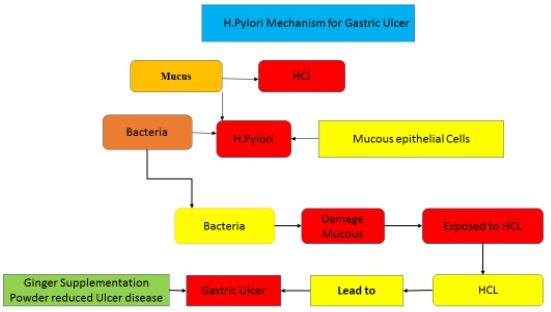

Figure 4: H. Pylori Mechanism for Gastric Cancer

CONCLUSIONS

HP infection is still one of the most common and persistent bacterial diseases in the world. There are many options for diagnosing infection and determining eradication following HP infection therapy. Additionally, different therapies are used as forms of treatment. Although HP may not be the only factor in these conditions, the organism is responsible for 70% to 90% of them. As long as oral-oral and fecal-oral transmission methods are still used, it is crucial to maintain environmental cleanliness and make sure that municipal water and food are safe to eat before consumption. In addition to gastrointestinal problems like belching, bloating, vomiting, indigestion, and constipation, it has been used for a long time to treat a variety of disorders. The current study's findings were to assess how supplementing with ginger powder affected patients who had the HP infection's eradication and the relief of their dyspeptic.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Alfarouk KO, Adil HH, Ahmed NA, AbdelRahman MR, Abdel KM, Sari TS, et al. Helicobacter pylori the possible role of in gastric cancer and its management. Frontiers in Oncology. 2019; 9:75.
[2] Centers for Disease Control and Prevention (CDC. CDC Yellow Book 2020: health information for international travel. Oxford University Press; 2019 May.
[3] Yamaoka Y, editor. Helicobacter pylori: molecular genetics and cellular biology. Horizon Scientific Press; 2008.
[4] Brown LM. Helicobacter pylori: epidemiology and routes of transmission. Epidemiologic reviews. 2000 Jan; 22(2):283-97.
[5] Marshall C, Baller J, Stokes S. COMMENTS OF.
[6] Pooja V, Susmitha K, Venkatesh P, Kalarini DH, Prema R. A Literature Review on Helicobacter Pylori Management.
[7] 7. Nocturne G, Pontarini E, Bombardieri M, Mariette X. Lymphomas complicating primary Sjögren's syndrome: from autoimmunity to lymphoma. Rheumatology (Oxford). 2019 Mar; 60(8):3513–21. doi: 10.1093/rheumatology/kez052
[8] Blaser MJ. Who are we? Indigenous microbes and the ecology of human diseases. EMBO reports. 2006 Aug; 7(10):956-60.
[9] Laird-Fick HS, Saini S, Hillard JR. Gastric adenocarcinoma: the role of Helicobacter pylori in pathogenesis and prevention efforts. Postgraduate Medical Journal. 2016 Aug; 92(1090):471-7. doi: 10.1136/postgradmedj-2016-133997
[10] Bravo D, Hoare A, Soto C, Valenzuela MA, Quest AF. Helicobacter pylori in human health and disease: Mechanisms for local gastric and systemic effects. World Journal of Gastroenterology. 2018 Jul; 24(28):3071-3089. doi: 10.3748/wjg.v24.i28.3071
[11] Minalyan A, Gabrielyan L, Scott D, Jacobs J, Pisegna JR. The Gastric and Intestinal Microbiome: Role of Proton Pump Inhibitors. Current Gastroenterology Reports. 2017 Aug; 19(8):42. doi: 10.1007/s11894-017-0577-6
[12] Ebrahimzadeh Attari V, Somi MH, Asghari Jafarabadi M, Ostadrahimi A, Moaddab SY, Lotfi N. The Gastro-protective Effect of Ginger (Zingiber officinale Roscoe) in Helicobacter pylori Positive Functional Dyspepsia. Advanced Pharmaceutical Bulletin. 2019 Jun; 9(2):321-324. doi: 10.15171/apb.2019.038
[13] Prasad S and Tyagi AK. Ginger and its constituents: role in prevention and treatment of gastrointestinal cancer. Gastroenterology Research and Practice. 2015; 2015:142979. doi: 10.1155/2015/142979
[14] Khan WA and Alishah S. H. pylori Infection in human Gastrointestinal Cancer Diagnosis and Treatment Control: A review. International Journal of Advanced Research in Biological Sciences. 2022; 9(7):108-19.

DOI: https://doi.org/10.54393/pjhs.v3i05.192

doi: 10.22192/ijarbs
[15] Chey WD, Leontiadis GI, Howden CW, Moss SF. ACG Clinical Guideline: Treatment of Helicobacter pylori Infection. American Journal of Gastroenterology. 2017 Feb; 112(2):212-239. doi: 10.1038/ajg.2016.563
[16] Fallone CA, Chiba N, van Zanten SV, Fischbach L, Gisbert JP, Hunt RH, et al. The Toronto Consensus for the Treatment of Helicobacter pylori Infection in Adults. Gastroenterology. 2016 Jul; 151(1):51-69.e14. doi: 10.1053/j.gastro.2016.04.006
[17] Selgrad M and Malfertheiner P. New strategies for Helicobacter pylori eradication. Current Opinion in Pharmacology. 2008 Oct; 8(5):593-7. doi: 10.1016/j.coph.2008.04.010
[18] Kabir S. The current status of Helicobacter pylori vaccines: a review. Helicobacter. 2007 Apr; 12(2):89-102. doi: 10.1111/j.1523-5378.2007.00478.x
[19] de Vries R, Klok RM, Brouwers JR, Postma MJ. Cost-effectiveness of a potential future Helicobacter pylori vaccine in the Netherlands: the impact of varying the discount rate for health. Vaccine. 2009 Feb; 27(6):846-52. doi: 10.1016/j.vaccine.2008.11.081
[20] Sutton P and Boag JM. Status of vaccine research and development for Helicobacter pylori. Vaccine. 2019 Nov; 37(50):7295-7299. doi: 10.1016/j.vaccine.2018.01.001
[21] Tsukamoto T, Nakagawa M, Kiriyama Y, Toyoda T, Cao X. Prevention of Gastric Cancer: Eradication of Helicobacter Pylori and Beyond. International Journal of Molecular Sciences. 2017 Aug; 18(8):1699. doi: 10.3390/ijms18081699
[22] Burkitt MD, Duckworth CA, Williams JM, Pritchard DM. Helicobacter pylori-induced gastric pathology: insights from in vivo and ex vivo models. Disease Model and Mechanism. 2017 Feb; 10(2):89-104. doi: 10.1242/dmm.027649
[23] Fortunato F, Bürgers H, Bergmann F, Rieger P, Büchler MW, Kroemer G, et al. Impaired autolysosome formation correlates with Lamp-2 depletion: role of apoptosis, autophagy, and necrosis in pancreatitis. Gastroenterology. 2009 Jul; 137(1):350-60, 360.e1-5. doi: 10.1053/j.gastro.2009.04.003
[24] Li L and Yu C. Helicobacter pylori Infection following Endoscopic Resection of Early Gastric Cancer. Biomed Research International. 2019 Oct; 2019:9824964. doi: 10.1155/2019/9824964
[25] Lamont JT. Patient education: Helicobacter pylori infection and treatment (Beyond the Basics).
[26] Chey WD, Leontiadis GI, Howden CW, Moss SF. ACG Clinical Guideline: Treatment of Helicobacter pylori Infection. American Journal of Gastroenterology. 2017 Feb; 112(2):212-239. doi: 10.1038/ajg.2016.563
[27] Fallone CA, Chiba N, van Zanten SV, Fischbach L, Gisbert JP, Hunt RH, et al. The Toronto Consensus for the Treatment of Helicobacter pylori Infection in Adults. Gastroenterology. 2016 Jul; 151(1):51-69.e14. doi: 10.1053/j.gastro.2016.04.006
[28] Malfertheiner P, Megraud F, O'Morain CA, Gisbert JP, Kuipers EJ, Axon AT, et al. Management of Helicobacter pylori infection-the Maastricht V/Florence Consensus Report. Gut. 2017 Jan; 66(1):6-30. doi: 10.1136/gutjnl-2016-312288
[29] Brown LM. Helicobacter pylori: epidemiology and routes of transmission. Epidemiologic Reviews. 2000; 22(2):283-97. doi: 10.1093/oxfordjournals.epirev.a018040
[30] Mégraud F. Transmission of Helicobacter pylori: faecal-oral versus oral-oral route. Alimentary Pharmacology and Therapeutics. 1995; 9 Suppl 2:85-91. PMID: 8547533.
[31] Du Y, Zhu H, Liu J, Li J, Chang X, Zhou L, et al. Consensus on eradication of Helicobacter pylori and prevention and control of gastric cancer in China (2019, Shanghai). Journal of Gastroenterology and Hepatology. 2020 Apr; 35(4):624-629. doi: 10.1111/jgh.14947
[32] Bytzer P, Dahlerup JF, Eriksen JR, Jarbøl DE, Rosenstock S, Wildt S. Diagnosis and treatment of Helicobacter pylori infection. Danish Medical Bulletin. 2011 Apr; 58(4):C4271.
[33] Ishaq S and Nunn L. Helicobacter pylori and gastric cancer: a state of the art review. Gastroenterology and Hepatology from Bed to Bench. 2015 Spring; 8(Suppl 1):S6-S14
[34] Díaz P, Valenzuela Valderrama M, Bravo J, Quest AFG. Helicobacter pylori and Gastric Cancer: Adaptive Cellular Mechanisms Involved in Disease Progression. Frontiers in Microbiology. 2018 Jan; 9:5. doi: 10.3389/fmicb.2018.00005
[35] Mentis AA, Boziki M, Grigoriadis N, Papavassiliou AG. Helicobacter pylori infection and gastric cancer biology: tempering a double-edged sword. Cell and Molecular Life Sciences. 2019 Jul; 76(13):2477-2486. doi: 10.1007/s00018-019-03044-1
[36] Choi IJ, Kim CG, Lee JY, Kim YI, Kook MC, Park B, et al. Family History of Gastric Cancer and Helicobacter pylori Treatment. The New England Journal of Medicine. 2020 Jan; 382(5):427-436. doi: 10.1056/NEJMoa1909666
[37] Zhang XY, Zhang PY, Aboul-Soud MA. From inflammation to gastric cancer: Role of Helicobacter pylori. Oncology Letters. 2017 Feb; 13(2):543-548. doi: 10.3892/ol.2016.5506
[38] Zhang W, Lu H, Graham DY. An Update on

DOI: https://doi.org/10.54393/pjhs.v3i05.192

Helicobacter pylori as the Cause of Gastric Cancer. Gastrointestinal Tumors. 2014 Aug; 1(3):155-65. doi: 10.1159/000365310

[39] Brown LM. Helicobacter pylori: epidemiology and routes of transmission. Epidemiologic Reviews. 2000; 22(2):283-97. doi: 10.1093/oxfordjournals.epirev.a018040

[40] Ebrahimzadeh Attari V, Somi MH, Asghari Jafarabadi M, Ostadrahimi A, Moaddab SY, Lotfi N. The Gastro-protective Effect of Ginger (Zingiber officinale Roscoe) in Helicobacter pylori Positive Functional Dyspepsia. Advanced Pharmaceutical Bulletin. 2019 Jun; 9(2):321-324. doi: 10.15171/apb.2019.038

[41] Goodman KJ and Correa P. The transmission of Helicobacter pylori. A critical review of the evidence. International Journal of Epidemiology. 1995 Oct; 24(5):875-87. doi: 10.1093/ije/24.5.875

[42] Li H, Yang T, Tang H, Tang X, Shen Y, Benghezal M, et al. Helicobacter pylori infection is an infectious disease and the empiric therapy paradigm should be changed. Precision Clinical Medicine. 2019 Jun; 2(2):77-80. doi: 10.1093/pcmedi/pbz009

[43] Prasad S and Tyagi AK. Ginger and its constituents: role in prevention and treatment of gastrointestinal cancer. Gastroenterology Research and Practice. 2015; 2015:142979. doi: 10.1155/2015/142979

[44] Cardos IA, Zaha DC, Sindhu RK, Cavalu S. Revisiting Therapeutic Strategies for H. pylori Treatment in the Context of Antibiotic Resistance: Focus on Alternative and Complementary Therapies. Molecules. 2021 Oct; 26(19):6078. doi: 10.3390/molecules26196078

DOI: https://doi.org/10.54393/pjhs.v3i05.237

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Review Article

Coronavirus 2019 Affliction Vaccine Response in Pregnant and Lactating Women - A Disciple Learning

Ghulam Fiza Nida Badar[1], Gulzar Usman[2], Wali Muhammad Nizamani[2], Fakhra Ayyub[3], Shaheer Ahmed[4] and Jawaria Ishfaq[5*]

[1]Shaikh Zaid Women's Hospital, Larkana, Pakistan
[2]Department of Community Medicine, Liaquat University of Medical & Health Sciences (LUMHS), Sindh, Pakistan
[3]Department of Family Medicine Zainab Clinic, Karachi, Pakistan
[4]Dow Medical College DUHS, Karachi, Pakistan
[5]Nuclear Institute for Agriculture & Biology Collage-PIEAS, Faisalabad, Pakistan

ARTICLE INFO

Key Words:
COVID-19 vaccine, pregnancy, clinical trials, infection

How to Cite:
Nida Badar, G. F. ., Usman, G. ., Nizamani, W. M. ., Ayyub, F. ., Ahmed, S. ., & Ishfaq, J. . (2022). Coronavirus 2019 Affliction Vaccine Response in Pregnant and Lactating Women - A Disciple Learning: Coronavirus 2019 Affliction Vaccine Response in Pregnant and Lactating Women. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.237

***Corresponding Author:**
Jawaria Ishfaq
Nuclear Institute for Agriculture & Biology Collage-PIEAS, Faisalabad, Pakistan
jawariaishfaq1@gmail.com

Received Date: 13th October, 2022
Acceptance Date: 23rd October, 2022
Published Date: 31st October, 2022

ABSTRACT

Vaccines have become more popular and influential in fighting against new viruses as the COVID-19 universal vaccine alongside the SARS-CoV-2 coronavirus began. Although high-quality approaches for blocking mortality exist, impoverished pregnant girls are included in composed tests. Cure safety should be taken into account when designing a mathematical, as well as when dealing with blast spheres and baby remnants. A concerted effort has been made to reassure pregnant women that there is a low risk of their child becoming infected with the flu. Given that COVID-19 has impacted people of all ages, a post-hoc dossier group should determine the effects of COVID-19 on future generations. Most people who receive COVID-19 injection responses experience injection-site erythema, discomfort, lump, fatigue, problem, fever, and lymphadenopathy. These symptoms can occur before or during birth. We have looked at some of the first-production fervid vector and mRNA COVID-19 vaccines known to cause adverse side effects, including backlashes in pregnant women and babies. We have looked at the potential implications of using the COVID-19 model to discover the enduring consequences of immunization against COVID-19 during the fetal and newborn ages.

INTRODUCTION

Vaccines are the primary prevention method for native and expanding human and bovine animal illnesses. To tackle COVID-19, which is induced by one zoonotic SARS-CoV-2 coronavirus, vaccinations have been conceived and made at the highest possible speed [1]. Vaccines have never before happened created and are state-of-the-art through Phase III medical troubles in a specific little epoch. Not only were vaccinations fast developed and licensed for use, but this is the primary break a coronavirus cure has tested on human beings. Pfizer-BioNTech and Modern mRNA cure planks constitute a genetically devised mRNA series encrypting the immunogenic SARS-CoV-2 pierce protein. The World Health Organization classified the SARS-CoV-2 storm as a general virus on March 11, 2020 [2]. Closely four hundred million examples of SARS-CoV-2 contamination take existed rooted worldwide so far. Although deciding the exact number of instances in significant inmates is questioned, current figures signify that women of reproductive age give a reason for more than 20% of the general populace, accompanying about 5% of mothers of reproductive age significant at some likely importance [3]. As a result, it is envisioned that various heap instances of

DOI: https://doi.org/10.54393/pjhs.v3i05.237

COVID-19 before birth have happened in the last 2 ages, creating SARS-CoV-2 contagion individual of ultimate ordinary contaminations affecting this probability. Pregnant sufferers with characteristic COVID-19 contamination are at raised jeopardy for a severe complaint, with enlarged duties of nursing home confirmation, rigorous caution unit (ICU) confirmation, intubation, and oblivion [3]. In keeping with recent orderly research, pregnant girls with COVID-19 expression more excellent charges of various adverse motherly consequences as fit as ICU admittance and invasive the act of providing or changing the air distinguished from nonpregnant wives of the generative stage with COVID-19, and considerably more adequate amounts of decease distinguished with pregnant victims outside, assumed the exposures faced by two together pregnant girls and neonates, considerate the immunologic reaction to immunization pregnancy is precariously primary [4]. Over 100 vaccinations have been tested in clinical situations, and 12 are used widely. Obstetric patients and their caretakers were primarily prerequisites to draw judgments about vaccinations in the restricted dossiers since gestation was a prohibiting test in initial impartial vaccine judgments [4]. This study targets physicians who treat pregnant patients and researchers working on medical errors or population health to fill this gap. Severe critical breathing disorder (SARS-CoV) and the Middle East respiratory disease coronavirus (MERS-CoV) are hazardous before birth. Therefore, obstetrics doctors and scientists recognized that their instances were hopeful and more sensitive as the SARS-CoV-2 universal started in 2020 [5]. The COVID-19 vaccination was rolled out to pregnant women before the clinical trials were finished, although they were not a part of the initial testing of the vaccine. According to our vast real-world data, immunizations are safe and effective during pregnancy [6].

Obstetric consequences subsequent SARS-CoV-2 epidemic

A more current meta-reasoning of one hundred and twenty studies found that contamination considerably raised the probability of untimely delivery, preeclampsia (OR 1.7, CI 1.3-2.2), stillbirth (OR 2.4, CI 1.3-4.5), neonatal death (OR 3.43, CI 1.11-11.5), and maternal death (OR 3.35, CI 1.07-10.5) in pregnant cases polluted accompanying SARS-CoV (OR 3.19, CI 1.6-6.4) [7][8]. Additional necessary studies later in the magazine of these meta-studies revealed exalted maternal depression and mortality risks, preterm beginning, and neonatal demise connected to SARS-CoV-2 contamination before birth [9]. There is authentication that the δ trend of the SARS-CoV-2 contagious maternal and neonatal effects has been worse than in previous waves. [10]. Iatrogenic PTBs give the impression that an essential subscriber to the exalted risk of PTB guide SARS-CoV-2 contamination [11], accompanying clinicians [12], selecting to deliver the offspring in work to sustain the precariously ill patient. Inflammatory alterations to the covering layer are more inclined to be connected to the expanded risk of stillbirth and preeclampsia [13].

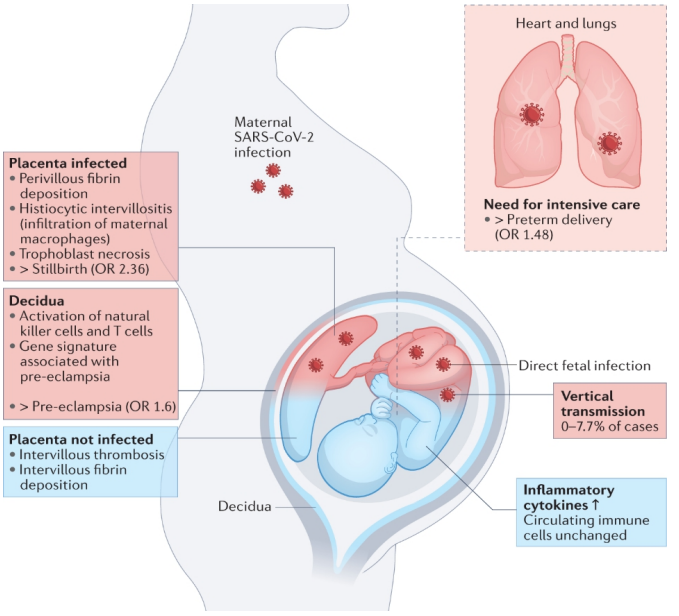

Figure 1: Direct against unintended SARS-CoV-2 epidemic on the embryo and amniotic sac

There are various approaches in which maternal SARS-CoV-2 contamination can influence gestation. A higher rate of rash births can come into being the infant having expected brought on account of the requirement for detracting care to guide severe disease. SARS-CoV-2 placentas, which are connected to a raised risk of stillbirth, may be caused by placental contamination.

Placenta and SARS-CoV-2

The placenta has angiotensin-converting enzyme 2 (ACE2) and Transmembrane serine protease 2 (TMPRSS2) cellular receptors for SARS-CoV-2 [14-15], and few COVID-19 patients develop viremia displaying the feasibility of placental SARS-CoV-2 contamination. Even though skill is limited to the placental appearance of ACE2 and TMPRSS2, which should recognize illness passage into the unit, SARS-CoV-2 viremia fertilizations are expected to be rare [16,17]. These aspects concede the possibility of being predicted to shield the placenta against SARS-CoV-2 contamination apart from the primary defenses the amniotic sac carries against viral infection [18]. Contamination of the placenta does give the impression of being rare. SARS-CoV-2-linked coagulation and swelling can happen outside of a SARS infection, as well as intervillous coagulation and fibrin confession [19-21]. When the placenta is infected, a weightier inflammatory ailment named SARS-CoV-2 placentas evolves [22-26].

DOI: https://doi.org/10.54393/pjhs.v3i05.237

SARS-CoV-2 and the embryo

SARS-CoV-2 contamination in newborns of the SARS-infected population has been documented in many searches [27,28]. Smaller experiments have examined whether umbilical cord blood can help prevent infections that transmit horizontally from parent to child. The formation of IgG and IgM antibodies in the newborn between 12 and 20 weeks of gestation suggests prenatal exposure to an antigen. This happens because maternal IgG might cross the placenta. Spike-specific IgM was found in the cord blood of up to 7.7% of fetuses infected with SARS-CoV-2 [29]. Even in the lack of placental contamination, raised levels of provocative cytokines to take happened in the direction of neonatal rope ancestry. It is obscure if these cytokines were constructed regionally for one fetus or are an outcome of motherly cytokines that crossed the amniotic sac. However, the remarks that invulnerable containers in rope blood conceive more cytokines if the gestation was jolted by SARS-CoV-2 contamination and those I.L. deliberations are frequently more fantastic in rope ancestry than in parental ancestry imply that the infant concedes the possibility of producing a few of these cytokines.

New varieties, new results

Much of the above dossier has a meaningful warning: it was calm all the while former waves of the universe when the superior SARS-CoV-2 differences differed from those we challenged immediately [24,25]. This represents that we cannot anticipate that obstetric results will go along with the future waves as they have happened earlier.

Covid-19 vaccines in pregnancy

Pre-pregnancy vaccination can diminish disease-related depression and humanity among members of the meaningful community and their children [30-34]. Immunization appeared to benefit all three populations - mother, fetus, and newborn - via transplacental IgG antibody transfer [14]. Some immunizations are advised during pregnancy, but it is not always apparent which ones are best for each individual. Because live vaccines may induce inborn contamination if administered during pregnancy or near gestation, several vaccines are only suggested during the assumption and postpartum periods. To enhance the chances of passing protective antibodies to the infant, pertussis immunization is recommended in all pregnancies, ideally between 27 and 36 weeks.

Covid-19 vaccine immunogenicity statistics in gestation

There is no evidence to suggest a higher risk of adverse consequences next to a Covid-19 immunization pregnancy, so immunization is recommended [35]. The immunogenicity of immunizations during gestation appears to be about the same as in the non-significant society. However, it is unlikely that the neonatal/infant immunization station is best structured for child benefit. Also, more information about non-mRNA vaccination, prenatal vaccination, and long-term effects on children is needed [36].

Vaccine safety in pregnancy

Vaccination benefits during pregnancy

It has a long and persuasive history of immunizing before birth to lower maternal depression and cessation or to give future juveniles passive exemption [38]. Infants innate to mothers, the ones taking the smallpox vaccine before birth, were erect to be shielded themselves as early as 1879, and comparable judgments were achieved accompanying pertussis and nervous system infection vaccines in the middle of the 20th of one hundred years. Like SARS-CoV-2, influenza bacterium contamination during pregnancy is connected to a raised risk of maternal depression [39]

Side effects of the Covid-19 vaccination during pregnancy

We establish 12 studies that look at the side effects of motherly COVID-19 immunization symptoms of COVID-19 immunization are frequently gentle to moderate and appear within three days of immunization adulthood of cases that occur during the epoch; subsequently, immunizations solve within one to two days. The second dosage is connected to more frequent and harsh side effects. The vaccination adverse effect sketch in gestation corresponds to that in non-significant mothers, with ultimate ordinary symptoms being discomfort at the injection section, tiredness, migraine, and myalgia [40]. Although standard prophylaxis accompanying acetaminophen is not urged in a few countries, pregnant victims who have a fever following position or vaccination should take acetaminophen. Covid-19 vaccines were well tolerated by pregnant females, and nursing, according to a prospective cohort investigation involving 7809 pregnant women. Pregnant women had lower odds of experiencing some reactions, such as fever with Pfizer dosage 2 and fever following Moderna dose, compared to people who were not pregnant or nursing [41]. Furthermore, A prospective study of 83 vaccinated pregnant women found no difference in the number of complaints following vaccination delivery between pregnant and no pregnant [42].

Safety of COVID-19 immunization

IgM is not found in umbilical cord blood after immunization pregnancy. This shows that the vaccine did not elicit an immunological response from the fetus. This suggests no link between receiving the COVID-19 vaccine during pregnancy and placenta pathology. These results indicate that there is little chance of a direct influence on the embryonic development of immunization. Although they are not as common in the general population, people with

DOI: https://doi.org/10.54393/pjhs.v3i05.237

schizophrenia can experience many symptoms local and systemic immunological reactions to the COVID-19 vaccine occur in pregnant women[43-45].

Record studies

The first such trial used the U.S. Department of Infectious Diseases and Prevention's v-safe birth registry[39, 41]. The rates of adverse events among 713 pregnant women who received inoculations and gave birth. A subsequent study that examined 1,613 pregnant women who received vaccinations and gave birth by September 20, 2021, also discovered a constant rate of harmful events [46]. The Better Outcomes Registry and Network immunized 64,240 pregnant women in Ontario, Canada, against COVID-19. There was no increase in the rate of abortion, premature births, or babies born early for their gestational age between October 30, 2021, and now [47]. A study of 18,400 members of the public in Scotland who were immunized against COVID-19 before birth found no risk of PTB or neonatal death, a feature of a well-established set of concerns[48].

Case-control research

Case-control studies are studies in which researchers compare the behavior of individuals who have undergone an unfortunate event with those who have not. Two studies have been conducted in the United States. The Vaccine Safety Datalink system includes 31,100 girls who have been vaccinated. One of these learnings told no clue that COVID-19 immunization filiated to stillbirth; the next found that one miscarried was no more inclined to have been inoculated in the previous than those who acted not miscarry[49,50].

Cohort studies

Cohort studies contrast the effects of pregnant moms inoculated with COVID-19 with the effects of current uva. These investigations account for any disparities between study participants and those randomly chosen to accept a COVID-19 cure [51]. Seven cohort studies showed no increased risk of miscarriage or other weak outcome events of pregnancy associated with concomitant COVID-19 vaccination stations. Regardless of whether each of the above, i.e., The different proposals to send the query of COVID-19 remedy security in gestation, have different risks, so their judgments will likely influence the decision. The number of colleagues in these analyzers indicates that the COVID-19 immunization is unaware of potential vegetation repercussions[52].

Effectiveness of COVID-19 immunization

Previous research has examined how organicity affects immunization in meaningful participants and age and sexuality-doubled non-meaningful controls. According to two investigations, the same group of perpetrators was responsible for the spike in aggressive behaviors, SARS-CoV-2 neutralizing treatments, and receptor binding in both groups of mice. Two trials found that people vaccinated against SARS-CoV-2 were further expected to have advanced levels of bacteria that can be used to identify the virus. This suggests that immunization is beneficial for those who have been exposed to the virus. Third, antibody titers were not different between groups, but it was inferred that antibody effector operations were significant in the influential group after only one measure of cure. Pregnancy immunizations are very successful in the U.K., according to statistics used to simulate the effectiveness of cures. All prenatal deaths caused by SARS-CoV-2 infection during pregnancy occur in people who are not immune to the virus. As the Omicron variant becomes more common, its susceptibility to this virus strain will change, with increased susceptibility after a booster dose and a decline in guardianship over time. It may be inevitable to decide to what extent vaccination can prevent pregnancy problems related to COVID-19[53].

Protection of infants by maternal COVID-19 vaccination

IgG levels in newborns' blood remain increased for six months following delivery. Transplacental transfer of IgG after vaccinations, nervous system illness, and pertussis protect newborns from these diseases. This vaccine allows pregnant women not well protected against COVID-19 to receive assistance for their kids. This increase in baby protection after immunization during pregnancy is consistent with previous findings that the highest antibodies are present in the second to the early second trimester. This indicates that after first-trimester vaccinations, women with higher IgG levels may be more effective at transmitting spike-distinguishing antibodies across the amniotic sac. The main advantage of COVID-19 immunization during pregnancy is that it may reduce the risk of premature birth. It is advised that the organ requests guardianship changes before birth rather than following the baby's birth or in the baby's position. Notably, antagonistic-Spike antibody titers in rope ancestry are lower with SARS-CoV-2 contamination in pregnancy than following COVID-19 inoculation.

Guidelines

According to WHO, expectant women can get covid-19 vaccinations. Because skill is more beneficial to getting vaccinated before birth than risks, all who are not now immunized can sustain Emergency Use Listing authorization. The vaccinations Johnson-Janssen, Oxford-AstraZeneca, Novavax, and Pfizer, are recommended by WHO, while Sino pharm, BIBP-CorV, Bharat Biotech Covaxin, and Sinovac are allowed. The Royal School of Obstetricians, Gynecologists, and the Joint Group on Vaccination and Immunization recommend that pregnant women receive COVID-19 injections [40]. According to the Royal College of Obstetricians and

DOI: https://doi.org/10.54393/pjhs.v3i05.237

Gynecologists, pregnant women should be offered the Pfizer-BioNTech or Moderna mRNA vaccinations. Women who have previously taken one dosage of the Oxford-AstraZeneca vaccine should get a second one. In the United States, the CDC, the ACOG, and the SMFM suggest that pregnant women vaccinate and keep up to date on their covid-19 immunizations using a booster injection [38]. Overall, the CDC prefers mRNA Vacca-19 vaccinations to the Johnson & Johnson-Janssen cure for primary and booster immunization; nevertheless, the concluding vaccine concedes that possibility is secondhand in particular conditions, in an antagonistic way backlash, a lack of mRNA vaccine chance, or patient priority. The Federation of Gynecological Societies of India approves that meaningful and breastfeeding wives accept covid-19 care. The benefits of immunization give the impression degree of any potential risks. The International Society of Infectious Diseases in Obstetrics and Gynecology approves that significant wives sustain the SARS-CoV-2 cure but prefer mRNA vaccines just before more security dossier is convenient.

CONCLUSIONS

CoVID-19 immunization is the best way to protect yourself and your baby from COVID-19 disease. There is currently no evidence that a COVID-19 vaccine would increase the risk of adverse consequences for pregnant women, so pregnant women should continue to be vaccinated.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Dubé È, Dionne M, Rochette L. Exploring the impact of Quebec's vaccine lottery and vaccine passports on Covid-19 vaccination intention: Findings from repeated cross-sectional surveys. Human Vaccines & Immunotherapeutics. 2022 Aug; 2100168.

[2] Reuters WH. Warns Individuals against Mixing and Matching COVID Vaccines. Reuters. 2021 Jul.

[3] Ciarambino T, Para O, Giordano M. Immune system and COVID-19 by sex differences and age. Women's Health. 2021 Jun; 17:17455065211022262.

[4] Karrow NA, Shandilya UK, Pelech S, Wagter-Lesperance L, McLeod D, Bridle B, et al. Maternal COVID-19 vaccination and its potential impact on fetal and neonatal development. Vaccines. 2021 Nov; 9(11):1351.

[5] Maykin MM, Heuser C, Feltovich H. Pregnant people deserve the protection offered by SARS-CoV-2 vaccines. Vaccine. 2021 Jan; 39(2):171.

[6] Klein SL, Creisher PS, Burd I. COVID-19 vaccine testing in pregnant females is necessary. The Journal of clinical investigation. 2021 Mar; 131(5).

[7] Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, et al. for PregCOV-19 Living Systematic Review Consortium. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. British Medical Journal. 2020 Sep; 370:m3320. doi: 10.1136/bmj.m3320.

[8] Marchand G, Patil AS, Masoud AT, Ware K, King A, et al. Systematic review and meta-analysis of COVID-19 maternal and neonatal clinical features and pregnancy outcomes up to June 3, 2021. AJOG Global Reports. 2022 Feb; 2(1):100049. doi: 10.1016/j.xagr.2021.100049.

[9] Metz TD, Clifton RG, Hughes BL, Sandoval GJ, Grobman WA, Saade GR, et al. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units (MFMU) Network. Association of SARS-CoV-2 Infection with Serious Maternal Morbidity and Mortality from Obstetric Complications. Journal of the American Medical Association. 2022 Feb; 327(8):748-759. doi: 10.1001/jama.2022.1190.

[10] Piekos SN, Roper RT, Hwang YM, Sorensen T, Price ND, Hood L, et al. The effect of maternal SARS-CoV-2 infection timing on birth outcomes: a retrospective multicentre cohort study. The Lancet Digital Health. 2022 Feb; 4(2): e95-104.

[11] Stock SJ, Carruthers J, Calvert C, Denny C, Donaghy J, Goulding A, et al. SARS-CoV-2 infection and COVID-19 vaccination rates in pregnant women in Scotland. Nature medicine. 2022 Mar; 28(3):504-12.

[12] Strid P, Zapata LB, Tong VT, Zambrano LD, Woodworth KR, Riser AP, et al. COVID-19 Severity among Women of Reproductive Age with Symptomatic Laboratory-Confirmed SARS-CoV-2 by Pregnancy Status–United States, 2021 Jan.

[13] Vousden N, Bunch K, Morris E, Simpson N, Gale C, O'Brien P, et al. The incidence, characteristics and outcomes of pregnant women hospitalized with symptomatic and asymptomatic SARS-CoV-2 infection in the UK from March to September 2020: A national cohort study using the UK Obstetric Surveillance System (UKOSS). PLoS One. 2021 May; 16(5): e0251123. doi: 10.1371/journal.pone.0251123.

[14] Edlow AG, Li JZ, Collier AY, Atyeo C, James KE, Boatin AA, et al. Assessment of Maternal and Neonatal SARS-CoV-2 Viral Load, Transplacental Antibody

DOI: https://doi.org/10.54393/pjhs.v3i05.237

Transfer, and Placental Pathology in Pregnancies During the COVID-19 Pandemic. JAMA Network Open. 2020 Dec; 3(12):e2030455. doi: 10.1001/jamanetworkopen.2020.30455.

[15] Pique-Regi R, Romero R, Tarca AL, Luca F, Xu Y, Alazizi A, et al. Does the human placenta express the canonical cell entry mediators for SARS-CoV-2? elife. 2020 Jul; 9:e58716. doi: 10.7554/eLife.58716.

[16] Ashary N, Bhide A, Chakraborty P, Colaco S, Mishra A, Chhabria K, et al. Single-Cell RNA-seq Identifies Cell Subsets in Human Placenta That Highly Expresses Factors Driving Pathogenesis of SARS-CoV-2. Frontiers in Cell and Developmental Biology. 2020 Aug; 8:783. doi: 10.3389/fcell.2020.00783.

[17] Lu-Culligan A, Chavan AR, Vijayakumar P, Irshaid L, Courchaine EM, et al. Maternal respiratory SARS-CoV-2 infection in pregnancy is associated with a robust inflammatory response at the maternal-fetal interface. New York state journal of medicine. 2021 May; 2(5):591-610.e10. doi: 10.1016/j.medj.2021.04.016.

[18] Delorme-Axford E, Sadovsky Y, Coyne CB. The Placenta as a Barrier to Viral Infections. Annual review of virology. 2014 Nov; 1(1):133-46. doi: 10.1146/annurev-virology-031413-085524.

[19] Prabhu M, Cagino K, Matthews KC, Friedlander RL, Glynn SM, Kubiak JM, et al. Pregnancy and postpartum outcomes in a universally tested population for SARS-CoV-2 in New York City: a prospective cohort study. British journal of obstetrics and gynaecology. 2020 Nov; 127(12):1548-1556. doi: 10.1111/1471-0528.16403.

[20] Smithgall MC, Liu-Jarin X, Hamele-Bena D, Cimic A, Mourad M, Debelenko L, et al. Third-trimester placentas of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)-positive women: histomorphology, including viral immunohistochemistry and in-situ hybridization. Histopathology. 2020 Dec; 77(6):994-999. doi: 10.1111/his.14215.

[21] Garcia-Flores V, Romero R, Xu Y, Theis KR, Arenas-Hernandez M, Miller D, et al. Maternal-fetal immune responses in pregnant women infected with SARS-CoV-2. Nature communications. 2022 Jan; 13(1):320. doi: 10.1038/s41467-021-27745-z.

[22] Watkins JC, Torous VF, Roberts DJ. Defining Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Placentitis. Archives of Pathology & Laboratory Medicine. 2021 Nov; 145(11):1341-1349. doi: 10.5858/arpa.2021-0246-SA.

[23] Linehan L, O'Donoghue K, Dineen S, White J, Higgins JR, Fitzgerald B. SARS-CoV-2 placentitis: An uncommon complication of maternal COVID-19. Placenta. 2021 Jan; 104:261-266. doi: 10.1016/j.placenta.2021.01.012.

[24] Shook LL, Brigida S, Regan J, Flynn JP, Mohammadi A, Etemad B, et al. SARS-CoV-2 Placentitis Associated with B.1.617.2 (Delta) Variant and Fetal Distress or Demise. The Journal of infectious diseases. 2022 Mar; 225(5):754-758. doi: 10.1093/infdis/jiac008.

[25] Fitzgerald B, O'Donoghue K, McEntagart N, Gillan JE, Kelehan P, et al. Fetal Deaths in Ireland Due to SARS-CoV-2 Placentitis Caused by SARS-CoV-2 Alpha. Archives of Pathology & Laboratory Medicine. 2022 May;146(5):529-537. doi: 10.5858/arpa.2021-0586-SA.

[26] Schwartz DA, Avvad-Portari E, Babál P, Baldewijns M, Blomberg M, et al. Placental Tissue Destruction and Insufficiency From COVID-19 Causes Stillbirth and Neonatal Death From Hypoxic-Ischemic Injury. Archives of Pathology and Laboratory. 2022 Jun;146(6):660-676. doi: 10.5858/arpa.2022-0029-SA.

[27] Kotlyar AM, Grechukhina O, Chen A, Popkhadze S, Grimshaw A, Tal O, et al. Vertical transmission of coronavirus disease 2019: a systematic review and meta-analysis. American Journal of Obstetrics and Gynecology. 2021 Jan; 224(1):35-53.e3. doi: 10.1016/j.ajog.2020.07.049.

[28] Woodworth KR, Olsen EO, Neelam V, Lewis EL, Galang RR, Oduyebo T, et al. Birth and infant outcomes following laboratory-confirmed SARS-CoV-2 infection in pregnancy—SET-NET, 16 jurisdictions, March 29–October 14, 2020. Morbidity and Mortality Weekly Report. 2020 Nov; 69(44):1635.

[29] Flaherman VJ, Afshar Y, Boscardin WJ, Keller RL, et al. Infant Outcomes Following Maternal Infection with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2): First Report From the Pregnancy Coronavirus Outcomes Registry (PRIORITY) Study. Archives of clinical infectious diseases. 2021 Nov; 73(9):e2810-e2813. doi: 10.1093/cid/ciaa1411.

[30] Norman M, Navér L, Söderling J, Ahlberg M, Hervius Askling H, et al. Association of Maternal SARS-CoV-2 Infection in Pregnancy With Neonatal Outcomes. Journal of the American Medical Association. 2021 May; 325(20):2076-2086. doi: 10.1001/jama.2021.5775.

[31] Beharier O, Mayo RP, Raz T, Sacks KN, Schreiber L, Suissa-Cohen Y, et al. Efficient maternal to neonatal transfer of antibodies against SARS-CoV-2 and BNT162b2 mRNA COVID-19 vaccine. The Journal of clinical investigation. 2021 Jul;131(13).

DOI: https://doi.org/10.54393/pjhs.v3i05.237

[32] Gee S, Chandiramani M, Seow J, Pollock E, Modestini C, Das A, et al. The legacy of maternal SARS-CoV-2 infection on the immunology of the neonate. Nature immunology. 2021 Dec; 22(12):1490-1502. doi: 10.1038/s41590-021-01049-2.

[33] Dahlgren J, Samuelsson AM, Jansson T, Holmäng A. Interleukin-6 in the maternal circulation reaches the rat fetus in mid-gestation. Pediatric research. 2006 Aug; 60(2):147-51. doi: 10.1203/01.pdr. 0000230026. 74139.18.

[34] Mackin DW and Walker SP. The historical aspects of vaccination in pregnancy. Best Practice and Research in Clinical Obstetrics and Gynaecology. 2021 Oct; 76:13-22. doi: 10.1016/j.bpobgyn. 2020.09.005.

[35] Atyeo C, DeRiso EA, Davis C, Bordt EA, De Guzman RM, Shook LL, et al. COVID-19 mRNA vaccines drive differential antibody Fc-functional profiles in pregnant, lactating, and nonpregnant women. Science translational medicine. 2021 Oct; 13(617):eabi8631. doi: 10.1126/scitranslmed. abi8631.

[36] Ben-Mayor Bashi T, Amikam U, Ashwal E, Hershkovitz G, Attali E, Berkovitz-Shperling R, et al. The association of maternal SARS-CoV-2 vaccination-to-delivery interval and the levels of maternal and cord blood antibodies. International Journal of Gynecology & Obstetrics. 2022 Mar; 156(3):436-443. doi: 10.1002/ijgo.14014.

[37] Freitas DA, Souza-Santos R, Carvalho LMA, Barros WB, Neves LM, Brasil P, et al. Congenital Zika syndrome: A systematic review. PLoS One. 2020 Dec;15(12):e0242367. doi: 10.1371/journal. pone.0242367.

[38] Lamont RF, Sobel JD, Carrington D, Mazaki-Tovi S, Kusanovic JP, Vaisbuch E, *et al.* Varicella-zoster virus (chickenpox) infection in pregnancy. British journal of obstetrics and gynaecology. 2011 Sep; 118(10):1155-62. doi: 10.1111/j.1471-0528.2011.02983. x.

[39] Kachikis A, Englund JA, Singleton M, Covelli I, Drake AL, Eckert LO. Short-term Reactions Among Pregnant and Lactating Individuals in the First Wave of the COVID-19 Vaccine Rollout. JAMA Network Open. 2021 Aug; 4(8):e2121310. doi: 10.1001/jamanet workopen.2021.21310.

[40] Maertens K, Orije MRP, Van Damme P, Leuridan E. Vaccination during pregnancy: current and possible future recommendations. European journal of pediatrics. 2020 Feb; 179(2):235-242. doi: 10.1007/s 00431-019-03563-w.

[41] Blakeway H, Prasad S, Kalafat E, Heath PT, Ladhani SN, Le Doare K, et al. COVID-19 vaccination during pregnancy: coverage and safety. American Journal of Obstetrics and Gynecology. 2022 Feb; 226(2): 236.e1-236.e14. doi: 10.1016/j.ajog.2021.08.007.

[42] Dick A, Rosenbloom JI, Karavani G, Gutman-Ido E, Lessans N, Chill HH. Safety of third SARS-CoV-2 vaccine (booster dose) during pregnancy. American Journal of Obstetrics and Gynecology. 2022 Jul; 4(4):100637. doi: 10.1016/j.ajogmf.2022.100637.

[43] Ontario BO. COVID-19 vaccination during pregnancy in Ontario. BORN Ontario https://www. bornontario. ca/en/whats-happening/covid-19-vaccination-during-pregnancy-in-ontario. aspx. 2021 Dec.

[44] Zauche LH, Wallace B, Smoots AN, Olson CK, Oduyebo T, Kim SY, et al. CDC v-safe Covid-19 Pregnancy Registry Team. Receipt of mRNA Covid-19 Vaccines and Risk of Spontaneous Abortion. The New England journal of medicine. 2021 Oct; 385(16):1533-1535. doi: 10.1056/NEJMc2113891.

[45] Kharbanda EO, Haapala J, DeSilva M, Vazquez-Benitez G, Vesco KK, et al. Spontaneous Abortion Following COVID-19 Vaccination During Pregnancy. Journal of the American Medical Association. 2021 Oct; 326(16):1629-1631. doi: 10.1001/jama.2021.15494.

[46] Magnus MC, Gjessing HK, Eide HN, Wilcox AJ, Fell DB, Håberg SE. Covid-19 Vaccination during Pregnancy and First-Trimester Miscarriage. The New England journal of medicine. 2021 Nov; 385(21):2008-2010. doi: 10.1056/NEJMc2114466.

[47] Lipkind HS, Vazquez-Benitez G, DeSilva M, Vesco KK, Ackerman-Banks C, et al. Receipt of COVID-19 Vaccine During Pregnancy and Preterm or Small-for-Gestational-Age at Birth - Eight Integrated Health Care Organizations, United States, December 15, 2020-July 22, 2021. Morbidity and Mortality Weekly Report (MMWR). 2022 Jan; 71(1):26-30. doi: 10.15585/mmwr.mm7101e1.

[48] Goldshtein I, Steinberg DM, Kuint J, Chodick G, Segal Y, Shapiro Ben David S, et al. Association of BNT162b2 COVID-19 Vaccination During Pregnancy With Neonatal and Early Infant Outcomes. JAMA Pediatrics. 2022 May; 176(5):470-477. doi: 10.1001/jamapediatrics.2022.0001.

[49] Goldshtein I, Nevo D, Steinberg DM, Rotem RS, Gorfine M, Chodick G, et al. Association Between BNT162b2 Vaccination and Incidence of SARS-CoV-2 Infection in Pregnant Women. Journal of the American Medical Association. 2021 Aug; 326(8):728-735. doi: 10.1001/jama.2021.11035

[50] Buyon JP. The effects of pregnancy on autoimmune diseases. Journal of leukocyte biology. 1998 Mar; 63(3):281-7. doi: 10.1002/jlb.63.3.281.

[51] Atyeo CG, Shook LL, Brigida S, De Guzman RM, Demidkin S, Muir C, et al. Maternal immune response

DOI: https://doi.org/10.54393/pjhs.v3i05.237

and placental antibody transfer after COVID-19 vaccination across trimester and platforms. Nature communications. 2022 Jun;13(1):1-5.

[52] Dagan N, Barda N, Biron-Shental T, Makov-Assif M, Key C, et al. Effectiveness of the BNT162b2 mRNA COVID-19 vaccine in pregnancy. Nature Medicine. 2021 Oct; 27(10):1693-1695. doi: 10.1038/s41591-021-01490-8.

[53] Vousden N, Ramakrishnan R, Bunch K, Morris E, Simpson N, Gale C, et al. Impact of SARS-CoV-2 variant on the severity of maternal infection and perinatal outcomes: Data from the UK Obstetric Surveillance System national cohort. medRxiv. 2021. doi.org/10.1101/2021.07.22.21261000.

DOI: https://doi.org/10.54393/pjhs.v3i05.229

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Review Article

Epidemiology and Resistance Pattern in Microbial Pneumonia: A Review

Muhammad Naveed Adil[1], Jawad Royaidar[2], Ramy Rafaat Wadie Yassa[3], Ma. Socorro GonzagaLeong-on[4]*, Faisal Iqbal[5], Abrar Hussain[5], Qamreen Ali[6] and Arsalan Rasheed[7]*

[1]Department of Animal Genomics and Biotechnology (PIASA), Quaid-e-Azam International University Islamabad, Pakistan
[2]Department of General Medicine, DHQ Teaching Hospital, Dera Ismail Khan, Pakistan
[3]Department of Medicine, Ain Shmas University Cairo, Egypt
[4]Department of Health Sciences, University of San Agustin, Iloilo City, Philippines
[5]Department of Biological Sciences, International Islamic University, Islamabad, Pakistan
[6]Bachelor of Medicine and Bachelor of Surgery, Aga Khan University Hospital, Karachi, Pakistan
[7]Department of Bio-Chemistry, School of Science and Technology (SST) Elementary and Secondary Education Department, Khyber Pakhtunkhwa, Pakistan

ARTICLE INFO

Key Words:
Pneumonia, Epidemiology, Pathogenicity, Diagnosis, Treatment, Resistance

How to Cite:
Naveed Adil, M. ., Royaidar, J. ., Wadie Yassa, R. R., GonzagaLeong-on, M. S. ., Iqbal, F. ., Hussain, A. ., Ali, Q. ., & Rasheed, A. . (2022). Epidemiology and Resistance Pattern In Microbial Pneumonia: A Review: Epidemiology and Resistance Pattern in Microbial Pneumonia. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.229

***Corresponding Author:**
Ma. Socorro Gonzaga-Leong-on
Department of Health Sciences, University of San Agustin, Iloilo City, Philippines
socorroleongon@gmail.com
Arsalan Rasheed
Department of Bio-Chemistry, School of Science and Technology (SST) Elementary and Secondary Education Department, Khyber Pakhtunkhwa, Pakistan
arsalanrrasheed@gmail.com

Received Date: 11th October, 2022
Acceptance Date: 25th October, 2022
Published Date: 31st October, 2022

ABSTRACT

The pneumonia is a significant public health issue because it raises the mortality and morbidity in people of all ages (2.56 million deaths worldwide each year) and has high medical and financial expenses. The two types of pneumonia i.e. community-acquired pneumonia (CAP) and hospital-acquired pneumonia (HAP). The incidences of multi-drug resistance in gram negative bacteria create difficulty in treatment and have negative effect on patients' results. Antimicrobial resistance has also increased with passage of time. The goal of the current study was to describe microbial pneumonia with a focus on the pathogens' etiology, pathogenicity, epidemiology, resistance pathways, diagnosis updates, and vaccine issues in order to address the issue before it has serious consequences. When choosing an antibiotic medication, clinicians face a significant challenge due to the emergence of novel illnesses, the increase in bacteria with multiple medication resistance, and germs that are challenging to cure. It is demonstrated that the effectiveness of first antimicrobial treatment is a critical issue for mortality in pneumonia, it is imperative to manage and effectively guide adequate antibiotic treatment. This requires the knowledge of engagement of the numerous pathogens in etiology of pneumonia. Additionally, until microbiological data are known and prompt de-escalation cannot be conducted; broad-spectrum antibiotic therapy may occasionally be administered. An overview of the epidemiology, resistance trends, microbiological etiology, and microbial diagnostics of pneumonia is given in this review.

INTRODUCTION

In general, pneumonia is the presence of a recent lung infiltrate together with indicators that the infiltrate was caused by an infectious agent including viruses, bacteria, fungi, parasites or leukocytosis [1]. During bacterial

DOI: https://doi.org/10.54393/pjhs.v3i05.229

pneumonia, one or more lung lobes are brought on by bacteria**.** CAP and HAP are two categories of pneumonia that can be categorized according to how the infection is acquired**.** A study explain that CAP is a lung-parenchyma infection which is not contracted from a hospital or other healthcare institution [2]. When pneumonia develops after 48 hours or longer of hospitalization, it is referred to as HAP or Ventilator-associated pneumonia (VAP) if mechanical support is involved [3]. Infections in lower respiratory tract (LRT; including bacterial pneumonia) accounts for about 2-3 million worldwide mortality each year, making them one of the greatest reason of mortality, with South Asia, Sub-Sahara Africa and Southeast Asia having the highest fatality rates [4]. Pathogenic bacteria can spread through the circulation, aspiration, or inhalation to cause bacterial pneumonia [5]. The most prevalent causes of typical pneumonia are *S. aureus*, *K. pneumoniae*, *H. influenzae*, *P. aeruginosa*, *M. catarrhalis*, and *E. coli*, whereas the most frequent causes of atypical pneumonia are L. *pneumophila, C. pneumoniae, and M. pneumonia* [6]. Despite the fact that *A. baumannii*, *E. coli*, *K. pneumoniae*, and *P. aeruginosa* are examples of gram-negative bacteria (GNB) frequently associated with HAP, *S. pneumoniae* still accounts for the majority of CAP cases in all age categories globally [7]. As a result of incorrect use and overuse of antibiotics, Drug resistance is quickly becoming recognized as a severe threat to global health [8]. Multidrug-resistant gram-negative bacteria (MDR-GNB) pneumonia is on the rise nowadays and has a harmful effect on patient health, demonstrating a change in disease patterns with GNB and their fast dissemination, chiefly in hospital environments [9]. The goal of that review is to provide a brief description of bacterial pneumonia with a focus on the epidemiology, pathophysiology, diagnostics, treatment and antibiotic resistance, so that the pertinent bodies may address the problem before it has significant effects**.**

Epidemiology of HAP

After urinary tract infections, HAP is the second-most typical nosocomial disease. HAP is a common issue in general wards, with a frequency of 5-15 cases/1000 hospital admissions (1.6 to 3.67 cases per 1000 admissions, on average) [10]. HAP can occur in up to 20% of patients who are hospitalized in an intensive care unit (ICU), with 60 to 70% of incidents taking place during mechanical ventilation. The occurrence of HAP in the ICU differs by physical region (Table 1) [11, 12]. According to a significant Italian research conducted in 120 intensive care unit (ICUs) with 32,473 patients, nearly 9.2% of all hospitalized patients in Europe experienced nosocomial infections, with pneumonia (more particularly, VAP) accounting for 47.8% of all ICU-acquired illnesses [13].In a prevalence survey conducted in 264 intensive care unit (ICUs) in Mexico, the prevalence of ICU-acquired infections was found to be 22.3%, with ventilator associated pneumonia (VAP)accounting for 42.1% of all infections [14].

Year	Country	Population	Study period	Prevalence Rate	Reference
1991	Spain	VAP	April 1987 to May 1988	78 (24%) per 322 cases	[15]
1991	Spain	VAP	January 1988 to November 1989	58 (21.9%) per 264 cases	[16]
2009	India	VAP	October 2006 to December 2007	22.94 per 1000 ventilator days	[17]
2014	European countries	VAP	6 months	14.6% in patients of age group 45-6417.0% in patients of age group 65-7412.8% in patients of age group ≥ 75	[18]
2007	Japan	VAP	July 2002 & June 2004	53.0% (7.3 cases/ 1000 patient/days)	[19]
2014	Spain	Non-ICU HAP	January 2006 and April 2008	95% (2.45 cases /1000 hospital admission)	[20]
2005	Spain	Non-ICU HAP	November 1997 to January 1999	3.35 cases/1000 hospital admission	[21]
2007	USA	HAP/VAP	2000 to 2003	0.37 cases/1000 hospital admission	[22]
2011	Iran	HAP/VAP	June 2008 and March 2009	6.9% NP, of which 72% were VAP	[23]

Table 1: Occurrence of HAP

Epidemiology of CAP

The actual frequency of CAP is unknown because it is not a reportable disease. Hospitalization is only necessary for 20 to 50% of CAP patients. A yearly prevalence of CAP in young adults in Europe varies from 1.09 to 1.24 in 1000 person and 1.53 to 1.72in 1000 people, and it rises with age (15 cases/1000 persons in individuals of 65 years' age. Men (in comparison to women) and patients around 65 years old were shown to have a higher chance of developing CAP, according to a research by Torres et al [24]. According to estimates, patients with CAP have a death rate that ranges from 1-5% in outpatient settings, from 5.8-14.1% in regular wards, and from 33-50% in intensive care units (mainly in ventilated patient) [25]. The Pneumonia Patient Outcomes Research Team cohort research included CAP patients and the patients' death rates were 8.9% within 90 days of presentation, 29.1% within one year, and 25.3% within five years [26].

Microbial Etiology of Hospital Acquired Pneumonia (HAP)

The environment around hospitals and a patient's own micro biomes is the main sources of HAP infections. Depending on the patient demographic, the ICU conditions, the state, and the type of presentation, various microbes are the cause of HAP in the ICU (early- or late-onset) [27]. Figure 1 shows that six pathogens (Staphylococcus Aureus, Escherichia Coli, Klebsiella species, Acinetobacter species, Pseudomonas Aeruginosa, and Enterobacter species) are thought to be conscientious intended for around 80% of HAP instances [28].

DOI: https://doi.org/10.54393/pjhs.v3i05.229

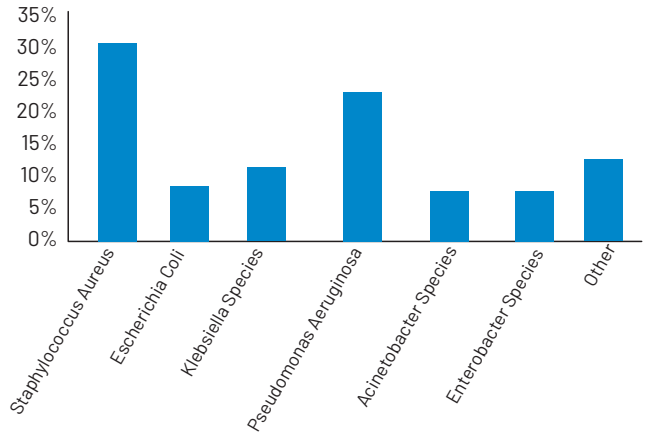

Figure 1: Microbial Etiology of HAP

Microbial Etiology Of Cap: Studies have shown varying percentages of pathogenic bacteria linked to CAP, and these percentages are likely a result of a variety of local epidemiological variables, patient characteristics(e.g. sex, age), and location (outpatients, hospitalized, or ICU).However, it is commonly acknowledged that S. pneumoniae, which may cause CAP in patients [29]. Up to 37% of CAP in patients receiving outpatient treatment is caused by M. pneumoniae, and 10% of cases needed hospitalization. The L. pneumophila pneumonia causes nearly 2-6% of CAP in the immunosuppressed patients, while C. pneumoniae causes 5 to 15% of CAP cases [30, 31]. The main infections responsible for CAP are listed in Table 2

Outdoor patients	Hospitalized (Non- Intensive Care Unit Patients)	Intensive Care Unit Patients
Chlamydia Pneumoniae	Chlamydia pneumoniae	Haemophilus influenzae
Streptococcus Pneumoniae	Streptococcus pneumoniae	Staphylococcus aureus
Haemophilus Influenzae	Legionella pneumophila	Streptococcus pneumoniae
Mycoplasma Pneumoniae	Mycoplasma pneumoniae	Respiratory Viruses
Respiratory Viruses: Influenza A and B	Haemophilus influenzae	Legionella pneumophila
	Respiratory Viruses	Pseudomonas aeruginosa

Table 2: Microbial etiology of CAP

Methods for Determining Pneumonia

Detecting antigens in urine and respiratory specimens, blood cultures, microscopy and culture of respiratory tract specimens and recognition of particular antibodies within blood are still employed often in the regular laboratory examination of patients with pneumonia as shown in Table 3[32].

Diagnosis	Specimen Types
Bacterial Culture	Blood, sputum, pleural fluid, lung aspirates, bronchoscopic specimens
Viral Culture	Nasopharyngeal specimens, oropharyngeal specimens, sputum, lung aspirates, bronchoscopic specimens
Mycobacterial Culture	Blood, sputum, pleural fluid, lung aspirates, bronchoscopic specimens, gastric aspirates
Antibody Detection	Serum
Antigen Detection	Nasopharyngeal specimens, oropharyngeal specimens, urine, pleural fluid
NAD	Nasopharyngeal specimens, oropharyngeal specimens, sputum, lung aspirates, pleural fluid, bronchoscopic specimens, blood

Table 3: Diagnostic Techniques for Determining the Cause of Pneumonia.

Antibiotic Resistance: In the last two decades, antibiotic resistance has grown globally. Nevertheless, measures like the conjugated pneumococcal vaccination, which protects against the serotypes most probable to show resistance, have prevented a rise in the death rates associated with S. pneumoniae that is resistant to antibiotics [33]. Many medicines including cephalosporin, fluoroquinolone, macrolide and penicillin no longer effective against some pneumococcal strains(Table4)[34]. P. aeruginosa in CAP is uncommon and those who have underlying conditions are more susceptible to be impacted by this pathogen are cystic fibrosis, chronic obstructive pulmonary disease, and bronchiectasis. P. aeruginosa is a major contributor to HAP and common reason for VAP [35].The main risk factors for pseudomonas VAP are extended tracheal intubation and previous antibiotic treatment, particularly with some broad-spectrum antibiotics. P. aeruginosa or Acinetobacter infections were significantly more common in VAP patients who had previously received antimicrobial therapy(65%)compared to those who hadn't(19%)[36].

	Infectious Agents	Drugs Resistance	Major Resistance Mechanisms	Risk Factors Of Resistance
CAP resistance	*Streptococcus pneumoniae*	Penicillins	Methylation of the 23S ribosomal objective site, determined via the erm(B) gene	• Age<5 years • Attendance to daycare centers
		Macrolides	Active efflux, determined via the macrolide efflux or mefA genes	• being a resident of a long-term treatment center • Nosocomial acquisition
		Fluoroquinolones	Alteration in the QRDR of gyrA and/or parC	Older age • Previous use of fluoroquinolones
	Mycoplasma pneumoniae	Macrolides	Mutation in the 23S gene ribosomal RNA	
HAP resistance	*Staphylococcus aureus*	Methicillin (MRSA) Vancomycin (VRSA) Daptomycin	Gene mecA existence of transposon Tn1526	• Hospital environment (ICU) delayed • hospitalization (>5 days)
	Pseudomonas aeruginosa	Penicillins Aminoglycosides Fluoroquinolones	access to bacterial targets is restricted incidence of efflux mechanisms	• For 3 days in the 90 days' prior • Current antibiotic treatment

Table 4: Community-Acquired Pneumonia(CAP)resistance

CONCLUSIONS

A crucial challenge for the most clinically effective treatment of pneumonia is the introduction of novel pathogens and microbiological identification of pathogens causing pneumonia. However, recent studies have proven the need of using novel molecular platforms because

DOI: https://doi.org/10.54393/pjhs.v3i05.229

despite the effort made to collect samples in pneumonia patients, nearly 50% of the cases remain without microbiological diagnosis using conventional approaches. Conventional methods and molecular testing, in our opinion, will enhance the microbiological diagnosis of pneumonia, leading to improved clinical management, including faster start-up of antibiotic treatment, more successful de-escalation, better focused antibiotic selection, and better stewardship for pneumonia patients.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Erb CT, Patel B, Orr JE, Bice T, Richards JB, Metersky ML, et al. Management of Adults with Hospital-acquired and Ventilator-associated Pneumonia. Annals of the American Thoracic Society. 2016 Dec; 13(12):2258-2260. doi: 10.1513/AnnalsATS.201608-641CME.

[2] Temesgen D, Bereded F, Derbie A, Biadglegne F. Bacteriology of community acquired pneumonia in adult patients at Felege Hiwot Referral Hospital, Northwest Ethiopia: a cross-sectional study. Antimicrobial resistance and infection control. 2019 Jun; 8:101. doi: 10.1186/s13756-019-0560-0.

[3] Kalanuria AA, Mirski M, Ziai W. Ventilator-associated pneumonia in the ICU. Annual Update in Intensive Care and Emergency Medicine 2014; 65-77.

[4] Assefa M. Multi-drug resistant gram-negative bacterial pneumonia: etiology, risk factors, and drug resistance patterns. Pneumonia (Nathan). 2022 May; 14(1):4. doi: 10.1186/s41479-022-00096-z.

[5] Estes RJ and Meduri GU. The pathogenesis of ventilator-associated pneumonia: I. Mechanisms of bacterial transcolonization and airway inoculation. Intensive care medicine. 1995 Apr; 21(4):365-83. doi: 10.1007/BF01705418.

[6] File TM Jr. Streptococcus pneumoniae and community-acquired pneumonia: a cause for concern. American journal of medicine studies. 2004 Aug; 117 3A (3):39S-50S. doi: 10.1016/j.amjmed.2004.07.007.

[7] Chetty K and Thomson AH. Management of community-acquired pneumonia in children. Paediatric Drugs. 2007;9(6):401-11. doi: 10.2165/00148581-200709060-00007.

[8] Prestinaci F, Pezzotti P, Pantosti A. Antimicrobial resistance: a global multifaceted phenomenon. Journal of global health. 2015; 109(7):309-18. doi: 10.1179/2047773215Y.0000000030.

[9] Exner M, Bhattacharya S, Christiansen B, Gebel J, Goroncy-Bermes P, Hartemann P, et al. Antibiotic resistance: What is so special about multidrug-resistant Gram-negative bacteria? GMS hygiene and infection control. 2017;12.

[10] Chawla R. Epidemiology, etiology, and diagnosis of hospital-acquired pneumonia and ventilator-associated pneumonia in Asian countries. American journal of infection control. 2008 May; 36(4): S93-100. doi: 10.1016/j.ajic.2007.05.011.

[11] Baker D, Quinn B. Hospital Acquired Pneumonia Prevention Initiative-2: Incidence of nonventilator hospital-acquired pneumonia in the United States. American Journal of Infection Control. 2018 Jan;46(1):2-7. doi: 10.1016/j.ajic.2017.08.036

[12] Hutchins K, Karras G, Erwin J, Sullivan KL. Ventilator-associated pneumonia and oral care: a successful quality improvement project. American Journal of Infection Control. 2009 Sep; 37(7):590-7. doi: 10.1016/j.ajic.2008.12.007.

[13] Malacarne P, Boccalatte D, Acquarolo A, Agostini F, Anghileri A, Giardino M, et al. Epidemiology of nosocomial infection in 125 Italian intensive care units. Minerva anestesiologica. 2010 Jan; 76(1):13.

[14] Torres A and Cillóniz C. Epidemiology, etiology, and risk factors of bacterial pneumonia. In Clinical Management of Bacterial Pneumonia 2015;(7-28).

[15] Torres A, Aznar R, Gatell JM, Jiménez P, González J, Ferrer A, et al. Incidence, risk, and prognosis factors of nosocomial pneumonia in mechanically ventilated patients. American Journal of Respiratory and Critical Care Medicine. 1990 Sep;142(3):523-8. doi: 10.1164/ajrccm/142.3.523.

[16] Rello J, Quintana E, Ausina V, Castella J, Luquin M, Net A, et al. Incidence, etiology, and outcome of nosocomial pneumonia in mechanically ventilated patients. Chest. 1991 Aug; 100(2):439-44. doi: 10.1378/chest.100.2.439.

[17] Joseph NM, Sistla S, Dutta TK, Badhe AS, Rasitha D, Parija SC. Ventilator-associated pneumonia in a tertiary care hospital in India: role of multi-drug resistant pathogens. Journal of Infection in Developing Countries (JIDC). 2010 May; 4(4):218-25. doi: 10.3855/jidc.634.

[18] Blot S, Koulenti D, Dimopoulos G, Martin C, Komnos A, Krueger WA, et al. EU-VAP Study Investigators. Prevalence, risk factors, and mortality for ventilator-associated pneumonia in middle-aged, old, and very old critically ill patients*. Critical Care Medicine. 2014 Mar; 42(3):601-9. doi: 10.1097/01.ccm.0000435665.

DOI: https://doi.org/10.54393/pjhs.v3i05.229

07446.50.

[19] Suka M, Yoshida K, Uno H, Takezawa J. Incidence and outcomes of ventilator-associated pneumonia in Japanese intensive care units: The Japanese nosocomial infection surveillance system. Infection Control and Hospital Epidemiology. 2007 Mar; 28(3):307-13. doi: 10.1086/511997.

[20] Sopena N, Heras E, Casas I, Bechini J, Guasch I, Pedro-Botet ML, et al. Risk factors for hospital-acquired pneumonia outside the intensive care unit: a case-control study. American Journal of Infection Control. 2014 Jan; 42(1):38-42. doi: 10.1016/j.ajic.2013.06.021.

[21] Barreiro-López B, Tricas JM, Mauri E, Quintana S, Garau J. Risk factors and prognoses of nosocomial pneumonia in patients not admitted to intensive care units. Infectious diseases and clinical microbiology. 2005 Sep; 23(9):519-24.

[22] Weber DJ, Rutala WA, Sickbert-Bennett EE, Samsa GP, Brown V, Niederman MS. Microbiology of ventilator-associated pneumonia compared with that of hospital-acquired pneumonia. Infection Control & Hospital Epidemiology. 2007 Jul; 28(7):825-31. doi: 10.1086/518460.

[23] Diouf E, Beye MD, Kane O, Seydi AA, Ndiaye PI, Bah MD, et al. Nosocomial ventilator-associated pneumonia in a tropical intensive care unit. Dakar medical. 2006 Jan; 51(2):81-8.

[24] Chang DC, Anderson S, Wannemuehler K, Engelthaler DM, Erhart L, Sunenshine RH, et al. Testing for coccidioidomycosis among patients with community-acquired pneumonia. Emerging infectious diseases. 2008 Jul; 14(7):1053-9. doi: 10.3201/eid1407.070832.

[25] Craven DE, Barber TW, Steger KA, Montecalvo MA. Nosocomial pneumonia in the 1990s: update of epidemiology and risk factors. InSeminars in respiratory infections 1990 Sep 1(Vol. 5, No. 3, pp. 157-172).

[26] Johnstone J, Eurich DT, Majumdar SR, Jin Y, Marrie TJ. Long-term morbidity and mortality after hospitalization with community-acquired pneumonia: a population-based cohort study. Medicine (Baltimore). 2008 Nov;87(6):329-334. doi: 10.1097/MD.0b013e318190f444.

[27] Suaya JA, Fletcher MA, Georgalis L, Arguedas AG, McLaughlin JM, Ferreira G, et al. Identification of Streptococcus pneumoniae in hospital-acquired pneumonia in adults. Infection Prevention in Practice (IPIP). 2021 Feb; 108:146-157. doi: 10.1016/j.jhin.2020.09.036.

[28] Jones RN. Microbial etiologies of hospital-acquired bacterial pneumonia and ventilator-associated bacterial pneumonia. Archives of clinical infectious diseases. 2010 Aug; 51 Suppl 1: S81-7. doi: 10.1086/653053.

[29] Tran HD, Bach Nguyen YT, Thanh Tran T, Thu Le TT, Thu Nguyen HT, Minh Nguyen C, et al. Community-acquired pneumonia-causing bacteria and antibiotic resistance rate among Vietnamese patients: A cross-sectional study. Medicine (Baltimore). 2022 Sep; 101(36): e30458. doi: 10.1097/MD.0000000000030458.

[30] Apisarnthanarak A and Mundy LM. Etiology of community-acquired pneumonia. Clinics in Chest Medicine. 2005 Mar;26(1):47-55. doi: 10.1016/j.ccm.2004.10.016.

[31] Johnstone J, Majumdar SR, Fox JD, Marrie TJ. Viral infection in adults hospitalized with community-acquired pneumonia: prevalence, pathogens, and presentation. Chest. 2008 Dec;134(6):1141-1148. doi: 10.1378/chest.08-0888.

[32] Murdoch DR, O'Brien KL, Driscoll AJ, Karron RA, Bhat N; Pneumonia Methods Working Group; PERCH Core Team. Laboratory methods for determining pneumonia etiology in children. Archives of clinical infectious diseases. 2012 Apr; (54) 2:146-52. doi: 10.1093/cid/cir1073.

[33] Cillóniz C, Garcia-Vidal C, Ceccato A, Torres A. Antimicrobial resistance among Streptococcus pneumoniae. In Antimicrobial Resistance in the 21st Century 2018;(13):38

[34] Mayanskiy N, Alyabieva N, Ponomarenko O, Lazareva A, Katosova L, et al. Serotypes and antibiotic resistance of non-invasive Streptococcus pneumoniae circulating in pediatric hospitals in Moscow, Russia. International Journal of Infectious Diseases (IJID). 2014 Mar; (20):58-62. doi: 10.1016/j.ijid.2013.11.005.

[35] Zilberberg MD, Nathanson BH, Sulham K, Fan W, Shorr AF. A Novel Algorithm to Analyze Epidemiology and Outcomes of Carbapenem Resistance Among Patients with Hospital-Acquired and Ventilator-Associated Pneumonia: A Retrospective Cohort Study. Chest. 2019 Jun; 155(6):1119-1130. doi: 10.1016/j.chest.2018.12.024.

[36] Höffken G and Niederman MS. Nosocomial pneumonia: the importance of a de-escalating strategy for antibiotic treatment of pneumonia in the ICU. Chest. 2002 Dec; 122(6):2183-96. doi: 10.1378/chest.122.6.2183.

DOI: https://doi.org/10.54393/pjhs.v3i05.242

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Comparison of Knowledge Sufficiency Regarding the Specialty of Prosthodontics Among Health Care Professionals of Karachi

Osama Yasin[1*], Anum Baqar[1], Farnaz Ilyas[1], Saman Hakeem[1] and Muhammad Faisal Fahim[2]

[1]Department of Prosthodontic, Bahria University Health Sciences, Karachi, Pakistan
[2]Department of Biostatistics, Bahria University Health Sciences, Karachi, Pakistan

ARTICLE INFO

Key Words:
prosthodontics, health care professionals, awareness

How to Cite:
Yasin, O. ., Baqar, A. ., Ilyas, F. ., Hakeem, S. ., & Faisal Fahim, M. . (2022). Comparison of Knowledge Sufficiency Regarding the Specialty of Prosthodontics Among Health Care Professionals of Karachi: Comparison of Knowledge Sufficiency Regarding the Specialty of Prosthodontics. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.242

***Corresponding Author:**
Osama Yasin
Department of Prosthodontic, Bahria University Health Sciences, Karachi, Pakistan
osamayaseen64@gmail.com

Received Date: 13th October, 2022
Acceptance Date: 25th October, 2022
Published Date: 31st October, 2022

ABSTRACT

A chunk of people from general public and health care professionals know about Prosthodontics as one of the essentials of dentistry and hence, the patients are not adequately referred to them. Subsequently, the quality of oral rehabilitation is negatively affected. **Objective:** Therefore, the aim was to assess and compare the level of knowledge related to Prosthodontics among various healthcare professionals in Karachi. **Methods:** This cross-sectional study using a voluntarily filled validated questionnaire was disseminated to various health care professionals. The selection of participants was in an equal ratio of various health professional communities and were categorized into 5 groups: medical professionals (MBBS), fraternity of doctor of physical therapy (DPT), personnel of doctor of pharmacy (Pharm- D), medical laboratory technicians (MLT) and faculty of nursing. The core results were interpreted in terms of descriptive analysis whereas the inter-group comparison of data was done through ANOVA test application to compare the level of knowledge among various health care professionals. **Results:** Superficially, 72% health care professionals knew about Prosthodontics through newspaper. The inter-group comparison showed that there is a significant difference in the comprehensive knowledge about Prosthodontics among all health care professionals. Among them, DPT and MLT professionals were found to be at the higher level of knowledge status than those of MBBS, nursing and pharmacy. **Conclusions:** The specialty of Prosthodontics is still searching for its identity rather among the health care providers than among the general public.

INTRODUCTION

People living in the current century are considerably concerned regarding their dental and medical health and thus, demanding the best possible treatment for their diseases [1]. Multi- disciplinary approach is the possible solution to this problem, but this is only achievable when different disciplines of health care system have awareness and knowledge about competencies and domains of each other [1-3]. Deteriorated dentition or tooth loss adversely affects the functional, aesthetic, and psycho-social health of an individual's life and can be used as a marker to assess the burden of oral health diseases in a population [4].To confront this, Prosthodontics is the recognized branch of dentistry by American Dental Association that deals with the restoration of injured, damaged or missing teeth with prosthetic replacements such as dental veneers, crowns, removable dentures and implant-supported prostheses [4]. Maxillofacial defects originated via congenital or accidental cause, cleft lip and palate, TMJ problems are also efficiently rehabilitated by the Prosthodontist [1]. Professionals other than dentists have significant roles in oral health care system [1,2]. When awareness regarding the concerned discipline is lacking, adequate referrals are delayed and hence, compromising the prognosis of the disease [3,1,2]. Although, there is a dearth of published literature on the statistics of awareness regarding specialty of Prosthodontics, but Oral and Maxillofacial surgery (OMFS) and Oral medicine which are also the significant sub-specialties of dentistry, literature shows

DOI: https://doi.org/10.54393/pjhs.v3i05.242

only small number of people have the core concept about them [1,2]. Hence, it is evident that awareness of dental specialties among health care professionals and public is very low [1,2,3]. The public literacy status and awareness about health care system among the population of Pakistan vary disproportionately and differ according to different regions [1]. Therefore, it is desirable to determine the knowledge level of the health care professionals prior undertaking the general public to establish the baseline data in this regard. Therefore, the current study aimed to assess and compare the level of knowledge related to Prosthodontics, a specialty of dentistry among various health care professionals in Karachi. The meager knowledge, and hence lack of awareness was the predicted outcome of the study. Moreover, a uniform pattern of knowledge was expected upon comparison of participants of health care professionals.

METHODS

This cross-sectional study using a voluntarily filled validated questionnaire was distributed to various health care professionals of Karachi except dentists and dental auxiliaries, and those who agreed to participate, in the year of 2021.The non-probability convenience sampling technique was utilized to sort out the sample size of the study. The sample size was calculated to be 384 participants based on 50% prevalence rate. The selection of participants was in an equal ratio of various health professional communities and were categorized into 5 groups: medical professionals (MBBS), fraternity of doctor of physical therapy (DPT), personnel of doctor of pharmacy (Pharm- D), medical laboratory technicians (MLT) and faculty of nursing. A self-reported questionnaire was designed in English language and sent to the sample population using online version of questionnaire. The questionnaire contained two sections. The first section consisted of demographic data and the second section was based upon 7 questions related to Prosthodontics specialty to assess the basic knowledge about the discipline. However, comprehensive knowledge regarding Prosthodontics was determined via 2 detailed questions which were designed in multiple choice format. The score of each question was calculated in terms of percentage of correct responsiveness. 4 true options were given the percentage of 100%, 3 right options were equalized to 75% of in-depth awareness, 2 accurate answers corresponded to 50% knowledge level while 1 correct answer meant 25% knowledge status of the participant. Questionnaire validation was accomplished using a pilot study which was conducted on 10% of the sample size to sort out any ambiguity regarding language or understanding barriers. Kappa test value was calculated as 0.80 from pilot study, to determine the internal reliability of the questionnaire. Factors affecting internal validity were identified and tried to kept under control. Lack of participation was minimized by giving rationale of the study. Fear of exposure of identity was addressed through a disclaimer note about confidentiality, anonymity and restricted use of the gathered data. Statistical analysis was done using SPSS version 23.0. The core results were interpreted in terms of descriptive analysis in the form of frequencies, means and standard deviations. The inter-group comparison of data was done through one-way ANOVA test application to compare the level of knowledge among different health care professionals. P- values < 0.05 was considered to be significant.

RESULTS

Among the 400 respondents from various sectors of health sciences, 223 (55.8%) and 177(44.2%) were males and females respectively. Regarding awareness of the dental profession and its associated disciplines, majority of positive responses were obtained from the DPT personnel followed by MBBS and MLT as shown in Figure 1. Out of which, maximum 24.14% MLT personnel heard of it through newspapers (43.48%) as their leading source of information.(Figure 3)

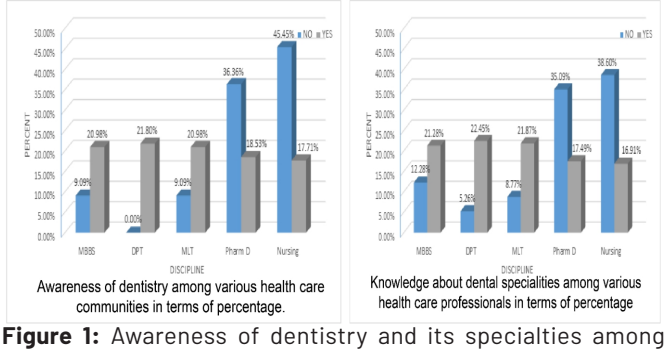

Figure 1: Awareness of dentistry and its specialties among various health care communities in terms of percentage

Having explored awareness regarding Prosthodontics as a specific discipline of dentistry, the overall positive response turned out to be 72.5% as shown in figure 2.

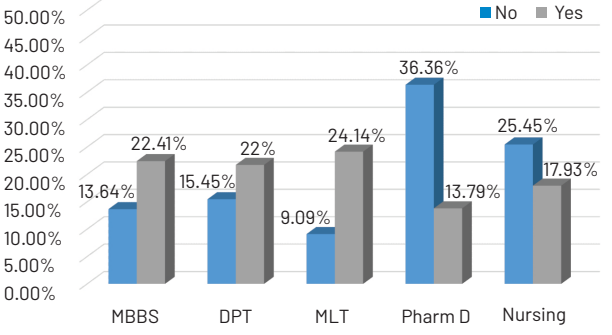

Figure 2: Familiarity with prosthodontics among different health care professionals in terms of percentages

DOI: https://doi.org/10.54393/pjhs.v3i05.242

Out of which, maximum 24.14% MLT personnel heard of it through newspapers (43.48%) as their leading source of information as shown in figure 3.

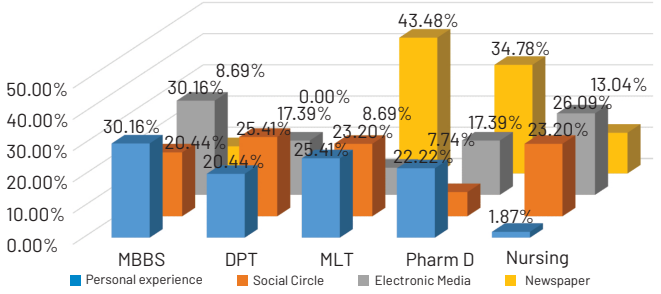

Figure3: Percentages of various resources used by health care professionals to get knowledge about prosthodontics

The only acknowledged sample population regarding Prosthodontics specialty was then assessed for further in-depth knowledge about the subject. When asked about the various sorts of patients dealt by Prosthodontists, DPT group produced higher accurate knowledge with a mean score of 0.49±0.24 followed by MLT category having a mean score value of 0.45±0.23. Moreover, there was a significant difference recorded in awareness levels among all health professionals with a p-value of 0.000.(Table 1) When asked about the services offered by Prosthodontists, MLT faculty responded with a higher mean awareness score of 0.47±0.26 followed by MBBS (0.38±0.27). The significant co-relational value of 0.000 was noted among all health professional groups as shown in table 1. Regarding an accessible location for prosthodontic work, maximum precise knowledge was obtained in DPT faculty (0.44±0.09) followed by nursing and MBBS staff with mean scores of 0.43±0.09 and 0.40±0.11 respectively. The one- way ANOVA revealed significant association among knowledge of all health groups (p-value0.000) as shown in Table 1. While exploring the competencies of a prosthodontist whether he is capable of doing general dental procedures or not, majority subjects associated with pharmacy and DPT reported the correct knowledge about this question. The difference of knowledge among various health professionals was found to be significant. (p=0.004) as shown in Table 1.

Knowledge and Attitude versus Discipline	In your opinion, what sort of the following patients are dealt by Prosthodontists?	Which of the following services are offered by Prosthodontists?	In your opinion is an easily accessible location for prosthodontic work?	Can a Prosthodontist do general dental procedures as well?
Parameter	Mean±SD	Mean±SD	Mean±SD	Mean±SD
MBBS	0.39±0.27	0.38±0.27	0.40±0.11	0.07±0.04
DPT	0.49±0.24	0.30±0.16	0.44±0.09	0.08±0.03
MLT	0.45±0.23	0.47±0.26	0.38±0.12	0.06±0.04
Pharm D	0.23±0.12	0.21±0.18	0.34±0.08	0.09±0.02
Nursing	0.34±0.20	0.25±0.17	0.43±0.09	0.07±0.04
P-value	0.000	0.000	0.000	0.004

Table 1: Level of knowledge about Prosthodontics among various health care professionals

*One-way ANOVA test was applied to see the significant at P-value≤ 0.05, SD=Standard Deviation

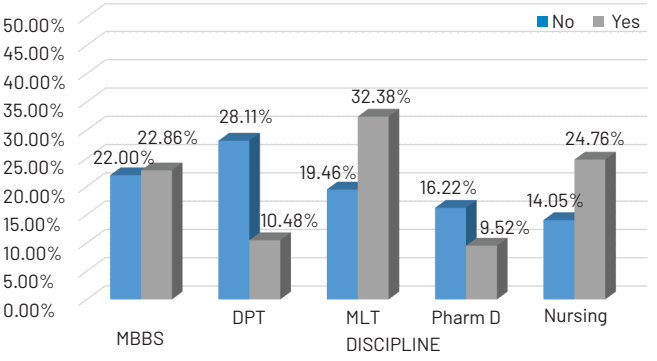

Figure 4: Percentages of health care workers who had undergone personal experience with prosthodontist

DISCUSSION

Dentistry is one of the main components of health care system and it has various specialties. Among them Prosthodontics is one of the leading specialties that deal with replacement of missing teeth and its associated structures. Upon literature review, it is revealed that the competencies of a Prosthodontist are poorly recognized by the other health care communities and hence, the patients are not adequately referred by them [1]. In this regard, this is an initiative to generate exact statistics about awareness of prosthodontics as a dental specialty.Understanding the attitude and perception of our health care professionals is more vital than assessing the knowledge of the general public in order to develop the culture of multidisciplinary treatment approach and promote the trend of patient referrals in our society. These were the reasons behind to incorporate the members of health sciences as sample population, to check their awareness status rather than the general public. The current study showed that 91.8% of health care personnel know about dental profession. This finding is quite similar to the studies did by Oyetola et al., and Chandra et al where 95% and 100% participants knew about dentistry respectively [1,2]. When inquired about dental specialties and Prosthodontics, specifically,85.8% and 72.5% health care professionals had heard about these respectively. This can be compared to the research work done by Subhashraj et al., while exploring awareness regarding OMFS specialty in which 41% of medical students and 76 % of medical professionals and 58% of paramedics had heard of it [1]. Another study by Bokkasam et al., showed that 31% of medical professionals were aware of oral medicine [8]. Mane PN et al., while investigating awareness of Orthodontics, came to know that only 67% patients knew about it [1]. Many researches revealed that awareness of dental specialties among various medical professionals and public is low [9-11]. This may be due to the fact that dental fraternity with its sub- disciplines are not very well-

DOI: https://doi.org/10.54393/pjhs.v3i05.242

recognized in developing countries like ours. This study also showed that their core sources of information regarding Prosthodontics is through newspaper, personal experiences and social circle. This may be closely related to the study did by Dahane TM et al., that showed that books and personal experiences were the core sources of knowledge regarding dentistry [12]. However, majority ignorant participants belonged to pharmacy and nursing professions, 36.36% and 25.45% respectively. This may be due the fact that MLT, DPT, MBBS learners are usually taught under the umbrella of a single institution while nursing and pharmacy are trained completely in a separate learning environment, so that the chances of social interaction with students and faculty of BDS is lesser for them as compared to those of MBBS, DPT and MLT.Having probed into the comprehensive knowledge about Prosthodontics, an overall 4.8% and 8.6% health care professionals responded the questionnaire correctly regarding what sort of patients can be dealt and services offered by this specialty. DPT and MLT personnel were found to be at the higher level of knowledge than other health care professionals. Subhashraj et al., in 2018, reported the same awareness difference among various health care communities revealing, medical community to have less amount of knowledge regarding OMFS field [15]. Many other studies also revealed the similar fact that other health care communities do not have even the basic knowledge about dental profession [13,1,2]. and hence, appropriate referral is compromised [8]. In 2019, a study conducted in Indian population exploring the services provided by a Prosthodontist revealed that only 31 out of 500 participants had higher awareness about it [1]. Albraa B et al., while investigating awareness of different dental specialties in Medina showed that 3.5% participants had good ,44.5% had average and 52% had poor level of knowledge [1]. The existing literature suggests that the lack of publicity by the professional bodies may be the underlying reason. Hence, there is an obligation for the health care professionals especially the Prosthodontists, to get involved in oral health promotion programs like continuing medical education (CME) and continuing dental education (CDE) programs to promote the field of Prosthodontics in Pakistan.The strengths of the current study were the incorporation of various healthcare workers from private and public sectors of Karachi while maintaining an equal ratio of all health care communities. However, this survey was done in a single city of Pakistan undertaking only one discipline of dentistry may be the limiting factors of the study. But it can be predicted from the findings of the present study that the scenario in any part of Pakistan would be no different from Karachi. Therefore, it is recommended to generate and co-relate the statistics of other disciplines of dentistry as well, incorporating sample population of different regions of Pakistan to precisely conclude the scenario regarding awareness and growth of dental fraternity in Pakistan. Undertaking the present finding, it is right to say that the specialty of prosthodontics is still searching for its identity rather among the health care providers than among the general public.

CONCLUSIONS

The overall positive response regarding familiarity with Prosthodontics is 72.5%. Moreover, there is a significant difference observed in the comprehensive knowledge status about Prosthodontics among all health care professionals. However, DPT and MLT personnel were found to be at the higher level of knowledge than those of MBBS, nursing and pharmacy.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Naidu RS, Boodoo D, Percival T, Newton JT. Dental emergencies presenting to a university-based paediatric dentistry clinic in the West Indies. International Journal of Paediatric Dentistry. 2005 May; 15(3):177-84. doi: 10.1111/j.1365-263X.2005.00625.x.

[2] Bradbury-Jones C, Innes N, Evans D, Ballantyne F, Taylor J. Dental neglect as a marker of broader neglect: a qualitative investigation of public health nurses' assessments of oral health in preschool children. BMC Public Health. 2013 Apr; 13:370. doi: 10.1186/1471-2458-13-370.

[3] McGrath C, Sham AS, Ho DK, Wong JH. The impact of dental neglect on oral health: a population-based study in Hong Kong. International journal of dentistry. 2007 Feb; 57(1):3-8. doi: 10.1111/j.1875-595x.2007.tb00111.x.

[4] Gabiec K, Bagińska J, Łaguna W, Rodakowska E, Kamińska I, Stachurska Z, et al. Factors Associated with Tooth Loss in General Population of Bialystok, Poland. International Journal of Environmental Research and Public Health. Public Health. 2022 Feb; 19(4):2369. doi: 10.3390/ijerph19042369.

[5] Umeizudike KA, Onajole AT, Ayanbadejo PO. Periodontal health knowledge of nonmedical professionals and their oral hygiene behavior in a teaching hospital in Nigeria. European Journal of General Dentistry. 2015 May; 4(02):48-54.

DOI: https://doi.org/10.54393/pjhs.v3i05.242

[6] Sa'adu ZO and Abdulraheem IS. Oral health care practice and socio-demographic findings among the physicians in Ilorin, Nigeria. Nigerian Journal of Medicine: Journal of the National Association of Resident Doctors of Nigeria. 2003 Oct; 12(4):211-6.

[7] Ameerally P, Fordyce AM, Martin IC. So you think they know what we do? The public and professional perception of oral and maxillofacial surgery. British Journal of Oral and Maxillofacial Surgery. 1994 Jun; 32(3):142-5. doi: 10.1016/0266-4356(94)90097-3.

[8] Bokkasam VK, Raviraj J, Gundlapalle P, Kolugundla VK, Vardhan H, Thombarapu L. Awareness of oral medicine specialty among medical practitioners in and around Tirupati: A survey. Journal of Indian Academy of Oral Medicine and Radiology. 2015 Jan; 27(1):59.

[9] Nagrik AP, Bhagat BA, Yemle SB, Maidapwad S. Awareness of Specialties of Dentistry among Medical Trainees and Teaching Faculty of Medical College in the Central West India. Journal of International Society of Preventive and Community Dentistry. 2019 Jun; 9(3):269-274. doi: 10.4103/jispcd.JISPCD_297_18.

[10] Azodo CC, Ehigiator O, Ehizele AO, Ololo O. Medical doctors' knowledge of dental specialty: Implication for referral. Journal of Research in Medical Sciences. 2010; 6:140-3.

[11] Srinidhi S, Ingle NA, Chaly PE, Reddy C. Dental awareness and attitudes among medical practitioners in Chennai. Journal of International Oral Health. 2011;5(2):73-8.

[12] Sabzwari SR. Health literacy in Pakistan: Exploring new ways of addressing an old challenge. Journal of Pakistan Medical Association. 2017; 67(12):1901.

[13] Dahane TM, Patel RM, Dubey SG, Mangal K. Awareness & Knowledge of Maxillofacial Prosthodontics as a Dental Specialty amongst Medical Practitioners. Journal of Evolution of Medical and Dental Sciences. 2021 Mar; 10(9):608-13.

[14] Oyetola EO, Oyewole T, Adedigba M, Aregbesola ST, Umezudike K, Adewale A. Knowledge and awareness of medical doctors, medical students and nurses about dentistry in Nigeria. The Pan African medical journal. 2016 Apr; 23:172. doi: 10.11604/pamj.2016.23.172.7696.

[15] Shekar BC, Reddy CV, Manjunath B, Suma S. Dental health awareness, attitude, oral health-related habits, and behaviors in relation to socio-economic factors among the municipal employees of Mysore city. Annals of Tropical Medicine and Public Health. 2011 Jul; 4(2):99.

[16] Subhashraj K and Subramaniam B. Awareness of the specialty of oral and maxillofacial surgery among health care professionals in Pondicherry, India. Journal of maxillofacial surgery. 2008 Nov; 66(11): 2330-4. doi: 10.1016/j.joms.2007.04.025.

[17] Mane PN, Patil SD, Kadam K, Ganiger CR, Pawar RL, Phaphe SA, et al. Evaluation of the awareness and knowledge of orthodontics and orthodontic treatment in patients visiting School of Dental Sciences, Karad. Journal of Oral Research and Review. 2018 Jul; 10(2):62.

[18] Adeghe H, Ehigiator O, Azodo C, Ehizele A. Nigerian clinical level medical students' knowledge of dental specialty. Annals of medical research. 2012 Jul; 2(2):157-60. doi: 10.4103/2141-9248.105664.

[19] Nwhator SO, Olojede CO, Ijarogbe O, Agbaje MO. Self-assessed dental health knowledge of nigerian doctors. East African Medical Journal. 2013; 90(5):147-55.

[20] Usman S, Bhat SS, Sargod SS. Oral health knowledge and behavior of clinical medical, dental and paramedical students in Mangalore. International journal of oral health dentistry. 2007 Sep; 1(3):46-8.

[21] Alolayan AB, Alsahafi YA, Alobodi AK, Mahfouz AM, Alnakhli MT, Abulfaraj AE. Knowledge and awareness of different dental specialties among the population of Madinah, Saudi Arabia. Age (Years). 2022;18(13):3-8.

DOI: https://doi.org/10.54393/pjhs.v3i05.160

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Neonatal Disease Distribution and Admission Outcomes at the District Hospital DADU, Sindh

Washdev Talreja[1], Suhail Aman[2], Wajid Hussain[3], Zahid Hussain[4], Irfan Ali Jhatial[5], Sapna Kewalani[6], Zainab Baloch[7] and Muhammad Parial Shahani[2*]

[1]Taluka Headquarter Hospital Rohri, Sukkur, Pakistan
[2]Faculty of Community Medicine and Public Health Sciences, Shaheed Mohtarma Benazir Bhutto Medical University, Larkana, Pakistan
[3]National Institute of Child Health, Karachi, Pakistan
[4]Department of Pediatric Nephrology, Sindh Institute of Urology and Transplantation, Karachi, Pakistan
[5]Department of Pediatrics, United Medical and Dental College, Karachi, Pakistan
[6]Aga Khan University Hospital, Karachi, Pakistan
[7]The Larkana General Hospital, Larkana, Pakistan

ARTICLE INFO

Key Words:

Neonates, Neonatal Morbidity, Admission Outcomes, Neonatal Mortality

How to Cite:

Talreja, W. ., Aman , S. ., Hussain , W. ., Hussain, Z. ., Jhatial, I. A. ., Kewalani, S. ., Baloch, Z. ., & Parial Shahani, M. . (2022). Neonatal Disease Distribution and Admission Outcomes at the District Hospital: Neonatal Disease Distribution and Admission Outcomes. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.160

***Corresponding Author:**

Muhammad Parial Shahani
Faculty of Community Medicine and Public Health Sciences, Shaheed Mohtarma Benazir Bhutto Medical University, Larkana, Pakistan
drmpshahani@gmail.com

Received Date: 24th September, 2022
Acceptance Date: 11th October, 2022
Published Date: 31stOctober, 2022

ABSTRACT

The most vulnerable time for a newborn is during the neonatal period. The important factors affecting neonatal mortality during the first 28 days of life include poor antenatal care for mothers, inadequate treatment during birth, or lack of skillful care. With a rate of 48 per 1000 live births, Pakistan is ranked third in the world. This is because it accounts for 7% of all neonatal deaths globally. In Pakistan one in every 22 newborns dies within the first month of life. **Objective**: To evaluate the frequency and distribution of neonatal morbidity patterns and admission outcomes in district hospital Dadu, Sindh, Pakistan. **Methods:** A descriptive cross-sectional study was conducted at the Civil Hospital Dadu which is a district hospital in Sindh. The data was obtained in 2020. Using universal sampling method, neonates' gender, age at the time of the birth, disease patter and admission outcome were recorded. Data was analyzed in Microsoft Excel 2010. **Results:** Out of total 1637 admitted neonates there were 411(25.1%) case of sepsis, BA 17.16%, preterm 14.9%, LBW 13.81%. Amongst, 789 (48.1%) were discharged after improvement, and 251(15.3%) neonates died. **Conclusions:** Less than half of the newborns who were admitted could improve during the admission. More than 15% of newborn deaths are alarming. The policymakers should take action to reduce early neonatal mortality by effectively managing neonatal illnesses.

INTRODUCTION

The most vulnerable time for a newborn is during the neonatal period [1]. The important factors affecting neonatal mortality during the first 28 days of life include poor antenatal care for mothers, inadequate treatment during birth, or lack of skillful care. The great majority of neonatal deaths occur in low- and middle-income nations as a result of diseases that can be prevented and treated [2]. Prematurity, infection and birth asphyxia are the main causes of neonatal fatalities [3, 4]. These factors account for over 80% of newborn fatality causes [5]. In the meanwhile, some of the aforementioned causes could be avoided. Lack of cooperation between paediatricians and obstetricians at the hospital is one of the potential causes of the high neonatal mortality rate. India, Pakistan, and Nigeria are the three countries with the highest rates of newborn death [2]. According to reports, the main causes

DOI: https://doi.org/10.54393/pjhs.v3i05.160

of neonatal mortality in developed regions of the world are prematurity and congenital malformations, while birth asphyxia and sepsis are the main causes in developing countries [6]. With a rate of 48 per 1000 live births and a total of 298000 newborn fatalities in the country per year, Pakistan is ranked third in the world. This is because it accounts for 7% of all neonatal deaths globally [7, 8]. According to estimates, 130 million newborns are born every year; regrettably, 4 million of them pass away in the first 28 days of life [2]. About half of all newborn deaths take place within the first 24 hours of life. The most sensitive indicators of the availability, use, and value of maternity and paediatric healthcare services are neonatal mortality [9]. In Pakistan, there are more neonatal deaths than elsewhere because one in every 22 newborns dies within the first month of life [10]. This study was aimed to determine the morbidity patterns and admissions outcomes of admitted neonates at district hospital Dadu, Sindh.

METHODS

A descriptive cross-sectional study was conducted at the Civil Hospital Dadu which is a district hospital in Sindh province of Pakistan. The data was obtained from the neonatal ward from Jan. 2020 to December 2020. Using the universal sampling method, all the admitted neonates were recorded during data collection. Out of the 1682 neonates admitted at the ward during the year, 1637 neonates were included in the study since the data for remaining neonates was either incomplete or missing. Neonates' gender, age at the time of the birth, disease patter and admission outcome were the variables included in this study. Data were entered and analyzed using the Microsoft Excel 2010.

RESULTS

Out of 1637 neonates admitted during the year, there were 932 (56.9%) female and 705 (43.1%) male newborns (Figure 1).

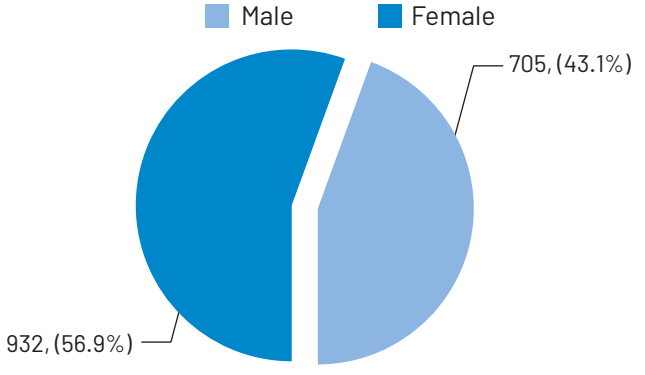

Figure 1: Gender Distribution of admitted Neonates

It was observed that the more than half of the neonates presented on the first of after the Delivery and more than two third neonates presented within the first week if the life (Figure 2).

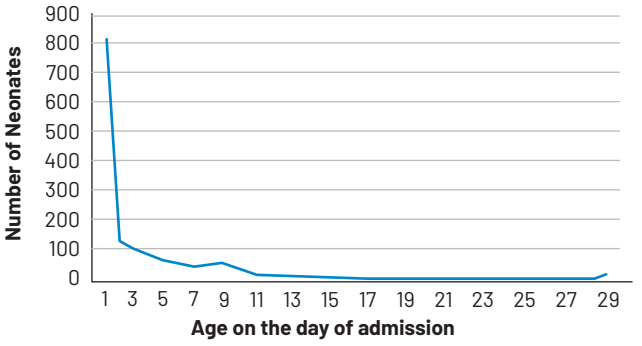

Figure 2: Number and Age on the day of admission

Out of total 1637 admitted neonates there were 411 (25. 1%) case of sepsis followed by birth asphyxia 281 (17.16%), preterm 244 (14.9%), LBW 227 (13.81%), RDS 128 (7.81%), neonatal jaundice 88 (5.37%), TTN 49 (2.99%) and others were 209 (12.76%) (Table 1).

Disease	No.	Percentage
Sepsis	411	25.1
Birth Asphyxia	281	17.16
Preterm	244	14.9
LBW	227	13.86
Respiratory Distress	128	7.81
Jaundice	88	5.37
TTN	49	2.99
Others	209	12.76
Total	1637	100

Table 1: Distribution of Neonatal Diseases

It was observed that out of 1637 admitted neonates, 789 (48.1%) were discharged after improvement, 352 (21.5%) were referred for admission to better set ups nearby, 245 (14.9%) left the hospital without informing the hospital staff on their own and 251 (15.3%) neonates died at in ward (Table 2).

Outcome	No.	Percentage
Discharge	789	48.19
Referred	352	21.5
Expired	251	15.33
LAMA	245	15.96
Total	1637	100

Table 2: Outcome of Neonatal Diseases

DISCUSSION

One hundred and thirty million babies are estimated to be born each year; miserably, 4 million of them die within the first 28 days of life [2]. The first 24 hours of a newborn's life are when almost half of all infant deaths occur. Neonatal death rates are the most sensitive indicators of the availability, utilization, and value of maternity and

DOI: https://doi.org/10.54393/pjhs.v3i05.160

paediatric healthcare services [10]. In the current study, there were more newborn girls (932, 56.9%) than male infants (705, 43.1%) which is in contrast to local literature provided by Seyal et al., (68.73% male vs 31.27% female)[11], Seyal et al., (59.55% male versus 40.5% female)[12], and a study conducted in India (60% male versus 40% female). Our study's finding showed a female majority [13]. We observed that the more than half of the neonates presented on the first day after the Delivery and more than two third neonates presented within the first week if the life which is in line with figures from Lahore and Rawalpindi where 67.9% and 60.1% neonates were admitted during the first week of life, respectively [12, 14]. Out of the 1637 neonates admitted for the study, 411 (25.1%) cases of sepsis, 281 (17.16%) cases of birth asphyxia, 244 (14.9%) cases of preterm delivery, 227 (13.81%) cases of low birth weight, 128 (7.81%) cases of RDS, 88 (5.37%) cases of neonatal jaundice, 49 (2.9%) cases of TTN, and 209 (12.76%) cases of other cases were identified. Haider et al., stated that 1397 (25%) babies had sepsis, which is consistent with our observations. However, compared to our findings, the proportions of newborns presenting with RDS and BA were larger at 1088 (19.4%) and 1058 (19%) respectively [8]. The most frequent disease pattern, according to Shahani et al., was HIE grade I, which was followed by sepsis, preterm birth, and BA with 418 (18.59), 380 (16.90), 315 (14.01%), and 224 (9.96) cases, respectively [15]. In contrast to our findings, a study in Peshawar found that hyperbilirubinemia, severe infections, hypoxia, and congenital defects were the most frequent neonatal morbidities in Rawalpindi. Our findings concur with those of the study with the highest percentage of newborn sepsis [16]. Similar research from Asia revealed a different morbidity pattern in newborns, with sepsis accounting for the highest percentage of cases (29%) respiratory distress syndrome (23.8%), jaundice (7%), and meconium aspiration syndrome (5.5%) [17]. Among the measures of children's health one of the important indicators is neonatal mortality. Nearly 50% of neonatal mortality occur within the first 24 hours, and 75% occur within the first 7 days of life [2]. Out of 1637 neonates admitted in the current study, 789 (48.1%) were discharged after improvement, 352 (21.5%) were referred for admission to better facilities nearby, 245 (14.9%) left the hospital on their own without alerting hospital staff, and 251 (15.3%) neonates died in the ward. The neonatal mortality was noticeably lower than that reported by Shahani et al., in their research done in Pakistan, which reported that 506 (23.26%) neonatal deaths among neonates admitted at the hospital [15]. Our reported neonatal mortality is nearly analogous to published research by Yasmin et al., (123/1000) from Bangladesh [18]. Sepsis has been observed to be the most common presentation pattern in our study. Mothers with antenatal sepsis endanger the health of neonate who can possibly develop neonatal sepsis proceeding to one of the leading causes for admission in developing countries [19]. Nearly 22-66% of all booking in neonatal wards are due to infections which causes almost 70% and almost 70% of all neonatal deaths [20]. Preterm birth was the second most frequent illness pattern in the current investigation, after sepsis. Hussain et al., conducted a study at the neonatal section of the Combined Military Hospital Kharian and came to the conclusion that our policymakers might sufficiently prevent preterm delivery by implementing specific actions [21]. However, the World Health Assembly set six global nutrition targets to be met by 2025 during its 2012 session. 30 percent reduction in LBW was one of these six goals [22]. With these numbers in hand, the current situation, and the most recent research, it appears to be rather difficult to control low birth weight and reach the objective within the next few years. Therefore, reducing first week newborn mortality through essential interventions and techniques can help us attain Millennium Development Goal 4 (MDG4) in Pakistan.

CONCLUSIONS

According to the study's findings, the most prevalent morbidity patterns at the study site were sepsis, birth asphyxia, preterm birth, and low birth weight. Less than half of the newborns who were admitted could improve during the admission. More than 15% of newborn deaths is of great concern. District and provincial governments, as well as policymakers, should take action to reduce early neonatal mortality by effectively managing neonatal illnesses.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Agrawal R, Singh S, Gupta R, Agarwal G, Jain A. Morbidity and Mortality pattern among neonates admitted in a Special Newborn Care Unit of Central India: A Retrospective Observational Study. European Journal of Molecular & Clinical Medicine. 2022 Mar; 9(3):476-89.

[2] Lawn JE, Cousens S, Zupan J; Lancet Neonatal Survival Steering Team. 4 million neonatal deaths: when? Where? Why? Lancet. 2005 Mar; 365(9462): 891-900. doi: 10.1016/S0140-6736(05)71048-5

[3] He C, Liu L, Chu Y, Perin J, Dai L, Li X, et al. National

DOI: https://doi.org/10.54393/pjhs.v3i05.160

and subnational all-cause and cause-specific child mortality in China, 1996-2015: a systematic analysis with implications for the Sustainable Development Goals. Lancet Global Health. 2017 Feb; 5(2):e186-e197. doi: 10.1016/S2214-109X(16)30334-5

[4] Shane AL, Sánchez PJ, Stoll BJ. Neonatal sepsis. Lancet. 2017 Oct; 390(10104):1770-1780. doi: 10.1016/S0140-6736(17)31002-4

[5] Wang XY and Liu YJ. Analysis on disease pattern and causes of death of 11,769 hospitalized newborn infants. Chinese Journal of Pediatrics. 2003 Jul; 41(7):551-2. Chinese

[6] Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? Lancet. 2003 Jun; 361(9376):2226-34. doi: 10.1016/S0140-6736(03) 13779-8

[7] World Health Organization. Neonatal and perinatal mortality: country, regional and global estimates. World Health Organization; 2006.

[8] Shirazi H. Morbidity and Mortality pattern of Newly born babies in a teaching hospital. Journal of Rawalpindi Medical College. 2015 Dec; 19(3):204-8.

[9] Pakistan has the world's highest newborn mortality rate, reveals UNICEF report. Available at: https:// www.dawn.com/news/1390592.

[10] Ugwu GI. Pattern of morbidity and mortality in the newborn special care unit in a tertiary institution in the Niger Delta region of Nigeria: A two year prospective study. Global Advanced Research Journal of Medicine and Medical Sciences. 2012 Jul; 1(6):133-8.

[11] Ali Akbar S, Ali Raza B, Arbab Ali J. Pattern and outcome of admissions to neonatal unit of tertiary care hospital Nawabshah. Medical Forum Monthly. 2012; 23(3): 16-19

[12] Seyal T, Husnain F, Anwar A. Audit of neonatal morbidity and mortality at Neonatal Unit of Sir Gangaram Hospital Lahore. Annals of King Edward Medical University. 2011; 17(1):9-.

[13] Kumor MK, Thakur SN, Singh BB. Study of morbidity and the mortality patterns in NICU at tertiary care teaching hospital in Rohtas district, Bihar, India. JCDR2012. 2012; 6(2):282-5.

[14] Zulfqar R. Neonatal mortality: Review from a tertiary hospital in Rawalpindi. Journal of Rawalpindi Medical College. 2009 Jun; 13(1):2-6.

[15] Shahani Z, Shaikh AR, Gemnani VK, Abro K, Aizuddin AN, Manaf MR, et al. Neonatal Morbidity Patterns and Admission Outcomes: A Cross Sectional Study at a Tertiary Care Hospital in Pakistan. Journal of Pharmaceutical Research International. 2022 Jan; 72-6.

[16] Shahid R, Sabir SA, Bilal S, Sheikh AR, Nasim S, Qureshi M. Pattern and maternal determinants of neonatal morbidity in tertiary care hospitals of Rawalpindi medical university, Pakistan. Rawal Medical Journal. 2022 Jan; 47(1):101-.

[17] Thammanna PS, Sridhar PV, Sandeep M. Morbidity pattern and hospital outcome of neonates admitted in a tertiary care teaching hospital, Mandya. International Journal of Scientific Study. 2015; 3(6):126-9.

[18] Yasmin S, Osrin D, Paul E, Costello A. Neonatal mortality of low-birth-weight infants in Bangladesh. Bull World Health Organ. 2001; 79(7):608-14

[19] Anwer SK, Mustafa S, Pariyani S, Ashraf S, Taufiq KM. Neonatal sepsis: an etiological study. Journal of Pakistan Medical Association. 2000 Mar; 50(3):91-4

[20] Bhutta Z. Priorities in newborn care and development of clinical neonatology in Pakistan. JCPSP-Journal of the College of Physicians and Surgeons Pakistan. 1997; 7(6):231-4.

[21] Hussain S. Neonatal morbidity and mortality pattern in a tertiary care neonatal unit of a teaching hospital. Annals of Pakistan Institute of Medical Sciences. 2014; 10(1):7-11.

[22] World Health Organization. WHA global nutrition targets 2025: low birth weight policy brief. Geneva: World Health Organization. 2014.

DOI: https://doi.org/10.54393/pjhs.v3i05.162

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Psychosocial Risk Factors and Quality of Life Among Nurses Working in Public Sector Tertiary Care Hospitals of Peshawar, A Correlational Study

Lalkhaida[1*], Dildar Muhammad[2], Tariq Rahim[3], Hina Ajmal[4] and Nazma Bibi[5]

[1]Institute of Health Sciences, Peshawar, Pakistan
[2]Khyber Medical University, Peshawar, Pakistan
[3]Government College of Nursing, Kohat, Pakistan
[4]Naseem Nursing Institute, Peshawar, Pakistan
[5]Postgraduate College of Nursing, Peshawar, Pakistan

ARTICLE INFO

Key Words:
Psychosocial risk factors, Quality of life, Nurse, Tertiary care

How to Cite:
Lalkhaida, ., Muhammad, D. ., Rahim, T. ., Ajmal, H. . . ., & Bibi , N. . (2022). Psychosocial Risk Factors and Quality of Life Among Nurses Working in Public Sector Tertiary Care Hospitals of Peshawar, A Correlational Study : Psychosocial Risk Factors and Quality of Life among Nurses. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.162

***Corresponding Author:**
Lalkhaida
Institute of Health Sciences, Peshawar, Pakistan
lalkhaida@gmail.com

Received Date: 24th September, 2022
Acceptance Date: 11th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Psychosocial risk factors at nurse's work environment are the major threat to the professional well-being and health of nurses. Nurses in developing countries like Pakistan are not appreciated and valued as greatly as compared to Western states which are evinced by their very low pays and poor work conditions. These can lead to different consequences like affecting work abilities and poor quality of life. **Objectives:** To evaluate psychosocial risk factors and quality of life among nurses working in public sector tertiary care hospitals of Peshawar. **Methods:** A cross sectional (correlational) study was conducted to assess relationship between "Psychosocial risk factors" and "quality of life" (QOL) among registered nurses at public sector tertiary care hospitals of Peshawar. Copenhagen Psychosocial Questionnaire and WHO quality of life scales were used for data collection. Data was analyzed using SPSS version 23. **Results**: The mean age of nurses was mean 28.95 ±5.25 SD. In term of psychosocial risk factors, participants reported high mean score in all factors. Regarding quality of life, majority 63% reported having "Poor" while only 37% nurses have "Good" quality of life. There was negative correlation between quantitative demands, work pace, emotional demands, burnout and stress and offensive behaviours with participant's quality of life (p-value 0.001). While positive correlation was observed between recognition, social support and quality of life among studied nurses. **Conclusions**: This study found multiple factors of psychosocial environment at public sector hospitals of Peshawar. The poor psychosocial environment has potential influence on overall health and quality of life of nurses.

INTRODUCTION

Nursing is renowned and gratifying profession, however it is also known as a very hectic and stressful job [1, 2]. Due to the distinctive nature of the nursing profession where work rosters, work burden, coworkers behavior, environmental issues, patient cooperation, administrative features, nature of illnesses and family support directly affect the work routine [3]. Various psychosocial risks factors and stress induced by those factors have been extensively accepted as the global concern [4]. Quality of life is an important part of physical and psychological health, which can be affected by psychosocial risk factors [5]. Hence, the concept of quality of life is incomplete without considering work life, which is an important component in health care settings, particularly in nurses' work life [6]. Different psychosocial hazards in work environment are the major threat to the Quality of life (QOL) that has profound impact on the level of responsibility during the provision of primary healthcare facilities [5]. Similarly, burnout and stress are the ultimate outcomes of psychosocial risk factors. A descriptive cross sectional study from Peshawar reported that majority of nurses (81%) had job stress [7]. Nurses in developing countries such as Pakistan are not appreciated

DOI: https://doi.org/10.54393/pjhs.v3i05.162

and valued as greatly as compared to Western states which is evinced by their very low wages and poor work conditions [8]. This may result in attrition of job which may worsen the acute shortage being faced by Pakistan health care system [3, 9].

METHODS

A cross sectional study was conducted from July 1st to August 31, 2021 at public sector tertiary care hospitals of Peshawar. Sample size was calculated using Raosoft sample calculator, at 95% CI, 5% margin of error and 50% prevalence. The calculated sample size was 341. The rate of refusal was taken as 10% so the total sample was 375. A proportionate sample of 375 nurses was selected using simple random sampling technique from Hayatabad medical complex, Khyber teaching hospital and Lady reading hospital Peshawar. All male and female nurses having at least 1 year experience and willing to participate in study were included in the study. However nurses with any co morbidity like diabetes and any psychiatric illness were excluded from the study. Ethical approval was taken from ethical review board (ERB) of Khyber medical university. In addition, written informed consent was taken from each study participants. Psychosocial risk factors were measured with Copenhagen psychosocial questionnaire. The reliability of scales of COPSOQ III is ranging from Cronbach alpha of 0.7 to 0.9 [10]. The WHOQOL BREF covers four types of domains including physical, psychological, social and environmental domains and consists of 26 items. Alpha coefficient ranging from 0.71 to 0.86 has been found for the four subscales.

RESULTS

Socio demographic Variables	Categories	N (%)
Age	Equal or less than 24	57 (16.72)
	25-34 years	238 (69.79)
	35 to 60 years	46 (13.49)
Gender	Male	145 (42.52)
	Female	196 (57.48)
Marital Status	Married	147 (43.11)
	Unmarried	194 (56.89)
Educational Qualification	Diploma	147 (43.11)
	BSN	178 (52.20)
	Master's degree	16 (4.69)
Current Position	Charge nurse	309 (90.62)
	Head nurse	21 (6.16)
	Nursing Manager	11 (3.23)
Professional experience	1-5 years	234 (68.62)
	6-10 years	76 (22.29)
	11 years and above	31 (9.09)
	Regular	225 (65.98)

Table 1: Socio demographic information among participants

Figure 1 shows overall quality of life of nurses, majority 63% reported having "Poor" while only 37% nurses have "Good" quality of life.

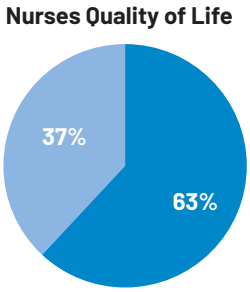

Figure 1: Quality of Life

Table 2 presents the transformed score with mean and standard deviation of all four domains of WHOQOL-BREF among participants

WHOQOL-BREF Domains	Mean ± SD
Physical health	49.18 ± 12.01
Psychological health	49.56 ± 12.91
Social relationships	46.76 ± 21.97
Environment	46.39 ± 16.12

Table 2: WHOQOL-BREF Domains Transformed Score (0-100)

Table 3 shows the relationship between psychosocial risk factors and domains of quality of life among nurses. Psychosocial risk factors were assessed using COPSOQ questionnaire. Seven features of nurses' work environment were evaluated: the demands at work place, work organization and job contents, interpersonal relationship and leadership, work individual interface, social capital, conflicts and offensive behaviours and general health and wellbeing. Higher mean in the scale of job demands were the indication of poor working conditions. Whereas the lowest mean in the resource scale i.e. interpersonal relationship and social capital were the evidence of unfavourable and worst working environment. In demands at work domain, participants reported high mean score in "work pace" (67.38 ± 26.58 SD), followed by quantitative demands (60.39 ± 24.44 SD), emotional demands (60.31 ± 21.41SD) and demands for hiding emotions (56.33 ± 20.44SD). Regarding work organization and job contents, the highest mean score was observed in "meaning of work" (68.73 ± 27.99) influence at work (56.80 ± 20.30) possibilities for development (54.11 ± 31.47) while the lowest score was reported in control over working time (38.53 ± 26.15). Interpersonal relationship and leadership subscale mean score was lowest in "Recognition" (41.50 ± 24.05), quality of leadership (46.73 ± 23.82) predictability (47.29 ± 25.74) and social support from colleagues (49.78 ± 26.76). Highest score was reported in the dimension of role clarity (61.36 ± 22.55). The scale related to job satisfaction was lowest mean value (3.0 ± 0.87), that proved that nurses were dissatisfied from their job. Quality of work score was in average limit (51.76 ± 27.46) while "work life conflict" mean

DOI: https://doi.org/10.54393/pjhs.v3i05.162

score was highest (64.04 ± 22.70) among all dimensions that indicate that nurses personal life is in conflict with their job. Mean score of "horizontal trust" (58.43 ± 27.66) vertical trust (56.13 ± 25.74) organizational justice (41.20 ± 27.31). Vertical Trust deals with whether the employees can trust the management and vice versa while Horizontal Trust deals with whether the employees can trust each other in daily work or not. The highest mean score in this domain was bullying (37.74 ± 33.08) followed by "gossips and slander" (35.12 ± 33.33) unpleasant teasing (30.28 ± 31.06) physical violence (29.25 ± 31.80) cyber bullying (22.87 ± 31.75) conflicts and quarrels (21.55 ± 29.35). However, sexual harassment was lowest score (19.28 ± 28.83) among all dimensions. The highest mean score was observed in burnout (57.90 ± 26.78) and sleeping troubles (57.09 ± 24.27), which shown that the incidence of burnout and sleeping troubles was high among nurses.

Psychosocial risk factors	Physical Health	Psychological health	Social relationship	Enviro-nment
		Correlation coffiencent ®		
Quantitative demands	-0.104	-.247**	-.061	-.386**
Work pace	-.223**	-.338**	-.229**	-.348**
Emotional demands	-.123*	-.172**	-.027	-.298**
Demands for hiding emotions	-.111*	-.155**	-.093	-.347**
Influence at work	-.207**	-.117*	-.255**	-.240**
Possibility for the development	0.017	.139*	.247**	.147**
Control over working time	0.077	-.060	.198**	.009
Meaning of work	-0.023	.018	-.005	-.136*
Predictability	0.045	.077	.253**	.136*
Recognition	0.061	.120*	.139*	.234**
Role clarity	0.006	.120*	.099	.064
Role conflict	-0.004	-.075	.088	-.120*
Illegitimate tasks	-.131*	-.192**	-.005	-.159**
Quality of leadership	-.153**	.003	.079	-.015
Social support from supervisor	.180**	.085	.096	.217**
Social support from colleagues	.208**	.135*	.265**	.291**

Table 3: Psychosocial risk factors and Quality of Life

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

Nowadays, Nurses are facing multiple work related psychosocial risk factors in hospitals which have profound impact on their wellbeing and quality of life. The present study was conducted to investigate all such psychosocial risk factors and examined the nurses' quality of life. Regarding demands at work, nurses reported high score for work pace and quantitative demands. This situation may be due to the reason that Pakistan is facing acute shortage of nurses and the nursing workforce has mostly been ignored [9, 10]. Work burden is the main cause of anxiety in the hospital settings [11]. These findings are consistent with other studies that explained that demands at workplace were high on nurses [12, 13]. Regarding work organization and job contents, nurses reported highest mean value for meaning of work. It is a work related positive attitude that is manifested by strength, commitment, and interest [14]. On the other hand, the lowest score was reported in control over working time which indicated that nurses are facing unpredicted work schedules and lengthy working hours. Interpersonal relationship and leadership is the positive psychosocial aspect of work environment. Competent and efficient leadership is fundamental for the improvement and success of health care organizations [15]. Unfortunately, based on the results of this study, the lowest score was found in subscales including recognition, quality of leadership, and social support from colleagues. These findings show that majority of nurses are facing lack of recognition, haven't good leadership. These results are not consistent with previous studies conducted in china and Serbia [5]. Their scores were relatively better than the present study. In Pakistan, Displeasure of nurses regarding their job is badly disturbing the provision of quality healthcare services to patients [16]. In the present study, the job satisfaction scale was lowest mean value that proved that nurses were dissatisfied from their job. This result is similar with the study conducted in Karachi [17, 18]. Quality of work score was in average limit and dissimilar with previous study that reported good quality of work among nurses [19, 20] while "work life conflict" mean score was highest among all dimensions that indicate that nurses' personal life is potentially affect due to the nature of their job. Active utilization of time by worker is very necessary to prevent this conflict [21]. The findings of previous study regarding work life conflict is also consistent with our result [11]. In the present study, the organizational justice score was lower than the average. This suggests that nurses are exposed to unfair environment and facing discrimination at their workplace. Past research studies have also revealed that injustice and reduced organizational support is the contributed factor for stress and anxiety among nurses [2]. "American Nursing Centre" considered bullying at workplace as a very damaging factor and associated with symptoms of hopelessness, depression and anxiety in nurses [22]. Several Research studies had explored that nurses are more vulnerable to sexual harassment due to their close contact with opposite sex patients, medical assistants, caregivers, paramedical staff, doctors and administrative staff [23]. In this study, Nurses reported average mean score of bullying, gossips, slander, physical violence and sexual violence at their work environment. These findings are also congruent with other studies [6, 23]. Improper sleep is the major cause of health issues such as depression, hypertension, and many heart diseases. Nurses' sleep troubles can have major effects on their attention, decision-making and communication [24]. The

DOI: https://doi.org/10.54393/pjhs.v3i05.162

highest mean score was observed in burnout and sleeping troubles .Similar results were reported from other studies that also found high level of burnout among participants [25]. Regarding overall quality of life, majority 62.76% reported having "Poor" while only 37.24% nurses have "Good" quality of life. These findings were not supported by previous study that reported majority of participants have good quality of life [17, 18]. The present study found negative correlation between quantitative demands, work pace and emotional demands with participant's quality of life. This suggests that high work demands have negative impacts on nurses' quality of life and can cause stress among nurses. These findings were congruent with study conducted previously [20]. Meanwhile, offensive behaviors i.e. bullying, physical and sexual violence have negative impact on quality of life and nurses' health. This may result in poor job performance by nurses like lack of enthusiasm and consideration in performing duty. 21 In present study burnout and stress were also negatively correlated with nurses' quality of life health. Previous studies strongly support these findings. Burnout brings to have harmful consequences for health-care workers, such as broken relationships, challenging substance and alcohol use, and suicidal ideations [12].

CONCLUSIONS

The present study discovered multiple positive and negative aspects of psychosocial environment at public sector hospitals of Peshawar. The poor psychosocial environments have potential impact on physical and mental health of nurses. Demands at work, Burnout and lack of social support were the major cause of job dissatisfaction and poor quality of life among nurses. It is very mandatory for nursing management to plan and implement policies to improve working environment and lessen stress at work that can eventually improve the health and well-being of nurses.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Badil B, Shah H, Ur-Rehman R, Ali SA, Siddiqui A. Occupational Stress among Nurses of Tertiary Care Hospitals in Karachi, Pakistan. Journal of the Dow University of Health Sciences. 2016 Dec; 10(3):96-100. doi: 10.36570/jduhs.2016.3.474

[2] Ghavidel F, Fallahi-Khoshknab M, Molavynejad S, Zarea K. The role of organizational factors in nurse burnout: Experiences from Iranian nurses working in psychiatric wards. Journal of Family Medicine and Primary Care. 2019 Dec; 8(12):3893-3899. doi: 10.4103/jfmpc.jfmpc_615_19

[3] Shahzad MN, Ahmed MA, Akram B. Nurses in double trouble: Antecedents of job burnout in nursing profession. Pakistan Journal of Medical Sciences. 2019 Aug; 35(4):934-939. doi: 10.12669/pjms.35.4.600

[4] Javaid MU, Isha ASN, Sabir AA, Ghazali Z, Nübling M. Does Psychosocial Work Environment Factors Predict Stress and Mean Arterial Pressure in the Malaysian Industry Workers? Biomed Research International. 2018 Jan; 2018:9563714. doi: 10.1155/2018/9563714

[5] Asante JO, Li MJ, Liao J, Huang YX, Hao YT. The relationship between psychosocial risk factors, burnout and quality of life among primary healthcare workers in rural Guangdong province: a cross-sectional study. BMC Health Services Research. 2019 Jul; 19(1):447. doi: 10.1186/s12913-019-4278-8

[6] Kirlioğlu M and Toygar ŞA. The Effects of Sexual Harassment on Quality of Nurses' Work Life and Turnover Intentions: A Sample of Ankara Province. OPUS International Journal of Society Researches. 2020; 16(29):1613-27. doi: 10.26466/opus.775992

[7] Khan N, Anwar H, Sayed M. Prevalence of Stress Factors in Nurses in Leady Reading Hospital (LRH), Khyber Teaching Hospital (KTH) and Hayatabad Medical Complex (HMC) Hospitals, Peshawar, KPK. International Journal of Innovative Research and Development. 2015; 4(4)

[8] Naz S, Hashmi AM, Asif A. Burnout and quality of life in nurses of a tertiary care hospital in Pakistan. Journal of Pakistan Medical Association. 2016 May; 66(5):532-6.

[9] Parveen S. Acute shortage of nursing professional in Pakistan. Texila International Journal of Nursing. 2016; 2:1-6. doi: 10.21522/TIJNR.2015.02.01.Art020

[10] Burr H, Berthelsen H, Moncada S, Nübling M, Dupret E, Demiral Y, et al. The Third Version of the Copenhagen Psychosocial Questionnaire. Safety and Health Work. 2019 Dec; 10(4):482-503. doi: 10.1016/j.shaw.2019.10.002

[11] Alomani QF. The mediating role of emotional exhaustion and work engagement on the relationship between job demands-resources and nurses' anxiety, turnover intention, and happiness in Saudi public hospitals (Doctoral dissertation, Brunel University London). 2016

[12] Ullah H, Sehrish A, Anwar CH, Rana SM. Factors Influencing Job Satisfaction of Nurses In Public And

DOI: https://doi.org/10.54393/pjhs.v3i05.162

Private Sector's Hospitals: A Cross Sectional Study. Pakistan Journal of Public Health. 2018 Dec; 8(3):147-51. doi: 10.32413/pjph.v8i3.177

[13] Kwak Y, Han Y, Song JS, Kim JS. Impact of emotional labour and workplace violence on professional quality of life among clinical nurses. International Journal of Nursing Practice. 2020 Feb; 26(1):e12792. doi: 10.1111/ijn.12792

[14] Vaksalla A and Hashimah I. How hope, personal growth initiative and meaning in life predict work engagement among nurses in Malaysia private hospitals. International Journal of Arts & Sciences. 2015 Jan; 8(2):321.

[15] Mohsin Z, Shahed S, Sohail T. Correlates of professional quality of life in nurses. Annals of King Edward Medical University. 2017; 23(4):1-5. doi: 10.21649/journal.akemu/2017/23.4.474.478

[16] Dahri AS, Hameed WU, Nawaz M, Sami A, Bux Shah SK. Nurses' Job Satisfaction is Burned out by their Leaders and Stress. Journal of Managerial Sciences. 2019 Apr; 13(2).

[17] Ahmed T, Ali A, Rasheed A, Naz S. Compassion Satisfaction, Fatigue and Burnout Among Nurses Working In Clinical Departments at a Tertiary Care Hospital In Karachi. Pakistan Journal of Physiology. 2019 Sep; 15(3):19-22.

[18] Suleiman K, Hijazi Z, Al Kalaldeh M, Abu Sharour L. Quality of nursing work life and related factors among emergency nurses in Jordan. Journal of Occupational Health. 2019 Sep; 61(5):398-406. doi: 10.1002/1348-9585.12068

[19] Khan S. The prevalence of patientsâ€™ satisfaction with nursing care in tertiary care hospital, Peshawar. Northwest Journal of Medical Sciences. 2018 Jul 19.

[20] Waqar S and Hamid S. Job satisfaction among nurses in public and private hospitals of rawalpindi and islamabad. Pakistan Journal of Public Health. 2016; 6(4):44-8. doi: 10.32413/pjph.v6i4.14

[21] Fernandes C and Pereira A. Exposure to psychosocial risk factors in the context of work: a systematic review. Revista de Saude Publica. 2016; 50:24. doi: 10.1590/S1518-8787.2016050006129

[22] Homayuni A, Hosseini Z, Aghamolaei T, Shahini S. Which nurses are victims of bullying: the role of negative affect, core self-evaluations, role conflict and bullying in the nursing staff. BMC Nursing. 2021 Apr; 20(1):57. doi: 10.1186/s12912-021-00578-3

[23] Mushtaq M, Sultana S, Imtiaz I. The trauma of sexual harassment and its mental health consequences among nurses. Journal of the College of Physicians and Surgeons Pakistan. 2015 Sep; 25(9):675-9.

[24] Portela LF, Kröning Luna C, Rotenberg L, Silva-Costa A, Toivanen S, Araújo T, et al. Job strain and self-reported insomnia symptoms among nurses: what about the influence of emotional demands and social support?. BioMed research international. 2015 Oct; 2015.

[25] Ilić IM, Arandjelović MŽ, Jovanović JM, Nešić MM. Relationships of work-related psychosocial risks, stress, individual factors and burnout - Questionnaire survey among emergency physicians and nurses. Medycyna Pracy. 2017 Mar; 68(2):167-178. doi: 10.13075/mp.5893.00516.

DOI: https://doi.org/10.54393/pjhs.v3i05.198

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Biochemical Effects of Oral Contraceptive Pills on Serum Bilirubin, Creatinine and Antioxidants System Among Females

Muhammad Jamil[1*], Muhammad Zafar Iqbal Butt[2], Shahzaman Khan[3], Aftab Ahmad Jan[4], Sumaiya Amanat Ali[5], Alamgir Khan[2], Zeliha Selamoglu[6], Javed Ali Soomro[1], Ata Ur Rehman[7]

[1]Center of Physical Education, Health & Sports Sciences, University of Sindh, Jamshoro, Sindh
[2]Department of Sports Sciences and Physical Education, University of the Punjab, Lahore, Pakistan
[3]Department of Physical Education and Sports Sciences, Sukkur Institute of Business Administration, Sukkur, Pakistan
[4]Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Gomal University, Dera Ismail Khan, KPK, Pakistan
[5]Faculty of Health and Medicine USYD, Sydney, Australia
[6]Department of Medical Biology, Faculty of Medicine, Nigde Ömer Halisdemir University, Nigde, Turkey
[7]Institute of Biological Sciences, Gomal University, Dera Ismail Khan, KPK, Pakistan

ARTICLE INFO

Key Words:
Serum bilirubin, Serum Creatinine, Oxidative Stress, Oral Contraceptive Pills

How to Cite:
Jamil, M. ., Iqbal Butt, M. Z. ., Khan, S. ., Ahmad Jan, A., Amanat Ali, S. ., Khan, A. ., Selamoglu, Z. ., Ali Soomro, J. ., & Rehman, A. U. . (2022). Biochemical Effects of Oral Contraceptive Pills on Serum Bilirubin, Creatinine and Antioxidants System Among Females: Oral Contraceptive Pills on Serum Bilirubin, Creatinine and Antioxidants System. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.198

***Corresponding Author:**
Muhammad Jamil
Punjab Highway Patrolling Police, Lahore, Pakistan
meharjamil88@gmail.com

Received Date: 05th October, 2022
Acceptance Date: 15th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Both estrogens and progestogens antifertility agents are used by huge number of females. Excessive use of antifertility agents caused toxic effects on body systems. Liver play its key role in the metabolic process of these toxic antifertility agents. **Objective:** To examine the biochemical effects of oral contraceptive pills on serum bilirubin, creatinine and antioxidants system among females. **Methods:** Participants of the study were categorized in to two groups i.e. control group (CG) (female using no contraceptive pills) and experimental group (EG) (females using contraceptive pills). Five (05) ml of blood was collected from each subject by vein cut and an expendable syringe. All blood samples were marked with separate identification code or mark. Ferric reducing assay protocol (FRAP) was applied for measuring oxidative stress and liver functions test (LFTs) was performed for measuring serum bilirubin and creatinine. **Results:** The collected data were tabulated and were analyzed by using mean, standard deviation, frequency and percentage etc. through the application of statistical package for social sciences (SPSS, version-26.0). **Conclusions:** Based on analysis the researcher draws the conclusion that oral contraceptive pills (OCP) have significant effect on serum bilirubin (p-value was 0.004), serum creatinine (p-value 0.023) and oxidative stress (p-value 0.002).

INTRODUCTION

Both estrogens and progestogens antifertility agents are used by huge number of females. Excessive use of antifertility agents caused toxic effects on body systems. Liver play its key role in the metabolic process of these toxic antifertility agents. By having direct or indirect relation of liver, it is important to know the physiological and pathological vitality of these agents [1]. Liver produces different enzymes having different functions [2,3]. Contraceptive pills cause disturbance in liver cell and biliary secretion and liver tumor among the female, [4]. Liver tumor caused by oral contraceptive pills of two types i.e. tumors may be of two types either tumor made from blood vessel or round shape tumor. Mostly it was benign tumor but some time contingent upon the body state it become malicious [5]. Liver metabolize many poisonous and toxic compounds from blood thus long use of oral

DOI: https://doi.org/10.54393/pjhs.v3i05.198

contraceptive can damage the liver [6]. Use of estrogen and progesterone hormones caused gal stone formation, cholestasis and also venous thrombosis in liver [7]. Literally 80% bilirubin is resultant to breakdown of hemoglobin (means part of hemoglobin, myoglobin, cytochromes, catalase, peroxidase, etc.) [8]. Actually it is toxic in nature but body has natural mechanism for making it clean and usable [9-11]. 20% bilirubin is found in tissues like liver and muscles. 4mg/kg of body weight bilirubin is produced on daily basis by the body [12-14]. Drugs effect liver enzymes particularly bilirubin level. In addition, drugs also damage the liver cell [15]. Drugs like diazepam and oxytocin both effect the level of bilirubin concentration [16]. Evaluated blood pressure in a major cause of cardiovascular problems and also considered a leading cause of many health problems [17]. Serum bilirubin is one among the powerful antioxidants and helps in reducing the chances of cardiovascular problems [18, 19]. Creatinine is a waste product resultant to normal wear and tears of the muscles and thus creatinine is found in blood stream of the body [20]. An evaluation of serum creatinine concentration reduces the level of glomerular filtration and caused rise in blood urea nitrogen [21]. Contraceptive pills significantly cause oxidative stress while oxidative stress causes the failure of kidney. In females using oral contraceptive pills the level of plasma rennin was significantly increase as compared to non-user the increase plasma rennin level leads to fundamental hypertension [22]. Just like other health complications among the users of contraceptive pills the user of oral contraceptive pills may at risk of cardiac problems. A great number of female may lead to death every year due to cardiac problems caused by oral contraceptive pills [23]. As a result of all the above critical discussion, it is obvious to say that medicines caused different enzymatic changes in body. What changes accurse in serum bilirubin, creatinine and antioxidant system? To discover the fact, the researchers intend to carry a research study under the title "Biochemical effects of oral contraceptive pills on serum bilirubin, creatinine and antioxidants system among females"

METHODS

Below procedures were adopted by the researcher for reaching at certain findings and conclusion. The participants of the study were comprised of females (user and non-user of contraceptive pills (OCP). Thus participants of the study were categorized in to two groups i.e. control group (CG)(female using no contraceptive pills) and experimental group (EG)(females using contraceptive pills). Control group (CG) was comprised of 24 subjects and experimental group (EG) was comprised of 60 subjects. Furthermore, the selection criteria for participants were; Subject using contraceptive pills from minimum duration of one (01) year, subjects aging not less 20 years and more 30 years, subjects who voluntarily participate in the study, subject using no other kind of medication instead of OCP and subjects having no chronic health problems. Five (05) ml of blood was collected from each subject by vein cut and an expendable syringe and quickly move into serum accumulation gel tubes and thus each sample was marked with separate identification mark. Ferric reducing assay protocol (FRAP) introduced by Benzie I.F., Strain J (1996) was applied for measuring oxidative stress and liver functions test (LFTs) was performed for measuring serum bilirubin and creatinine. For the assessment of oxidative stress all the principles of FRAP was applied accordingly as suggested by Benzie I.F., Strain J (1996). Collected data were tabulated and examined by using mean, standard deviation, frequency and percentage etc. through the application of statistical package for social sciences (SPSS, version-26.0).

RESULTS

Table 1 shows the frequency and percentage of subjects. The total number of respondents aging 20-25 were 45 (53.57%) and the subjects aging 26 to 30 years were 9 (46.42%).

Age	Frequency (%)
20-25 Years	45 (53.57%)
26-30 Years	39 (46.42%)
Total	84 (100)

Table 1: Age-wise frequencies and percentages of subjects

Table 2 shows the comparison of both CG and EG in term of serum bilirubin. Data were expressed in term of mean a, standard deviation and p-value. Mean and standard deviation of CG was 0.967± 0.25. Mean and standard deviation of EG 1.3833 ± 0.66081. T value of both CG and EG was -2.994, df was 82 and p value was 0.004.

Comparison of control and subject		Number	M+SD	DF	T	P-value
Serum billrubin mg/dl	CG	24	.967±.251			-2.994
	EG	60	.38±.661	82	-2.994	

Table 2: Comparison of CG and EG in term of Serum bilirubin mg/dl.

Table 3 shows the comparison of both CG and EG in term of serum creatinine. Data were expressed in term of mean a, standard deviation and p-value. Mean ± SD of CG was 0.93± 0.21. Mean ± SD of EG 0.95 ± 0.25. T value of both CG and EG was -0.448, df was 82 and p value was 0.655.

Comparison of control and subject		Number	M+SD	DF	T	P-value
Serum Creatinine mg/dl	CG	24	.93±.21			.655
	EG	60	.95±.25	82	-.448	

Table 3: Comparison of CG and EG in term of Serum creatinine

DOI: https://doi.org/10.54393/pjhs.v3i05.198

Table 4 shows the comparison of both CG and EG in term of FRAP. Data were expressed in term of mean a, standard deviation and p-value. Mean ± SD of CG was 137.95 ± 20.9. Mean ± SD of EG 110.54 ± 39.2. T value of both CG and EG was 3.236, df was 82 and p-value was 0.002.

Normal and subjects comparison		Number	M+SD	DF	T	Sig. (2-Tailed)
Ferric reducing antioxidant power assay	CG	24	137.95±20.9			.002
	EG	60	110.54±39.2	82	3.236	

Table 4: Comparison of CG and EG in term of FRAP

DISCUSSION

It is found that oxidative stress was primarily allied with oral contraceptive pills (OCP). Such emerging concept was supported by Pincemail et al., [24]. They further concluded that OCP caused or lead the body towards oxidative stress. He further indicated that OCP was not only source of oxidative stress but it also caused letdown of entire body functions. Present study finds that contraceptive pills have a significant effect on the liver cells. This finding was also supported by of the previous research studies conducted by Shojania by stating that drugs effect the liver functions. Oral contraceptives disturbed the biliary secretion as well as damage to liver cells. The studies conducted by Dourakis et al., supported that present study by indicating that oral contraceptive pills affected the functional capacity of liver [26]. The study conducted by Lim et al., revealed that systolic blood pressure is inversely concerned with serum bilirubin concentration which caused hypertension. The findings of the study showed that cardiovascular risk is totally concerned with serum bilirubin [27-30].

CONCLUSION

On the basis of data analysis and findings, it is concluded that oral contraceptive pills caused significant effects on serum bilirubin and creatinine. In addition, it also indicated by findings of the study that OCP caused oxidative stress.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Hargreaves T. Oral contraceptives and liver function. Journal of Clinical Pathology. 1969 Jan; 1(1): 1-0. doi: 10.1136/jcp.s1-3.1.1

[2] Giannini EG, Testa R, Savarino V. Liver enzyme alteration: a guide for clinicians. Canadian Medical Association Journal. 2005 Feb; 172(3):367-79. doi: 10.1503/cmaj.1040752.

[3] Limdi JK and Hyde GM. Evaluation of abnormal liver function tests. Postgraduate Medical Journal. 2003 Jun; 79(932):307-12. doi: 10.1136/pmj.79.932.307.

[4] Shojania AM, Hornady GJ, Barnes PH. The effect of oral contraceptives on folate metabolism. American Journal of Obstetrics and Gynecology 1971 Nov; 111(6):782-91. doi: 10.1016/0002-9378(71)90489-3.

[5] Makhlouf HR, Ishak KG, Goodman ZD. Epithelioid hemangioendothelioma of the liver: a clinicopathologic study of 137 cases. Cancer. 1999 Feb; 85(3):562-82. doi: 10.1002/(sici)1097-0142(19990201)85:3<562: aid-cncr7>3.0.co;2-t.

[6] Kurzweil R and Grossman T. Fantastic voyage: live long enough to live forever. Rodale; 2005 Sep.

[7] Dourakis SP and Tolis G. Sex hormonal preparations and the liver. European Journal of Contraception and Reproductive Health Care. 1998 Mar; 3(1):7-16. doi: 10.3109/13625189809167479.

[8] Kalakonda, A, Jenkins BA, John S. 2017. Physiology, bilirubin.

[9] Kosmachevskaya OV and Topunov AF. Alternate and Additional Functions of Erythrocyte Hemoglobin. Biochemistry (Mosc). 2018 Dec; 83(12):1575-1593. doi: 10.1134/S0006297918120155.

[10] Dosch AR, Imagawa DK, Jutric Z. Bile Metabolism and Lithogenesis: An Update. Surgical Clinics of North America. 2019 Apr; 99(2):215-229. doi: 10.1016/j.suc.2018.12.003.

[11] Shen H, Zeng C, Wu X, Liu S, Chen X. Prognostic value of total bilirubin in patients with acute myocardial infarction: A meta-analysis. Medicine (Baltimore). 2019 Jan; 98(3): e13920. doi: 10.1097/MD.0000000000013920.

[12] Hinds TD Jr and Stec DE. Bilirubin, a Cardiometabolic Signaling Molecule. Hypertension. 2018 Oct; 72(4):788-795. doi: 10.1161/Hypertensionaha.118.11130.

[13] Ngashangva L, Bachu V, Goswami P. Development of new methods for determination of bilirubin. Journal of Pharmaceutical and Biomedical Analysis 2019 Jan; 162:272-285. doi: 10.1016/j.jpba.2018.09.034.

[14] Roy-Chowdhury J, Roy-Chowdhury N, Listowsky I, Wolkoff AW. Drug-and Drug Abuse–Associated Hyperbilirubinemia: Experience with Atazanavir. Clinical pharmacology in drug development. 2017 Mar; 6(2):140-146. doi: 10.1002/cpdd.314.

[15] Drew JH and Kitchen WH. The effect of maternally administered drugs on bilirubin concentrations in the newborn infant. The Journal of Pediatrics. 1976 Oct; 89(4):657-61. doi: 10.1016/S0022-3476(76)80413-1

[16] Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk

DOI: https://doi.org/10.54393/pjhs.v3i05.198

factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. The lancet. 2012 Dec; 380(9859):2224-60.

[17] Rodrigues C, Rocha S, Nascimento H, Vieira E, Santos R, Santos-Silva A, et al. Bilirubin levels and redox status in a young healthy population. Acta Haematologica. 2013; 130: 57-60. doi: 10.1159/000346429

[18] Bélanger S, Lavoie JC, Chessex P. Influence of bilirubin on the antioxidant capacity of plasma in newborn infants. Neonatology. 1997; 71(4): 233-8. doi: 10.1159/000244422

[19] Perrone RD, Madias NE, Levey AS. Serum creatinine as an index of renal function: new insights into old concepts. Clinical Chemistry. 1992; 38: 1933-53. doi: 10.1093/clinchem/38.10.1933

[20] Inker LA and Perrone RD. Assessment of kidney function. Waltham, MA. Accessed. 2014 May; 9.

[21] Lyman JL. Blood urea nitrogen and creatinine. Emergency medicine clinics of North America. 1986 May; 4(2): 223-33. doi: 10.1016/S0733-8627(20)30997-4

[22] Ribstein J, Halimi JM, Du Cailar G, Mimran A. Renal characteristics and effect of angiotensin suppression in oral contraceptive users. Hypertension. 1999 Jan; 33(1):90-5. doi: 10.1161/01.HYP.33.1.90

[23] Tanis BC, Van Den Bosch MA, Kemmeren JM, Cats VM, Helmerhorst FM, Algra A, et al. Oral contraceptives and the risk of myocardial infarction. New England Journal of Medicine. 2001 Dec; 345(25): 1787-93. doi: 10.1056/NEJMoa003216

[24] Pincemail J, Vanbelle S, Gaspard U, Collette G, Haleng J, Cheramy-Bien JP, et al. Effect of different contraceptive methods on the oxidative stress status in women aged 40–48 years from the ELAN study in the province of Liege, Belgium. Human Reproduction. 2007 Aug; 22(8): 2335-43. doi: 10.1093/humrep/dem146

[25] Shojania AM. Effect of Oral Contraceptives On Vitamin-B12, Metabolism. The Lancet. 1971 Oct; 298(7730): 932. doi: 10.1016/S0140-6736(71)92552-9

[26] Dourakis SP and Tolls G. Sex hormonal preparations and the liver. The European Journal of Contraception & Reproductive Health Care. 1998 Jan; 3(1):7-16. doi: 10.3109/13625189809167479

[27] Lin JP, O'Donnell CJ, Schwaiger JP, Cupples LA, Lingenhel A, et al. Association between the UGT1A1* 28 allele, bilirubin levels, and coronary heart disease in the Framingham Heart Study. Circulation. 2006 Oct; 114(14):1476-81. doi: 10.1161/CIRCULATIONAHA.106.633206

[28] Djoussé L, Levy D, Cupples LA, Evans JC, D'Agostino RB, Ellison RC. Total serum bilirubin and risk of cardiovascular disease in the Framingham offspring study. American journal of cardiology. 2001 May; 87(10): 1196-200. doi: 10.1016/S0002-9149(01)01494-1

[29] Madhavan M, Wattigney WA, Srinivasan SR, Berenson GS. Serum bilirubin distribution and its relation to cardiovascular risk in children and young adults. Atherosclerosis. 1997 May; 131(1): 107-13. doi: 10.1016/S0021-9150(97)06088-7

[30] Benzie IF, Strain JJ. The ferric reducing ability of plasma (FRAP) as a measure of "antioxidant power": the FRAP assay. Analytical Biochemistry. 1996 Jul; 239(1):70-6. doi: 10.1006/abio.1996.0292.

DOI: https://doi.org/10.54393/pjhs.v3i05.222

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

A Clinical Audit of Patients Suffering from an Acute Attack of Asthma Attending Emergency Department at Al-Nafees Medical College and Hospital Islamabad

Talal Ali[1*], Mubashir Rahim[2], Muhammad Azhar Majeed[3], Waleed Sabir[4], Naimat Ullah[5] and Muhammad Hamza[1]

[1]Al Nafees Medical College and Hospital, Islamabad, Pakistan
[2]Mardan Medical Complex, Mardan, Pakistan
[3]Hamad General Hospital, Doha, Qatar
[4]Dr Arshad Health Associates, Islamabad, Pakistan
[5]Women and Children Hospital MTI Bannu, Pakistan

ARTICLE INFO

Key Words:
Anxiolytics, Asthma, PEFR, Mechanical ventilation, Corticosteroids

How to Cite:
Ali, T., Rahim, M., Majeed, M. A. ., Sabir, W. ., Ullah, N. ., & Hamza, M. . (2022). A Clinical Audit of Patients Suffering from an Acute Attack of Asthma Attending Emergency Department at Al-Nafees Medical College and Hospital Islamabad: A Clinical Audit of Patients Suffering from an Acute Attack of Asthma. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.222

***Corresponding Author:**
Talal Ali
Al Nafees Medical College and Hospital, Islamabad, Pakistan
talalali7007@gmail.com

Received Date: 11th October, 2022
Acceptance Date: 22n October, 2022
Published Date: 31st October, 2022

ABSTRACT

Asthma has been considered historically a major chronic illness faced by human beings with recurrent attacks of breathlessness and expiratory wheezes especially in children and an old ages**. Objective:** To determine the pattern of patients suffering from an acute attack of asthma and being managed by the emergency departments. **Methods:** A prospective study conducted at Al-Nafees Medical College and hospital in emergency department on patients suffering from an acute attack of Asthma from May 2022 to September 2022. 300 patients were selected through convenience sampling and followed for three steps management. **Results:** On arrival 250 patients received PEFR with 162 measured before bronchodilation, 285 had oxygen saturation greater than 92%, 264 were assessed for SaO_2 on room air, 255 responded well with a SaO_2 overcrossing 92%. PEFR was measured after nebulization in 168 patients while both pre and post PEFR assessment was done in 27 .3 % patients Seventy eight received β2agonists by nebulizer. Intravenous theophylline was given to 52 patients, while corticosteroids were given to 44 patients as an initial treatment, 35 patients received IV fluids as a 1st line of management for an acute attack. Mechanical ventilation was used in 2 cases only. Supplemental oxygen was given to 14 without SpO_2 while with SpO_2 in 12 cases. Antibiotics were used in 16 cases and mucolytic in 6 only. IV corticosteroids were given in 14 cases and anxiolytics in only 4 cases. **Conclusions:** Overall emergency services at Al-Nafees medical college and hospital for patients' management with acute asthmatic attack were satisfactory.

INTRODUCTION

Asthma has been considered historically a major chronic illness faced by human beings with recurrent attacks of breathlessness and expiratory wheezes especially in children and an old ages. It is prevalent in most of the parts of the world [1]. This medical emergency face underdiagnoses and under treatment in various part of the world. In a report shared by "(PAHO)" in 1999 reported that, respiratory illnesses account more than 12% of all medical emergencies to be visited by the emergency department (ED) especially an acute attack of asthma [2]. In various parts of the world an acute attack are managed haphazardly at various hospitals and especially the situation is more horrible and pathetic in under developed countries like south Asian countries, African countries [3]. Asthma involves the mast cells, lymphocytes, macrophages and inflammatory mediators especially for the emergence of clinical sign and symptoms of an acute attack in all of the patients [4]. These symptoms result in airflow obstruction, chest tightness and coughing particularly at night or in the early hours of the morning [5]. Globally almost 300 million people of all ages suffer from an acute attack of asthma regardless of ethic and genetic

DOI: https://doi.org/10.54393/pjhs.v3i05.222

supposition or predisposition [6]. Advances in science has led to the development of advance techniques and erasing of agony faced by asthmatic patients in dire situations [7]. Guidelines given by Global Initiatives for asthma (GINA) and British guidelines on asthma management are practiced widely for managing an acute attack of asthma in an emergency department widely over the large part of the world [8]. American National Asthma Education and prevention program (NAEPP) protocols are widely used all over the world for management of an acute attack of asthma [9]. Assessment of the quality of asthma management is imperative in developing countries [10]. This clinical audit has been especially designed to see the application of standard protocols implemented in the emergency department for management of an acute attack of asthma and the deficiency marked to improve the status of the management standards for an acute attack of asthma at Al-Nafees medical college and hospital Islamabad.

METHODS

A prospective audit was done in the emergency department of the Al-Nafees medical college and hospital Islamabad investigating the sufferers of an acute attack of asthma seeking emergency medical care at an emergency department of the Al-Nafees medical college and hospital Islamabad between 1st May 2022 to 1st September 2022.Patients included in this an audit consist of 2 years of a child to an age to 83 years of an old one. Convenience sampling was used for subjects selection as this study is based on emergency seeking patients for management of an acute of asthma. British Adult asthma audit tool was used for reference to conduct this study.it assessed three stage criteria to assess, to manage and to discharge cases suffering from an acute attack of asthma. Peak expiratory flow rate (PEFR) was applied in an initial step, PEFR defined as "the maximal rate that a person can exhale during a short maximal expiratory effort after a full inspiration". Data were coded and SPSS 24 was used for statistical analysis. Fisher exact test and bivariate analysis was used for categorical variables. Students's *t*-tests used for analysis of age and PEFR analysis. Ethical approval was taken prior to conduction of study from Research and ethical board committee Al-Nafees medical college and hospital Islamabad. This audit followed the three steps management protocol practiced at Al-Nafees medical college and hospital for the management of an acute attack of asthma.

1. **Initial Phase of assessment**
   a. Use of standard Peak expiratory flow rate
   b. oxygen saturation use
2. **1st step of management**
   a. Intravenous corticosteroid use
   b. Nebulizer use
3. **Instructions at discharge of the patients**

RESULTS

Three hundred patients with acute asthmatic patients were admitted in an emergency department of the Al-Nafees medical college and hospital Islamabad during the period May 1 to September 01, 2022. Some of the patients had a multiple visits with the records of 300 patients showing different demographic presentations. Age and gender distribution show that there were 61.7% male and 38.3% were female patients in the study. Among the 300 patients, ages ranged from 2 to 83 years with mean of 38 years. In the 1st phase of the assessment status of the asthmatics patients was studied through records to conduct initial assessment. Majority of the patients were new and had visited the hospital for the 1st time, 60.66% cases had no previous visit for an acute asthmatic attack in the hospital. Eighty-five of 300 patients reported for never coming to hospital for acute attack of asthma or it has passed more than a year to visit any hospital for the asthma attack. Table 1 shows the frequency of the patients with status asthmatics visited to the Al- Nafees medical complex Islamabad in the emergency department for seeking emergency care an acute asthma attack .table shows that majority of the patients visiting during study period were visiting 1st time and their DATA was not available before.

Last visit Month	Frequency (%)
Less than a month	45 (16%)
1-4 months	34 (11.3%)
5-12months	67 (22.33%)
>12 months/Never	34 (11.3%)
Data not available	112 (37.33%)

Table 1: Frequency distribution of visiting patients at Al-Nafees medical college and hospital Islamabad for management of Status asthmatics.

Of the 250 out of 300 patients who had received PEFR on arrival, only 162 were measured before bronchodilation, and of these, only 84 had the expected PEFR recorded. Two hundred and eighty five of the total patients admitted to emergency department had been recorded with an oxygen saturation measuring greater than 92%, however, 264 patients oxygen saturation (SaO2) was performed on room air; the other thirty six patients were recorded for oxygen saturation while on oxygen. Out of total 264 patients who were assessed for SaO2 on room air, 255 responded well with a SaO2 overcrossing 92%. In total, an arterial blood gas was performed on 12 patients (Figure 1).

DOI: https://doi.org/10.54393/pjhs.v3i05.222

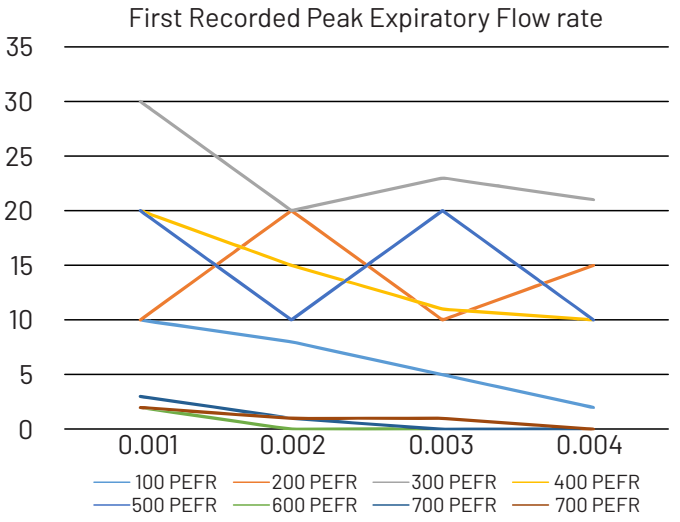

Figure 1: Graphical display of the distribution of the first recorded PEFR

On 1st assessment upon arrival of the patients, 91 patients were marked to have acute asthma attack and preliminary assessment labelled them as either mild, moderate or very severe. 25 patients were transfused intravenous corticosteroids upon 1st arrival at the emergency unit. Three to four nebulization were advised for every fifteen to twenty minutes for the first hour for all the patients, however, only 15 patients were administered the nebulization in this time frame. Physicians prescribed intravenous Ipratropium bromide with the nebulization in 282/300 (94%) of the cases, however, it was observed properly (one dose per set of three nebulization of salbutamol) in few cases only. Most of the patients were reassessed almost two to three hours post-nebulization and some patients lack recorded times for reassessment (Figure 2).

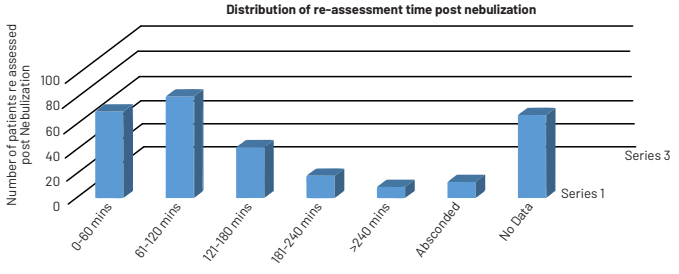

Figure 2: Re-assessment time post nebulization

Out of 300 total patients, 168 patients had been recorded a PEFR after a proper set of nebulization. A total of 83 patients observed both pre and post PEFR assessment. Out of the total 300 patients, 18 and 5 patients received inoculation of magnesium sulphate (MgSO4) and aminophylline infusion respectively during study period of four months. In this study majority of the patients had been treated for status asthmatic attacks, 86 % after initial treatment were discharged from the emergency department. Nineteen patients had been referred for admission for further treatment to the general medical wards (Figure 3). During the study time mortality was not recorded in any case nor was any patient admitted in the intensive care unit (ICU). Out of total 300 admitted patients to emergency department, 167 patients had been put on inhaled corticosteroids in previous visits at this hospital or elsewhere in emergency unit. Ninety-five per cent of them had been prescribed an inhaled corticosteroids which were continued post-discharge. In addition, 83/300 (27.3%) patients had been remedied on oral corticosteroids post-discharge also.

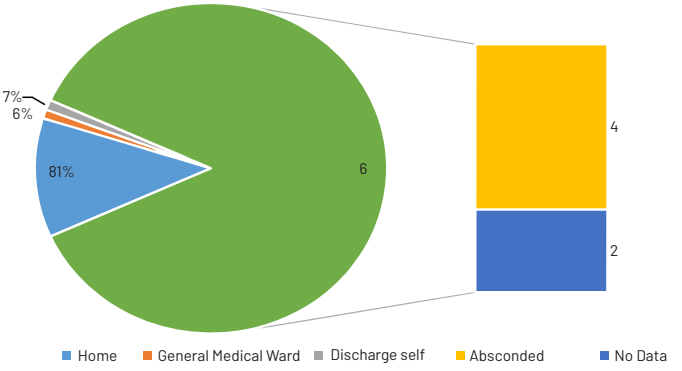

Figure 3: Discharge/shift status of the patients to various places from emergency department

Inhaler techniques played a key role in management of acute asthma Inhaler techniques were checked in only 3% of patients, while 1% was health educated by an action plan to manage an acute attack of asthma at home. Eighteen per cent were advised to observe follow-up for 24 hours post-discharge. Figure 4 shows the distribution of various treatment options given at 1st visit of the patient in emergency department. Mostly patients were received β2 agonists by nebulizer as an initial remedy Intravenous theophylline was given to 52 patients, while corticosteroids to 44 patients as an initial treatment IV fluids were the 1st line of management in 35 patients. While only in 2 cases mechanical ventilation was the 1st choice of the physicians in an emergency room t. Supplemental oxygen was given in 14 cases without SpO2 while with SpO2 in 12 cases. Antibiotics were the 1st line of therapy in 16 cases and mucolytic in 6 patients in management of acute attack of asthma. IV corticosteroids were given in 14 cases and anxiolytics in only 4 cases.

DOI: https://doi.org/10.54393/pjhs.v3i05.222

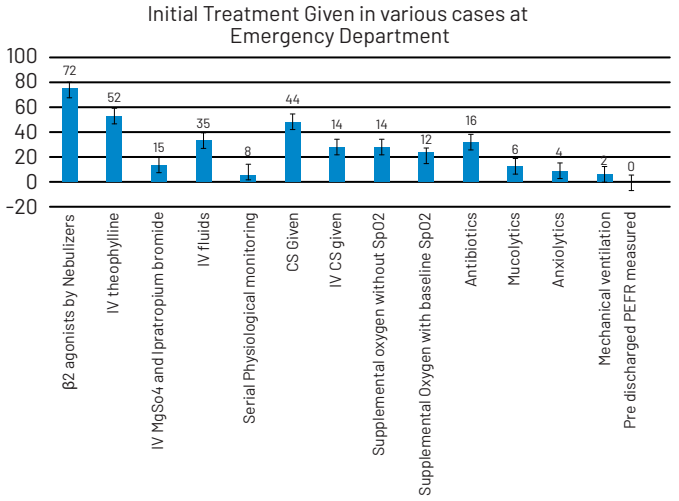

Figure 4: Initial treatment given for acute attack of Asthma in Emergency department

DISCUSSION

Asthma prevalence is much marked in girls in early childhood, however at puberty this shift tends towards girls predominantly. Majority of the kids were male rather females in emergency rooms of various tertiary care hospitals. British Guidelines for management of asthma reveal that repeated admission for acute attack of asthma usually culminate at fatal end and come with serious complications. (UK /BTS sign) [11]. A study conducted by Graham et al., reveal that clinical signs and symptoms have poor correlation with the severity and outcome of the acute attack of asthma [12]. Children with an acute attack of asthma may exhibit different outcome with the acute severe attack of the asthma. Severity, variability and reversibility of acute asthmatic attack largely depend on a measurement of lung function accurately [10, 13]. PEF measurements can't be used in children under 5 years of age accurately due to lack of compliance by the children at this age.at this age initial pulse rate is considered important according to UK BTS/SIGN asthma guidelines. Ibrahim et al., enforced the use of the β2 agonists as the first line treatment for an acute of asthma. Pressurized Metered-Dose inhalers (pMDI) with spacers has been considered as the effective alternative to use of nebulizers [14]. Acute care is mostly given by junior staff at hospital, which is much different from care given by respiratory physicians, as trained individuals follow the strict guidelines and policies. Many patients with acute asthma are monitored by chest physicians and they tend to recover more quickly [15, 16]. Some of the clinical practices for acute asthma management has been found outside the standard protocols which may nevertheless was incorrect and deliver fruitless results [17]. Muzamil et al., found in a retrospective study conducted at asthma management in the emergency department found that corticosteroid use helps in identification of higher risk patients [18]. Conversely clinical impression is deceivable and notorious in terms of risk estimation. Objective measurements are more reliable in terms of patients status for flow of rate measurements. Lung functions tests are more important along with tests to monitor the response of the treatment in patients [19] and it is consistent with the findings by the studies Fitzgerald et al., [20]. Asthma has been found on the top to be practiced by the physicians in the emergency room so standard protocols must be followed and high class training is must require by the hospital to all the emergency staff along with the deployment of chest physician in the emergency room. It has been found in a study conducted by smith et al that Positive End Expiratory Pressure (PEEP) should be in limit form and must not exceed intrinsic PEEP and ongoing clinical assessment for the gas trapping presence while FRC magnitudes are compulsory. Inspired gas adequate humidification is especially important in the ventilated asthmatic persons for the prevention of mucosal drying and further thickening of secretions that might be responsible for stimulation of further bronchospasm [21]. It augments that mechanical ventilation might be responsible for compromise of delivery of aerosolized bronchodilators [8]. A clinical audit conducted by Farion et al., describes that the acute asthmatic attack management are usually suboptimal and there is always a low level of compliance with the most recommended GINA guideline. This audit further emphasized the need to address the nonperforming areas especially knowledge gaps, clinical competence, and most importantly organizational issues [22].

CONCLUSIONS

Acute asthmatic attack management is the emergency response by any standard hospital, so each hospital emergency department should be equipped with all necessaries including trained staff and pulmonologist facility on call as well, it has been practiced at Al-Nafees Medical CollegE and hospital more effectively.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] British Thoracic Society; Scottish Intercollegiate Guidelines Network. British guideline on the management of asthma. Thorax. 2014 Nov; 69 Suppl

DOI: https://doi.org/10.54393/pjhs.v3i05.222

1:1-192

[2] Bashir AA, Musa OA, Khalid A, Elsony A. Childhood asthma in Gadarif. The international Journal of tuberculosis and lung disease. 2003; 7(11).

[3] Becker JM, Arora A, Scarfone RJ, Spector ND, Fontana-Penn ME, Gracely E, et al. Oral versus intravenous corticosteroids in children hospitalized with asthma. Journal of allergy and clinical immunology. 1999 Apr; 103(4):586-90.

[4] Cates CJ, Welsh EJ, Rowe BH. Holding chambers (spacers) versus nebulisers for beta-agonist treatment of acute asthma. Cochrane Database of Systematic Reviews. 2013 Sep; 2013(9):CD000052. doi: 10.1002/14651858.CD000052.pub3

[5] Ciarallo L, Brousseau D, Reinert S. Higher-dose intravenous magnesium therapy for children with moderate to severe acute asthma. Archives of Pediatrics and Adolescent Medicine. 2000 Oct; 154(10):979-83. doi: 10.1001/archpedi.154.10.979

[6] Connett GJ and Lenney W. Use of pulse oximetry in the hospital management of acute asthma in childhood. Pediatric Pulmonology. 1993 Jun; 15(6):345-9. doi: 10.1002/ppul.1950150606

[7] Cowie RL, Revitt SG, Underwood MF, Field SK. The effect of a peak flow-based action plan in the prevention of exacerbations of asthma. Chest. 1997 Dec; 112(6):1534-8. doi: 10.1378/chest.112.6.1534

[8] Dasgupta S, Williams EW, Walters C, Eldemire-Shearer D, Williams-Johnson J. A clinical audit of the management of acute asthmatic attacks in adults and children presenting to an emergency department. West Indian Medical Journal. 2014 Jun; 63(3):226-33. doi: 10.7727/wimj.2013.146

[9] Desalu OO, Adeoti AO, Ogunmola OJ, Fadare JO, Kolawole TF. Quality of acute asthma care in two tertiary hospitals in a state in South Western Nigeria: A report of clinical audit. Nigerian Journal of Medicine. 2016 Dec; 57(6):339-346. doi: 10.4103/0300-1652.193860.

[10] Edmonds ML, Milan SJ, Camargo CA Jr, Pollack CV, Rowe BH. Early use of inhaled corticosteroids in the emergency department treatment of acute asthma. Cochrane Database of Systematic Reviews. 2012 Dec; 12(12):CD002308. doi: 10.1002/14651858.CD002308.pub2

[11] Foster JM, McDonald VM, Guo M, Reddel HK. "I have lost in every facet of my life": the hidden burden of severe asthma. European Respiratory Journal. 2017 Sep; 50(3):1700765. doi: 10.1183/13993003.00765-2017

[12] Graham V, Lasserson T, Rowe BH. Antibiotics for acute asthma. Cochrane Database of Systematic Reviews. 2001; (3):CD002741. doi: 10.1002/14651858.CD002741

[13] Holley AD and Boots RJ. Review article: management of acute severe and near-fatal asthma. Emergency Medicine Australasia. 2009 Aug; 21(4):259-68. doi: 10.1111/j.1742-6723.2009.01195.x

[14] Ibrahim SM, Haroun HM, Ali HM, Tag Eldeen IE. Audit of acute asthma management at the Paediatric Emergency Department at Wad Madani Children's Hospital, Sudan. Sudanese Journal of Paediatrics. 2012; 12(1):104-14

[15] Kahwa E, Younger NO, Waldron N, Wint Y, Knight Madden J, Bailey K. The prevalence of asthma and allergies among adults in Jamaica. West Indian Medical Journal. 2008; 57(Suppl 4):26-7.

[16] Kahwa EK, Waldron NK, Younger NO, Edwards NC, Knight-Madden JM, Bailey KA, et al. Asthma and allergies in Jamaican children aged 2-17 years: a cross-sectional prevalence survey. BMJ Open. 2012 Jul; 2(4):e001132. doi: 10.1136/bmjopen-2012-001132

[17] Levy ML, Ward A, Nelson S. Management of children and young people (CYP) with asthma: a clinical audit report. NPJ Primary Care Respiratory Medicine. 2018 May; 28(1):16. doi: 10.1038/s41533-018-0087-5

[18] Muzamil H, Bibi A, e Hina G. PHARMACEUTICAL SCIENCES. 2020

[19] Soltani A, Reid D, Wills K, Walters EH. Prospective outcomes in patients with acute exacerbations of chronic obstructive pulmonary disease presenting to hospital: a generalisable clinical audit. Internal Medicine Journal. 2015 Sep; 45(9):925-33. doi: 10.1111/imj.12816

[20] Fitzgerald JM, O'Byrne PM, McFetridge JT, Demuth D, Allen-Ramey FC. Pulmonary function testing in the emergency department and medications prescribed at discharge: results of the Multinational Acute asthma Management, Burden, and Outcomes (MAMBO) study. Primary Care Respiratory Journal. 2010 Jun; 19(2):155-62. doi: 10.4104/pcrj.2010.00005

[21] Smith S, Mitchell C, Bowler S. Standard versus patient-centred asthma education in the emergency department: a randomised study. European Respiratory Journal. 2008 May; 31(5):990-7. doi: 10.1183/09031936.00053107. Epub 2008 Jan 23. PMID: 18216062.

[22] Farion KJ, Wilk S, Michalowski W, O'Sullivan D, Sayyad-Shirabad J. Comparing predictions made by a prediction model, clinical score, and physicians: pediatric asthma exacerbations in the emergency department. Applied Clinical Informatics. 2013 Aug; 4(3):376-91. doi: 10.4338/ACI-2013-04-RA-0029.

DOI: https://doi.org/10.54393/pjhs.v3i05.184

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

A Comparison of Canal Width Changes in Simulated Curved Canals prepared with Profile and Protaper Rotary Systems

Aisha Faisal[1], Huma Farid[2*] and Robia Ghafoor[3]

[1]Pediatric Dentistry Department, Liaquat College of Medicine and Dentistry, Karachi, Pakistan
[2]Operative Dentistry Department, Margalla Institute of Health Sciences, Rawalpindi, Pakistan
[3]Department of Surgery, The Aga Khan University Hospital, Karachi, Pakistan

ARTICLE INFO

Key Words:

ProFile, ProTaper, Rotary instrument, Canal width, Resin block

How to Cite:

Faisal, A. ., Farid, H., & Ghafoor, R. . (2022). A Comparison of Canal Width Changes in Simulated Curved Canals prepared with Profile and Protaper Rotary Systems : Canal Width Changes in Simulated Curved Canals. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.184

***Corresponding Author:**

Huma Farid
Operative Dentistry Department, Margalla Institute of Health Sciences, Rawalpindi, Pakistan
drhumafarid@hotmail.com

Received Date: 30th September, 2022
Acceptance Date: 13th October, 2022
Published Date: 31st October, 2022

ABSTRACT

With advancement in the endodontic technology there is a quest to introduce root canal instruments showing superior performance by removing minimum amount of sound root dentine and retaining the original shape of the root canal. **Objective:** To compare the changes in the width of simulated curved canals prepared with ProFile and ProTaper rotary system. **Methods:** This in-vitro, Quasi Experimental study was carried out in the Dental section of The Aga Khan University Hospital. Pre and post instrumentation photographs (images) of sixty resin blocks prepared with ProFile and ProTaper rotary instruments respectively (with 1:10 magnification) were superimposed using software Adobe Photoshop 6.0. Measurements were done on print out of composite images. Measurements of change in width (resin removed) were recorded along the length of canal at 12 points. **Results:** Two rotary system showed statistically significant difference in simulated curved canals width after preparation. ProTaper rotary instruments showed more resin removal at the inner walls of the canal at 1, 8-12mm from the apex and more resin removal at outer wall of canal at 9-12 mm from apex. **Conclusions**: ProFile and ProTaper rotary files showed statistically significant difference in canal width after instrumentation. ProTaper rotary files showed more resin removal in canals towards the inner wall and coronal part of the outer wall.

INTRODUCTION

In endodontic therapy mechanical instrumentation of the root canal is a preliminary and vital step, involving debridement of necrotic and vital pulp tissue and creation of space for root canal irrigants and medicaments [1-3]. This step is responsible for creation of final shape of the root canal which ideally should has smallest diameter at the canal apex and widest diameter at the canal orifice [4, 5]. An important consideration in this context is maintenance of three dimensional relationship of original canal to the final preparation [5, 6]. Deviation of the canal from its original path predispose to iatrogenic changes like zipping, instrument separation, apical transportation or artificial canal, outer widening and ledging [7-9]. Endodontic literature has witnessed several types of preparation techniques and endodontic instruments in order to achieve root canal preparation without iatrogenic errors [10, 11]. Different endodontic instruments differ in their cross section, width and taper. But all instruments are designed to achieve the final canal shape that allow close adaptation of the obturating material with the canal in all dimensions [3, 10, 12]. Maintaining the canal curvature while ensuring adequate and symmetric dentine removal during root canal preparation is very important as vigorous removal of root dentine predisposes to deviation of original canal path [2, 4]. Metallurgical properties of instruments, technique employed of canal preparation, position of apical foramina

DOI: https://doi.org/10.54393/pjhs.v3i05.184

and the hardness of dentine effects final shape of curved canals after canal instrumentation [13]. Several Nickel Titanium (NiTi) rotary root canal preparation systems are available in market [14]. Protaper and Profile are two of the commonly used and available NiTi file systems for root canal preparation. We aimed to evaluate canal width changes after canal preparation with Protaper and Profile systems, so that better system can be promoted for improved outcome. The objective of this study was to compare the changes in the width of simulated curved canals prepared with ProFile and ProTaper rotary system. The null hypothesis was that there is no difference in the width of simulated curved canals prepared with ProFile and ProTaper rotary system. The alternate hypothesis was that there is a difference in the width of simulated curved canals prepared with ProFile and ProTaper rotary system.

METHODS

Clear polyester resin block with simulated curved canals (Endo Training-Bloc, Dentsply Maillefer, Ballaigues, Switzerland) were used for this research. The study was exempted from Ethical review committee of Aga Khan University Hospital as no human or animal subject was involved in this study. Total simulated canal length was 17 mm with 10mm long straight part and 7mm long curved part (Figure 1).

Figure 1: Pre instrumentation photograph of resin block

The clear resin blocks (Dentsply) were divided into two groups with thirty blocks in each group A and group B (after number allocation to each block). Working length of canal was measured by direct vision of canals using ISO # 10 size manual file which was determined to be 17 mm. Preoperative photographs of each block were taken with camera (Nikon F 90 X) after filling them with black ink to improve their outline and for comparison of images in standardize manner with the help of a stand at standardize distance. Before preparation, the blocks were covered with adhesive tape to prevent operator bias Blocks in group A and group B were prepared with ProFile0.04 rotary instruments and ProTaper rotary instruments respectively. Each instrument was discarded after preparing six resin blocks. EDTA cream (RC prep) was used as as a lubricant with each instrument. The simulated curved canal in resin block were flushed with water after every rotary file use. A plastic syringe carrying 5ml of water and a 27-gauge tip was used for irrigation. An electric motor (Dentsply Maillefer) was used for simulated canals preparations with permanent rotation (250 rpm.), torque and 16:1 reduction headpiece. Gentle in and out motions were used for canals preparation in a crown-down manner. The apical preparation with both rotary systems was limited to a size 30. The instruments sequence for ProFile 0.04 rotary files used was as followed: The straight portion (10mm) of simulated curved canal was prepared with size 40 ProFile. Once the straight portion of the canal was prepared till this length with file rotating freely, the size 35 ProFile was used to the same length. This step was followed by size 30 ProFile which was usd to prepare the canal till 12 mm. Finally sizes 25, 20 and 15 of ProFiles were instrumented to 17 mm (the full working length). The sequence in which ProTaper rotary files were used was as followed: There are six files in ProTaper system: First three were shaping files (Sx, S1, S2) followed by finishing files (F1, F2, F3). ProTaper Sx was employed to three-quarter of the length of simulated canal (17mm) in order to make the space for the next instrument in the sequence. Both S1 and S2 were instrumented to the working length (17mm) until instruments rotated freely in the canal. Then canals were enlarged to finishing instruments F1, F2 and F3 sequentially i up to the working length. After preparation simulated canals in resin blocks were filled with green (ProFile) and red ink (ProTaper). This step improved their outlines and facilitated comparison of pre and post instrumentation images. The obtained were superimposed using software Adobe Photoshop 6.0 was used to superimposed pre and post instrumentation images followed by taking print out of composite images and measurements were done on print outs. One dimensional measurements perpendicular to the surface of canal at twelve different points (starting at 1 mm from the apex and moving coronally till 12 mmm) was done to determine the changes after instrumentation at both outer and inner walls of simulated curved canals. Data of measurements of width changes was collected for 12 points at outer and inner walls (Figure 2).

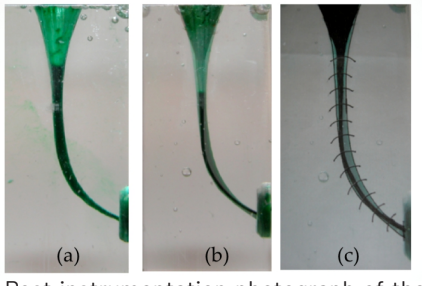

Figure 2: a) Post instrumentation photograph of the simulated

DOI: https://doi.org/10.54393/pjhs.v3i05.184

canal prepared with PROFILE 0.04 b) Superimposed image of pre and post instrumentation c) Printout of composite image showing measuring points

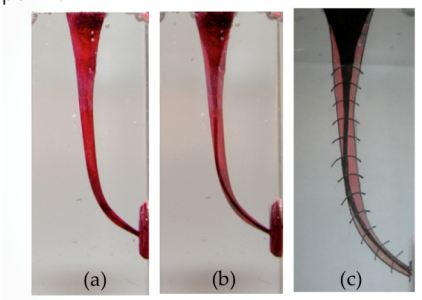

Figure 3: a) Post instrumentation photograph of the simulated canal prepared with PROTAPER b) Superimposed image of pre and post instrumentation c) Printout of composite image showing measuring points

Data analysis was done using SPSS version 16.0. Measurements recorded at 1:10 magnification were converted to original values by dividing it by 10. The original values were then subjected to analysis. Descriptive analysis like mean, standard deviation of the numerical variables was determined for canal width changes (both inner and outer) at 12 points starting 1mm from apex at 1mm distance. Independent sample t-test test was applied for the comparison of width changes at every level outer and inner wall of the canal between the group A and B. P-value of less than 0.05 was taken as significant.

RESULTS

A total of sixty resin blocks were included in the study based on the selection criteria with thirty resin blocks in each study group. In case of procedural problem like instrument separation another block was selected as replacement thus no sample loss occurred. There were no confounding variables in the study as canal in simulated resin blocks were used and prepared by single operator. Details of resin removal from canal walls is as follows: The greatest resin removal or width changes in the ProFile rotary system (group A) at inner wall of the canal was observed at 6 and 5mm from the apex {0.33 mm (SD ±0.12) and 0.30 mm (SD ± 0.10) mm} and at outer wall of the canal was observed at 12 mm {0.25 mm(SD 0.13). The greatest resin removal or width changes in the ProTaper rotary system (group B) at outer wall of the canal was observed at 12 mm from the apex {0.39mm (SD ± 0.17)} and at inner wall of canal at 6mm and 7 mm from the apex {0.38 mm (SD 0.21) and 0.36 (SD 0.20) respectively}. To compare the canal width changes in inner and outer canal wall at 1 to 12mm from apex between group A and B independent sample t test was used. The ProTaper files showed more resin removal at the inner walls of the canal at 1, 8, 9, 10, 11 and 12mm from the apex with statistically significant association (p-values ≤0.05). Protaper files also removed more resin at the outer wall of canal at 9, 10, 11, and 12 mm from the apex with statistically significant association (p-values ≤0.05)(Table 1 and 2).

Distance from apex	ProTaper Mean mm(SD)	ProFile Mean mm(SD)	p-value*
Inner wall at 1mm	0.08 (0.08)	0.03 (0.04)	0.019
Inner wall at 2mm	0.09 (0.09)	0.09 (0.07)	0.766
Inner wall at 3mm	0.14 (0.12)	0.15 (0.07)	0.782
Inner wall at 4mm	0.23 (0.14)	0.24 (0.11)	0.751
Inner wall at 5mm	0.34 (0.19)	0.30 (0.10)	0.266
Inner wall at 6mm	0.38 (0.21)	0.33 (0.12)	0.220
Inner wall at 7mm	0.36 (0.20)	0.28 (0.11)	0.078
Inner wall at 8mm	0.31 (0.16)	0.22 (0.11)	0.015
Inner wall at 9mm	0.28 (0.13)	0.19 (0.11)	0.008
Inner wall at 10mm	0.29 (0.12)	0.19 (0.10)	0.002
Inner wall at 11mm	0.31(0.12)	0.22 (0.13)	0.008
Inner wall at 12mm	0.32(0.14)	0.24 (0.13)	0.004

Table 1: Comparison of Canal width changes on inner canal wall between protaper and profile rotary file.
SD(standard deviation)
Test of significance: independent sample t-test
*Level of significance ≤ 0.05

Distance from apex	ProTaper Mean mm(SD)	ProFile Mean mm(SD)	p-value*
Outer wall at 1mm	0.13 (0.10)	0.11 (0.05)	0.441
Outer wall at 2mm	0.17 (0.10)	0.13 (0.06)	0.090
Outer wall at 3mm	0.18 (0.10)	0.14 (0.07)	0.103
Outer wall at 4mm	0.12 (0.08)	0.11 (0.07)	0.538
Outer wall at 5mm	0.06 (0.09)	0.07 (0.06)	0.822
Outer wall at 6mm	0.07 (0.10)	0.06 (0.06)	0.467
Outer wall at 7mm	0.14 (0.12)	0.11 (0.06)	0.333
Outer wall at 8mm	0.20 (0.11)	0.16 (0.09)	0.131
Outer wall at 9mm	0.27(0.12)	0.20 (0.10)	0.022
Outer wall at 10mm	0.34 (0.14)	0.23 (0.12)	0.003
Outer wall at 11mm	0.38 (0.15)	0.24 (0.12)	0.001
Outer wall at 12mm	0.39 (0.17)	0.25 (0.13)	0.001

Table 2: Comparison of Canal width changes on inner canal wall between protaper and profile rotary files
SD(standard deviation)
Test of significance: independent sample t-test
*Level of significance ≤ 0.00

DISCUSSION

Current study results revealed significant difference in pattern of width changes in simulated canals instrumented with ProFile and ProTaper rotary system. Thus the Null hypothesis was rejected and the alternate hypothesis was accepted. According to results of our study, ProTaper rotary files have a tendency to remove more resin material from the apical, mid and coronal segment of the canal towards inner wall as compare to ProFile rotary system. This rotary system also removes more resin material from coronal segment towards outer wall as compare to ProFile rotary system. The difference in results between two rotary systems can be attributed to the difference in the designs

DOI: https://doi.org/10.54393/pjhs.v3i05.184

of these two instruments. There is neutral or slightly negative rake angle in ProFile rotary system which cuts with a planning action and remain centered in canal [6, 8, 13]. ProTaper rotary system, on the other hand has slight positive rake angle which works like a shaver, requires less energy and remove more material by efficient cutting [14]. The greater amount of resin removal in proTaper group could be attributed to the greater taper and less flexibility of ProTaper finishing files [15, 16]. At the same time convex triangular cross section of proTaper instrument which was claimed to reduce contact area between file and root dentine, also predisposes the root canal to greater transportation when kept in the canal for more than 1 second [11]. In current study we have chosen resin blocks as an alternative to extracted human teeth in order to minimize variations in teeth anatomy and size that can affect the study results. Researches have been conducted on these resin blocks to evaluate different parameters of canal preparation [12, 17]. They offer several advantages over natural teeth like standardization of canals length, curvature and hardness of the material. Assessment of changes in canal width is also possible by superimposition of pre and post-instrumentation images. This assurances a high degree of reliability and the results of these researches can be applied to human teeth [18]. However the difference in micro hardness of resin blocks and dentine is a concern. The limitations of these resin blocks include different micro hardness values of dentine and resin ranging from 35–40 kg/mm2 for dentine and, 20 to 22 kg/mm2 for resin [6, 10]. Giovannone has compared canal width changes of M-two and ProTaper rotary instrument of 40 canals in resin blocks using pre and post instrumentation photographs and with image analysis to evaluate changes in canal shape at different points along length of canal. Results showed that both systems maintained original curvature with minimum transportation of apex which is the area at risk of modification. M-two caused less transportation of apex than ProTaper but it was not statically significant ($P > 0.05$) [19]. However in our study ProTaper files showed more resin removal from inner wall in apical and middle region and symmetrical resin removal in coronal portions of canals. Another study had compared canal width changes of ProFile and K3 rotary instruments in curved canals with 20 and 30 degree curvature. They have used digital images (pre and post instrumentation) on which assessment was done starting from 0.5mm till the end point (total of 28 points comparison). There was more resin removal for both rotary instruments from outer canal walls in comparison to inner canal walls in apical segment with statistical significance [20]. In our study ProFile rotary instruments showed symmetrical removal of resin from both walls along the whole length of simulated canals in resin block. A comparison between ProTaper rotary system versus Hero 642 shaft in 20 resin blocks (L- and S-shaped resin canal) assessed the effect of instrument taper on shaping of canals. The result of width of resin removal showed that Hero 642 rotary instruments having constant taper maintained the original canal curvature with superior canal centering ability as compared to ProTaper rotary instruments. ProTaper instrument showed two patterns of transportation. In L-shaped curved canals there were more width changes at the outer aspect in the apical part and in S-Shaped canals there was more width changes on the inner aspects at the curve [21]. Similarly in our study ProFile having constant taper showed superior centring ability in curved canals (L-shape) as compare to ProTaper rotary instrument which has varying taper along the length of its cutting blades. Every research has some limitations. Although canals in the resin blocks offer many advantages in term of standardization and reproducibility still difference in the hardness and abrasion of acrylic resin and root dentine is a limitation of this research. Also the heat generation by rotary instruments results in more softening of blocks as compare to natural dentine. This can result in more width changes as compare to natural dentine [10].

CONCLUSIONS

There is a difference in the simulated canal width after preparation with ProFile and ProTaper rotary systems. ProTaper files showed more resin removal from canals towards inner walls at all level (apical, middle and coronal). ProTaper files also showed more resin removal at coronal level towards outer walls. It is recommended that ProTaper rotary system should be used in canals with sufficient amount of root dentine is present. ProTaper F2 and F3 rotary systems should be used with caution in curved canals to prevent excessive removal of inner wall root dentine that can lead to straightening of the canal.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Khapre R, Sarve J, Makade C. Comparative Study of Endodontic Files with Various Cross Sections with Varying Threads. Advanced Science, Engineering and Medicine. 2014 Jan; 6(1):75-80. doi: 10.1166/asem.2014.1454

[2] Abd El Hamid HM. Comparative study between ProTaper next and 2 shape NI-TI rotary files on maintanence of canal curvature using

DOI: https://doi.org/10.54393/pjhs.v3i05.184

radiovisiography (RVG) (an in vitro study). Egyptian Dental Journal. 2019 Jul; 65(3-July (Fixed Prosthodontics, Dental Materials, Conservative Dentistry & Endodontics)):3037-44. doi: 10.21608/edj.2019.72700

[3] Kim H, Jeon SJ, Seo MS. Comparison of the canal transportation of ProTaper GOLD, WaveOne GOLD, and TruNatomy in simulated double-curved canals. BMC Oral Health. 2021 Dec; 21(1):1-7. doi: 10.1186/s12903-021-01854-z

[4] Stavileci M, Hoxha V, Görduysus Ö, Tatar I, Laperre K, Hostens J, et al. Effects of preparation techniques on root canal shaping assessed by micro-computed tomography. Medical science monitor basic research. 2013; 19:163. doi: 10.12659%2FMSMBR.889350

[5] Schilder H. Cleaning and shaping the root canal. Dental clinics of north America. 1974 Apr; 18(2):269-96. doi: 10.1016/S0011-8532(22)00677-2

[6] Hülsmann M, Peters OA, Dummer PM. Mechanical preparation of root canals: shaping goals, techniques and means. Endodontic topics. 2005 Mar; 10(1):30-76. doi: 10.1111/j.1601-1546.2005.00152.x

[7] Gao Y, Gutmann JL, Wilkinson K, Maxwell R, Ammon D. Evaluation of the impact of raw materials on the fatigue and mechanical properties of ProFile Vortex rotary instruments. Journal of endodontics. 2012 Mar; 38(3):398-401. doi: 10.1016/j.joen.2011.11.004

[8] Farid H, Khan FR, Rahman M. ProTaper rotary instrument fracture during root canal preparation: a comparison between rotary and hybrid techniques. Oral health and dental management. 2013; 12(1):50.

[9] Park HJ, Seo MS, Moon YM. Root canal volume change and transportation by Vortex Blue, ProTaper Next, and ProTaper Universal in curved root canals. Restorative Dentistry & Endodontics. 2017 Dec; 43(1). doi: 10.5395/rde.2018.43.e3

[10] Hülsmann M. A critical appraisal of research methods and experimental models for studies on root canal preparation. International Endodontic Journal. 2022 Mar; 55:95-118. doi: 10.1111/iej.13665

[11] Yalniz H, Koohnavard M, Oncu A, Celikten B, Orhan AI, Orhan K. Comparative evaluation of dentin volume removal and centralization of the root canal after shaping with the ProTaper Universal, ProTaper Gold, and One-Curve instruments using micro-CT. Journal of Dental Research, Dental Clinics, Dental Prospects. 2021; 15(1):47. doi: 10.34172%2Fjoddd.2021.009

[12] Fernandes Zancan R, Hadis M, Burgess D, Zhang ZJ, Di Maio A, Tomson P, et al. A matched irrigation and obturation strategy for root canal therapy. Scientific Reports. 2021 Feb; 11(1):1-3. doi: 10.1038/s41598-021-83849-y

[13] Mounce R. Negotiating challenging mid root curvatures: rounding the bend. Dentistry today. 2007 Feb; 26(2):108-10.

[14] Badar SB, Zafar K, Ghafoor R, Khan FR. Changes in canal width and angle in curved canals in the resin blocks: Pro taper next versus one shape instruments. Journal of Pakistan Medical Association. 2020 Dec; 70(12(B)):2371-2375. doi: 10.47391/JPMA.335. PMID: 33475546.

[15] Kandaswamy D, Venkateshbabu N, Porkodi I, Pradeep G. Canal-centering ability: An endodontic challenge. Journal of Conservative Dentistry. 2009 Jan; 12(1):3-9. doi: 10.4103/0972-0707.53334

[16] de Cristofaro Almeida G, Aun DP, Resende PD, Peixoto IFDC, Viana ACD, Buono VTL, et al. Comparative analysis of torque and apical force to assess the cutting behaviour of ProTaper Next and ProTaper Universal endodontic instruments. Australian Endodontic Journal. 2020 Apr; 46(1):52-59. doi: 10.1111/aej.12351

[17] Madani Z, Soleymani A, Bagheri T, Moudi E, Bijani A, Rakhshan V. Transportation and Centering Ability of Neoniti and ProTaper Instruments; A CBCT Assessment. Iranian Endodontic Journal. 2017; 12(1):43-49. doi: 10.22037/iej.2017.09

[18] Christofzik D, Bartols A, Faheem MK, Schroeter D, Groessner-Schreiber B, Doerfer CE. Shaping ability of four root canal instrumentation systems in simulated 3D-printed root canal models. PLoS One. 2018 Aug; 13(8):e0201129. doi: 10.1371/journal.pone.0201129.

[19] Giovannone T, Migliau G, Bedini R, Ferrari M, Gallottini L. Shaping outcomes using two Ni-Ti rotary instruments in simulated canals. Minerva Stomatologica. 2008 Apr; 57(4):143-54

[20] Ayar LR and Love RM. Shaping ability of ProFile and K3 rotary Ni-Ti instruments when used in a variable tip sequence in simulated curved root canals. International Endodontic Journal. 2004 Sep; 37(9):593-601. doi: 10.1111/j.1365-2591.2004.00851.x

[21] Yang GB, Zhou XD, Zhang H, Wu HK. Shaping ability of progressive versus constant taper instruments in simulated root canals. International Endodontic Journal. 2006 Oct; 39(10):791-9. doi: 10.1111/j.1365-2591.2006.01151.x

DOI: https://doi.org/10.54393/pjhs.v3i05.137

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Analysis of Community-Based Awareness Regarding Schizophrenia: A Cross-Sectional Study from Pakistan

Hareem Mohsin[1*], Muhammad Kamran Aslam[2], Kaneez Fatima[1], Azka Asif [3], Amal Fiaz[4], Bushra Ahmad[5], Afeefa Khalid[1] and Warda Fatima[6]

[1]Department of Life Sciences, School of Sciences, University of Management and Technology, Lahore, Pakistan
[2]Department of Economics and Statistics, University of Management and Technology, Lahore, Pakistan
[3]School of Biological Sciences, University of Punjab, Lahore, Pakistan
[4]Department of Biological Sciences, Superior University, Lahore, Pakistan
[5]Nishtar Medical University, Multan, Pakistan
[6]Institute of Microbiology and Molecular Genetics, University of Punjab, Lahore, Pakistan

ARTICLE INFO

Key Words:

Schizophrenia, Pakistan, Awareness, Stigma, Mental illness

How to Cite:

Mohsin, H., Aslam, M. K., Fatima, K. ., Asif, A. ., Fiaz, A. ., Ahmad, B. ., Khalid, A. ., & Fatima, W. . (2022). Analysis of Community-Based Awareness Regarding Schizophrenia: A Cross-Sectional Study from Pakistan: Community-Based Awareness Regarding Schizophrenia. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.137

***Corresponding Author:**

Hareem Mohsin
Department of Life Sciences, School of Sciences, University of Management and Technology, Lahore, Pakistan
hareem.mohsin@umt.edu.pk

Received Date: 19th September, 2022
Acceptance Date: 5th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Schizophrenia is a serious mental disorder and general public usually show unfavorable attitudes towards the patients. **Objective**: The study assesses the extent of public knowledge about Schizophrenia, a mental illness, among Pakistan's educated population and to recommend ways to create a better society for the patients and caretakers. **Methods**: 500 participants voluntarily took part in the study. A questionnaire was developed and a cross-sectional survey was conducted among the respondents. Participants were asked questions related to general, medical, socioeconomic, and treatment information of schizophrenia. Data analysis was done using SPSS software via T/F tests and Chi-square analysis. **Results**: It was revealed that overall females were more aware of mental illness as compared to males. The age groups of 18-22, 23-27 and 33-37 and participants with graduate and post-graduate degrees were having more knowledge regarding general, medical, socioeconomic, and treatment categories. Upon analysis via chi-square using SPSS, null hypotheses were accepted. **Conclusions:** Despite of the people having knowledge regarding schizophrenia, there is a significant percentage of populace which is not aware. Seminars, workshops, and campaigns must be conducted to enhance the knowledge of the general public to put an end to this stigma from society which will help in giving better care to the patients.

INTRODUCTION

Schizophrenia is one of the top ten mental illnesses in the world characterized by symptoms like disorganized behavior, hallucinations, delusions, stupor, and disturbances related to perception, feelings, and thinking capabilities [1-2]. It causes a considerable deal of suffering, not only individually, but also emotionally and socioeconomically. Schizophrenia patients live 10-20 years shorter than the normal population [3]. According to World Health Organization (WHO), schizophrenia is affecting 21 million people worldwide occurring in an age range of 15-44 years [4-5]. The awareness of disease dynamics and treatment for schizophrenia is less and is usually labeled as 'poor insight' [6,7] owing to a lack of knowledge. Dearth of understanding has made this disease to be recognized as a major public health concern [8,9] and a weighty problem to be managed by caregivers as it is not well perceived around the world. The occurrence and duration of untreated psychosis are also influenced by cultural structures, socio-

DOI: https://doi.org/10.54393/pjhs.v3i05.137

economic conditions, and the education level. Moreover, the caregivers are not comfortable disclosing the patient's situation. A study performed by a assessed awareness in caregivers and concluded that there is a dire need to educate the caregivers to educate, develop acceptability, and encourage them to better treatment and care for patients for societal advantages [10]. With the advancements in everyday life, people are getting awareness of psychiatric disorders [11]. Further awareness can be inculcated via seminars, workshops, campaigns, social media, and other platforms [12]. This will enable the sufferer to gain prompt help from professional and relatives to comprehend the illness and provide better care [13]. A study performed by Leiderman, Vazquez shows that patients' relatives were more aware of disorders as compared to the general public which had no interaction with schizophrenic patients [14]. However, there remains a need to educate the general public about the disorder and its consequences [15]. In this current study, we have investigated whether the participants have apt knowledge related to schizophrenia via a cross-sectional survey followed by statistical analysis.

METHODS

The study was designed at the Institute of Microbiology and Molecular Genetics, University of the Punjab. The study was a cross-sectional survey of 500 participants with demographic characteristics i.e., gender, age groups, and education (independent variables) from major cities of Pakistan aged between 18 years to 42 years. People related to the field of psychology/medical sciences were not included. The study was carried out between September 2021, to December 2021. The data was collected via questionnaires followed by participants' consent. The participants were ensured that their responses will be kept anonymous and confidential. The questionnaire had a total of 24 questions divided into four sub-categories (dependent variables) i.e., general, medical, socio-economic, and treatment. All the questions were close-ended and responses were recorded in MS Excel. It was hypothesized that: With increasing age, people would have more information regarding schizophrenia, the medical condition of patients, the socio-economic status of the sufferers, and possible treatments. The higher the education, more will be the information regarding medical condition of patients, socio-economic status of the sufferers, and possible treatments.

RESULTS

A total of 500 participants filled out the questionnaire survey. Table 1 shows the socio-demographic characteristics and their frequencies divided in 3 categories.

Variables	Characteristics	n	Frequency (%)
Gender	Male	209	41.8%
	Female	291	59%
Age Groups	18-22	98	19.6%
	23-27	103	20.6%
	28-32	101	20%
	33-37	108	22%
	38-42	90	18%
Level of Education	Matric	11	2.2%
	Intermediate	66	13.2%
	Graduate	250	50%
	Post-Graduate	145	29%
	Others (Diplomas)	28	5.6%

Table 1: Frequency distribution of socio-demographic characteristics of participants (n=500)

General Information Regarding Schizophrenia

A total of six questions were asked from the participants. **Gender:** 24.8% (n=52) males and 31.6% (n=92) females answered in affirmative while 71% (n=50) male and 66.3% (n=193) did not. 3.3% (n=7) males and 2% (n=6) females selected the option of "don't know". **Age Groups:** 33.6% (n=33) of age group 18-22, 38.8% (n=40) of age group 23-27, 22.7% (n=23) of age group 28-32, 22.2% (n=24) of age group 33-37, and 26.6% (n=24) of age group 38-42 answered "yes" while, 64% (n=63) of age group 18-22, 58.2% (n=60) of age group 23-27, 73.2% (n=74) of age group 28-32, 75.9% (n=82) of age group 33-37, and 71.1% (n=64) of age group 38-42 chose "no". 2%, (n=2) of age group 18-22, 2.9% (n=3) of age group 23-27, 3.9% (n=4) of age group 28-32, 1.8% (n=2) of belonging to the age group of 33-37, and 2.2% (n=2) of age group 38-42 respondents had no idea about schizophrenia and thus chose the option "don't know". **Education:** 63.6% (n=7) with matriculation, 30.3% (n=20) with intermediate degree, 25.2% (n=63) with graduation, 33.1% (n=48) having post-graduation, and 21.4% (n=6) having diplomas opted "yes" while 36.3% (n=4) with matriculation, 69.6% (n=36) with intermediate education, 70.4% (n=176) graduated individuals, 65.5% (n=95) post-graduated, and 78.5% (n=22) having diplomas opted for a "no". 4.4% (n=11) graduated and 1.3% (n=2) post-graduated respondents selected "don't know".

Medical Information Regarding Schizophrenia

A total of five questions were asked from the respondents. **Gender:** Respondents who answered in affirmative were 29.1% (n=61) males and 32.9% (n=96) females while 64.5% (n=135) males and 61.8% (n=180) females opted for "no". 6.2% (n=13) males and 5.1% (n=15) females chose "don't know". **Age Groups:** 35.7% (n=35) of age group 18-22. 36.8% (n=38) of age group 23-27, 26.7% (n=27) of age group 28-32, 25% (n=27) belonging to the age group of 33-37, and 33.3% (n=30) of age between 38-42 agreed with the questions by selecting a "yes". 58.1% (n=57) of 18-22 age group, 61.1%

DOI: https://doi.org/10.54393/pjhs.v3i05.137

(n=63) of age group 23-27, 70.2% (n=71) of age group 28-32, 67.5% (n=73) of age group 33-37, and 56.6% (n=51) of age group 38-42 answered "no" for the solicited questions. 6.1% (n=6), 1.9% (n=2), 2.9% (n=3), 7.4% (n=8), and 10% (n=9) belonging to the age groups 18-22, 23-27, 28-32, 33-37, and 38-42 respectively selected "don't know". **Education:** 27.2% (n=3) with matriculation, 33.3% (n=22) with intermediate degree, 28% (n= 70) were graduated, 37.9% (n=55) were post graduated, and 25% (n=7) diploma holders opted for "yes" regarding medical information about schizophrenia. Those who responded with a "no" were 92.7% (n=8), 62.1% (n=41), 65.6% (n=64), 57.9% (n=84), and 64.2% (n=18) with matriculation, intermediate, graduation, post-graduation, and diplomas respectively. 4.5% (n=3), 6.4% (n=16), 4.1% (n=6), and 10.7% (n=3) were intermediate, graduated, post-graduated, and diploma holders who selected "don't know".

Socio-economic Information Regarding Schizophrenia

A total of seven questions were asked from the respondents. **Gender:** 15.3% (n=32) males and 20.9% (n=61) females chose "yes" while 82.7% (n=173) males and 77.3% (n=225) females chose "no". 1.9% (n=4) males and 1.7% (n=5) females selected "don't know". **Age Groups:** 18.3% (n=18) of age group 18-22, 19.4% (n=20) of age group 23-27, 17.8% (n=18) of age group 28-32, 17.5% (n=19) belonging to the age group of 33-37, and 20% (n=18) of age between 38-42 answered "yes". 79% (n=78) of 18-22 age group, 79.6% (n=82) of age group 23-27, 78.2% (n=79) of age group 28-32, 81.4% (n=88) of age group 33-37, and 78.8% (n=71) of age group 38-42 answered "no" for the questions. 2% (n=2), 0.9% (n=1), 3.9% (n=4), 0.9% (n=1), and 1.1% (n=1) belonging to the age groups 18-22, 23-27, 28-32, 33-37, and 38-42 respectively opted for "don't know". **Education:** 18.1% (n=2) with matriculation, 19.6% (n=13) with intermediate degree, 15.2% (n= 38) were graduated, 25.5% (n=37) were post graduated, and 10.7% (n=3) diploma holders chose "yes" regarding socio-economic information. Those who selected a "no" were 81.8% (n=9), 80.3% (n=53), 82% (n=205), 73.1% (n=106), and 89.2% (n=25) with matriculation, intermediate, graduation, post-graduation, and diplomas respectively. 2.8% (n=7) graduates and 1.3% (n=2) postgraduates selected "don't know".

Treatment Information Regarding Schizophrenia

A total of six questions were asked from the participants. **Gender:** 23.9% (n=50) males and 30.2% (n=88) females opted for "yes" while 70.3% (n=147) males and 68% (n=198) females chose a "no". Participants going for "don't know" were 5.7% (n=12) males and 1.7% (n=5) females. **Age Groups:** 26.5% (n=26) of age group 18-22, 30% (n=31) of age group 23-27, 22.7% (n=23) of age group 28-32, 17.527.7% (n=30) belonging to the age group of 33-37, and 31.1% (n=28) of age between 38-42 opted for "yes". 71.4% (n=70) of 18-22 age group, 66% (n=68) of age group 23-27, 72.2% (n=73) of age group 28-32, 71.2% (n=77) of age group 33-37, and 63.3% (n=57) of age group 38-42 answered "no". 2% (n=2), 3.8% (n=4), 4.9% (n=5), 0.9% (n=1), and 5.5% (n=5) belonging to the age groups 18-22, 23-27, 28-32, 33-37, and 38-42 respectively selected "don't know". **Education:** 36.3% (n=4) with matriculation, 27.2% (n=18) with intermediate degree, 26.8% (n= 67) were graduated, 30.3% (n=44) were post graduated, and 17.8% (n=5) diploma holders chose "yes" while 63.6% (n=7), 72.7% (n=48), 69.2% (n=173), 66.8% (n=97), and 71.4% (n=20) with matriculation, intermediate, graduation, post-graduation, and diplomas respectively chose "no". 4% (n=10) graduates, 2.7% (n=4) postgraduates, and 10.7% (n=3) diploma holders selected "don't know".

Statistical Comparison of General, Medical, Treatment, and Socio-Economic Information Among Socio-Demographic Characteristics:

T/F-Test Analysis:

According to the current survey the highest score in general information, medical, and socio-economic category was 1.8 while in the case of treatment information, the highest score of 1.9. Table 2 shows the mean score of all categories. The analyses revealed p>0.05 which leads to the acceptance of our null hypotheses. The Chi-square test also showed the acceptance of null hypotheses revealing that elder people with higher education are more aware of schizophrenia and related aspects.

DOI: https://doi.org/10.54393/pjhs.v3i05.137

Variables	Characteristics	N (%)	General Information Score	Medical Information Score	Socio Economic Information Score	Treatment Information Score
Gender	Male	209(41.8%)	1.8038 ±. 60031	1.7703±.55025	1.8660 ±.39375	1.8182 ±.51465
	Female	291(59%)	1.7045 ± .50029	1.7216± .55228	1.8076± .43638	1.7045± 0.48893
Statistics			t test=.045; p = 0.964	t test=.244; p = 0.808	t test=.359; p = 0.720	t test=.693; p = 0.489
Age	18 – 22	98(19.6%)	1.6837±.50964	1.7041±.57811	1.8367±.42339	1.7551±.47756
	23 – 27	103(20.6%)	1.6796±.74378	1.6505±.51846	1.8155±.41415	1.7379±.52321
	28 – 32	101(20%)	1.8119±.48400	1.7624±.49292	1.8614±.44788	1.8218±.49792
	33 – 37	108(22%)	.48400±.44680	1.8257±.54167	1.8349±.39707	1.7339±.46432
	38 – 42	90(18%)	1.7528±.48338	1.7640±.62199	1.8090±.42309	1.7416±.55449
Statistics			F test=1.323; p = 0.260	F test=.534; p = 0.711	F test=.233; p = 0.233	F test=1.529; p = 0.192
Age	Matric	11(2.2%)	1.3636±.50452	1.7273±.46710	1.8182±.40452	1.6364±.50452
	Intermediate	66(13.2%)	1.6970±.46309	1.7121±.54815	1.8030±.40076	1.7273±.44877
	Graduate	250(50%)	1.8080±.59713	1.7840±.54639	1.8760±.40655	1.7720±.50700
	Post Graduate	145(29%)	1.6828±.49586	1.6621±.55554	1.7586±.46061	1.7241±.50666
	Others	28(5.6%)	1.7857±.41786	1.8571±.59094	1.8929±.31497	1.9286±.53945
Statistics			F test=2.853; p = 0.023	F test=1.323; p = 0.260	F test=2.041; p = 0.088	F test=1.486; p = 0.205

Table 2: Socio-demographic variables and their mean score of general, medical, socio-economic, and treatment information of Schizophrenia

DISCUSSION

The stigma of mental health is a grave problem across the globe which has greatly lessened the chances of the right to treatment and necessary services for the affected populace. In Pakistan, people are highly influenced by false beliefs which led them to suffer in an impoverished socioeconomic setting. Poor literacy rate enhances the graveness of this situation [16]. Therefore, it is crucial to monitor and assess the knowledge regarding schizophrenia in the educated population to come up with revised health policies and campaigns to eliminate the stigma [17,18]. The current study was performed with educated public to evaluate their awareness regarding different aspects of schizophrenia and to evaluate if there has been an increase in schizophrenia-associated knowledge. According to our study, female participants had more knowledge of schizophrenia as compared to males. The T/F and chi-square analysis also showed the same. So, to the best of our knowledge, this study is the first in Pakistan to reveal that females are more aware of schizophrenia as compared to males. This can be supported by the fact that with advancements in daily life, females are working hard to stay up-to-date and connected with the outside world. Naslund, Grande The responses of different age groups were analyzed with each category. This revealed that age groups of 18-22, 23-27, and 33-37 were more aware of schizophrenia and the scores of age groups across the categories and chi-square analysis revealed the same. These results can be supported by the fact that people belonging to the above-mentioned age groups are actively involved in educational activities i.e. through books, internet, online courses, social media, workshops and seminars etc [19]. There is a study reported by Naslund, Grande that people using social media and other means of communication are more aware of mental disorders like schizophrenia which play a vital role in learning [20]. Based on educational groups, it was observed that graduates followed by postgraduates were most mindful of schizophrenia. Our results were concordant with the study conducted in France by Durand-Zaleski, in which people with tertiary education were having more knowledge regarding the disease. All the scores and chi-square analyses complied with our hypotheses except for education across the category of general information. This contradiction in our results may indicate that graduates and postgraduates are having focused research and working on specific problems instead of trivial matters [21]. Findings of the present study suggest that the general public is aware of the basics of schizophrenia. As a result, it aids in the de-stigmatization of mental diseases in our culture, allowing patients to be accepted. Not only that, but mental health awareness aids in treatment accessibility and early detection of the disease.

CONCLUSIONS

Schizophrenia is a serious problem that needs attention for its proper management. The study explains that Pakistanis are aware of schizophrenia but those who are not aware are still in higher percentages. Thus, it is high time to educate people about schizophrenia so that the sufferers can lead a life with their basic rights to treatment and care. Such initiatives and studies can help in the elimination of this grave stigma from society. More work or surveys should be conducted to get a clearer picture of society's status and peoples' way of thinking about schizophrenia.

DOI: https://doi.org/10.54393/pjhs.v3i05.137

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Chong HY, Teoh SL, Wu DB, Kotirum S, Chiou CF, Chaiyakunapruk N. Global economic burden of schizophrenia: a systematic review. Neuropsychiatric disease and treatment. 2016; 12:357.

[2] De Crescenzo F, Postorino V, Siracusano M, Riccioni A, Armando M, Curatolo P, et al. Autistic Symptoms in Schizophrenia Spectrum Disorders: A Systematic Review and Meta-Analysis. Front Psychiatry. 2019 Feb; 10:78. doi: 10.3389/fpsyt.2019.00078.

[3] Baruth JM, Ho JB, Mohammad SI, Lapid MI. End-of-life care in schizophrenia: a systematic review. International psychogeriatrics. 2021 Feb;33(2):129-147. doi: 10.1017/S1041610220000915.

[4] Maritska Z, Prananjaya BA, Parisa N, Suryani PR, Anggraini F, Putri SN, et al. Parental risk factors in schizophrenia: The apple does not fall far from the tree. Annals of Indian Psychiatry. 2022 Apr; 6(2):122.

[5] Al-HadiHasan A, Callaghan P, Lymn JS. Qualitative process evaluation of a psycho-educational intervention targeted at people diagnosed with schizophrenia and their primary caregivers in Jordan. BMC Psychiatry. 2017 Feb; 17(1):68. doi: 10.1186/s12888-017-1225-2.

[6] Drake R. Outcome and insight in early schizophrenia. The University of Manchester (United Kingdom); 2003.

[7] Lysaker PH, Pattison ML, Leonhardt BL, Phelps S, Vohs JL. Insight in schizophrenia spectrum disorders: relationship with behavior, mood and perceived quality of life, underlying causes and emerging treatments. World Psychiatry. 2018 Feb; 17(1):12-23. doi: 10.1002/wps.20508.

[8] Brouwers EPM. Social stigma is an underestimated contributing factor to unemployment in people with mental illness or mental health issues: position paper and future directions. BMC psychology. 2020 Apr; 8(1):36. doi: 10.1186/s40359-020-00399-0.

[9] Folsom DP, Lebowitz BD, Lindamer LA, Palmer BW, Patterson TL, Jeste DV. Schizophrenia in late life: emerging issues. Dialogues in clinical neuroscience. 2022 Apr.

[10] Koschorke M, Padmavati R, Kumar S, Cohen A, Weiss HA, Chatterjee S, et al. Experiences of stigma and discrimination faced by family caregivers of people with schizophrenia in India. Social Science and Medicine. 2017 Apr; 178:66-77. doi: 10.1016/j.socscimed.2017.01.061.

[11] Marchira CR, Supriyanto I, Subandi S, Good MJD, Good BJ. Brief interactive psychoeducation for caregivers of patients with early phase psychosis in Yogyakarta, Indonesia. Early Intervention in Psychiatry. 2019 Jun; 13(3):469-476. doi: 10.1111/eip.12506.

[12] Saha K, Torous J, Ernala SK, Rizuto C, Stafford A, De Choudhury M. A computational study of mental health awareness campaigns on social media. Translational behavioral medicine. 2019 Nov; 9(6):1197-1207. doi: 10.1093/tbm/ibz028.

[13] Jorm AF. Mental health literacy. Public knowledge and beliefs about mental disorders. British Journal of Psychiatry. 2000 Nov; 177:396-401. doi: 10.1192/bjp.177.5.396.

[14] Leiderman EA, Vazquez G, Berizzo C, Bonifacio A, Bruscoli N, Capria JI, et al. Public knowledge, beliefs and attitudes towards patients with schizophrenia: Buenos Aires. Social Psychiatry and Psychiatric Epidemiology. 2011 Apr; 46(4):281-90. doi: 10.1007/s00127-010-0196-0.

[15] Saha K, Weber I, Birnbaum ML, De Choudhury M. Characterizing Awareness of Schizophrenia Among Facebook Users by Leveraging Facebook Advertisement Estimates. Journal of medical internet research. 2017 May; 19(5): e156. doi: 10.2196/jmir.6815.

[16] Talat A, Khan SE, Hassan M. Stigmatization of Seeking Mental Health Care: Youth Perspectives from Pakistan. Pakistan Journal of Social Research. 2022 Jun;4(2):559-66.

[17] Kara UY and Şenel Kara B. Schizophrenia on Turkish Twitter: an exploratory study investigating misuse, stigmatization and trivialization. Social Psychiatry and Psychiatric Epidemiology. 2022 Mar; 57(3):531-539. doi: 10.1007/s00127-021-02112-x.

[18] Hazell CM, Fixsen A, Berry C. Is it time to change the approach of mental health stigma campaigns? An experimental investigation of the effect of campaign wording on stigma and help-seeking intentions. PLoS One. 2022 Aug; 17(8): e0273254. doi: 10.1371/journal.pone.0273254.

[19] Rampazzo F, Bijak J, Vitali A, Weber I, Zagheni E. A Framework for Estimating Migrant Stocks Using Digital Traces and Survey Data: An Application in the United Kingdom. Demography. 2021 Dec; 58(6):2193-2218. doi: 10.1215/00703370-9578562.

[20] Naslund JA, Grande SW, Aschbrenner KA, Elwyn G. Naturally occurring peer support through social media: the experiences of individuals with severe mental illness using YouTube. PLoS One. 2014 Oct;

DOI: https://doi.org/10.54393/pjhs.v3i05.137

9(10): e110171. doi: 10.1371/journal.pone.0110171.

[21] Durand-Zaleski I, Scott J, Rouillon F, Leboyer M. A first national survey of knowledge, attitudes and behaviours towards schizophrenia, bipolar disorders and autism in France. BMC Psychiatry. 2012 Aug; 12:128. doi: 10.1186/1471-244X-12-128.

DOI: https://doi.org/10.54393/pjhs.v3i05.257

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Association between Vitamin D Status and Diabetic Foot in Patients of Type 2 Diabetes Mellitus

Marium Kanwal[1*], Aqsa Soomro[1], Waqar Hussain[1], Sonam[1], Tanveer Yousuf[1] and Zuhaib Shaikh[1]

[1]Department of Medicine, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

ARTICLE INFO

Key Words:
Vitamin D and Diabetes mellitus

How to Cite: Soomro, A. ., Hussain, W. ., Sonam, ., Yousuf, T. ., & Shaikh, Z. . (2022). Association between Vitamin D Status and Diabetic Foot in Patients of Type 2 Diabetes Mellitus: Vitamin D Status and Diabetic Foot. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.257

***Corresponding Author:**
Marium Kanwal
Department of Medicine, Jinnah Postgraduate Medical Centre, Karachi, Pakistan
dr.maryamkanwal@gmail.com

Received Date: 17th October, 2022
Acceptance Date: 24th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Vitamin D not only perform endocrine role in body but also it have strong immunomodulatory properties. Approximately 20% of diabetic people diagnosed foot infections each year. **Objective:** To find the link between vitamin D status and diabetic foot in patients suffering from type 2 diabetes mellitus. **Methods:** A cross-sectional study conducted at the Diabetic OPD medical unit II ward 6 in Jinnah Postgraduate Medical Centre, Karachi for the duration of six months from June 2021 to May 2022. 172 patients were selected for the study and groups were divided into DF and non DF. The body mass index and age in these patients was evaluated. **Results:** The average age of patients was 67 in case of DF group and 65 in case of non DF group. There were 67 non-smokers in non DF group and 30 reported about smoking as per our data. The features like TG, TC, HDL-C, LDL-C was checked and analyzed in both groups. There were 57 patients having diabetes for more than 10 years in non DF group and 20 patients had diabetes for more than 10 years in DF group. **Conclusions:** The low serum level of vitamin D was reported in diabetic foot patients. The patients who had diabetic foot had more chance to have vitamin D deficiency as compared to control group. Therefore, low level of vitamin D is linked with diabetic foot patients significantly.

INTRODUCTION

Vitamin D not only perform endocrine role in body but also it have strong Immunomodulatory properties. It also play crucial role in calcium and bone metabolism. It is a pleotropic hormone. It has been demonstrated to be either directly or indirectly linked to an increased incidence of infections. The deficiency of vitamin D is commonly observed in the general population. Vitamin D levels are linked to a different pathologies. The pathology includes, type II diabetes and metabolic diseases [1, 2]. Peripheral diabetic neuropathy is observed in more than 50% of type 2 diabetic patients. It is one of the serious diabetic complication due to change of immune function mediators the immune state of the host being altered and it is indication of diabetic foot infection. Cytokines play crucial role in host defense mechanisms. They also aid in the macrophages differentiation, healing of wound and the eradication of infection. The inflammatory responses are trigger after the release of the inflammatory cytokines. The cytokines that trigger the inflammatory responses includes interferon (IFN), IL-1, IL-6, and TNF [3-5]. For the control of infection and effective wound healing the anti-inflammatory cytokines production is being regulated by the counter-regulatory mechanisms. These includes IL-8 and IL-10 that basically functions to avert the hyper inflammatory state. Diabetes patients suffered from abnormalities in wound-healing due to a number of known physiological factors, such as decrease in production of growth factor and impaired cytokine production [6, 7]. Different pathological conditions also disrupt the normal production of cytokines. The hyperglycemia is the one of

DOI: https://doi.org/10.54393/pjhs.v3i05.257

the most common pathological conditions that interfere with the regular production of cytokines. The critical persistent and elevated inflammatory activities are resulted from the chronic wound development. Vitamin D deficiency has strong association with the musculoskeletal diseases. Approximately 20% of diabetic people diagnosed foot infections each year. Immunological abnormalities leads to development of diabetic foot and subsequent infections. The malfunctioning of immune cells is highly reported in the Vitamin D deficiency [8, 9]. There is a dearth of literature available on the function of systemic inflammation in patients diagnosed with diabetic foot infections in relation to vitamin D deficiency, which may be the cause of delayed wound healing. The immunological dysregulation in the vitamin D deficient patients increases the risk of developing the diabetic foot infection. Different studies have evaluated the levels of IL-1, IL-6 and TNF in the blood of patients [10].

METHODS

Patients who attended the at the Diabetic OPD medical unit II ward 6 in Jinnah Postgraduate Medical Centre, Karachi for the duration of six months from June 2021 to May 2022 were selected for the study. The data were taken from 172 patients. The patients were separated into two groups based on their clinical examination. The groups were divided into DF and non DF, there were 71 individuals present in DF group and 101 were included in the non DF group. The body mass index, age and diabetes duration in these patients was evaluated. The smoking history of patients was checked. Diabetic patients with clinical evidence of foot infection were included in the case group, while diabetic patients with no indication of any systemic infection were included in the controls group. The complete clinical history was documented on the performa. Culture positive and/or leucocytosis in the context of fever were used to diagnosis infection. All participants filled the informed written consent. This study was carried out in accordance with the Helsinki Declaration criteria. The ethical and review board committee of institute approved the study. Blood samples were collected with and without anticoagulant to calculate glycosylated HbA1c and serum 25-hydroxyvitamin D (25(OH)D). RIA commercial kit Diasorin was used to calculate serum 25(OH)D. The data was stratified. Different statistical test was performed for the analysis and SPSS version 21.0 tool was used.

RESULTS

There were 71 individuals present in DF group and 101 were included in the non DF group. Table 1 shows the basic characteristics and clinical features of two groups. The body mass index, age and duration of diabetes in these patients was evaluated. The smoking history of patients was checked. The average age of patients was 67 in case of DF group and 65 in case of non DF group. There were 43 male and 28 females in DF group, while in non DF group there were 29 male and 71 female participants. Majority of the patients were included in group who had diabetes for more than 10 years. There were 67 non-smokers in non DF group and 30 reported about smoking as per our data.

Parameter	Total n=172	DF group n=71	Non-DF group n=101	p-value
Age	65	67	65	0.001
BMI	24.3	23.1	24.3	0.005
Gender				
Male	82	43	29	<0.001
Female	90	28	71	0.001
Type 2 diabetes mellitus duration				
<5 years	55	14	24	0.001
5-10 years	32	37	19	
>10 years	85	20	57	
Smoking history				
Smoking	63	30	33	0.001
Non-smoking	109	41	67	0.001

Table 1: Basic characteristics and clinical features in two groups

The features like TG, TC, HDL-C, LDL-C was checked and analyzed as showed in the table 2. Cr (µmol/L), UA (µmol/L), Ca+2 mmol/L levels were also checked and data was compared in both groups. There were 57 patients having diabetes for more than 10 years in non DF group and 20 patients had diabetes for more than 10 years in DF group.

Features	Total	DF group n=71	Non-DF group n=101	p-value
25(OH)-VD in nmol/L	42.12	35.4	43.2	<0.001
HbA1c in %	7.98	7.9	7.8	<0.001
TG mmol/L	1.36	1.3	1.38	<0.001
TC mmol/L	4.15	3.97	4.27	<0.001
HDL-C mmol/L	1.13	1.04	1.2	<0.001
LDL-C mmol/L	2.27	2.13	2.4	<0.001
ALB g/L	41.34	38.12	43.1	<0.001
Cr (µmol/L)	72	84	65	<0.001
UA(µmol/L)	332	328	332	<0.001
Ca+2 mmol/L	2.31	2.22	2.23	<0.001

Table 2: Laboratory features in two groups

The vit D sufficiency, insufficiency and deficiency was studied in two groups, there were 33% patients having vit D deficiency in DF group as shown in table 3.

Vit D level	Total	DF group	Non- DF group
Vit D sufficiency	100%	100%	100%
Vit D insufficiency	55%	76%	52%
Vit D deficiency	24%	33%	22%

Table 3: Prevalence rate of vit-D among groups

Complications that took place because of diabetes were also evaluated and are listed in table 4.

DOI: https://doi.org/10.54393/pjhs.v3i05.257

Features	Total n=172	DF group n=71	Non-DF group n=101	p-value
DN, n	69	39	33	<0.001
DR, n	42	29	26	<0.001
DPN, n	102	53	61	<0.001
PAD, n	45	21	17	<0.001
DAN, n	83	43	38	<0.001

Table 4: Complications due to diabetes among groups

DISCUSSION

The analysis found that the 25OH-vitamin D levels were lower in DF group (35) as compared to the non DF group (43). Also the rate of vitamin D deficiency and insufficiency was higher in the DF group as compared to the non DF group. A study was conducted to find the association of vitamin D condition and diabetic factors, it showed that the vitamin D deficiency was more in case of diabetic foot patients as compared to the non-diabetic ones [11]. The infection involved in causing diabetic foot disease is also playing role in causing vitamin D deficiency. There was an increased cytokines concentration at the inflammation site and a vitamin D deficiency of <25nmol/L was found in these patients. Since then several studies have been conducted to find the cause and link between vitamin D deficiency and diabetic foot disease [12]. However, there were inconsistent findings regarding this association. Another study has demonstrated that the serum level vitamin D deficiency has no significant link with the diabetic foot disease. A similar finding was obtained after another study carried out [13, 14]. As per previous analysis, there are several pre-clinical data studies that have shown that use of vitamin D plays a key role in healing of diabetic foot inflammation. That means vitamin D is involved in wound healing as it interacts with TGF-β signaling pathway. Another study has shown that vitamin D suppresses the NF-kB mediated inflammatory gene expression that result in decreasing the severity of inflammation [15]. Vitamin D also plays an indirect role in improving the glycemic control in case of diabetic patients. In our study the patients with poor glycemic control had less 25OH vitamin D levels as compared to the control group having normal glycemic control. These results are consistent throughout the previous studies [16]. As per pathophysiological mechanism, the patients who are suffering from type 2 diabetes mellitus have more chances to suffer from foot ulcers [17]. Moreover, the deficiency of vitamin D can be considered as a causative agent in development of ulcers in diabetes patients. Also the patients who already have diabetic foot will have low levels of vitamin D in their serum. If this levels falls for a longer period of time and it is associated with other factors like lo nutritional condition, decreased physical exercise, it can lead to limb immobilization. However, the exact mechanism by which these two factors are linked to each other is still unclear but we can say that there is some link between the diabetic foot and vitamin D deficiency [18]. In a study carried out to find the link between diabetes and vitamin D concentration in the serum, the seasonal variations of vitamin D was studied. The vitamin D levels were low in winters and in spring, however, this level was higher in summer and autumn. The study also showed that the lowering of vitamin D serum level was found in DF and non DF groups in same season. Mainly vitamin D is formed under the skin after exposure of ultraviolet B radiations. A number of factors can have role in determining the concentration of vitamin D level in the serum [19]. Therefore, there is need to screen the patients for vitamin D deficiency in winters and spring. As per previous studies there were two trails carried out where the vitamin D supply was done to check the wound healing in both groups. It was found that the vitamin D levels were restored more easily in control patients as compared to the diabetic foot patients. There is need to maintain enough vitamin D in the diet for diabetic patients so that any wound if takes place can be cured easily [20, 21]. Although this link does not exactly mean that both factors are correlated but there is a great significance in treatment and management of diabetic foot with vitamin D supplements. The sample size of our study was small so there can be confusion about the exact relationship and link between the two factors still our studies coincides with the previous studies where it was found that there was vitamin D deficiency in diabetes patients.

CONCLUSIONS

Vitamin D deficiency is a prevalent condition especially among diabetic patients. The low serum level of vitamin D was reported in diabetic foot patients. The patients who had diabetic foot had more chance to have vitamin D deficiency as compared to control group. Therefore, low level of vitamin D is linked with diabetic foot patients significantly.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Tiwari S, Pratyush DD, Gupta SK, Singh SK. Vitamin D deficiency is associated with inflammatory cytokine concentrations in patients with diabetic foot infection. British Journal of Nutrition. 2014 Dec; 112(12):1938-43. doi: 10.1017/S0007114514003018

[2] Feldkamp J, Jungheim K, Schott M, Jacobs B, Roden

DOI: https://doi.org/10.54393/pjhs.v3i05.257

M. Severe Vitamin D3 Deficiency in the Majority of Patients with Diabetic Foot Ulcers. Hormone and Metabolic Research. 2018 Aug; 50(8):615-619. doi: 10.1055/a-0648-8178

[3] Zubair M, Malik A, Meerza D, Ahmad J. 25-Hydroxyvitamin D [25(OH)D] levels and diabetic foot ulcer: is there any relationship? Diabetes and Metabolic Syndrome. 2013 Sep; 7(3):148-53. doi: 10.1016/j.dsx.2013.06.008

[4] Kota SK, Meher LK, Jammula S, Modi KD. Inflammatory markers in diabetic foot and impact of vitamin D deficiency. InEndocrine Abstracts 2013 Apr 1 (Vol. 32). Bioscientifica. doi: 10.1530/endoabs.32.P384

[5] Razzaghi R, Pourbagheri H, Momen-Heravi M, Bahmani F, Shadi J, Soleimani Z, et al. The effects of vitamin D supplementation on wound healing and metabolic status in patients with diabetic foot ulcer: A randomized, double-blind, placebo-controlled trial. Journal of Diabetic Complications. 2017 Apr; 31(4):766-772. doi: 10.1016/j.jdiacomp.2016.06.017

[6] Yammine K, Hayek F, Assi C. Is there an association between vitamin D and diabetic foot disease? A meta-analysis. Wound Repair and Regeneration. 2020 Jan; 28(1):90-96. doi: 10.1111/wrr.12762

[7] Tang W, Chen L, Ma W, Chen D, Wang C, Gao Y, et al. Association between vitamin D status and diabetic foot in patients with type 2 diabetes mellitus. Journal of Diabetes Investigation. 2022 Jul; 13(7):1213-1221. doi: 10.1111/jdi.13776

[8] Soroush N, Radfar M, Hamidi AK, Abdollahi M, Qorbani M, Razi F, et al. Vitamin D receptor gene FokI variant in diabetic foot ulcer and its relation with oxidative stress. Gene. 2017 Jan; 599:87-91. doi: 10.1016/j.gene.2016.11.012

[9] Dai J, Yu M, Chen H, Chai Y. Association Between Serum 25-OH-Vitamin D and Diabetic Foot Ulcer in Patients With Type 2 Diabetes. Frontiers in Nutrition. 2020 Sep; 7:109. doi: 10.3389/fnut.2020.00109

[10] He R, Hu Y, Zeng H, Zhao J, Zhao J, Chai Y, et al. Vitamin D deficiency increases the risk of peripheral neuropathy in Chinese patients with type 2 diabetes. Diabetes Metabolism Research and Reviews. 2017 Feb; 33(2). doi: 10.1002/dmrr.2820

[11] Danny Darlington CJ, Suresh Kumar S, Jagdish S, Sridhar MG. Evaluation of Serum Vitamin D Levels in Diabetic Foot Infections: A Cross-Sectional Study in a Tertiary Care Center in South India. Iranian Journal of Medical Sciences. 2019 Nov; 44(6):474-482. doi: 10.30476/ijms.2018.44951

[12] Maggi S, Siviero P, Brocco E, Albertin M, Romanato G, Crepaldi G. Vitamin D deficiency, serum leptin and osteoprotegerin levels in older diabetic patients: an input to new research avenues. Acta Diabetologica. 2014; 51(3):461-9. doi: 10.1007/s00592-013-0540-4

[13] Singh SK, Jain R, Singh S. Vitamin D deficiency in patients with diabetes and COVID- 19 infection. Diabetes and Metabolic Syndrome. 2020 Oct; 14(5):1033-1035. doi: 10.1016/j.dsx.2020.06.071

[14] Kurian SJ, Miraj SS, Benson R, Munisamy M, Saravu K, Rodrigues GS, et al. Vitamin D Supplementation in Diabetic Foot Ulcers: A Current Perspective. Current Diabetes Reviews. 2021; 17(4):512-521. doi: 10.2174/1573399816999201012195735

[15] Todorova AS, Jude EB, Dimova RB, Chakarova NY, Serdarova MS, Grozeva GG, et al. Vitamin D Status in a Bulgarian Population With Type 2 Diabetes and Diabetic Foot Ulcers. International Journal of Lower Extremity Wounds. 2020 Oct: 1534734620965820. doi: 10.1177/1534734620965820

[16] Klashami ZN, Ahrabi NZ, Ahrabi YS, Hasanzad M, Asadi M, Amoli MM. The vitamin D receptor gene variants, ApaI, TaqI, BsmI, and FokI in diabetic foot ulcer and their association with oxidative stress. Molecular Biology Reports. 2022 Sep; 49(9):8627-8639. doi: 10.1007/s11033-022-07698-2

[17] Maier GS, Horas K, Seeger JB, Roth KE, Kurth AA, Maus U. Is there an association between periprosthetic joint infection and low vitamin D levels? International Orthopaedics. 2014 Jul; 38(7):1499-504. doi: 10.1007/s00264-014-2338-6

[18] Lin J, Mo X, Yang Y, Tang C, Chen J. Association between vitamin D deficiency and diabetic foot ulcer wound in diabetic subjects: A meta-analysis. International Wound Journal. 2022 May. doi: 10.1111/iwj.13836

[19] Macido A. Diabetic Foot Ulcers and Vitamin D Status: A Literature Review. SAGE Open Nursing. 2018 Sep; 4:2377960818789027. doi: 10.1177/2377960818789027

[20] López-López N, González-Curiel I, Treviño-Santa Cruz MB, Rivas-Santiago B, Trujillo-Paez V, Enciso-Moreno JA, et al. Expression and vitamin D-mediated regulation of matrix metalloproteinases (MMPs) and tissue inhibitors of metalloproteinases (TIMPs) in healthy skin and in diabetic foot ulcers. Archives of Dermatological Research. 2014 Nov; 306(9):809-21. doi: 10.1007/s00403-014-1494-2

[21] Malhotra K, Baggott PJ, Livingstone J. Vitamin D in the Foot and Ankle: A Review of the Literature. Journal of the American Podiatric Medical Association. 2020 May; 110(3):Article_10. doi: 10.7547/18-087

DOI: https://doi.org/10.54393/pjhs.v3i05.197

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Causes and Management of Blunt Liver Trauma in a Tertiary Care Hospital in Peshawar

Asad Ullah Khan[1], Kamran Ahmad[2], Abeer Jehanzeb Khan[3], Nasir Bakhtiar[1], Ahmad Arsalan Tahir[1], Muhammad Haris[4*], Muhammad Jehangir Khan[5], Sobia Haris[6] and Farah Deeba[6]

[1]Department of Surgery, Peshawar Medical College, Peshawar, Pakistan
[2]Department of Surgery, Nowshera Medical College, Nowshera, Pakistan
[3]Department of Surgical ICU, Khyber Teaching Hospital, Peshawar, Pakistan
[4]Department of Anatomy, Nowshera Medical College, Nowshera, Pakistan
[5]Department of Pediatric Surgery, Makka Medical Center, Nowshera, Pakistan
[6]Department of Medical Education, Nowshera Medical College, Nowshera, Pakistan

ARTICLE INFO

Key Words:

Blunt liver trauma, Hospital stay, Managed conservatively

How to Cite:

Khan, A. U. ., Ahmad, K. ., Jehanzeb Khan, A. ., Bakhtiar, N. ., Arsalan Tahir, A. ., Harris, M. ., Jehangir Khan, M. ., Haris, S. ., & Deeba, F. . (2022). Causes and management of blunt liver trauma in a tertiary care hospital in Peshawar: Blunt Liver Trauma. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.197

***Corresponding Author:**

Muhammad Haris
Department of Anatomy, Nowshera Medical College, Nowshera, Pakistan
dx_harris@hotmail.com

Received Date: 3rd October, 2022
Acceptance Date: 13th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Trauma is the principal reason of deaths in kids and young adults globally. **Objective:** To determine the causes and management of blunt liver trauma in a tertiary care hospital in Peshawar. **Methods:** The present investigation observed a total of 150 individuals through non-probability consecutive sampling to determine the mean hospital stay in patients presented with blunt liver trauma. **Results:** In this study, age distribution among 150 patients was analyzed as n= 10-20 Years 51 34.0%), 21-30 Years 35 (23.3%), 31-40 Years 16 (10.7%), 41-50 Years 23 (15.3%), 51-60 Years 25 (16.7%). Mean age was 41.56±5.357 years. Gender wise Distribution among 150 Patients was analyzed as Male were 94 (62.7%) and female were 56 (37.3%) Distribution of BMI among 150 patients were analyzed as n=Below 18.5 Underweight 76 (50.7%), 18.5-24.9 Normal weight 35 (23.3%), 25.0-29.9 pre-obesity 21 (14.0%), 30.0-34.9 Obesity class 18 (12.0%). Distribution Mechanism of Injury among 150 patients were analyzed as n= RTA was 57 (38.0%), fall from height was 52 (34.7%), Sport's injury was 18 (12.0%), physical assault was 23 (15.3%). Successful Conservative Management among 150 patients were analyzed as n= Yes was 106 (70.7%) and No was 44 (29.3%), Distribution of Mortality among 150 patients were analyzed as n= Yes was found 66 (44.0%) and No was found 84 (56.0%). **Conclusions:** The severity of liver damage and concomitant intra-abdominal injuries demonstrated a strong association with the chance of success with conservative therapy. The restricted hospital facilities and lack of agreement on traditional therapy had a detrimental influence on success.

INTRODUCTION

Trauma is the principal reason of deaths in kids and young adults globally. According to World Health Organization (WHO), trauma claimed an estimated 5 million lives in the year 2016 with a majority (20-25%) resulting from road traffic accidents (RTA). Approximately 6% of all deaths in Pakistan are caused by trauma [1, 2]. The most frequent damaged solid organ in acute abdominal trauma is the liver, which accounts for up to 38% of cases. The common mechanisms of injury include RTA, falls from height, and assault. Blunt hepatic trauma constitutes 75-90% all cases of liver injury. The mortality rate from liver trauma might reach 12.2% [3]. Over the last three decades, the introduction of advanced radiological diagnostic techniques such as computed tomography (CT) scans has led to a better knowledge and evaluation of liver damage, revolutionizing the practice of trauma surgery [4, 5].

DOI: https://doi.org/10.54393/pjhs.v3i05.197

According to the recently published guidelines from the World Society of Emergency Surgery (WSES) in March 2020, conservative management was the recommended treatment modality of choice in blunt hepatic injuries in hemo-dynamically stable patients while surgery was reserved for hemo-dynamically unstable patients [6]. The major advantages of non-operative management (NOM) is the circumvention of a major surgical procedure that is associated with its own risks and complications in addition to the increased burden on healthcare and increased financial costs. Surgery also leads to a delayed return to work and delayed recovery of patients with increased hospital stay [6, 7]. Conservative management of blunt liver trauma should be planned on the basis of findings of meticulous clinical examination and radiological investigations. A multidisciplinary approach ensures the best outcome. Aim of this study was to find the wide disparity in the reported literature on the accomplishment of conservative management of blunt liver trauma. Moreover, few Pakistani studies have focused on the NOM of liver trauma. Avoidance of surgery in a patient not only benefits the patients physically, and physiologically. The findings of this investigation will contribute to the validation of conservative care of blunt liver damage as a safe and effective therapeutic strategy, ultimately leading to better patient management.

METHODS

It was a Descriptive cross-sectional study carried out at Department of General Surgery, Hayatabad Medical Complex Peshawar. The duration of the study was from 7th May 2021 to 7th November 2021. Sample size of 150 were calculated using the WHO formula for "Estimating sample size for a population average with the following assumptions:

Length of hospital stay: 7.72 ± 4.818
Confidence Level: 95%
Relative precision: 10%

It was a non-probability consecutive sampling. All those individuals of either gender who were diagnosed as cases of blunt liver trauma (level I & II) as per operational definition of age between 10 to 60 years of ASA Class I, II and had BMI 19-30 Kg/m2 and were hemodynamically stable at the time of presentation were included in the study whereas, patients who had penetrating abdominal trauma, polytrauma having injury to other parts of body as well like head injury, fractures, chronic liver disease, ischemic heart disease and with identified history of coagulation disorders were excluded. A total of 150 patients presenting to the Accident and Emergency (A&E) Department of Hayatabad Medical Complex, Peshawar with blunt, abdominal trauma who met the inclusion and exclusion criterion were enrolled. All patients participating in the trial provided informed consent. All the patients were managed according to the Advanced Trauma Life Support (ATLS) protocol Primary and Secondary surveys were completed. Demographic particulars including age, gender, profession contact number and address were documented. History was taken in detail with record of the exact mechanism of injury and time since injury. A thorough examination was performed, as well as baseline laboratory examinations such as CBC, blood group and cross match, renal function tests, coagulation profile, liver function tests, and Hepatitis B and C serology. Following X-rays of the chest, cervical spine, and pelvis, a Focused Assessment with Sonography for Trauma (FAST) scan was accomplished to search for any indication of free fluid in the abdomen and pelvis. Radiologist requested to comment on any liver trauma if present. Patients were admitted to the surgical critical care unit (ICU) and monitored. Once hemodynamically stabilized, an abdominal contrast enhanced computed tomography (CECT) scan was required. The Liver injury were classified as per the American Association for Surgery of Trauma (AAST) scale into levels I-VI. Non-operative conservative treatment was planned and patients would be monitored for any hemodynamic instability, and fall in hemoglobin (Hb) levels. Serial Hb levels were done daily. Any patient suffering from severe pain, hemodynamic instability and a sudden fall in Hb levels were taken to Operation Theater (OT) for laparotomy. Conservative management were labelled as successful if the patient improves without surgery after a period of careful observation and is discharged. Data of all patients were recorded on a pre-designed proforma. Data were inserted into MS Excel and analyzed with SPSS version 25. Average and standard deviation were measured for the quantitative variable such as age, BMI, time of presentation and duration of hospital stay. Qualitative variable like gender, ASA class, and mechanism of injury, severity of injury, treatment outcome, and mortality were expressed as frequency and percentages.

RESULTS

In this study age distribution among 150 patients was analyzed as n= 10-20 Years 51 (34.0%), 21-30 Years 35 (23.3%), 31-40 Years 16 (10.7%), 41-50 Years 23 (15.3%), 51-60 Years 25 (16.7%). Mean age was 41.56 ± 5.357 years. Gender wise Distribution among 150 Patients was analyzed as Male were 94 (62.7%) and female were 56 (37.3%). Distribution of BMI among 150 patients were analyzed as n=Below 18.5 Underweight 76 (50.7%), 18.5–24.9 Normal weight 35 (23.3%), 25.0–29.9 pre-obesity 21(14.0%), 30.0–34.9 Obesity class 18 (12.0%). Distribution Mechanism of Injury among 150 patients were analyzed as n= RTA was 57 (38.0%)

DOI: https://doi.org/10.54393/pjhs.v3i05.197

Fall from height was 52 (34.7%) Sport's injury was 18 (12.0%) physical assault was 23 (15.3%) (Table 2). Successful Conservative Management among 150 patients were analyzed as n= Yes was 106 (70.7%) and No was 44 (29.3%). Distribution of Mortality among 150 patients were analyzed as n= Yes was found 66 (44.0%) and No was found 84 (56.0%).

Age	Frequency (%)
10-20 years	51 (34.0%)
21-30 years	35 (23.3%)
31-40 years	16 (10.7%)
41-50 years	23 (15.3%)
51-60 years	25 (16.7%)
Mean ± SD	41.56 ± 5.357
Mortality	
Yes	66 (44.0%)
No	84 (56.0%)

Table 1: Age Demographics

Mechanism of Injury	Frequency (%)
RTA	57 (38%)
Fall from height	52 (34.7%)
Sports injury	18 (12%)
Physical assault	23 (15.3%)
Total	150 (100%)

Table 2: Distribution Mechanism of Injury

DISCUSSION

According to Jin et al., liver damage happened in twenty percent of individuals with rounded abdominal trauma [8]. Our study discovered a ratio between male/female is 5:1. Kutcher et al., discovered that the ratio towards male to female lies between 15:1 [9]. Nearly 15-20 years ago, all severe liver wounds were handled surgically, although no active bleeding was discovered in 50-80% of instances [10, 11]. For related injuries, our study also discovered liver wounds without current bleeding throughout laparotomy. The hemodynamic state was the primary factor in deciding the therapy method in our investigation. According to the findings of our study, roughly eighty five percent of individuals with rounded liver injuries are hemodynamically stable or stabilize after getting intravenous fluids [12]. According to Stassen et al., many competent trauma surgeons use surgical therapy in hemodynamically stable individuals and have resolute that traditional handling has a good influence on patient endurance [13]. A helical CT scan with oral and venous contrast was conducted in hemodynamically stable patients to identify the severity of the liver disorders, the quantity of hemoperitoneum, the existence of pseudoaneurysms, and other intraperitoneal lesions. Repeated ultrasound exams revealed hemoperitoneum, and in some cases, a CT scan was used to confirm the diagnosis. According to Udobi et al., a substantial amount of hemoperitoneum (perihepatic space, Douglas pouch, and blood in the lateral channels) is a major risk feature for conservative therapy failure [14]. Because of the limited transfusion resources at our institution, we discontinued conservative therapy in patients who had a high need for transfusion and whose hemoperitoneum was steadily expanding. Fifteen individuals in Group A of 88 individuals chosen for conservative therapy had problems that required surgery. Group B included 85 individuals who had an urgent laparotomy because of hemodynamic variability, concomitant intra-abdominal wounds, or piercing trauma. It is interesting to note that a case of piercing liver damage induced by shooting rifle injuries were handled cautiously. Ten individuals had perihepatic packing; six of them required a second laparotomy, and four did not live. Our study discovered that bullet injuries and wounds due to sharp instruments occurred at a rate of 24.8%. This proportion was considerable, and took part in a decrease in the number of conservatively managed patients. Gunfire victims were penetrating in 35-70% of cases, whereas sharp tool injuries were not penetrating in 35-61% of instances [15-17]. Another useful procedure for determining the presence or type of intraperitoneal fluid is diagnostic peritoneal lavage (DPL). We utilized this method in some instances. DPL, as defined by Root in 1965, relics a significant tool in surgeons' hands, particularly in the nonattendance of noninvasive technology. For intraperitoneal injuries, DPL has extreme sensitivity and specificity rate of ninety five and ninety nine percent, respectively. But this technique is linked to issues in 0.8-1.7% of instances [18]. According to our findings, conservative therapy was positive in 42.2% of individuals with mixed hepatic damage and 58.7% of individuals with solitary hepatic trauma. These proportions found in our research are smaller than those seen elsewhere. These disparities, in our opinion, are due to two reasons: (1) a lack of agreement for conventional care and other (2) restricted hospital facilities (limited interventional radiology procedures). Traditional therapy was unsuccessful in 17.2% of patients. According to certain studies, the effectiveness of traditional care of liver suffering in hemodynamically stable individuals is around eighty-seven and ninety eight percent and an unsuccessful rate of 10 to 25% [19, 20]. Wounds of level III or higher contributed significantly to unsuccessful of cautious care. We only had two individuals with level IV liver damage who were treated predictably. According to Udobi et al., conservative therapy was unsuccessful in 14% of individuals with level IV wounds and

DOI: https://doi.org/10.54393/pjhs.v3i05.197

22.6% of individuals with level V wounds, whereas the failure rate in individuals with levels I, II, and III injuries was 3-7 and 5%, respectively [14]. The severity of liver damage has a substantial link with the chance of effectiveness of conservative therapy. 2.6 was recorded as the coefficient of level damage, implying that as level of injury grows, the likelihood of conservative therapy being effective reduces to 2.6. Furthermore, the efficacy of conservative therapy was significantly related to accompanying intra-abdominal injuries. Other variables in the effectiveness of the conservative therapy were statistically negligible. The conservative treatment's failure was frequently linked to worsening of hemodynamic parameters, bile outflow, and the existence of overlying septic sequelae. Secondary bleeding occurs in fewer than 5% of patients managed conservatively, according to Knudson et al., and Yamamoto et al., [21, 22]. We discovered that conservative therapy failed in 3% of instances due to subsequent bleeding. According to Richards et al., and Ma et al., bile spillage can occur in 3-20% of patients who are treated cautiously [23, 24]. Only one patient in our research required surgical intervention as a result of elevated ALT and AST levels. Conservative therapy failure rates owing to connected intra-abdominal damages have been testified to fluctuate between 0.5 to 3.5%, while in our findings, the unsuccessful rate with related intra-abdominal injuries was 2.3%.

CONCLUSIONS

The severity of liver damage and concomitant intra-abdominal wounds demonstrated a strong association with the chance of success with conservative therapy. The restricted hospital facilities and lack of agreement on traditional therapy had a detrimental influence on success.

REFERENCES

[1] Philipoff AC, Lumsdaine W, Weber DG. Traumatic gallbladder rupture: a patient with multiple risk factors. BMJ Case Reports. 2016 Oct; 2016:bcr 2016216811. doi: 10.1136/bcr-2016-216811

[2] Ward J, Alarcon L, Peitzman AB. Management of blunt liver injury: what is new? European Journal of Trauma and Emergency Surgery. 2015 Jun; 41(3):229-37. doi: 10.1007/s00068-015-0521-0

[3] Jennings GR, Poole GV, Yates NL, Johnson RK, Brock M. Has nonoperative management of solid visceral injuries adversely affected resident operative experience? The American Journal of Surgery. 2001 Jun; 67(6):597-600

[4] Parks RW, Chrysos E, Diamond T. Management of liver trauma. British Journal of Surgery. 1999 Sep; 86(9):1121-35. doi: 10.1046/j.1365-2168.1999.01210.x

[5] Ingram MC, Siddharthan RV, Morris AD, Hill SJ, Travers CD, McKracken CE, et al. Hepatic and splenic blush on computed tomography in children following blunt abdominal trauma: Is intervention necessary? Journal of Trauma and Acute Care Surgery. 2016 Aug; 81(2):266-70. doi: 10.1097/TA.0000000000001114

[6] Timofte D, Hutanu I, Livadariu RM, Soroceanu RP, Munteanu I, Diaconu C, et al. Management of Traumatic Liver Lesions. Revista Medico-Chirurgicala a Societatii de Medici si Naturalisti din Iasi. 2015 Jun; 119(2):431-6

[7] Van As AB and Millar AJ. Management of paediatric liver trauma. Pediatric Surgery International. 2017 Apr; 33(4):445-453. doi: 10.1007/s00383-016-4046-3

[8] Jin W, Deng L, Lv H, Zhang Q, Zhu J. Mechanisms of blunt liver trauma patterns: An analysis of 53 cases. Experimental and Therapeutic Medicine. 2013 Feb; 5(2):395-398. doi: 10.3892/etm.2012.837

[9] Kutcher ME, Weis JJ, Siada SS, Kaups KL, Kozar RA, Wawrose RA, et al. The role of computed tomographic scan in ongoing triage of operative hepatic trauma: A Western Trauma Association multicenter retrospective study. Journal of Trauma and Acute Care Surgery. 2015 Dec; 79(6):951-6. doi: 10.1097/TA.0000000000000692

[10] Fu CJ, Wong YC, Tsang YM, Wang LJ, Chen HW, Ku YK, et al. Computed tomography arterial portography for assessment of portal vein injury after blunt hepatic trauma. Diagnostic and Interventional Radiology. 2015 Oct; 21(5):361-7. doi: 10.5152/dir.2015.14445

[11] LeBedis CA, Anderson SW, Mercier G, Kussman S, Coleman SL, Golden L, et al. The utility of CT for predicting bile leaks in hepatic trauma. Emergency Radiology. 2015 Apr; 22(2):101-7. doi: 10.1007/s10140-014-1262-9

[12] Fulcher AS, Turner MA, Yelon JA, McClain LC, Broderick T, Ivatury RR, et al. Magnetic resonance cholangiopancreatography (MRCP) in the assessment of pancreatic duct trauma and its sequelae: preliminary findings. Journal of Trauma. 2000 Jun; 48(6):1001-7. doi: 10.1097/00005373-200006000-00002

[13] Stassen NA, Bhullar I, Cheng JD, Crandall M, Friese R, Guillamondegui O, et al. Nonoperative management of blunt hepatic injury: an Eastern Association for the Surgery of Trauma practice management guideline. Journal of Trauma and Acute Care Surg. 2012 Nov; 73(5 Suppl 4):S288-93. doi: 10.1097/TA.0b013e318270160d

[14] Udobi KF, Rodriguez A, Chiu WC, Scalea TM. Role of ultrasonography in penetrating abdominal trauma: a prospective clinical study. Journal of Trauma. 2001 Mar; 50(3):475-9. doi: 10.1097/00005373-200103000-

DOI: https://doi.org/10.54393/pjhs.v3i05.197

00011
[15] Walter KD. Radiographic evaluation of the patient with sport-related abdominal trauma. Current Sports Medicine Reports. 2007 Apr; 6(2):115-9. doi: 10.1007/BF02941152
[16] Wong YC, Wang LJ, Fang JF, Lin BC, Ng CJ, Chen RJ. Multidetector-row computed tomography (CT) of blunt pancreatic injuries: can contrast-enhanced multiphasic CT detect pancreatic duct injuries? Journal of Trauma. 2008 Mar; 64(3):666-72. doi: 10.1097/TA.0b013e31802c5ba0
[17] Poletti PA, Mirvis SE, Shanmuganathan K, Killeen KL, Coldwell D. CT criteria for management of blunt liver trauma: correlation with angiographic and surgical findings. Radiology. 2000 Aug; 216(2):418-27. doi: 10.1148/radiology.216.2.r00au44418
[18] Casillas VJ, Amendola MA, Gascue A, Pinnar N, Levi JU, Perez JM. Imaging of nontraumatic hemorrhagic hepatic lesions. Radiographics. 2000 Apr; 20(2):367-78. doi: 10.1148/radiographics.20.2.g00mc10367
[19] Søndenaa K, Horn A, Nedrebø T. Diagnosis of blunt trauma to the gallbladder and bile ducts. European Journal of Surgery. 2000 Nov; 166(11):903-7. doi: 10.1080/110241500447326
[20] Fang JF, Chen RJ, Wong YC, Lin BC, Hsu YB, Kao JL, et al. Classification and treatment of pooling of contrast material on computed tomographic scan of blunt hepatic trauma. Journal of Trauma. 2000 Dec; 49(6):1083-8. doi: 10.1097/00005373-200012000-00018
[21] Knudson MM and Maull KI. Nonoperative management of solid organ injuries. Past, present, and future. Surgical Clinics of North America. 1999 Dec; 79(6):1357-71. doi: 10.1016/s0039-6109(05)70082-7
[22] Yamamoto F, Pu Y, Igimi H, Kojima T, Witt JL, Yamamoto S. MR imaging of traumatic hepatic laceration: evaluation and course of healing after surgery. Abdominal Imaging. 1993; 18(3):253-7. doi: 10.1007/BF00198116
[23] Richards JR, McGahan JP, Pali MJ, Bohnen PA. Sonographic detection of blunt hepatic trauma: hemoperitoneum and parenchymal patterns of injury. Journal of Trauma. 1999 Dec; 47(6):1092-7. doi: 10.1097/00005373-199912000-00019
[24] Ma OJ and Kefer MP. Ultrasound detection of free intraperitoneal fluid associated with hepatic and splenic injuries. Southern Medical Journal. 2001 Jan; 94(1):54-7. PMID: 11213943.

DOI: https://doi.org/10.54393/pjhs.v3i05.273

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Chewing Gum and Postoperative Ileus in Children after an Appendectomy in Terms of Early Gut Motility, Resumption of Feed, and Hospital Stay

Gulshan Rehana[1], Sameen Hanif[2*], Syeda Sidra Tasneem Kausar[3], Zeeshan Raza[4] and Lubna Peter[3]

[1]Public Health Nursing Supervisor, College of Nursing, Hafizabad,Pakistan
[2] Department of Anaesthesia, Hameed Latif Hospital, Lahore, Pakistan
[3]Department of Nursing, The Superior University, Lahore, Pakistan
[4]CMH hospital, Lahore, Pakistan

ARTICLE INFO

Key Words:

Chewing gum, Postoperative ileus, Early gut motility

How to Cite:

Rehana, G. ., Hanif, S. . ., Tasneem Kausar, S. S. ., Raza, Z. ., & Peter, L. . (2022). Chewing Gum And Postoperative Ileus In Children After An Appendectomy In Terms Of Early Gut Motility, Resumption Of Feed, And Hospital Stay: Chewing gum and Postoperative ileus in children after an appendectomy. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.273

***Corresponding Author:**

Sameen Hanif
Department of Anaesthesia, Hameed Latif Hospital, Lahore, Pakistan
sam_656308@hotmail.com

Received Date: 6th October, 2022
Acceptance Date: 14th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Chewing gum usage decreases the postoperative ileus in kids who have had appendicectomies in terms of quick gut motility, feeding resumement, and hospital stay. **Objective:** The goal of this study was to determine how chewing gum affects early intestinal motility and how to avoid postoperative ileus in children who have had appendicectomies. **Methods:** In this study, children who had appendicectomies at a children's hospital in Lahore underwent a randomized control experiment. This study included elderly pediatric patients between the ages of 5 and 18. Two groups—one serving as the control group and the other as the interventional group—were formed. 51 patients made up the study's sample size, as determined by G power. In this study, 25 patients were placed in the control group and 26 patients were divided into the intervention and control groups. **Results:** In terms of early gut motility, early flatus pass, early bowel motions, early appetites, and early stool pass, gum chewing produced favorable effects in patients. Gum chewing can be effective in preventing intestinal paralysis or as a technique to improve gut motility after surgery, as it demonstrated early flatus, early bowel movements, early appetites, and early stool pass, protecting our children from the suffering of postoperative ileus. These metrics demonstrate how successful chewing gum is in preventing post-operative ileus in pediatric patients.**Conclusions:** The findings of this study demonstrated that chewing gum is one method for promoting oral intake, enhancing intestinal movement, and shortening the interval between the first flatulence and bowel movement.

INTRODUCTION

Due to surgical interventions and the use of different opioids, the gastrointestinal tract is markedly affected in approximately every other abdominal surgery [1]. In some patients, the recovery of bowel movements comes within a few days whereas many patients face prolong intestinal paralysis [2]. This intestinal paralysis is perceived as postoperative ileus. Postoperative ileus(POI) describes the disturbance in gastrointestinal motility which usually occurs after abdominal surgery and includes distention, lack of bowel sounds, accumulation of gas and fluids in the bowel, and delays in the passage of flatus and stool [3]. Post-operative ileus happens due to the hypo-motility of the intestines and the limited working ability of the parasympathetic nervous system [4]. Extreme manipulation during various abdominal surgery stimulates the parasympathetic nervous system which inhibits neuronal activities that leads to the paralysis of the intestines[5]. The prolonged recovery of intestinal motility increases abdominal distention which causes gas and ultimately becomes the reason for abdominal discomfort and pain[6]. which also becomes the reason for the delay in the patient's discharge from the hospital. It has been seen that surgical trauma activates stress response and inflammatory mediators. The combination of different

DOI: https://doi.org/10.54393/pjhs.v3i05.273

mediators for example nitric oxide, vasoactive intestinal peptide, substance P, and Calcitonin leads to the post-operative ileus [7]. Experts have differing opinions on changes in bowel activity because the gastrointestinal tract takes varied times for activity and motility, such as the stomach, which takes 24 to 48 hours, and the sigmoid colon, which takes 3 to 5 days [8]. However, a variety of approaches and interventions, including pharmacological and non-pharmacological methods, have been suggested to prevent postoperative ileus. The use of non-steroidal anti-inflammatory medicines, laparoscopic operations rather than whole abdominal surgeries, and better carbohydrate consumption following abdominal surgery are just a few of the many measures that have lately been developed to combat this issue [9]. But it has been seen that all the pharmacological interventions left one or other residual effects on the health of the patient which prolonged opioids requirements postoperatively, severe withdrawal symptoms, or surgical bleeding [10]. On the other hand, no such effects were seen in any non-pharmacological strategy. Non-pharmacological recovery from post-operative ileus includes early oral intake, early mobilization, and pre-operative psychological training of the patients. Among these strategies, gum chewing has proven to be simple but effective in accelerating complication-free recovery of gastrointestinal function after abdominal surgery [11]. However, Postoperative ileus has been a common problem among pediatric patients after an appendectomy. It increases the medical cost to the patient because of prolonged hospitalization, then there are many other concerns regarding hospital-acquired infection for the surgeons and working staff [12]. Previous research has downplayed the value of non-pharmacological methods for treating post-operative ileus. Furthermore, in countries with a high population density like Pakistan, a large percentage of youngsters undergo various abdominal procedures. As a result of a larger patient-to-staff ratio and a delay in healing brought on by post-operative ileus, public hospitals are under a heavy patient load. Healthcare professionals throughout the world have recently implemented a variety of pharmacological, non-pharmacological, and interventional strategies to lessen the suffering caused by postoperative ileus. Therefore, this study considers chewing gum as the nonpharmacological intervention to reduce the POI among the peads. Chewing gum accelerates salivation,it increases gastric secretions and gut motility [13]. Therefore, chewing gum after abdnominal surgery has recently become the simples way of mobility and redcuces POI. Previously, It is suggested that chewing gum after surgery may help in the functioning of the gastrointestinal and resumption of bowel activity. It is previously noted that chewing gum is an example of sham feeding and helps in gastrointestinal function without causing any complications [14]. The use of chewing gum as a useful non-pharmacological technique of gastrointestinal functioning following abdominal surgery, particularly in children, has not been empirically shown in prior investigations. In other industrialized nations, this type of non-pharmacological intervention has been carried out, but in Pakistan, no such data analysis has been carried out to treat postoperative ileus. Therefore, the purpose of this study is to determine if chewing gum reduces postoperative ileus in pediatric patients who have undergone an appendectomy. With the aid of this study's findings, pediatric patients will be shielded from the agony of postoperative ileus. Literature has noted that sham feeding significantly contributes to the motility of the gastrointestinal tract from the stomach and duodenum [15]. It is also noted that sham feeding increases the peptide hormone gastrin, the neuropeptide neurotensin, and pancreatic polypeptide which is helpful after surgery in passing the latus postoperatively [16]. Besides, sham feeding also enhances duodenal alkaline secretion [17]. Further, chewing gum mimics the food intake and is considered sham feeding. Chewing gum activates the cephalic-vagal pathway and leads the intestinal myoelectric activity to counteract the activation of the gastrointestinal μ opioid receptors [18]. which leads the bowel motility through hormonal and nervous stimulation. Further, chewing gum is safe and cheap way of stimulating the gastrointestinal tract. In adolescents chewing gum has been seen a simple and secure way of speeding up bowel motility and early oral intake [19]. The need of the hour is improvising such tools and tricks that can improve the postoperative health of the patients by providing effective preoperative and intraoperative care. Therefore, a range of pharmacologically and non-pharmacologically based approaches have been used to address potential risks and high financial impacts. The use of nasogastric intubation was the cornerstone of therapy for many years. The most prevalent difficulty is gastrointestinal tract defect, which leads to nausea, vomiting, abdominal distension, delayed defecation and even obstruction of the intestine. More specifically, Sorbitol and other hexitols is the main ingredient of sugar free chewing gum and causes the gastrointestinal gas, bloating and cramps, however, maxitols in 'sugar-free' chewing gums may play a role in the amelioration of ileus after surgery [20,21]. Therefore, maxitols based sugar free chewing gum is more helpful in gastrointestinal motility.

METHODS

This was a randomized controlled trial study for children with appendices undergoing an appendectomy. In this

DOI: https://doi.org/10.54393/pjhs.v3i05.273

study, ethical approval was taken from the Children's Hospital Lahore, Pakistan to conduct the experimental study on admitted patients for abdominal surgery. Thus, the department of pediatric surgery of Children's Hospital and the Institute of Child Health Lahore was the selected setting for this study. In this study, 51 patients were considered for this study and consent was also taken. The patient was randomly divided into two groups. The Intervention Group 'A' was given chewing gum after they were shifted to a recovery room. On the other hand Control Group 'B' was treated with traditional methods postoperatively i.e. NPO, intravenous fluids, and antibiotics. Out of 51 patients, 26 patients were taken in the intervention group and 25 were taken in the control group. The data were collected from the experimental group who chewed the gum after surgery and the control group. Further post-operative gastrointestinal functioning data was also collected from the patients as suggested in previous findings [22]. In this study, children of age 16-18 years were selected who went through appendectomy because of appendicitis. Moreover, patients who had perforated appendix, appendicular mass, and appendectomy with other procedures such as LADD's procedure were not included in this study. The patients who met the selection criteria were included in the study and consent form was also taken from the patients. Consequently, data were analyzed by using SPSS 21.0.

RESULTS

The results in Table 1 shows that 8 (30.8%) patients in Group-A and 19 (76%) patients in Group B were of 5-9 years. Further, 12 patients (46.2%) in Group-A and 6 patients (24%) in Group B were of 10-15 years. Likewise, 6 patients (23%) of 16-18 years were in Group-A and none of the patients from Group B of this age group. Similarly, Table 1 reveals the age of this study participant 11 patients (42.3%) were male, and 15 patients (57.7%) were female in Group-A. While in Group B, 18 patients (72%) were male, and 7 patients (28%) were female. Moreover, the weight of this study participants was also checked and Table 1 shows the results that in Group-A, 5 patients (19.2%) weight 15-18 kg, 13 patients (50%) were having a weight of 19-30 kg and 8 patients (30.8%) were having the weight of 31-45 kg. Likewise, in Group B, 10 patients (40%) weight 15-18kg, 14 patients (56%) were weighting 19-30 kg and only 1 patient (4%) weight was in between 31-45 kg respectively.

Parameter		Group-A (26)	Group-B (25)	Total
Age	5-9	8(30.8%)	19(76%)	27
	10-15	12(46.2%)	6(24%)	18
	16-18	6(23.1%)	0(0%)	6
	Total	26	25	51
Gender	Male	11(42.3%)	18(72%)	29
	Female	15(57.7%)	7(28%)	22
	Total	26	25	51
Weight	15-18	5(19.2%)	10(40%)	15
	19-30	13(50%)	14(56%)	27
	31-45	8(30.8%)	1(4%)	9
Total		26	25	51

Table 1: Demographic Analysis

Table 2 shows the results of the randomized control trial results of this study. It is revealed in Table 2 that patients from group A who chewed the gum stayed significantly shorter than patients of group B as the majority (18; 69.2%) of the patients from group A were discharged in 1-2 days as compared to the only 6(24%) patients from group B discharged in 1-2 days. Further, Table 2 shows that is no significant difference regarding nausea and vomiting between both groups as 21 (81.8%) patients from Group-A and 20(80%) from group-B have not experienced nausea and vomiting. In the same manner, chewing efficacy was also higher in group-A patients as compared to group B. On the other hand, the time of the first bowel movement (less than 12 hours) was significantly less in group-A as 20(76.9%) patients experienced the first bowl moment earlier as compared to only 6(24%) patients from group B. Likewise, 73.1% of the patients from group-A passed a stool within 24 hours as compared to only 16% patients from group-B. Further, table 2 shows the results that the feeling of hunger was also significantly higher (92.3%) in patients of group-A as compared to patients from group B (36%). However, there was no significant difference regarding abdominal distention between group-A and group B (both groups shows only 6% of patient felt abdominal distention). Additionally, Table 2 shows that patients from both groups A and B have been given the same type of Analgesia and there is no significant difference regarding the type of Analgesia.

Parameter		Group-A (26)	Group-B (25)	Total
Hospital Stay	1-2 Days	18(69.2%)	6(24%)	24
	2-5 Days	5(19.2%)	15(60%)	20
	>5 Days	3(11.5%)	4(16%)	7
	Total	26	25	51
Nausea/Vomiting	No	21(80.8%)	20(80%)	41
	<3	5(19.2%)	5(20%)	10
	Total	26	25	51
Chewing Efficacy	Yes	20(76.9%)	0(0%)	20
	No	6(23.1%)	25(100%)	31
	Total	26	25	51
First Bowl Movement	<12hrs	20(76.9%)	6(24%)	26
	12-24hrs	6(23.1%)	10(40%)	16
	>24hrs	0(0%)	9(36%)	9
	Total	26	25	51
Stool Passing	Within 24hrs	19(73.1%)	4(16%)	23
	24-48hrs	7(26.9%)	3(12%)	10

DOI: https://doi.org/10.54393/pjhs.v3i05.273

	>48hrs	0(0%)	18(72%)	18
	Total	26	25	51
Feeling of Hunger	<12 Hours	24(92.3%)	9(36%)	33
	12-24 Hours	2(7.7%)	8(32%)	10
	>24 Hours	0(0%)	8(32%)	8
	Total	26	25	51
Postoperative Abdominal distention	Yes	6(76.9%)	6(76%)	12
	No	20(23.1%)	19(24%)	39
	Total	6	25	51

Table 2: Randomized Controlled Trial Analysis

DISCUSSION

The patients especially children who undergo abdominal surgery face the critical issue of indigestion and bowel movement and ultimately the delay in their digestion, healing, and discharge from the hospital occur. Thus, this study aims to investigate the role of non-pharmaceutical techniques (Chewing gum) in post-operative ileus. Recently, it is noted that chewing gum is the latest method for gastrointestinal relief after abdominal surgery [23]. The findings of this study demonstrate that chewing gum significantly affects gastrointestinal motility and intestinal function in children undergoing abdominal surgery. The findings of this study are consistent with those of a previous study, which found that patients who chewed gum experienced more regular bowel movements than those who did not. In the past, researchers have conducted meta-analyses on the first bowel motions, first flatulence, and gastrointestinal healing. These studies have shown the major stabilizing and health benefits of oral consumption following surgery [24].The previous finding of Maheshwaran, Ashwin revealed that eating gum during the initial post-operative phase for individuals having abdominal surgery is simple, affordable, and risk-free [25]. Gum chewing has significantly decreased the incidence of DGE and its associated parameters, such as the time to NGT removal, the return to a solid diet, the passage of the first flatus, and the passage of the first stool, and as a result, significantly decreased the length of the postoperative hospital stay. The use of chewing gum following colorectal surgery was also proven to be a safe and effective strategy in lowering the incidence of POI and deserves routine usage in conjunction with other ERAS approaches in the postoperative situation [26]. Additionally, it has been shown that postoperative gum chewing following ileostomy reversal is associated with a noticeably shorter time for flatus to pass and a shorter period of hospital stay [27].

CONCLUSIONS

The purpose of this study is to learn how to prevent postopetative ileus in children who have had appendicectomies as well as the impact of chewing gum on early intestinal motility. The findings of this study demonstrate that chewing gum is one method for promoting oral intake, enhancing intestinal movement, and shortening the interval between the first flatulence and bowel movement. It can be said that giving chewing gum to young patients who have had appendicectomies would help them heal more quickly and be discharged from the hospital with better flatulence, flatulence, and stool passing. The findings of this study also show that chewing gum is a low-cost, non-pharmaceutical strategy that significantly boosts hunger in patients. Consequently, the patient's digestive movement begins earlier and eventually.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] López-Jaimez G and Cuello-García CA. Use of chewing gum in children undergoing an appendectomy: A randomized clinical controlled trial. International surgery journal. 2016 Aug; 32:38-42. doi: 10.1016/j.ijsu.2016.06.003.

[2] Kobayashi T, Masaki T, Kogawa K, Matsuoka H, Sugiyama M. Efficacy of Gum Chewing on Bowel Movement After Open Colectomy for Left-Sided Colorectal Cancer: A Randomized Clinical Trial. Diseases of the colon and rectum. 2015 Nov; 58(11):1058-63. doi: 10.1097/DCR.0000000000000452.

[3] Volpi A, Ialongo P, Panebianco A, Lozito R, Prestera A, Laforgia R, et al. Long lasting postoperative ileus after surgery for intestinal obstruction due to left paraduodenal hernia (LPDH). Case report. Giornale di Chirurgia. 2016 Dec; 37(6):271-274. doi: 10.11138/gchir/2016.37.6.271.

[4] Jaslina Gnanarani J, Nadu T, Mathew LM, Venkatesan L. Effectiveness of chewing gum exercise upon gut motility among patients after open abdominal surgery 2018.

[5] Carroll J and Alavi K. Pathogenesis and management of postoperative ileus. Clinics in Colon and Rectal Surgery. 2009 Feb; 22(1):47-50. doi: 10.1055/s-0029-1202886.

[6] Mahmoud MH and Mohammad SH. Chewing gum for declining ileus and accelerating gastrointestinal recovery after appendectomy. Frontiers of Nursing. 2018 Dec; 5(4):277-84.

[7] Noble EJ, Harris R, Hosie KB, Thomas S, Lewis SJ. Gum chewing reduces postoperative ileus? A

DOI: https://doi.org/10.54393/pjhs.v3i05.273

systematic review and meta-analysis. International surgery journal. 2009 Apr;7(2):100-5. doi: 10.1016/j.ijsu.2009.01.006.

[8] Volpi M and Tuia D. Dense semantic labeling of subdecimeter resolution images with convolutional neural networks. IEEE Transactions on Geoscience and Remote Sensing. 2016 Oct; 55(2):881-93.

[9] Zhu YP, Wang WJ, Zhang SL, Dai B, Ye DW. Effects of gum chewing on postoperative bowel motility after caesarean section: a meta-analysis of randomised controlled trials. BJOG. 2014 Jun; 121(7):787-92. doi: 10.1111/1471-0528.12662.

[10] Liu Q, Jiang H, Xu D, Jin J. Effect of gum chewing on ameliorating ileus following colorectal surgery: A meta-analysis of 18 randomized controlled trials. International surgery journal. 2017 Nov; 47:107-115. doi: 10.1016/j.ijsu.2017.07.107.

[11] Yang P, Long WJ, Wei L. Chewing Xylitol Gum could Accelerate Bowel motility Recovery after Elective Open Proctectomy for Rectal Cancer. Revista de Investigacion Clinica. 2018; 70(1):53-58. doi: 10.24875/RIC.18002428.

[12] Baig MK and Wexner SD. Postoperative ileus: a review. Diseases of the Colon & Rectum. 2004 Apr; 47(4):516-26. doi: 10.1007/s10350-003-0067-9.

[13] Bouvet L, Loubradou E, Desgranges FP, Chassard D. Effect of gum chewing on gastric volume and emptying: a prospective randomized crossover study. British journal of anaesthesia. 2017 Nov; 119(5):928-933. doi: 10.1093/bja/aex270.

[14] Short V, Herbert G, Perry R, Atkinson C, Ness AR, Penfold C, et al. Chewing gum for postoperative recovery of gastrointestinal function. Cochrane Database of Systematic Reviews. 2015 Feb; (2):CD006506. doi: 10.1002/14651858. Cd006506. pub3.

[15] Chanpong A, Cronin H, Rampling D, Ashworth M, Eaton S, Rybak A, et al. Enhancing the utility of antroduodenal manometry in pediatric intestinal pseudo-obstruction. Journal of neurogastroenterology and motility. 2022 May; 34(5):e14259. doi: 10.1111/nmo.14259.

[16] Stern RM, Crawford HE, Stewart WR, Vasey MW, Koch KL. Sham feeding. Cephalic-vagal influences on gastric myoelectric activity. Journal of digestive diseases. 1989 Apr;34(4):521-7. doi: 10.1007/BF01536327.

[17] Kusika NP, Hutagaol IE, Yusuf M, Suyanto S, Tilusari SP. The Role of Chewing Gum on Post-operative Bowel Recovery after Gynecological Laparoscopic Surgery: A Short Report and Updated Review. Open Access Macedonian Journal of Medical Sciences. 2021 Sep; 9(B):1123-7.

[18] Kanza Gül D and Şolt Kırca A. Effects of acupressure, gum chewing and coffee consumption on the gastrointestinal system after caesarean section under spinal anaesthesia. Journal of Obstetrics and Gynaecology. 2021 May; 41(4):573-580. doi: 10.1080/01443615.2020.1787363

[19] Walker J, Hosiner A, Kergoat S, Walker JM, Somoza V. Chewing unflavored gum does not reduce cortisol levels during a cognitive task but increases the response of the sympathetic nervous system. Physiology and Behavior. 2016 Feb; 154:8-14. doi: 10.1016/j.physbeh.2015.11.003.

[20] O'Donnell K and Kearsley MW. Sweeteners and Sugar Alternatives in Food Technology 1988.

[21] Leveille G, McMahon K, Alcantara E, Zibell S. Benefits of chewing gum: oral health and beyond. Nutrition Today. 2008 Mar; 43(2):75-81.

[22] López-Otín C, Galluzzi L, Freije JMP, Madeo F, Kroemer G. Metabolic Control of Longevity. Cell. 2016 Aug;166(4):802-821. doi: 10.1016/j.cell.2016.07.031.

[23] Ashcroft J, Singh AA, Ramachandran B, Habeeb A, Hudson V, Meyer J, et al. Reducing ileus after colorectal surgery: A network meta-analysis of therapeutic interventions. Clinical Nutrition. 2021 Jul; 40(7):4772-4782. doi: 10.1016/j.clnu.2021.05.030.

[24] Su'a BU, Pollock TT, Lemanu DP, MacCormick AD, Connolly AB, Hill AG. Chewing gum and postoperative ileus in adults: a systematic literature review and meta-analysis. International surgery journal. 2015 Feb;14:49-55. doi: 10.1016/j.ijsu.2014.12.032.

[25] Maheshwaran MU, Ashwin R, Ravichandran P, Jeswanth S, Manoharan G. Impact of Chewing Gum Protocol on Delayed Gastric Emptying Following Pancreaticoduodenectomy. International Journal Of Scientific Study. 2020;7(12):54-8.

[26] Roslan F, Kushairi A, Cappuyns L, Daliya P, Adiamah A. The Impact of Sham Feeding with Chewing Gum on Postoperative Ileus Following Colorectal Surgery: a Meta-Analysis of Randomised Controlled Trials. World journal of gastrointestinal surgery. 2020 Nov; 24(11):2643-2653. doi: 10.1007/s11605-019-04507-3.

[27] Bhatti S, Malik YJ, Changazi SH, Rahman UA, Malik AA, Butt UI, et al. Role of Chewing Gum in Reducing Postoperative Ileus after Reversal of Ileostomy: A Randomized Controlled Trial. World journal of surgery. 2021 Apr; 45(4):1066-1070. doi: 10.1007/s00268-020-05897-1.

DOI: https://doi.org/10.54393/pjhs.v3i05.252

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Comparison of The Oral Health Status of Type-1 Diabetes Mellitus and Healthy Children: A Comparative Study

Hina Nasim[1*], Safi Ullah Khan[2], Ayousha Iqbal[3], Jawad Tareen[4], Hira Asghar[5] and Nighat Haider[6]

[1]Department of Oral Biology, School of Dentistry, Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), Islamabad, Pakistan
[2]Department of Oral Biology, Bakhtawar Amin Medical and Dental College, Multan, Pakistan
[3]Department of Science of Dental Materials, HBS Dental College, Tiramri, Islamabad, Pakistan
[4]Department of Prosthodontics, Bakhtawar Amin Medical and Dental College, Multan, Pakistan
[5]Department of Science of Dental Materials, Azra Naheed Dental College (Superior University), Lahore, Pakistan
[6]Children's Hospital, Pakistan Institute of Medical Sciences (PIMS), Islamabad, Pakistan

ARTICLE INFO

Key Words:
Oral health, Type-1 diabetes, Caries, Periodontal health

How to Cite:
Nasim, H., Khan, S. U., Iqbal, A., Tareen, J., Asghar, H., & Haider, N. (2022). Comparison of the oral health status of type-1 Diabetes Mellitus and healthy children: A comparative study: Oral Health Status of Type-1 Diabetes Mellitus and Healthy Children. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.252

***Corresponding Author:**
Hina Nasim
Department of Oral Biology, School of Dentistry, *Shaheed Zulfiqar Ali Bhutto Medical University* (SZABMU)
drhinanasim34@gmail.com

Received Date: 17th October, 2022
Acceptance Date: 25th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Being a chronic systemic disease type-1 Diabetes Mellitus (DM) affect both physical health and oral health of an individual. As a dentist, a thorough comprehension of the pathology, clinical manifestations, and therapy of orofacial diseases in DM patients is necessary to provide the best care possible to the patients. **Objective:** The purpose of this study was to observe the impact of type-1 DM on dental health. **Methods:** A questionnaire-based study was conducted on 264 subjects (132 type-1 DM children, 132 healthy children) attending Children's hospital PIMS, Islamabad. The oral health status of type-1 DM and healthy children was compared using WHO oral health assessment form for children and Fox's questionnaire was used. Comparisons between the oral health status of type-1 DM children with healthy children was done by Mann-Whitney U test. A comparison of oral health status among Type-1 DM children based on glycemic control was done by one-way ANOVA test. **Results:** Females were in majority in both groups as compared to males. The frequency of oral diseases was more in type-1 DM children as compared to healthy children. A significant statistical difference $p < 0.005$ was found between the oral health status of both groups. Based on glycemic control among type-1 DM children, there was no significant statistical difference found for DMFT, halitosis, and xerostomia however, there was a significant statistical difference found for BOP and mucosal lesion. **Conclusions:** Type-1 DM children are more prone to developing oral diseases as compared to healthy children.

INTRODUCTION

Diabetes mellitus (DM) refers to a group of metabolic illnesses characterized by unusually high blood glucose levels due to defects in insulin secretion, increased cellular resistance to insulin, or both. Diabetes mellitus has been divided into different categories of DM however, type-1 DM and type-2 DM are the most common types of diabetes mellitus [1]. The prevalence of DM has been rising. The global prevalence of diabetes was projected to be 2.8% in 2000 and is expected to climb to 4.4% by 2030 [2]. The prevalence of type-2 DM was found to be 6.28% globally whereas type-1 DM prevalence was found to be highest for European countries at 76% while lowest for African countries at 8% [3,4]. A previous study reported the prevalence of DM in Pakistan to be 13.2% in males and 6% in females [5]. The estimated yearly increase in type-1 DM is around 3% per year [6]. There are multiple medical

DOI: https://doi.org/10.54393/pjhs.v3i05.252

ailments that have been associated with DM. Among acute medical complications, hypoglycemia and diabetic ketoacidosis(DKA)is the most common. On the other hand, diabetic retinopathy, nephropathy, and neuropathy are common chronic medical conditions related to DM [7]. The type-1 DM patients were reported to be more frequently affected by hypoglycemia and DKA as compared to the type-2 DM patients [8,9]. Similarly, the prevalence of diabetic retinopathy is more in type-1 DM patients as compared to type-2 DM patients [10]. However, diabetic neuropathy and nephropathy were more commonly observed in type-2 DM patients [11,12]. Systemic diseases have got detrimental effects on the oral health of individuals. In dentistry one of the most commonly encountered systemic disease is DM. DM does not only affect the physical health of an individual as explained before but it also has multiple deleterious effects on the oral health of an individual. It also compromises the overall quality of life of an individual. Dental caries, xerostomia, taste dysfunction, oral infections, and periodontal diseases have been reported as the most common oral manifestations of DM [13]. Among oral complications, periodontal diseases, candidiasis, and poor wound healing were more frequently found in type-1 DM patients in comparison to type-2 DM patients and non-diabetic individuals [14,15]. Although studies have been done to explore the impact of diabetes mellitus on the oral health of individuals, however, sufficient research has not been done to check the prevalence of oral manifestations and the effects of type-1 DM on the oral health of an individual, especially in Pakistan. The prevalence of type-1 DM oral manifestations and their effective management is critical for endocrinologists and dentists to give necessary care in order to improve their quality of life of these patients. This study aimed to investigate the impact of Type-1 DM on oral health of an individual particularly in the Pakistani population.

METHODS

This comparative questionnaire survey-based study was conducted in Children's Hospital PIMS and the pediatric dentistry department of the School of Dentistry, Islamabad. Prior ethical approval by the ethical review committee of Shaheed Zulfiqar Ali Bhutto Medical University Islamabad Pakistan under ref. no. F.1-1/2015/ERB/SZABMU/958, was taken before conducting the study. The study population consisted of 132 Type-1 DM patients that attended the endocrinology outpatient department and 132 non-diabetic children that attended the pediatric dentistry department of the School of Dentistry between 5th April 2022 to 27th June 2022. Prior consent was taken on a consent form from the participants before the examination. Type-1 DM patients diagnosed as per WHO criteria, ages ranging between 7-12 years, and having at least one permanent tooth erupted in the oral cavity were recruited in this study. because 1st permanent tooth erupts usually after the age of 6 years [16]. The patients having a history of systemic diseases other than type-1 DM or infectious diseases and patients undergoing orthodontic treatment were excluded from this study. The type-1 DM patients were categorized on the basis of their Glycated Hemoglobin A1c(HbA1c scores as: good glycemic control HbA1c less than or equal to 6.5%, moderate glycemic control HbA1c 6.6-8.9%, poor glycemic control HbA1c more than 9%) [17]. The current study questionnaires included the WHO oral health assessment form for children in 2013 and Fox's questionnaire to assess the oral health status and xerostomia symptoms respectively. SPSS software was used to examine the data (version 22). Descriptive data were computed for both type-1 DM patients and healthy children. Comparisons of oral health status of both groups was done using Mann-Whitney U test and further comparison of oral health status among type-1 DM patients depending upon their glycemic control was done by apply one-way ANOVA test. Statistical significance was determined by a p-value of less than 0. 05.

RESULTS

A total of 264 subjects (132 type-1 DM patients and 132 non-diabetic healthy children) were examined for oral health status. The mean age of type-1 DM children was 10.0±1.6 years and the mean age of non-diabetic children was 9.67±1.5 years. The total number of female subjects were in slight majority 71 (53.8%) and 74 (56.1%) in type-1 DM children and non-diabetic healthy children respectively as compared to male subjects. Table 1 provides specifics on the demographic information of the study participants.

Variables		Type-1 DM children	Non-diabetic healthy children
Gender	Male	61(46.2 %)	58(43.9%)
	Female	71(53.8%)	74(56.1%)
Age(Years)	7-8	16(12.1%)	28(21.2%)
	9-10	54(40.9%)	60(45.5%)
	11-12	62(47.0%)	44(33.3%)
Education	No schooling	26(19.6%)	19(14.35)
	Primary school	59(44.6%)	63(47.7%)
	Middle school	47(35.6%)	50(37.8%)
Area of living	Rural	79(59.8%)	65(49.2%)
	Peri urban	37(28.0%)	46(34.8%)
	Urban	16(12.1%)	21(15.9%)

Table 1: Demographic data of study population

Table 2 presented the frequency of oral diseases among type-1 DM children and non-diabetic children. The frequency of caries was more in type-1 DM children(39.4%) as compared to non-diabetic children(20.9%). Bleeding on probing was more frequent in type-1 DM children(18.9%) as

DOI: https://doi.org/10.54393/pjhs.v3i05.252

compared to non-diabetic children (8.3%). Also, mucosal lesions (ulcers, abscesses, and candidiasis) were more frequently seen in type-1 DM children (12.8%) in comparison to non-diabetic children (4.6%). Moreover, type-1 DM patients experience halitosis more frequently (43.2%) as compared to non-diabetic healthy children (16.7%). Lastly, type-1 DM children experienced xerostomia more frequently (39.4%) as compared to non-diabetic children who barely had any complaint of xerostomia (6.2%). These results indicated that type-1 DM children experience more dental health issues as compared to non-diabetic healthy children.

Variables	Frequency	
	Type-1 DM	Non-diabetic
DMFT	39.4%	20.9%
BOP	18.9%	8.3%
Halitosis	43.2%	16.7%
Mucosal lesions	12.8%	4.6%
Xerostomia	39.4%.	6.2%

Table 2: Frequency of oral health issues among Type-1 DM children and non-diabetic children

DMFT=decayed, missing, filled, teeth; BOP=bleeding on probing

The comparison of the oral health status of both type-1 DM children and non-diabetic children is presented in table 3.

Variables	Mean ranks		p-value
	Type-1 DM	Non-diabetic	
DMFT	165.5	99.4	<0.005
BOP	125.5	139.5	0.012
Halitosis	127.3	137.7	0.024
Mucosal lesions	115.0	150.0	<0.005
Xerostomia	111.0	154.0	<0.005

Table 3: Comparison of oral health status between Type-1 DM children and non-diabetic children using the Mann-Whitney U test

DMFT=decayed, missing, filled, teeth; BOP=bleeding on probing, p-value of <0.005 was considered statistically significant. It can be observed that there is a significant statistical difference (p-value <0.005) between the oral health status of children with type-1 DM and non-diabetic children for DMFT, mucosal lesions and xerostomia. Further analysis was done to compare the oral health status of type-1 DM based on their glycemic control. The details can be seen in Table- 4. There was no statistically significant relationship found among the oral health status of type-1 DM children based on their glycemic control for DMFT, halitosis and xerostomia. However, a significant statistical difference was found among type-1 DM children for BOP and mucosal lesions (p< 0.05). further post Hoc analysis was done that showed that diabetic children with poor glycemic control has experienced more bleeding on probing and mucosal lesions as compared to the diabetic children with good- moderate glycemic control. These findings indicated that type-1 DM children with poor glycemic control experienced more dental health issues as compared to those who have good to moderate glycemic control.

Variables	Mean±SD			p-value
HbA1c	Good	Moderate	Poor	
DMFT	0.21±0.42	0.16±0.64	0.19±0.02	0.170
BOP	1.75±0.43	1.73±0.42	1.97±0.17	0.021
Halitosis	1.75±0.43	1.47±0.55	1.55±0.55	0.524
Mucosal lesions	3.78±0.42	3.80±0.56	3.91±0.52	0.045
Xerostomia	1.75±0.43	1.56±0.50	1.55±0.50	0.163

Table 4: Comparison of oral health status among Type-1 DM children based on glycemic control using one-way ANOVA test p-value < 0.05 was considered significant

DISCUSSION

Oral health is an important aspect of general health and well-being. Poor dental and oral health has a negative impact on the systemic health of an individual as well. In the present study, a significant statistical difference has been observed in the oral health status of children with type-1 DM and healthy children. The current study agrees with the previously done research that reported that type-1 DM children had a greater risk of developing oral complications in comparison to healthy children [18-20]. In the present study, the frequency of caries was found to be higher in type-1 DM children as compared to healthy children. A previous study conducted in Kosovo reported that children with type-1 DM are at a greater risk of developing dental caries as compared to healthy children [21]. Similarly, another study conducted in Finland reported that type-1 DM patients were at a greater risk of developing caries in comparison to healthy individuals [22]. Likewise, another study conducted in Lithuania reported that children with type-1 DM and adolescents were at a greater risk of developing dental caries as compared to healthy individuals [23]. Another study conducted in India on type-1 DM children reported that type-1 DM children are more prone to development of dental caries as compared to healthy individuals [24]. In our study, type-1 DM children had more frequent bleeding on probing than non-diabetic children. Another study conducted in Italy on type-1 DM children showed that they are more prone to gingivitis, bleeding on probing, and bacterial plaque as compared to healthy children [25]. Furthermore, another study conducted in Kuwait on type-1 DM patients reported that periodontal diseases are more commonly encountered in these patients as compared to healthy individuals [26]. Also, according to our study, type-1 DM children experienced halitosis more frequently as compared to non-diabetic children. Similar to our study, a study conducted on Swedish type-1 DM children reported that type-1 DM children patients with uncontrolled diabetes had a greater prevalence of halitosis as compared to type-1 DM children

DOI: https://doi.org/10.54393/pjhs.v3i05.252

with good glycemic control [27]. In our study, the prevalence of oral mucosal lesions (ulcers, abscesses, and candidiasis) was higher in children with type-1 DM as compared to healthy children. A study conducted in Brazil on type-1 DM children and adolescents reported that type-1 DM patients were more prone to develop oral mucosal lesions as compared to healthy subjects [28]. Correspondingly, another study conducted in Greece on type-1 DM children and adolescents reported that type-1 DM children and adolescents with poor glycemic control had a greater risk of developing oral infections as compared to healthy individuals [29]. In our study xerostomia was reported to be more prevalent in type-1 DM children as compared to non-diabetic children, which are in accordance with the results of previously done studies where xerostomia was found to be more frequently associated with type-1 DM patients as compared to healthy individuals [30-31]. A previous study conducted in Greece on type-1 DM children reported that these patients had a higher prevalence of xerostomia as compared to healthy individuals [32]. Another study conducted in Iran on type-1 DM children reported that these patients have lower salivary flow rates as compared to healthy individuals [30]. Lastly, our study showed that type-1 DM children with poor glycemic control experienced more oral health issues as compared to those who had good to moderate glycemic control. A previous study conducted in Brazil on DM had reported that DM patients with poor glycemic control were more prone to periodontal disease and caries as compared to those with good glycemic control [33]. Another study conducted in Greece of type-1 DM patients reported that the risk of developing oral diseases was higher in those patients when their metabolic control was poor [29]. Similarly, another study conducted in Saudi Arabia on DM had reported that good glycemic control significantly decreased the risk of oral diseases in DM patients [34]. In summary, our study has reported that oral health issues for example dental caries, periodontal issues, oral infections, halitosis and xerostomia are common oral manifestations of type-1 DM and are more frequently noted in children having type-1 DM as compared to non-diabetic healthy children.

CONCLUSIONS

Type-1 DM children are more susceptible to developing oral diseases in comparison to non-diabetic children. The oral health issues were more frequently noted in type-1 DM children in comparison to non-diabetic children. Medical professionals should take the lead in motivating type-1 DM patients to schedule routine dental appointments to improve the patient's quality of life by preventing such oral complications.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Kharroubi AT and Darwish HM. Diabetes mellitus: The epidemic of the century. World Journal of Diabetes. 2015 Jun; 6(6):850-67. doi: 10.4239/wjd. v6. i6.850.

[2] Choudhury H, Pandey M, Hua CK, Mun CS, Jing JK, Kong L, et al. An update on natural compounds in the remedy of diabetes mellitus: A systematic review. Journal of Traditional and Complementary Medicine. 2017 Nov; 8(3):361-376. doi: 10.1016/j.jtcme. 2017. 08.012.

[3] Khan MAB, Hashim MJ, King JK, Govender RD, Mustafa H, Al Kaabi J. Epidemiology of Type 2 Diabetes - Global Burden of Disease and Forecasted Trends. Journal of Epidemiology and Global Health. 2020 Mar; 10(1):107-111. doi: 10.2991/jegh. k.191028.001.

[4] Patterson C, Guariguata L, Dahlquist G, Soltész G, Ogle G, Silink M. Diabetes in the young - a global view and worldwide estimates of numbers of children with type 1 diabetes. Diabetes Research and Clinical Practice. 2014 Feb; 103(2):161-75. doi: 10.1016/j. diabres.2013.11.005.

[5] Shera AS, Jawad F, Maqsood A. Prevalence of diabetes in Pakistan. Diabetes Research and Clinical Practice. 2007 May;76(2):219-22. doi: 10.1016/ j.diabres.2006.08.011.

[6] Basit A, Fawwad A, Baqa K. Diabetes Registry of Pakistan. Pakistan Journal of Medical Sciences. 2020 Apr;36(3):578-580. doi: 10.12669/pjms.36.3.1877.

[7] Paul S, Ali A, Katare R. Molecular complexities underlying the vascular complications of diabetes mellitus - A comprehensive review. Journal of Diabetes and Its Complications. 2020 Aug; 34(8):107613. doi: 10.1016/j.jdiacomp.2020.107613.

[8] Chen J, Zeng H, Ouyang X, Zhu M, Huang Q, Yu W, et al. The incidence, risk factors, and long-term outcomes of acute kidney injury in hospitalized diabetic ketoacidosis patients. BMC Nephrology. 2020 Feb; 21(1):48. doi: 10.1186/s12882-020-1709-z.

[9] Alwafi H, Alsharif AA, Wei L, Langan D, Naser AY, Mongkhon P, et al. Incidence and prevalence of hypoglycaemia in type 1 and type 2 diabetes individuals: A systematic review and meta-analysis. Journal of Diabetes Research. 2020 Dec; 170:108522. doi: 10.1016/j.diabres.2020.108522.

[10] Lee R, Wong TY, Sabanayagam C. Epidemiology of

DOI: https://doi.org/10.54393/pjhs.v3i05.252

diabetic retinopathy, diabetic macular edema and related vision loss. Eye. 2015 Sep; 2:17. doi: 10.1186/s40662-015-0026-2.

[11] Ufuoma C, Ngozi JC, Kester AD, Godwin YD. Prevalence and risk factors of microalbuminuria among type 2 diabetes mellitus: A hospital-based study from, Warri, Nigeria. Sahel Medical Journal. 2016 Jan;19(1):16.

[12] Sifuentes-Franco S, Padilla-Tejeda DE, Carrillo-Ibarra S, Miranda-Díaz AG. Oxidative Stress, Apoptosis, and Mitochondrial Function in Diabetic Nephropathy. International Journal of Endocrinology. 2018 Apr; 2018:1875870. doi: 10.1155/2018/1875870

[13] Verhulst MJL, Loos BG, Gerdes VEA, Teeuw WJ. Evaluating All Potential Oral Complications of Diabetes Mellitus. Frontiers in Endocrinology. 2019 Feb; 10:56. doi: 10.3389/fendo.2019.00056.

[14] Sadeghi R, Taleghani F, Mohammadi S, Zohri Z. The Effect of Diabetes Mellitus Type I on Periodontal and Dental Status. Journal of Clinical and Diagnostic Research. 2017 Jul; 11(7):ZC14-ZC17. doi: 10.7860/JCDR/2017/25742.10153.

[15] Wan R, Weissman JP, Grundman K, Lang L, Grybowski DJ, Galiano RD. Diabetic wound healing: The impact of diabetes on myofibroblast activity and its potential therapeutic treatments. Wound Repair Regen. 2021 Jul; 29(4):573-581. doi: 10.1111/wrr.12954

[16] Afakova MS and Murtazaev SS. Improving the efficiency of caries prevention due to the timing of the eruption and mineralization of permanent teeth in children environmental problems of the regions of the republic of uzbekistan. middle european scientific bulletin. 2020 Nov; 6:1-4.

[17] Saini R, Al-Maweri SA, Saini D, Ismail NM, Ismail AR. Oral mucosal lesions in non-oral habit diabetic patients and association of diabetes mellitus with oral precancerous lesions. Journal of diabetes research. 2010 Sep; 89(3):320-6. doi: 10.1016/j.diabres.2010.04.016.

[18] Ismail AF, McGrath CP, Yiu CK. Oral health of children with type 1 diabetes mellitus: A systematic review. Journal of diabetes research.2015 Jun;108(3):369-81. doi: 10.1016/j.diabres.2015.03.003.

[19] Coelho ASEDC, Carneiro AS, Pereira VF, Paula AP, Macedo AP, Carrilho EVP. Oral Health of Portuguese Children with Type 1 Diabetes: The Journal of clinical pediatric dentistry. 2018; 42(3):231-235. doi: 10.17796/1053-4628-42.3.12.

[20] Rafatjou R, Razavi Z, Tayebi S, Khalili M, Farhadian M. Dental health status and hygiene in children and adolescents with type 1 diabetes mellitus. Journal of research in health sciences. 2016; 16(3):122.

[21] Ferizi L, Dragidella F, Spahiu L, Begzati A, Kotori V. The Influence of Type 1 Diabetes Mellitus on Dental Caries and Salivary Composition. International dental journal. 2018 Oct; 2018:5780916. doi: 10.1155/2018/5780916.

[22] Siudikiene J, Machiulskiene V, Nyvad B, Tenovuo J, Nedzelskiene I. Dental caries increments and related factors in children with type 1 diabetes mellitus. Caries Research. 2008; 42(5):354-62. doi: 10.1159/000151582.

[23] Hilt A and Filipińaska-Skapska R. Problemy zdrowotne jamy ustnej dzieci z cukrzyca typu 1 [Oral health problems in type 1 diabetic children]. Przegl Lek. 2007; 64(2):78-80.

[24] Babu KLG, Subramaniam P, Kaje K. Assessment of dental caries and gingival status among a group of type 1 diabetes mellitus and healthy children of South India - a comparative study. Journal of Pediatric Endocrinology and Metabolism. 2018 Dec; 31(12):1305-1310. doi: 10.1515/jpem-2018-0335

[25] Giuca MR, Pasini M, Giuca G, Caruso S, Necozione S, Gatto R. Investigation of periodontal status in type 1 diabetic adolescents. European journal of pediatrics. 2015 Dec; 16(4):319-23.

[26] Al-Khabbaz AK, Al-Shammari KF, Hasan A, Abdul-Rasoul M. Periodontal health of children with type 1 diabetes mellitus in Kuwait: a case-control study. Medical Principles and Practice. 2013; 22(2):144-9. doi: 10.1159/000342624.

[27] Javed F, Sundin U, Altamash M, Klinge B, Engström PE. Self-perceived oral health and salivary proteins in children with type 1 diabetes. Journal of oral rehabilitation. 2009 Jan; 36(1):39-44. doi: 10.1111/j.1365-2842.2008.01895.x.

[28] Silva MF, Barbosa KG, Pereira JV, Bento PM, Godoy GP, Gomes DQ. Prevalence of oral mucosal lesions among patients with diabetes mellitus types 1 and 2. Anais Brasileiros de Dermatologia. 2015 Feb; 90(1):49-53. doi: 10.1590/abd1806-4841.20153089.

[29] 29.Babatzia A, Papaioannou W, Stavropoulou A, Pandis N, Kanaka-Gantenbein C, Papagiannoulis L, et al. Clinical and microbial oral health status in children and adolescents with type 1 diabetes mellitus. International journal of dentistry. 2020 Apr; 70(2):136-144. doi: 10.1111/idj.12530.

[30] Hoseini A, Mirzapour A, Bijani A, Shirzad A. Salivary flow rate and xerostomia in patients with type I and II diabetes mellitus. Electron Physician. 2017 Sep; 9(9):5244-5249. doi: 10.19082/5244.

[31] López-Pintor RM, Casañas E, González-Serrano J, Serrano J, Ramírez L, et al. Xerostomia,

DOI: https://doi.org/10.54393/pjhs.v3i05.252

Hyposalivation, and Salivary Flow in Diabetes Patients. Journal of diabetes research. 2016; 4372852. doi: 10.1155/2016/4372852.

[32] Pappa E, Vastardis H, Rahiotis C. Chair-side saliva diagnostic tests: An evaluation tool for xerostomia and caries risk assessment in children with type 1 diabetes. Journal of dentistry. 2020 Feb; 93:103224. doi: 10.1016/j.jdent.2019.103224.

[33] Kogawa EM, Grisi DC, Falcão DP, Amorim IA, Rezende TM, da Silva IC, et al. Impact of glycemic control on oral health status in type 2 diabetes individuals and its association with salivary and plasma levels of chromogranin A. Archives of oral biology. 2016 Feb; 62:10-9. doi: 10.1016/j.archoralbio.2015.11.005.

[34] Javed F, Thafeed Alghamdi AS, Mikami T, Mehmood A, Ahmed HB, et al. Effect of glycemic control on self-perceived oral health, periodontal parameters, and alveolar bone loss among patients with prediabetes. Journal of periodontology. 2014 Feb; 85(2):234-41. doi: 10.1902/jop.2013.130008

DOI: https://doi.org/10.54393/pjhs.v3i05.241

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Diabetic Foot Ulcers: Prevalence and Associated Risk Factors among Diabetic Patients

Fizza Hussain[1], Momina Shabbir[1], Salma Bunyad[2], Feryal Arshad[2], Muhammad Kashif[1*] and Jaweria Siddique[1]

[1]Riphah International University, Faisalabad Campus, Faisalabad, Pakistan
[2]Department of Physical Therapy, Pakistan Society for the Rehabilitation of the Disabled, Lahore, Pakistan

ARTICLE INFO

Key Words:
Diabetic foot ulcers, Diabetes Mellitus, Neuropathy, Risk factor, Type-II diabetes

How to Cite:
Hussain, F. ., Shabbir, M. ., Bunyad, S. ., Arshad, F. ., Kashif, M. ., & Siddique, J. . (2022). Diabetic Foot Ulcers: Prevalence and Associated Risk Factors Among Diabetic Patients: Diabetic Foot Ulcers. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.241

***Corresponding Author:**
Muhammad Kashif
Riphah International University, Faisalabad Campus, Faisalabad, Pakistan
kashif.shaff@igmail.com

Received Date: 13th October, 2022
Acceptance Date: 22nd October, 2022
Published Date: 31st October, 2022

ABSTRACT

Diabetes Mellitus, a complex disease, chronic in nature; requires uninterrupted care to reduce various risk factors beyond glycemic control. **Objective:** To find out prevalence of foot ulcers among diabetic patients and identification of risk factors that can lead to the development of ulcers among diabetic patients attending the tertiary care centers of Faisalabad. **Methods:** A cross sectional survey was conducted on 500 diabetic patients attending the diabetic clinics. Subjects were identified using non-probable convenient sampling and data was collected by using structured questionnaire. Associated risk factors of diabetic foot ulcers were all assessed. Using SPSS version 23.0 for windows software, data were managed and analyzed. **Results:** There were n=239 males and n=261 females. Most of the patients were in the age group of 61-70. Major population belonged to middle socio-economic status (46.2%). Diabetic foot ulcer prevalence was 10.4%. There was significant association between ulcer and age (p=.036), gender (p<.001), lifestyle of patient (p=.003), BMI of Patient (p=.001), smoking habits (p<.001), duration of diabetes (p<.001), and family history of diabetes (p<.001)**. Conclusions:** The study concluded that 10.4% of diabetic patients had foot ulcers. Diabetic foot ulceration was significantly related with male gender. It is thus recommended that diabetic care providers can reduce the prevalence of diabetic foot ulcers by increasing understanding of the disease and foot care examination among those having sensory loss.

INTRODUCTION

Diabetes Mellitus, a complex disease, chronic in nature; requires uninterrupted care to reduce various risk factors beyond glycemic control. It needs regular medical screening and treatment strategies along with multifaceted risk management techniques beyond the glycemic control [1]. The life expectancy of people with diabetes has decreased by up to fifteen years, and seventy five percent patients die of macro-vascular complications [2]. 1.5 million new diabetic cases were reported in U.S having age of 18 years or older in 2015 [3]. Type-I diabetes has been reported in about 5-10 % of all diabetes and has many serious indications [4]. Whereas type-II diabetes covers about 85-95 % of all diabetic cases in developed countries [5]. The prevalence of diabetes would be around 67 % in developing countries between 2010 and 2030 [6]. It is also stated that children have higher rates of prevalence and incidence of type 2 diabetes [7]. Although there are a number of complications which effects patient's life, but complications related to feet are more devastating. In most of the developing countries, Diabetic Foot ulcer (DFU) is among the major complication which can lead to disability [8]. Foot complications due to diabetes consist of lesions within deep tissues and are also found in association with neurological deficits and vascular pathologies of lower extremities. Prevalence of Diabetic Peripheral Neuropathy (DPN) ranges between 16 and 66 percent [9]. Leading causes of lower extremity complications are ulcers related to diabetes and its resulting problems which includes

DOI: https://doi.org/10.54393/pjhs.v3i05.241

infections, gangrene and osteomyelitis [10]. If ulceration is neglected and not treated promptly than foot amputation is the only option that can be opted. As a result, there is distorted body image that may lead to loss of employment, dependency on others, impacts the finances and psychology of the patient [11]. In diabetic foot ulcers a wound near ankle is prevalent which encompass the full thickness of skin, regardless of its time period it is associated to peripheral atrial disease or neuropathy of lower limb [12]. DFU is one of the usual presentations of diabetic foot. The diabetic foot come under a group of syndromes in which tissue breakdown occurs due to infection, ischemia and neuropathy, that results in the risk of permanent morbidity and possibly amputation [13]. Foot complications lead to foot osteomyelitis when not treated for long time period [14]. Prior history of foot ulcers, neuropathy and deformities are among the risk factors responsible for foot ulceration. The other potential factors that set a person at risk of developing DFU includes older age, male gender, diabetes for a long time, poor glycemic control, renal disease, hypertension, diabetic retinopathy, peripheral vascular disease, poor knowledge of diabetic foot wear, high body mass index (BMI), poor blood circulation and smoking [15, 16]. To prevent the complications like diabetic foot, it is very essential that the patient should go for regular checkup and proper and adequate treatment [17]. It is known that the patients with diabetes mellitus are at increased for the development of ulcers so it is a major health concern that was a major reason behind this study. Thus, current study was focused to reveal the prevalence and its associated risk factors of foot ulcer among diabetics.

METHODS

This cross-sectional study was conducted in tertiary care centers of Faisalabad. For the survey a sample size of 500 diabetic patients was taken by using Epi Tool. A questionnaire based on earlier studies was used to record data attained from the medical records and interviewing the patients [18]. Non-Probability convenient sampling was used to identify male and female participants with age >19years, with any type of diabetes and willing to participate. Patients with traumatic ulcers, systemic illnesses, mental disorders were excluded. The data was collected using questionnaire aimed on demographics, diabetes mellitus history and risk factors, foot ulcers history and also using Wagner classification for measuring the location and depth of ulcers. Using SPSS-23 for windows software, data was managed and analyzed. The quantitative data was presented on form for frequency table and bar chart was used to show summary of measurements.

RESULTS

There were 1.9% of the participants below 40 years, 7.6% were between 41-50 years age group, 9.1% were between 51-60 years,18.9% were between 61-70 years and 12.9 % were >70 years old. There were 47.8% (n=239) males and 52.2% (n=261) females. Among total, 3% (n=15) were single and 97% (n=485) were married. 10.8% (n=54) were businessman, 8.6% (n=43) had government jobs, 15.2% (n=76) had private jobs, 15.8% (n=79) were unemployed and 49.6% (n=248) were housewives among them. Regarding their socioeconomic status, 36.6% (n=183) had low socioeconomic status, 48.8% (n=244) had middle socioeconomic status and 14.6% (n=73) belonged to upper class. Lifestyle of patients showed that 47.6% (n=238) were having sedentary lifestyle and 52.4% (n=262) were active. Educational level of patient showed that there were 33% (n=165) illiterate, 10.2% (n=51) had primary level education, 6 % (n=30) had elementary level education, 26.6 % (n=133) were having matriculation level education, 24.2% (n=121) had higher level of education. Considering the Body Mass Index, 1% (n=5) were underweight, 44% (n=223) were having normal weight, 45.6% (n=228) were overweight, 8.8% (n=44) were obese. 7.6% (n=38) were current smoker and ex-smoker were 20.8% (n=104) while 71.6% (n=358) were non-smoker (Table 1).

Variables	Number (%)
Age	
<40	1 (1.9%)
41-50	7 (7.6)
51-60	18 (18.9%)
61-70	18 (18.9%)
>70	8 (12.9%)
Gender	
Male	239 (47.8%)
Female	261 (52.2%)
Marital Status	
Single	15 (3.0%)
Married	485 (97%)
Occupation of Patient	
Businessman	54 (10.8%)
Government Job	43 (8.6%)
Private job	76 (15.2%)
Unemployed	79 (15.8%)
House wife	248 (49.6%)
Socio-Economic Status	
Lower SES	183 (36.6%)
Middle SES	244 (48.8%)
Upper SES	73 (14.6%)
Lifestyle of Patient	
Sedentary	238 (47.6%)
Active	262 (52.4%)
Educational Level of Patient	
Illiterate	165 (33.0%)
Primary	51 (10.2%)
Elementary	30 (6%)

DOI: https://doi.org/10.54393/pjhs.v3i05.241

Matric	133 (26.6%)
Higher	121 (24.2%)
BMI of Patient	
Underweight	5 (1.0%)
Normal	223 (44.6%)
Overweight	228 (45.6%)
Obese	44 (8.8%)
Smoking Habits	
Current smoker	38 (7.6)
Ex-Smoker	104 (20.8%)
Non Smoker	358 (71.6%)

Table 1: Demographic Data of the Subjects

The results of the current study showed that there were significant association of age with foot ulcers p=.036. Results also revealed that there was statistically significant association between gender and ulcer prevalence with p value <.001. Majority of males (80%) were having ulcers as compared to females 19.2%. Occupation of the patient showed that (13.5%) of the businessman, (11.5%) of participants with government job, (17.3%) having private job, (40.4%) of the unemployed and (17.3%) housewives had ulcer. Chi square showed significant association between occupation and ulcer with p value <.001. Majority of unemployed showed greatest association. Lifestyle of patient showed that there were 203(45.3%) sedentary and 245(54.7%) active patients with no ulcer. 35 sedentary subjects and 17 active patients had ulcer. Chi square test revealed association between lifestyle and ulcer with p value<.005(p -value 0.003). Of the total, 27 overweight patients had ulcer. This indicated significant association with p value = .001. Chi square test showed that there was no association among marital status, socioeconomic status and educational level of the patient (Table 2).

Variables	No ulcer Frequency (%)	Ulcer Frequency (%)	p-value
Age			
<40	25 (46.3%)	1 (1.9%)	0.036
41-50	39 (42.4%)	7 (7.6%)	
51-60	97 (49.2%)	18 (9.1%)	
61-70	34 (35.8%)	18 (18.9%)	
>70	29 (46.8%)	8 (12.9%)	
Gender			
Male	197 (44.0%)	42 (80.8%)	<.001
Female	251 (56.0%)	10 (19.2%)	
Marital Status			
Single	13 (2.9%)	2 (3.8%)	0 .706
Married	435 (97.1%)	50 (96.2%)	
Occupation of Patient			
Businessman	47 (10.5%)	7 (13.5%)	<.001***
Government Job	37 (8.3%)	6 (11.5%)	
Private job	67 (15.0%)	9 (17.3%)	
Unemployed	58 (12.9%)	21 (40.4%)	
House wife	239 (53.3%)	9 (17.3%)	
Socio-Economic Status			
Lower SES	160 (35.7%)	23 (44.2%)	
Middle SES	220 (49.1%)	24 (46.2%)	0.369
Upper SES	68 (15.2%)	5 (9.6%)	
Lifestyle of Patient			
Sedentary	203 (45.3%)	35 (67.3%)	0.003**
Active	245 (54.7%)	17 (32.7%)	
Educational Level of Patient			
Illiterate	147 (32.8%)	18 (34.6%)	0.098
Primary	44 (9.8%)	7 (13.5%)	
Elementary	23 (5.1%)	7 (13.5%)	
Matric	122 (27.2%)	11 (21.2%)	
Higher	112 (25.0%)	9 (17.3%)	
BMI of Patient			
Underweight	2 (.4%)	3 (5.8%)	0 .001**
Normal	202 (45.1%)	21 (40.4%)	
Overweight	201 (44.9%)	27 (51.9%)	
Obese	43 (9.6%)	1 (1.9%)	
Smoking Habits			
Current smoker	33 (7.4%)	5 (9.6%)	<.001**
Ex-smoker	81 (18.1%)	23 (44.2%)	
Non smoker	334 (74.6%)	24 (46.2%)	

Table 2: Risk Factors related to the Development of Ulcers among diabetics

DISCUSSION

The study findings revealed that the prevalence of diabetic foot ulcer in diabetics was 10.4% in tertiary care centers of Faisalabad. Comparable results were presented by Iversen, according to which the prevalence of foot ulcers in Norway was 10.4% [19]. Furthermore, a study directed in southern Ethiopia reported a prevalence of 14.8% for diabetic foot ulcers. Contrasting to the current study results, the Jordanian study reported less prevalence 4.6% [18]. According to existing study, 80.2% of diabetic foot ulcers were found in males (n = 42), compared with 19.2% of females (n = 10), signifying that the majority of males in this study compared to females had an ulcer. The result of the study was also supported by another study in southern Ethiopia, which displayed that 62.5% of men and 37.5% of women had diabetic foot ulcers [20]. Contradictory results were found in a study where DFU was more prevalent among women (58.2%) in comparison to men (41.8%). Likewise, Khan et al., reported that prevalence was considerably higher in women (56.1%) than in men (43.9%) attending primary health care centers at Saudi Arabia [21]. Statistically significant association (p-valve is <0.001) was found between prevalence of the ulcers in diabetics and body mass index (BMI). Findings revealed that 51.9% (n = 27) of overweight diabetic patients were more probable to ulcer than those with a normal body weight of 40.4% (n = 21).The findings of this study were also supported by studies in Ethiopia and Kenya. Findings of these studies revealed that there was 2.1 times more chances of development of ulcers among over-weight patients [8]. Current study also found that type of diabetes and

DOI: https://doi.org/10.54393/pjhs.v3i05.241

development of foot ulcers was not associated. The study conducted in Egypt also found that reported similar results [22]. The conclusions of current study determined that patients with extended history of diabetes mellitus were at higher risk for diabetic foot ulcers. This finding is alike to preceding studies in northern India, which revealed that diabetic patients > 10 years of age had ulcers eight times more often than patients under ten years of age [23, 24]. Our study found that the family history has a clear effect on the development of foot ulcers. The result of our study is supported by the other study conducted Chavan [25]. Patients with ulcer history may be susceptible to microvascular and macrovascular complications. In this study, patients with microvascular complications were found more prone to developing a diabetic foot ulcer. Neuropathy is an identified risk factor for the development of a foot ulcer. The results of this study are relatable to study carried out in Iran [26]. Amputation, retinopathy after diabetes and kidney disease was significantly associated with foot ulcer. A study conducted among diabetics in Kenya shows that diabetics with comorbidities are 7.8 times more susceptible to foot ulcers than patients without comorbidities [20].

CONCLUSIONS

Current study concluded that significant number of patients was found with foot ulcers. Diabetic foot ulcer was significantly associated with many of the risk factors.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] American Diabetes Association. Standards of medical care in diabetes—2014. Diabetes Care. 2014 Jan; 37 Suppl 1: S14-80. doi: 10.2337/dc14-S014

[2] Claxton K, Martin S, Soares M, Rice N, Spackman E, Hinde S, et al. Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. Health Technology Assessment. 2015 Feb; 19(14):1-503, v-vi. doi: 10.3310/hta19140

[3] Zablotsky B, Black LI, Maenner MJ, Schieve LA, Blumberg SJ. Estimated Prevalence of Autism and Other Developmental Disabilities Following Questionnaire Changes in the 2014 National Health Interview Survey. National Health Statistics Reports. 2015 Nov; (87):1-20

[4] Consultation W. Definition, diagnosis and classification of diabetes mellitus and its complications: report of a WHO consultation. Part 1: Diagnosis and classification of diabetes mellitus. Geneva. WHO, Department of Noncommunicable Disease Surveillance, Geneva. 1999.

[5] Atlas D. International diabetes federation. IDF Diabetes Atlas, 7th edn. Brussels, Belgium: International Diabetes Federation. 2015; 33.

[6] Shaw JE, Sicree RA, Zimmet PZ. Global estimates of the prevalence of diabetes for 2010 and 2030. Diabetes Research and Clinical Practice. 2010 Jan; 87(1):4-14. doi: 10.1016/j.diabres.2009.10.007

[7] American Diabetes Association. Diabetes care at diabetes camps. Diabetes Care. 2007 Jan; 30 Suppl 1:S74-6. doi: 10.2337/dc07-S074

[8] Mariam TG, Alemayehu A, Tesfaye E, Mequannt W, Temesgen K, Yetwale F, et al. Prevalence of Diabetic Foot Ulcer and Associated Factors among Adult Diabetic Patients Who Attend the Diabetic Follow-Up Clinic at the University of Gondar Referral Hospital, North West Ethiopia, 2016: Institutional-Based Cross-Sectional Study. Journal of Diabetes Research. 2017; 2017:2879249. doi: 10.1155/2017/2879249

[9] Boulton AJ, Armstrong DG, Albert SF, Frykberg RG, Hellman R, Kirkman MS, et al. Task Force of the Foot Care Interest Group of the American Diabetes Association. Comprehensive foot examination and risk assessment. Endocrine Practice. 2008 Aug; 14(5):576-83. doi: 10.4158/EP.14.5.576

[10] Frykberg RG. Diabetic foot ulcers: current concepts. The Journal of Foot and Ankle Surgery. 1998 Oct; 37(5):440-6. doi: 10.1016/s1067-2516(98)80055-0

[11] Shobhana R, Rao PR, Lavanya A, Vijay V, Ramachandran A. Cost burden to diabetic patients with foot complications—a study from southern India. Journal of the Associations of Physicians India. 2000 Dec; 48(12):1147-50

[12] Apelqvist J, Bakker K, van Houtum WH, Nabuurs-Franssen MH, Schaper NC. International consensus and practical guidelines on the management and the prevention of the diabetic foot. International Working Group on the Diabetic Foot. Diabetes Metabolism Research and Reviews. 2000 Oct; 16 Suppl 1:S84-92.

[13] Reiber GE, Vileikyte L, Boyko EJ, del Aguila M, Smith DG, Lavery LA, et al. Causal pathways for incident lower-extremity ulcers in patients with diabetes from two settings. Diabetes Care. 1999 Jan; 22(1):157-62. doi: 10.2337/diacare.22.1.157

[14] Price P. The diabetic foot: quality of life. Clinical Infectious Diseases. 2004 Aug; 39(Supplement_2): S129-31. doi: 10.1086/383274

[15] Walters DP, Gatling W, Mullee MA, Hill RD. The

DOI: https://doi.org/10.54393/pjhs.v3i05.241

distribution and severity of diabetic foot disease: a community study with comparison to a non-diabetic group. Diabetic Medicine. 1992 May; 9(4):354-8. doi: 10.1111/j.1464-5491.1992.tb01796.x

[16] Ulbrecht JS, Cavanagh PR, Caputo GM. Foot problems in diabetes: an overview. Clinical Infectioud Diseases. 2004 Aug; 39 Suppl 2:S73-82. doi: 10.1086/383266

[17] Edelson GW, Armstrong DG, Lavery LA, Caicco G. The acutely infected diabetic foot is not adequately evaluated in an inpatient setting. Journal of the American Podiatric Medical Association. 1997 Jun; 87(6):260-5. doi: 10.7547/87507315-87-6-260

[18] Bakri FG, Allan AH, Khader YS, Younes NA, Ajlouni KM. Prevalence of diabetic foot ulcer and its associated risk factors among diabetic patients in Jordan. Journal of Med Sciences. 2012 Apr; 46(2):118-25.

[19] Iversen MM. An epidemiologic study of diabetes-related foot ulcers. Department of Public Health and Primary Health Care, Bergen, Norway. 2009.

[20] Deribe B, Woldemichael K, Nemera G. Prevalence and factors influencing diabetic foot ulcer among diabetic patients attending Arbaminch Hospital, South Ethiopia. Journal of Diabetes and Metabolism. 2014; 5(1):1-7. doi: 10.4172/2155-6156.1000322

[21] Khan AR, Al Abdul Lateef ZN, Fatima S, Al Yousuf SA, Khan Afghan SZ, Al Marghani S. Prevalence of chronic complication among type 2 diabetics attending primary health care centers of Al Ahsa district of Saudi Arabia: a cross sectional survey. Global Journal of Health Science. 2014 Apr; 6(4):245-53. doi: 10.5539/gjhs.v6n4p245

[22] Saad N, Elhadedy K, Ramadan N, Mohmady O, Farid M. The prevalence and risk categorization of diabetic foot complications in cohort group in, Beni Suif, Egypt. Life Science Journal. 2013; 3(10).

[23] Shahi SK, Kumar A, Kumar S, Singh SK, Gupta SK, Singh TB. Prevalence of diabetic foot ulcer and associated risk factors in diabetic patients from North India. The journal of diabetic foot complications. 2012; 4(3):83-91.

[24] Manda V, Sreedharan J, Muttappallymyalil J, Das R, Hisamatsu E. Foot ulcers and risk factors among diabetic patients visiting Surgery Department in a University Teaching Hospital in Ajman, UAE. International Journal of Medicine and Public Health. 2012; 2(3). doi: 10.5530/ijmedph.2.3.8

[25] Chavan MS. Prevalence and risk factors of diabetic foot ulcer at a tertiary care hospital among diabetic patients. International Journal of Advances in Medicine. 2018 Sep; 5(5): 1274-9.

[26] Yazdanpanah L, Shahbazian H, Nazari I, Arti HR, Ahmadi F, et al. Incidence and Risk Factors of Diabetic Foot Ulcer: A Population-Based Diabetic Foot Cohort (ADFC Study)-Two-Year Follow-Up Study. International Journal of Endocrinology. 2018 Mar; 2018:7631659. doi: 10.1155/2018/7631659.

DOI: https://doi.org/10.54393/pjhs.v3i05.195

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Effect of Nursing Guidelines On Practices of Nurses Caring for Traumatic Brain Injury Patients in A Tertiary Care Hospital Lahore, Pakistan

Saima Zafar[1], Uzma Shahzadi[2], Sania Abdul Rehman[1], Uzma Khurshid[1], Fouzia Bashir[2*], Zummorrad Khurshid[2]

[1]Lahore General Hospital, Lahore, Pakistan
[2]Jinnah Hospital Lahore, Pakistan

ARTICLE INFO

Key Words:
Traumatic brain injury; External ventricular Drain; Nurses; Practice; Patients

How to Cite:
Zafar, S. ., Shahzadi, U. ., Abdul Rehman, S. ., Khurshid, U. ., Bashir, F. ., & Khurshid, Z. . (2022). Effect of Nursing Guidelines On Practices of Nurses Caring for Traumatic Brain Injury Patients in A Tertiary Care Hospital Lahore, Pakistan: Nursing Guidelines On Practices of Nurses Caring for Traumatic Brain Injury Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.195

***Corresponding Author:**
Fouzia Bashir
Jinnah Hospital Lahore, Pakistan
fouziabashir768@gmail.com

Received Date: 5th October, 2022
Acceptance Date: 16th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Traumatic brain injury (TBI) is one of the top causes of disability and deaths in the world. However, Pakistan has 81 TBI cases for per 100,000 residents, with a 15% death rate. In order to lower excessive intracranial pressure in brain injury patients, external ventricular drains (EVDs) are frequently used to remove cerebrospinal fluid (CSF). Nursing practices with reference to the care of patients with EVD are greatly improved by EVD care guidelines. Therefore, it is crucial to implement EVD care guidelines in order to enhance their current procedures for EVD care. **Objective:** The aim of the study was to assess the effect of nursing guidelines on practices of nurses caring for traumatic brain injury patients with external ventricular drain in a public hospital of Lahore, Pakistan. **Methods:** A quasi experimental study was conducted. Sample size contained 50 registered nurses. Purposive sampling technique was used to collect the data. A four-week education intervention was delivered to the participant nurses. Through the use of validated questionnaires, information on nurses' practices was gathered twice, before and after the intervention. **Results:** The study found that nurses' practices had significantly improved ($p< 0.001$) following the education. The practices had been competent as post- intervention practices are improved to 32 (64%) from pre- intervention practices 12(24%). **Conclusions:** Guidelines for the care of External Ventricular Drains (EVDs) have a statistically significant impact on nurses' education in EVD care. Guidelines for EVD care considerably improve the nursing practices and reduced EVD consequences in patients with traumatic brain injuries.

INTRODUCTION

Traumatic brain injury (TBI) is the disorder of normal brain function as a result of external trauma [1]. The commonest cause of TBI is engine vehicle collision and falls [2]. In elderly patients the commonest cause of TBI is ground level fall and only seen by trauma services if there is isolated head injury occur. In the same way fall of 20 feet account as mild if there is no serious neurological or orthopedic issue [3]. TBI is one of the top causes of disability and deaths in the world, with 50 million new cases worldwide recorded each year and a fatality rate as high as 30–40% [4]. However, there are 81 TBI cases for every 100,000 people in Pakistan, and the fatality rate is 15% [5]. In developed countries, TBI ranges from 47 to 618 per 100,000 annually. The annual incidence rate of TBI in Finland ranges from 101 to 221 per 100,000 people [6]. TBI is common in developing countries like Pakistan, which has a population of over 18 billion people. In Pakistan, a road traffic injury surveillance study found that 10% of patients had moderate to severe TBI and that 30% of patients had a TBI [7]. Traumatic brain injury is the main cause of death in men and women between the ages of 15 and 44 [8]. The frequency of TBI is more common among adolescent, young adults and male. Though, according to the statistics the risk for TBI in male is more than female. The frequency of TBI was 959.0/100,000 population among male and 810.8/100,000 for female. The percentage was higher for

DOI: https://doi.org/10.54393/pjhs.v3i05.195

people of 75 years or older 223.2/100,000 and for age group 15-24 years 1080.7/100,000 population [3]. Additionally, TBI is also related with increased hospital length of stay (LOS) and reduced access to hospital beds for other patients [9]. Cognitive impairment, communication difficulties, sensory processing issues, post-traumatic seizures, cerebrospinal fluid (CSF) leaks, skull fractures (8.5–12%), vascular or cranial nerve damage, and post-traumatic hydrocephalus are among the complications of TBIs [10]. In order to lower excessive intracranial pressure in brain tumor patients, external ventricular drains (EVDs) are frequently utilized to remove cerebrospinal fluid (CSF) [11]. EVD is a life-saving procedure [12]. However, due to the intrusive nature of the device, EVD complications can occur. The EVD has a wide range of consequences, including mechanical difficulties, physiological issues, and infectious complications. Nurses play a vital role in infection control and are essential in EVD infection prevention [13]. The management of External ventricular drain (EVD) is utmost duty of nurses. The main complications of External ventricular drain (EVD) are due to poor nursing care and level of knowledge of nurses regarding care of EVD. Nursing care for patients with EVD includes implementation of specific care throughout the insertion, maintenance, handling and monitoring of the device [14]. In patients with EVD, accurate and accountable nursing care indicates better outcomes [15]. Furthermore, according to studies, educational interventions reduced External ventricular drain (EVD) related complications by 40% to 50% [16]. Good knowledge and practices of nurses will prevent the patients from delayed recovery. Nurses involved in caring for patients with EVD must be knowledgeable and are accountable for ensuring that the care given is based on the EVD care guidelines [17]. Therefore, this study intended to improve the nursing practice on external ventricular drain care to reduce its complications among patients with post-traumatic brain inquiry. The objective of the study was to assess the effect of nursing guidelines on practices of nurses caring for traumatic brain injury patients with external ventricular drain in a public hospital of Lahore, Pakistan. There is no effect of nursing guidelines on nursing practices among patients with traumatic brain injury. There is an effect of nursing guidelines on nursing practices among patients with traumatic brain injury.

METHODS

This study was a quasi-experimental one group pre-test post-test design. It was conducted in Neurosurgery Intensive Care Unit of Jinnah Hospital Lahore, Pakistan from January 2022 to May 2022.The sample size consists of 50 Registered nurses. It is calculated with 9% margin of error and 95% confidence interval. The purposive sampling technique was used. All registered nurses aged between 25- 45 year were included in the study. Practices of nurses was assessed through 34 items EVD care checklist. The EVD care practices checklist is taken from AANN guidelines for EVD care. Done item will be marked as "1" and not done or missing item as "0". EVD Care practices are competent if score is >75% and incompetent if score is < 75% [18]. Data was collected at two points, pre and post educational intervention. It consists of three phases. In this phase, all the registered nurses following the inclusion and exclusion criteria were selected in the study. Informed consent in written form was taken from study subjects. Pre-interventional data was collected by researcher and each participant was assessed for practices at their original working place by maintaining secrecy. After completion of pre-intervention phase, a four-week educational intervention through PowerPoint presentation and audio visual demonstration delivered to the participants. In addition, hands on practice of participants via expert were taught to improve the practices. Educational intervention was delivered during morning and evening shift in auditorium of selected research setting. After educational intervention, registered nurses were assessed for practices and patients for complications by using same validated questionnaire. Data was analyzed using SPSS version 23. Frequencies and percentages were calculated. To compare the pre and post practices scores, the Wilcoxon signed rank test was used. P value ≤ 0.05 was measured as statistically significant.

RESULTS

The sample of 50 nurses included 42(84%) in age group 25-35 year & 8(15%) in age group 36-45 year, and six (12%) male & 44(88%) females, and 32(64%) have 2-10-year experience & 18(36%) greater than ten-year experience, and 28(56%) having General nursing diploma, 8(16%) Generic BSN degree, 10(20%) Generic Post RN & four (8%) MSN degree as shown in table 1.

Variable	Categories	Frequency (%)
Age	25-35 Year	42(84%)
	36-45 Year	08(15%)
Sex	Male	06(12%)
	Female	44(88%)
Experience	2-10 Year	32 (64%)
	> 10 Year	18 (36%)
Qualification	General nursing diploma	28 (56%)
	Generic BSN	08 (16%)
	Generic Post RN	10 (20%)
	MSN	04 (08%)

Table 1: Demographic features of participants

Table 2 indicated that before intervention 38(76%) nurses

DOI: https://doi.org/10.54393/pjhs.v3i05.195

have incompetent practices whereas 12(24%) had competent practices. After education intervention, the competent score was raised to 32(64%) and incompetent practice score was 18(36%) as shown in table 2.

Practices Categories	Pre-intervention	Post-intervention
	F (%)	F (%)
Incompetent practices	38 (76%)	18 (36%)
Competent practices	12 (24%)	32 (64%)

Table 2: Pre and post EVD care practice intervention score among Nurses

The result of the study proved that there is an effect of nursing guidelines on nursing practices among patients with traumatic brain injury as there was a significant difference between pre and post interventional practices score among nurses regarding EVD care as evident by (P< 0.001).

Table 3 shows the change in practices score of pre and post intervention, this was compared using Wilcoxon rank test. The findings revealed that there was a significant difference between pre and post interventional practices score among nurses regarding EVD care as evident by (P< 0.001). Furthermore, median scores of practices were improved as shown in table 3.

Variable	N	Pre-intervention Median	Post-intervention Median	Median Difference	Wilcoxon (z) test	P-value
Practices scores	50	12.00	24.00	12.00	-8.732	<0.001

Table 3: Comparison of pre intervention practices score and post intervention practice score

DISCUSSION

Effective nursing care is necessary for all patients admitted in hospital, especially for traumatic brain injury patients. It is recommended that evidence based nursing care should be provided to patients for better patient outcomes. The objective of present study was to assess the effect of nursing guidelines on practices of nurses caring for traumatic brain injury patients with external ventricular drain in a public hospital of Lahore, Pakistan. The discussion was divided into two parts; the first part is concerned with the socio-demographic characteristics of participants. The second part contains the discussion of findings related to the nurses' practices. In Neurosurgery intensive care units, EVD is a lifesaving procedure. The practices of nurses play a major role in provision of good quality nursing care and to reduce the complications among patients who enduring EVD. According to present study, 42(84%) participants were between the ages of 25-30 years. These findings are consistent with another study conducted by Ahmed et al., in 2017 which revealed that more than half (51%) of participant nurses were in the age group 25 -30 years. The findings of this study showed that majority of the participants 32(64%) had experience between 2-10 years. These findings are in accordance with Elbilgahy & Mohammed (2019) where (49.5%) nurses had 1-5-year experience [19]. According to present study in terms of qualification, majority of participants 56% having General Nursing diploma and 8% having MSN degree. These finding are in accordance with a study conducted in Egypt where 39.4% nurses were diploma holder [19]. The second part of discussion is related to the findings based on nurses' practices regarding care of external ventricular drain (EVD). The results of the study revealed that before educational intervention on EVD care nearly 38(76%) nurses' practices were incompetent. Knowledge and skills become obsolete if these are not put into practice, stressing that practice based knowledge is more meaningful which is observed in our results with the content related to good practices of EVD device maintenance. This study indicated that after receiving educational intervention based on AANN Guidelines for EVD care, the practices of nurses were improved significantly (p<0.001). Dina Mohamed Maarouf (2020) also found a significant improvement in practices of registered nurses, in a study conducted in Egypt [18]. The pretest results in this study were 5%, whereas the posttest results were 75% (p<0.001). The findings of our study were also consistent with those of Tsai-Yun Hsieh's study in Tainan [20]. This study found that nurses' pre-intervention practices were incompetent, but post- intervention practices were greatly improved with a consistent rate of 12 % to 100 % (p<0.000). Souza (2020) in Brazil conducted an interventional study and reported a significant difference in practices of nurses (p<0.001) after educational intervention in neurological ICU [16].

CONCLUSIONS

Guidelines for the care of External Ventricular Drains (EVDs) have a statistically significant impact on nurses' education in EVD care. Guidelines for EVD care considerably improve the nursing practices and reduced EVD consequences in patients with traumatic brain injuries.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Bloomfield J and Fisher MJ. Quantitative research design. Journal of the Australasian Rehabilitation Nurses Association. 2019 Aug; 22(2):27-30.

[2] Peeters W, van den Brande R, Polinder S, Brazinova A, Steyerberg EW, Lingsma HF, et al. Epidemiology of traumatic brain injury in Europe. Acta neuro-

DOI: https://doi.org/10.54393/pjhs.v3i05.195

chirurgica. Supplement. 2015 Oct;157(10):1683-96. doi: 10.1007/s00701-015-2512-7.

[3] Kassardjian CD, Willems JD, Skrabka K, Nisenbaum R, Barnaby J, Kostyrko P, et al. In-Patient Code Stroke: A Quality Improvement Strategy to Overcome Knowledge-to-Action Gaps in Response Time. Stroke. 2017 Aug; 48(8):2176-2183. doi: 10.1161/STROKEAHA.117.017622.

[4] De Bonis P and Anile C. Post-traumatic hydrocephalus: The Cinderella of Neurotrauma. Expert Review of Neurotherapeutics. 2020 Jul; 20(7):643-6.

[5] Siddiqui EU, Waheed S, Perveen F, Daniyal M, Raffay Khan MA, Siddiqui S, et al. Clinical outcome of paediatric patients with traumatic brain injury (TBI) receiving 3% hypertonic saline (HTS) in the emergency room of a tertiary care hospital. Journal of the Pakistan Medical Association 2019 Nov; 69(11):1741-1745. doi: 10.5455/JPMA.296439.

[6] Dewan MC, Rattani A, Gupta S, Baticulon RE, Hung YC, Punchak M, et al. Estimating the global incidence of traumatic brain injury. Journal of neurosurgery. 2018 Apr; (1):18. doi: 10.3171/2017.10. JNS17352.

[7] Adamson MM, Shakil S, Sultana T, Hasan MA, Mubarak F, Enam SA, et al. Brain Injury and Dementia in Pakistan: Current Perspectives. Frontiers in Neurology. 2020 Apr; 11:299. doi: 10.3389/fneur.2020.00299

[8] Khan M, Yaqoob U, Hassan Z, Uddin MM. Immediate Outcomes of Traumatic Brain Injury at a Tertiary Care Hospital of Pakistan-A Retrospective Study 2020.

[9] Omar M, Moore L, Lauzier F, Tardif PA, Dufresne P, Boutin A, et al. Complications following hospital admission for traumatic brain injury: A multicenter cohort study. Journal of Critical Care. 2017 Oct; 41:1-8. doi: 10.1016/j.jcrc.2017.04.031.

[10] Ahmed S, Venigalla H, Mekala HM, Dar S, Hassan M, Ayub S. Traumatic Brain Injury and Neuropsychiatric Complications. Indian Journal of Psychological Medicine. 2017 Apr; 39(2):114-121. doi: 10.4103/0253-7176.203129.

[11] Hepburn-Smith M, Dynkevich I, Spektor M, Lord A, Czeisler B, Lewis A. Establishment of an External Ventricular Drain Best Practice Guideline: The Quest for a Comprehensive, Universal Standard for External Ventricular Drain Care. Canadian journal of neuroscience nursing. 2016 Feb; 48(1):54-65. doi: 10.1097/JNN.0000000000000174.

[12] Fried HI, Nathan BR, Rowe AS, Zabramski JM, Andaluz N, Bhimraj A, et al. The Insertion and Management of External Ventricular Drains: An Evidence-Based Consensus Statement: A Statement for Healthcare Professionals from the Neurocritical Care Society. Journal of Neurocritical Care. 2016 Feb; 24(1):61-81. doi: 10.1007/s12028-015-0224-8.

[13] Fang W, Wei A, Zhu Y, You W, Wang H, Wen L, et al. Contribution of Patient Care Technicians to the Prevention of External Ventricular Drain Infection: A Retrospective Study. Canadian journal of neuroscience nursing. 2021 Feb; 53(1):44-48. doi: 10.1097/JNN.0000000000000561.

[14] De Oliveira-Costa RR, De Medeiros SM, Martins JC, Paiva-de Menezes RM, Souto-de Araújo M. O uso da simulação no contexto da educação e formação em saúde e enfermagem: uma reflexão acadêmica. Espaço para a Saúde-Revista de Saúde Pública do Paraná. 2015 Mar; 16(1):59-65.

[15] Muralidharan R. External ventricular drains: Management and complications. Surgical neurology international. 2015 May; (6)271-4. doi: 10.4103/2152-7806.157620.

[16] Souza RC, Siqueira EM, Meira L, Araujo GL, Bersaneti MD. Nurses' retention of knowledge about external ventricular shunt. Cuidarte Magazine. 2020 Apr; 11(1).

[17] Woodward S, Addison C, Shah S, Brennan F, MacLeod A, Clements M. Benchmarking best practice for external ventricular drainage. British journal of community nursing. 2002 Jan; 11(1):47-53. doi: 10.12968/bjon.2002.11.1.12217.

[18] Mohamed Maarouf D, Faltas Marzouk Faltas S. External Ventricular Brain Drain: Effect of Nursing Guidelines on Internship Nursing Students' Performance. Egyptian Journal of Health Care. 2020 Jun; 11(2):500-10.

[19] NA A, SS AR, SE H, AE AH. Assessment of Nurses Performance Regarding External Ventricular Drain among Children with Brain Tumor. Egyptian Journal of Health Care. 2021 Sep; 12(3):945-55.

[20] Hsieh TY and Chen CJ. A project on improvement of nursing personnel's external ventricular drainage knowledge and practice 2018.

DOI: https://doi.org/10.54393/pjhs.v3i05.217

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Effectiveness of Educational Program on Knowledge and Practices of Nurses Regarding Prevention of Diabetic Foot Ulcers at Tertiary Care Hospital, Lahore

Sonober Ramzan[1*], Hajra Sarwar[1], Muhammad Afzal[1] and Sadia Khan[2]

[1]Lahore School of Nursing, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan
[2]University Institute of Physical Therapy, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan

ARTICLE INFO

Key Words:
Educational program, Diabetic foot, Knowledge, Nurses

How to Cite:
Ramzan, S., Sarwar, H., Afzal, M., & Khan, S. . (2022). Effectiveness of Educational Program on Knowledge and Practices of Nurses Regarding Prevention of Diabetic Foot Ulcers at Tertiary Care Hospital, Lahore: Knowledge and Practices of Nurses Regarding Prevention of Diabetic Foot Ulcers. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.217

***Corresponding Author:**
Sonober Ramzan
Lahore School of Nursing, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan
facebook.snober@gmail.com

Received Date: 8th October, 2022
Acceptance Date: 16th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Diabetes is a chronic disease that affects 4.2% of the world's population. Nurses effectively prevent foot ulcers and lower limb amputations by providing educational intervention and health care. **Objective:** To evaluate the effectiveness of a training program on nurses' knowledge and practices related to diabetic foot ulcer prevention. **Methods:** A quasi-experimental pre-post study was conducted in the diabetes clinic and medical departments of Sir Ganga Ram Hospital in Lahore, Pakistan. A total of 36 nurses were randomly selected. After obtaining informed consent, all female nurses aged 23 to 35 years with inadequate knowledge of diabetic foot ulcer prevention were included in the study. The nurses received a 16-week intervention. Nurses' knowledge was assessed using a validated instrument called the Nurses Knowledge Questionnaire related to Diabetic Foot Management Care and an observation checklist for nurses' practice related to neurovascular assessment of diabetic patients before and after the intervention. Data were entered and analyzed using SPSS version 24.0. **Results:** The results showed that most of the participants were from 26 to 30 years, 19 (52.8) were single with educational level of nursing diploma (50.0%). Participants were having 2 to 5 years of experience. After the intervention there were 4 (11.1%), 13 (36.1%) and 19 (52.8%) participants having poor, moderate and good knowledge respectively regarding prevention of diabetic foot ulcers. There was a significant difference between pre and post interventional score of practice and knowledge among nurses (p value <0.001). **Conclusions:** Nurses have poor knowledge and practice regarding diabetic foot care but after the intervention it increases significantly.

INTRODUCTION

Diabetes is a chronic, complicated disease that affects 4.2% of the world's population [1]. Approximately 7.5 million people suffer from diabetes mellitus and 10% people develop peripheral neuropathy and peripheral vascular diseases and 15% chance of developing diabetic foot ulcers. The amputation rate due to diabetic foot ulcers is reported to be high ranging from 21.0%9 to 48.0% in Pakistan [2]. Diabetic Foot ulcers (DFU) results in the hospitalization of diabetic patients. Moreover, patients with foot ulcers have higher risk of lower limb amputations, which is a major problem [3]. DFU can be grouped into neuropathies, ischemic neuropathy or ischemic. Loss of protective sensation (LOPS) is present in diabetic patient due to neuropathic ulcers. Healthcare providers improve the quality of life of diabetic patients by preventing episodes or recurrences of diabetic foot through an efficient and accepted method [4]. A routine foot examination by an assistant or caregiver includes the assessment of foot care and skin examination [5, 6]. Furthermore; primary healthcare is the most important type of care provided to the patient. The nurses' role in preventing diabetic foot is crucial [7]. The nurse's knowledge and practice in providing foot care is essential for improvement in outcomes of diabetic foot ulcer. The number of diabetic foot ulcers and foot amputations has increased as a result of the lack of a standardized method for DFU. Important problems for the health care system include patients who lack poor knowledge and behaviors

DOI: https://doi.org/10.54393/pjhs.v3i05.217

regarding foot care, nurses with poor assessments and knowledge of DFU, health care workers with poor understanding of neuropathy assessments and foot screening investigations. The primary role of the nurse is to educate patients on proper foot care and to screen them for foot ulcers [8]. Furthermore nurses play vital role in providing diabetic care health services at primary, secondary and tertiary level as they are the primary source of health care delivery. It is important for nurses to enhance their knowledge and skills regarding diabetes foot care and early detect the cases of high risk foot. So that high risk diabetic patients prevent from amputation and other complications of diabetic foot. Continuity of nursing education can increase quality practice and decrease the morbidity and mortality rate related to DFU. Therefore the objective of study was to evaluate the effectiveness of an educational program on knowledge and practices of nurses regarding prevention of diabetic foot ulcers at tertiary care hospital Lahore.

METHODS

A quasi-experimental pre-post study was conducted in the diabetes clinic and medical departments of Sir Ganga Ram Hospital in Lahore, Pakistan. A total of 36 nurses were randomly selected. Sample size was calculated by using Post-test Nurses' knowledge total score (23.4 ± 2.2) by using 5% level of significance [9]. After obtaining informed consent, all female nurses (BSN RN, Diploma Nurses, MSN) aged 23 to 35 years with inadequate knowledge of diabetic foot ulcer prevention were included in the study. The nurses who were not in direct contact with diabetic patients, perform duties in critical care unit and already certified in diabetic /foot care management were excluded from the study. The research scholar developed an interventional program. The intervention was developed in the form of booklet and power point presentation by reviewing past and recent literature. All the material for intervention was developed from Guidelines for diabetic foot care: A template for the care of all feet [10]. Nurses were given 16 week Educational intervention provided to nurses to improve their knowledge and practice regarding diabetic foot ulcer. Each session lasted 90 minutes. Participants were given a multimedia presentation, demonstration and group discussions for better understanding. Nurses' knowledge was assessed using a validated instrument called the Nurses Knowledge Questionnaire related to Diabetic Foot Management Care and an observation checklist for nurses' practice related to neurovascular assessment of diabetic patients before and after the intervention. It is a validated tool designed only for the nurses knowledge assessment. Validity and reliability of tool was 0.90. The nurses' knowledge questionnaire on diabetic foot management consists of 68 questions. It includes 4 sections which are:

1) Knowledge regarding Risk Factors which have 16 questions
2) Knowledge regarding Foot examination which has 10 questions
3) Knowledge regarding Application of preventing foot complications which includes 32 questions
4) Knowledge regarding Foot wear selection which have10 questions.

Score of knowledge was concluded as good (more than75), moderate (50-75) and poor knowledge (less than 50) [7]. The nurse's practices were ranked as follows "Not done = 0, incompletely done = 1 and completely and correctly done = 2.

Data were entered and analyzed using SPSS version 24.0. Comparison of knowledge and practice scores before and after the intervention was analyzed using a paired t sample. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Demographic details of the participants are summarized in Table 1. Majority of the participants were from 26 to 30 years, 8 participants were from age group 21 to 25 years and remaining 9 participants were above 30 years of age. There were 17 (47.2%) married participants Majority of the participants 18 (50%) had nursing diploma, whereas only 8(22.2%) participants had completed their bachelors and remaining 10 (27.8%) participants had specialization. Out of 36 participants, 5 (13.9%) participants were from ICU, 28 (77.8%) and 3 (8.3%) were from medical ward and mixed services respectively. Total 18(50.0%) of the participants were having 2 to 5 years of experience, 15(41.7%) had 6 to 10 years' experience and rest 3 (8.3%) had 11 to 15 years of experience. Participants' experience in working unit, majority of the participants were having 7 months to years of experience in same working unit, the others 3 and 16 participants were working for less than 6 months and above 2 years respectively. Five (13.9%) were executive nurses, 13 (36.1%) were polyclinic nurses and 18 (50.0%) were ICU nurses.

Variables	Frequency (%)
Age (years)	
21 to 25	8 (22.2)
26 to 30	19 (52.8)
31 or above	9 (25.0)
Marital Status	
Married	17 (47.2)
Single	19 (52.8)
Education	
Bachelors	8 (22.2)
Specialization	10 (27.8)
Nursing Diploma	18 (50.0)

DOI: https://doi.org/10.54393/pjhs.v3i05.217

Working Unit	
ICU	5 (13.9)
Medical Ward	28 (77.8)
Mixed Services	3 (8.3)
Experience	
2 to 5 years	18 (50.0)
6 to 10 years	15 (41.7)
11 to 15 years	3 (8.3)
Experience in Working Unit	
< 6 months	3 (8.3)
7 months to 2 years	17 (47.2)
> 2 years	16 (44.4)
Designation	
Executive Nurse	5 (13.9)
Polyclinic Nurse	13 (36.1)
ICU Nurse	18 (50.0)

Table 1: Demographic Variables of the study participants

Table 2 depicts that in the pre-interventional phase, all participants (32) had poor knowledge. Whereas in the post-intervention phase there were 4 (11.1%), 13 (36.1%) and 19 (52.8%) participants having poor, moderate and good knowledge respectively regarding prevention of diabetic foot ulcers. The findings showed that there was a significant difference between the pre and the post interventional knowledge's score among participants regarding the prevention of diabetic foot ulcers as evident by p value <0.001. Moreover, when practice has categorized into poor, fair and good; results depict that in pre interventional phase majority of the participants were having poor practices 29 (80.6%) while only 7 (19.4%) were experiencing fair practices. And in post study group majority of the participants 61.1% experienced fair practices and remaining 38.9% were having good practices regarding prevention of diabetic foot ulcers. The findings revealed that there was a significant difference between pre and post interventional score of practice among participants as evident by p value <0.001.

Variables	Pre intervention No. (%)	Post intervention No. (%)	Test value	p-value
Knowledge				
Poor	36 (100.0)	4 (11.1)	-5.186*	< 0.001
Moderate	0 (0)	13 (36.1)		
Good	0 (0)	19 (52.8)		
Practice				
Poor	29 (80.6)	0 (0)	-13.105**	< 0.001
Fair	7 (19.4)	22 (61.1)		
Good	0 (0)	14 (38.9)		

Table 2: Comparison of Pre and Post Knowledge and Practice Categories

*Wilcoxon Signed Rank Test ** Paired Sample t-test

DISCUSSION

Diabetic foot ulcers are greatly influenced by a lack of adequate education and awareness of routine foot care. The incidence of foot ulcers and amputations can be reduced by a targeted education and training program on foot and wound care. Nurses, however, are the main point of contact for patients and are considered by them to be knowledgeable sources. Moreover to fulfill this role, nurses must be knowledgeable about diabetic foot care management and pass this knowledge on to patients. In current study it was documented that in the treatment and prevention of diabetic foot ulcer nurses play a vital role. Moreover there education, knowledge and practice about diabetic foot care is important. The results of current study showed that the majority of the participants were from 26 to 30 years, 19 (52.8) were single with educational level of nursing diploma (50.0%), and participants were having 2 to 5 years of experience. The 5 (13.9%) were executive nurses, 13 (36.1%) were polyclinic nurses and 18 (50.0%) were ICU nurses. However our data show a substantial gender gap, with women making up the majority of the workforce that is included in the current study. These findings are similar to a study which reported that more than half of the nurses were females. The age of nurses was between 25-30 years and single. They were under-graduate and 21.1% work in ICUs with up-to 5 years of experience [7]. In this research the practice and knowledge of nurses before and after intervention. The results revealed that there was a significant difference between the pre and the post interventional Median Knowledge Score (Pre= 27 vs. Post = 52) among nurses regarding the prevention of diabetic foot ulcers as evident by (p value <0.001). The overall knowledge of nurses was increased after intervention. In addition there, practices also become better after intervention. After intervention majority of the nurses 61.1% experienced fair practices and remaining 38.9% were having good practices regarding prevention of diabetic foot ulcers. Ren and coworkers investigated the level of knowledge of nurses about diabetic foot ulcers. Despite the fact that the majority of nurses had no training in diabetic foot care, they were adequately informed [11]. As a result, the knowledge levels of the nurses varied. This could be due to the educational background of the nurses or their participation in continuing education programs after their basic training. Therefore, it is important to determine the level of information about diabetic foot care among nurses working in the facilities, to fill any knowledge gaps, and to eliminate misconceptions [12]. In another study on the evaluation of nurse's knowledge and practice regarding diabetic fool ulcer showed that the nurses have good knowledge score regarding the prevention of diabetic foot ulcer but their practices showed poor score [13]. Moreover it was reported a moderate positive correlation between the knowledge and practices of nurses in diabetic foot

DOI: https://doi.org/10.54393/pjhs.v3i05.217

complications. It was concluded that the early detection and management of diabetic foot ulcer can prevent the worse outcomes of disease [14]. Only 56% of nurses who participated in a survey assessing nurses' knowledge and attitudes had a good knowledge of diabetic foot ulcers, it found. Sixty-seven percent of respondents reported having no formal training in wound care. Nurses' attitudes were generally positive. Overall, nurses showed positive attitudes toward patients with diabetic foot ulcers. However, they noted a lack of basic information [15]. Despite less experience, young, lively nurses were found to have a higher level of understanding of diabetic foot care. Experienced nurses noticeably lacked expertise in diabetic foot care. The conclusions are useful for developing educational programs. Patients will receive better diabetic foot care as a result [16]. However, the prevention of diabetic foot problems also involves patient education. Therefore, nurses should be involved in developing and implementing educational programs that improve patients' quality of life and self-care habits [17-19]. To meet the educational needs of nurses, theoretical and practical education programs on diabetic foot management should be planned. Training programs that combine theory and practice help nurses improve their knowledge and skills in caring for the feet of diabetic patients [20].

CONCLUSIONS

Nurses have poor knowledge and practice regarding diabetic foot care but after the intervention it increased significantly. Patient education and prevention of diabetic foot complications benefit from the knowledge of the nurse. The conclusions are useful for developing educational programs. Patients will receive better diabetic foot care as a result. Nurses are an important factor in educating patients, which can lead to a significant change in their behavior, self-management, and quality of life.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Aalaa M, Sanjari M, Shahbazi S, Shayeganmehr Z, Abooeirad M, Amini MR, et al. Diabetic foot workshop: Improving technical and educational skills for nurses. Medical Journal of the Islamic Republic of Iran. 2017 Jan; 31:8. doi: 10.18869/mjiri.31.8

[2] Bilal M, Haseeb A, Rehman A, Hussham Arshad M, Aslam A, Godil S, et al. Knowledge, Attitudes, and Practices Among Nurses in Pakistan Towards Diabetic Foot. Cureus. 2018 Jul; 10(7):e3001. doi: 10.7759/cureus.3001

[3] Bus SA, Lavery LA, Monteiro-Soares M, Rasmussen A, Raspovic A, Sacco ICN, et al. Guidelines on the prevention of foot ulcers in persons with diabetes (IWGDF 2019 update). Diabetes Metabolism Research and Reviews. 2020 Mar; 36 Suppl 1:e3269. doi: 10.1002/dmrr.3269

[4] Schaper NC, van Netten JJ, Apelqvist J, Bus SA, Hinchliffe RJ, Lipsky BA; IWGDF Editorial Board. Practical Guidelines on the prevention and management of diabetic foot disease (IWGDF 2019 update). Diabetes Metabolism Research and Reviews. 2020 Mar; 36 Suppl 1:e3266. doi: 10.1002/dmrr.3266

[5] Boulton AJ, Armstrong DG, Albert SF, Frykberg RG, Hellman R, Kirkman MS, et al. Comprehensive foot examination and risk assessment: a report of the task force of the foot care interest group of the American Diabetes Association, with endorsement by the American Association of Clinical Endocrinologists. Diabetes Care. 2008 Aug; 31(8):1679-85. doi: 10.2337/dc08-9021

[6] Singh S, Jajoo S, Shukla S, Acharya S. Educating patients of diabetes mellitus for diabetic foot care. Journal of Family Medicine and Primary Care. 2020 Jan; 9(1):367-373. doi: 10.4103/jfmpc.jfmpc_861_19

[7] Kaya Z and Karaca A. Evaluation of Nurses' Knowledge Levels of Diabetic Foot Care Management. Nursing Research and Practice. 2018 Jul; 2018:8549567. doi: 10.1155/2018/8549567

[8] Stolt M, Routasalo P, Suhonen R, Leino-Kilpi H. Effect of an educational intervention on nurses' knowledge of foot care and on the foot health of older residents. Journal of the American Podiatric Medical Association. 2011 Apr; 101(2):159-66. doi: 10.7547/1010159.

[9] Waheida S, Elshemy MB, Basal AA. Effect of educational program about foot care on nurses' knowledge, practice and outcomes for patients with diabetes. Management. 2015; 17:19.

[10] Beuscher TL. Guidelines for Diabetic Foot Care: A Template for the Care of All Feet. Journal of Wound Ostomy and Continence Nursing. 2019 Jun; 46(3):241-245. doi: 10.1097/WON.0000000000000532

[11] Ren M, Yang C, Lin DZ, Xiao HS, Mai LF, Guo YC, et al. Effect of intensive nursing education on the prevention of diabetic foot ulceration among patients with high-risk diabetic foot: a follow-up analysis. Diabetes Technology and Therapeutics. 2014 Sep; 16(9):576-81. doi: 10.1089/dia.2014.0004

[12] Abdullah WH, Al-Senany S, Al-Otheimin HK. Capacity building for nurses' knowledge and practice regarding

DOI: https://doi.org/10.54393/pjhs.v3i05.217

prevention of diabetic foot complications. International Journal of Nursing Sciences. 2017; 7(1):1-5. doi: 10.5923/j.nursing.20170701.01

[13] Sukri MB, Singh A, Singh LH, bin Abdul Wahid AM, Ortho MS. Knowledge and attitude of nurses towards diabetic foot care in a secondary health care centre in Malaysia. Medical Journal of Malaysia. 2020 Jul; 75(4):391.

[14] Porcelis Vargas C, Souza Lima DK, Loyze da Silva D, Dornelles Schoeller S, de Oliveira Vragas MA, Rozza Lopes SG. Conduct of Primary Care Nurses in the Care of People with Diabetic Foot. Journal of Nursing UFPE/Revista de Enfermagem UFPE. 2017 Nov; 11. doi: 10.5205/reuol.11138-99362-1-SM.1111sup201701

[15] Hazavehei SM, Sharifirad G, Mohabi S. The effect of educational program based on health belief model on diabetic foot care. International Journal of Diabetes in Developing Countries. 2007 Jan; 27(1).

[16] Younis BB, Shahid A, Arshad R, Khurshid S, Ahmad M, Yousaf H. Frequency of foot ulcers in people with type 2 diabetes, presenting to specialist diabetes clinic at a Tertiary Care Hospital, Lahore, Pakistan. BMC Endocrine Disorders. 2018 Aug; 18(1):53. doi: 10.1186/s12902-018-0282-y

[17] Ahmad Sharoni SK, Minhat HS, Mohd Zulkefli NA, Baharom A. Health education programmes to improve foot self-care practices and foot problems among older people with diabetes: a systematic review. International Journal of Older People Nursing. 2016 Sep; 11(3):214-39. doi: 10.1111/opn.12112

[18] Yıldırım Ayaz E, Dincer B, Oğuz A. The Effect of Foot Care Education for Patients with Diabetes on Knowledge, Self-Efficacy and Behavior: Systematic Review and Meta-Analysis. The International Journal of Low Extremity Wounds. 2022 Sep; 21(3):234-253. doi: 10.1177/15347346221109047

[19] Shiu AT and Wong RY. Diabetes foot care knowledge: a survey of registered nurses. Journal of Clinical Nursing. 2011 Aug; 20(15-16):2367-70. doi: 10.1111/j.1365-2702.2011.03748.x

[20] Kumarasinghe SA, Hettiarachchi P, Wasalathanthri S. Nurses' knowledge on diabetic foot ulcer disease and their attitudes towards patients affected: A cross-sectional institution-based study. Journal of Clinical Nursing. 2018 Jan; 27(1-2):e203-e212. doi: 10.1111/jocn.13917.

DOI: https://doi.org/10.54393/pjhs.v3i05.240

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Evaluation of Palatal Rugae in Patients for Maxillary Dental Prostheses

Muhammad Sartaj Khan[1*], Muhammad Raza[1], Maryam Tahir[1] and Samia Manzar[1]

[1]Prosthodontics Department, Peshawar Dental College, Peshawar, Pakistan

ARTICLE INFO

Key Words:

Rugae, Palate, Completely edentulous arch, Denture Support

How to Cite:

Khan, S. ., Raza, M. ., Tahir, M. ., & Manzar, S. . (2022). Evaluation of Palatal Rugae in Patients for Maxillary Dental Prostheses: Palatal Rugae in Patients for Maxillary Dental Prostheses. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.240

***Corresponding Author:**

Muhammad Sartaj Khan
Prosthodontics Department, Peshawar Dental College, Peshawar, Pakistan
sartajkhan06@hotmail.com

Received Date: 13th October, 2022
Acceptance Date: 22nd October, 2022
Published Date: 31st October, 2022

ABSTRACT

Significance and importance of palatal soft tissue rugae increases many folds when replacement of missing maxillary teeth with conventional complete denture is part of treatment plane. **Objectives:** To quantify the shape and size of rugae in completely and partial edentulous arches in both males and females. **Methods:** A total of 200 patients were selected on the basis of inclusion and exclusion criteria and after obtaining informed consent, impression with Alginate impression material were made and poured to form dental casts. Pattern and shapes of rugae were delineated with graphite marker. Under a good source of light different shapes, thus outlined, were counted in number and measured in length, categorizing them in various shapes such as divergent, wavy, curved and straight. Age, arches were computed for frequency and measuring the mean with standard deviation. All data were computed by using SPSS (version 22). **Results:** Out of 200 patients, a male (n=89) to female (n=111) ratio of 0.80 was found with a mean age of 52.6 and standard deviation of 11.3. Partially edentulous cases were 51%, while the rest were completely edentulous. A total of 1367 rugae were found in both types of patients. Females had more number of rugae (n=773) than males (n=594). Similarly primary rugae were higher in numbers (n=1132) than secondary rugae (n=235) and the observed difference was statistically significant (p=0.001). **Conclusions:** It was concluded in this study that female and partially edentulous arches had more numbers of rugae as compared to males and completely edentulous arches respectively.

INTRODUCTION

Conventional complete denture depends on soft and hard tissue for support. Rugae in anterior part of the maxillary hard palate have been of great significance for support purposes of prosthesis, resisting or limiting denture displacement anteriorly and identifying person's identification. Establishing a person's identity is necessary for personal, legal, criminal and social reasons. Identification of individuals in postmortem cases, from orofacial structures has been considered as economical alternatives to DNA profiling, fingerprints and other time consuming and expensive procedures. Amongst these maxillary palatal rugae has been used since very long in cases of mutilated individuals who are edentulous and sustaining disfigurement injuries. This advantage is mainly due to its concealed location and protection provided by tongue, teeth, lips and other soft and hard tissues [1]. Apart from this, rugae have been considered important for the support purposes of removable complete dentures in completely edentulous patients. This kind of secondary support supplements the support provided by hard palate and maxillary tuberosity on either side of the arch. Rugae also provide a guide to the placement of anterior margin and border allocation of major connectors for cast removable partial dentures. Rugoscopy, the study of palatal rugae pattern, reveals many important aspects of rugae. Rugae, present along each side of the mid-palatine raphae and behind the incisive papilla, are transverse irregular folds of connective tissue with thickened epithelium, which vary in symmetry, size, shape and number hence they are valuable landmarks for assessment

DOI: https://doi.org/10.54393/pjhs.v3i05.240

of orthodontic tooth movement and for the identification of sub-mucosal clefts. They also are substantial for prosthesis support, taste perception and accommodating patients having speech problems to their new prosthesis. A study carried out by Sharif et al., on certain group of people regarding rugae shape, direction and unification revealed curved shaped rugae as the most frequent pattern [2]. Similarly, a study carried out in Turkish subpopulation wavy type was the most common (44.2%) rugae shape and most common alignment was horizontal [3]. Assessing predominant rugae pattern and their variation amongst five different linguistic populations, a local study showed wavy as a predominant pattern, followed by straight, while curved was most common amongst Punjabi and Pushto speaking groups, wavy followed by curved and straight was common among Sindhi and Urdu speaking groups [4]. There is general consensus on the stability of rugae pattern throughout life of an individual, never the less, under certain circumstances changes may be anticipated for example underneath partial/ complete dentures and during orthodontics treatments [5, 6]. Different authors from different regions have observed variations of palatal rugae in different ethnic population. The present study aimed to analyze the pattern and distribution of the rugae, and to analyze and compare the predominant rugae pattern among males and females. This study further aimed at comparison of rugae pattern in terms of number, size, shape and symmetry in partially edentulous and completely edentulous subjects of either gender. The study will be valuable in terms of understanding the nature of rugae serving for the support and indirect retention for different types of teeth replacement prostheses.

METHODS

This cross sectional study was conducted in outpatient department of prosthodontics, Peshawar Dental College and Hospital, Peshawar. The study was carried out from January to June, 2022; after obtaining the ethical approval certificate from Institutional Review Board. A total of 200 patients including males and females, with an age ranging from 25 years to 75 years and fulfilling the exclusion and inclusion criteria, were selected. The sample size was based on 85% prevalence of straight rugae pattern, having a 95% confidence interval and a 5% margin of error. All participants were selected through convenient sampling technique and an informed verbal consent was sought before recruiting them into the study. The type and nature of the study was explained to them in a simple local language. Inclusion criteria included partially edentulous and completely edentulous patients seeking treatment for their missing teeth. Partially edentulous patients were those who had one or more than one tooth, but not all teeth, missing. Edentulous patients were having no teeth in either arch and irrespective of wearing or using any complete dentures. Subjects with cleft left and palate and having a history of facial trauma/ surgery were excluded. In both cases an impression of oral cavity was obtained with an Alginate impression material (Happy Buy, China) in a stock tray by the author MSK. After taking disinfection protocol for the impression, these impressions were poured with dental hard plaster type-II (Kopo Hard, CKH-52, China). Care was exercised at each step to avoid damage to the cast. Details of patient related information were recorded on each cast. Casts were examined under a good source of light. Rugae were outlined using graphite pencil and recorded. Rugae were counted on both right and left side of arch on cast. Shape of rugae was classified into four major types. Straight rugae were those running directly from their origin to insertion. Circular rugae which have definite continuous ring, Curved Rugae, which have simple crescent shape which curve gently. Wavy rugae were serpentine in nature. Frequency of each shape of rugae was counted and then tabulated for both right & left side of partially edentulous & completely edentulous casts. Unification occurs when two rugae were joined at their origin or insertion.Convergent rugae began as two separate rugae from their origin and joined at lateral portion. Divergent rugae began as single rugae at origin and diverge laterally. After identification number of converging and diverging rugae was then counted for both right and left sides of the arch. Length of each rugae was measured from origin to insertion using divider and millimeter ruler. For wavy rugae, total length was first divided into segments at highest point of crest and lowest point of trough. Measurements for individual segment was recorded and added to get the total length. For curved rugae three points were marked at origin, deepest point of curve and at termination. Length between these points was measured and then added to get the total length. After determining the length of all the rugae two categories were formed namely primary rugae having a length of more than 5mm and secondary rugae with a length of 3-5mm. Descriptive statistics were calculated for all valuable measurements. Chi-Sq test was used for comparison between partially edentulous and completely edentulous groups. Percentages of all the remaining qualitative records were tabulated. Data were analyzed using statistical package for social sciences (SPSS) version 22.

RESULTS

This study assessed the rugae in partially edentulous and completely edentulous patients of either gender on dental casts. The rugae were examined in terms of shape, size, location and length. Age of participants ranged from 25 to75 years with a mean of 52.6 years and a standard deviation of 11.3 years. A total of 200 dental casts were

DOI: https://doi.org/10.54393/pjhs.v3i05.240

examined by a single author and the data was calculated and tabulated. Out of a total of 200 casts, 89 (45%) were male, while 111 (55%) were female (ratio of 0.80). Cast of male participants were having partially edentulous (25%) and completely edentulous casts (24%), while out of female participants 26% were partially edentulous and 51(25%) completely edentulous (Table 1).

Gender	Male		Female
	89(45%)		111(55%)
Edentulous casts	Partially	49(25%)	53(26%)
	Completely	47(24%)	51(25%)
Age (yr)	Maximum72	Minimum28	Mean ± SD (52.6 ± 11.33)

Table 1: Gender, Type of casts and Age of patients (SD= Standard Deviation)

Numbers of rugae in male and female participants are shown in Table 2. It also show distribution on right and left side, right side (n=726) being more in number than left side (n=641). Similarly primary rugae (n=1132) are more when compared to secondary rugae (n=235). The results are statistically insignificant.

Gender	Number of Rugae				Length of Rugae					
					Primary >5mm			Secondary (3-5mm)		
	Right	Left	Total	p-value	Right	Left	Total	Right	Left	Total
Male	357	237	594	.516	311	195	506	46	42	88
Female	369	404	773	.513	313	313	626	84	63	147
Total	726	641	1367		624	508	1132	130	105	235

Table 2: Number and Length of rugae in male and female patients

Distribution of rugae in partially and completely edentulous arches is given in table 3. It is shown in the table that partially edentulous patients were having slightly more number of rugae (56%) when compared to completely edentulous rugae (44%).

Patients	Right n (%)	Left n (%)	Total n (%)
Partially edentulous	403 (29%)	374 (27%)	777 (56%)
Completely Edentulous	335 (25%)	255 (19%)	590 (44%)
Total	738 (54%)	629 (46%)	1367 (100%)

Table 3: Number of Rugae in partially edentulous and completely edentulous patients

Frequency of different shapes of rugae in both males and females is given in table 4. Numbers of different shapes of rugae such as wavy, curved and straight were analyzed in both male and female casts on both right and left side. The distribution is quite variable; however, female patients were having more rugae when compared to male.

Dental Casts	Diverging		Wavy		Curved		Straight	
	Right	Left	Right	Left	Right	Left	Right	Left
Male	55	67	82	79	84	82	75	70
Female	49	73	130	119	112	125	90	75
Total	244		410		403		310	

Table 4: Frequency of different shape of rugae in dental casts of male and female participants

DISCUSSION

In a completely edentulous state importance of rugae is increased for support purposes of complete denture. This is because complete denture is totally dependent on soft and hard tissue for its retention, support and stability like important attributes for its success. Apart from this rugae also contribute to taste perception, identification of texture of food. It can be used as indirect retention in free end saddle situations especially Kennedy Class II partially edentulous cases. Palatal rugae, being unique to an individual, are considered as the important source of forensic identification [7]. Various methods have been documented in different studies for analysis of palatal rugae patterns such as intraoral inspection, digital photography, stereoscopy and stereo-photogrammetry. Though, intraoral study of the palatal rugae is the most common method used universally, however, study of the dental casts obtained through impressions can be more accurate and have an advantage of preservation of the record for longer period of time [8]. In the present study, dental casts were used for their cost effectiveness along with their easy handling, readily availability and can be stored for future use. Moreover study of dental casts need less training on behalf of the examiner while recording different details of the various parameters of palatal rugae. However, the chances of abrasion and damage to the cast must be kept to minimum level in order not to lose fine details of the rugae [9]. A significant numbers of research papers have observed variation in size, numbers and shapes of palatal rugae. These aspects and characteristics of rugae have great variations in terms of ethnic, racial and sometimes intraoral considerations. Very few studies have observed and studied the number of rugae in partially edentulous and completely edentulous individuals. The role of rugae for complete denture support is well documented in literature and cannot be overlooked. The most relevant importance is in terms of vertical support for complete dentures, hence it can be assumed that more are the number and size of these rugae, denture support will be more enhanced in such cases and vice versa. Our study observed, compared and found that a difference was observed in rugae number among partially edentulous and completely edentulous casts with reduction observed in completely edentulous casts. Our finding is in agreement with the conclusions drawn by other studies done earlier by Jawad and Bhatt, where they have a similar finding [9-11]. Similarly changes in the pattern of rugae have been observed by researchers in partially edentulous and completely edentulous individuals. For instance complexity of rugae pattern tends to decrease in completely edentulous cases when compared with partially edentulous cases [12]. Distribution of rugae has been found to be different on right and left side of the same arch. This has been observed in many previous studies [13-15]. Our finding is similar to these studies. It was found in

DOI: https://doi.org/10.54393/pjhs.v3i05.240

our study that more number of rugae was present on right side of the arch as compared to the left side. This finding is consistent for both in gender (male/female) and status of edentulism (partially/ completely). The distribution of rugae across the midline of the palate though has been insignificant, never the less, the difference is noticeable. The number, length and shapes of rugae vary in different patients and gender type. Depending on the length, primary and secondary rugae has been found to be variable among partially edentulous and completely edentulous subjects, as observed in various studies carried out earlier. In a large number of studies number of rugae are found to be more in dentate as compared to edentate subjects, however, our study found more rugae in partially edentulous arches as compared to completely edentulous patients [11-13]. Rugae have a vast variety of shapes. Straight, wavy, curved, circular, divergent, convergent, perpendiculars, forward and backward are a few to mention. Again the shape may vary in males, females, partially edentulous and completely edentulous individuals. Our study observed more differences in distribution of wavy and straight rugae in partially edentulous and completely edentulous casts. Analysis of rugae shapes revealed that wavy type of rugae were more commonly (n=410) found in this study, this finding being in line with a study done by Abeer et al., while another study of such a kind found curved to be more in frequency when compared to our study [14, 15]. The difference might be due to the sample size and ethnic differences. In this study the total number of rugae was slightly higher in female, however, the nature of completely edentulous status is different than partially edentulous cases. This finding is similar to the observations of other studies [16-18]. However, our finding is not in line with the result of the study conducted by Saraf et al., which may be due to variation in sample size [19]. Results of another study also found that female has more numbers of rugae than males and this match our result in this regard [20].

CONCLUSIONS

Within the limitation of the present study it was concluded that no significant difference was found in relation to number and shapes of rugae on both right and left side in males and females, however, females had more rugae than males. Primary rugae were more in numbers as compared to secondary rugae, similarly completely edentulous patients had a slight less number of rugae when compared to partially edentulous arches. Our study did not focus on the ethnicity of the patients, this being limitation of our study can be explored in another study of this kind.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Gadicherla P, Saini D, Bhaskar M. Palatal rugae pattern: An aid for sex identification. Journal of Forensic Dental Sciences. 2017 Apr; 9(1):48. doi: 10.4103/jfo.jfds_108_15.

[2] Sherif AF, Hashim AA, Al Hanafy MA, Soliman EM. A pilot-cross sectional study of palatal rugae shape and direction among Egyptians and Malaysians. Egyptian Journal of Forensic Sciences. 2018 Dec; 8(1):1-9. doi: 10.1186/s41935-018-0050-1

[3] Buyuk SK, Simsek H, Yasa Y, Genc E, Turken R. Morphological assessment of palatal rugae pattern in a Turkish subpopulation. Australian Journal of Forensic Sciences. 2019 Jan; 51(1):40-8. doi: 10.1080/00450618.2017.1310922

[4] Gardezi S, Hassan N, Memon S, Mughal A. Rugoscopy In Five Different Ethnic Groups Of Pakistani Population. Pakistan Journal of Medicine and Dentistry. 2018 Feb; 7(1):11-4.

[5] Rajan VP, John JB, Stalin A, Priya G, Abuthagir AK. Morphology of palatal rugae patterns among 5-15 years old children. Journal of Pharmacy and Bioallied Sciences. 2013 Jun; 5(Suppl 1):S43-7. doi: 10.4103/0975-7406.113295

[6] Caldas IM, Magalhães T, Afonso A. Establishing identity using cheiloscopy and palatoscopy. Forensic Science International. 2007 Jan; 165(1):1-9. doi: 10.1016/j.forsciint.2006.04.010

[7] Almeida MA, Phillips C, Kula K, Tulloch C. Stability of the palatal rugae as landmarks for analysis of dental casts. Angle Orthodontist. 1995; 65(1):43-8

[8] Utsuno H, Kanoh T, Tadokoro O, Inoue K. Preliminary study of post mortem identification using lip prints. Forensic Science International. 2005 May; 149(2-3):129-32. doi: 10.1016/j.forsciint.2004.05.013

[9] Jawad IA. Comparison of rugae pattern between dentate and edentulous patients in Iraqi sample. Al-Rafidain Dental Journal. 2010 Sep; 10(2):265-71. doi: 10.33899/rden.2010.9019

[10] Rajguru JP, Misra SR, Somayaji NS, Masthan KM, Babu AN, Mohanty N. A comparative rugoscopic study of the dentate and edentulous individuals in the South Indian population. The Scientific World Journal. 2014 Jan; 2014. doi: 10.1155/2014/283428

[11] Bhatt G. Comparison of Rugae Pattern between Dentulous and Edentulous Population of Rajasthan State. Journal of Forensic Research. 2015 Jan; 6(1):1-3.

DOI: https://doi.org/10.54393/pjhs.v3i05.240

[12] Faisal MF and Yousif FT. Rugae pattern in a Saudi population sample of males and females.
[13] Syed S, Alshahrani I, Alshahrani A, Togoo RA, Luqman M, Dawasaz AA. Conversion of palatal rugae pattern to scanable Quick Response code in an Arabian population. Journal of Dental Sciences. 2016 Sep; 11(3):253-260. doi: 10.1016/j.jds.2016.02.004
[14] Abdellatif AM, Awad SM, Hammad SM. Comparative study of palatal rugae shape in two samples of Egyptian and Saudi children. Pediatric dental journal. 2011 Jan; 21(2):123-8. doi: 10.1016/S0917-2394(11)70238-5
[15] Chong JA, Mohamed AM, Pau A. Morphological patterns of the palatal rugae: A review. Journal of oral biosciences. 2020 Sep; 62(3):249-59.
[16] Naeem S, Zakir A, Manzoor M, Akram A, Khan M, Arshad F. Comparison of topographic changes of palatal rugae pattern in dentate and edentulous patients. Isra Medical Journal. 2021; 13(4): 265-269.
[17] Bharath ST, Kumar GR, Dhanapal R, Saraswathi T. Sex determination by discriminant function analysis of palatal rugae from a population of coastal Andhra. Journal of Forensic Dental Sciences. 2011 Jul; 3(2):58-62. doi: 10.4103/0975-1475.92144
[18] Surekha R, Anila K, Reddy VS, Hunasgi S, Ravikumar S, Ramesh N. Assessment of palatal rugae patterns in Manipuri and Kerala population. Journal of Forensic Dental Sciences. 2012 Jul; 4(2):93-6. doi: 10.4103/0975-1475.109896
[19] Saraf A, Bedia S, Indurkar A, Degwekar S, Bhowate R. Rugae patterns as an adjunct to sex differentiation in forensic identification. Journal of Forensic Odonto-stomatology. 2011 Jul; 29(1):14-9.
[20] Pramanik A, Debnath M, Debnath M. A comparative study of gender difference in palatal rugae patterns among Bengali subjects in Murshidabad. International Journal of Anatomy Radiology and Surgery. 2019; 8:6-10.

DOI: https://doi.org/10.54393/pjhs.v3i05.161

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Factors Influencing Malnutrition among Under 5 Year Children of District Gwadar: A Cross-Sectional Community Based Study

Mujahid Hussain[1], Muhammad Ans[2], Sara Shahid[3], Asima Bibi[4] and Muhammad Sultan[1]

[1]Pakistan Institute of Development Economics, Islamabad, Pakistan
[2]Department of Pharmacy, Punjab University, Lahore, Pakistan
[3]Lahore Pharmacy College, Lahore Medical & Dental College, Lahore, Pakistan
[4]Department of Pharmacy, Quaid e Azam University, Islamabad, Pakistan

ARTICLE INFO

Key Words:
Malnutrition, SAM, MAM

How to Cite:
Hussain, M. ., Ans, M. ., Shahid, S. ., Bibi , A., & Sultan, M. . (2022). Factors Influencing Malnutrition Among Under 5 Year Children of District Gwadar, A Cross-Sectional Community Based Study: Factors Influencing Malnutrition among Under 5 Year Children. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.161

***Corresponding Author:**
Mujahid Hussain
Pakistan Institute of Development Economics, Islamabad, Pakistan
hussainmujahid777@gmail.com

Received Date: 24th September, 2022
Acceptance Date: 6th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Malnutrition is one of the major causes in low and middle-income families' children's deaths under the age of 5 years. Nine times as many children with severe acute malnutrition (SAM) will pass away than healthy youngsters. In Pakistan, 17.7% of children under five are wasted, and 4 out of 10 infants under five are stunted. With almost 1/3 children (28.9%) underweight, the double burden of malnutrition is increasing. **Objectives:** To assess and identify the factors influencing malnutrition among under five years children of district Gwadar. **Methods:** A community-based cross-sectional research was carried out in randomly chosen clusters in several union councils in the Pakistani district of Gwadar. Mothers and other caregivers of children under five were interviewed as part of the house-to-house survey, using a practical sample approach. **Results:** The children age mean was 11.56 ± 12.4 months and the mean age of mothers was 27.29 ± 6.31 years. Overall stunting prevalence of severe acute malnutrition (SAM) cases was 21.2% and moderate acute malnutrition (MAM) cases were 46.2%. **Conclusions:** According to the study's results, under the age of five the malnutrition was widespread. The three types of nutritional outcomes were all strongly correlated with household income. Particularly in Baluchistan's underdeveloped regions, more labor and studies are needed.

INTRODUCTION

Malnutrition, according to the WHO, is defined as deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients [1]. Malnutrition causes a variety of health problems. Malnourishment, also known as stunting (low height for age), wasting (low weight for height), and underweight (low weight for age), is one (a lack of important vitamins and minerals). The second is non-communicable diseases linked to nutrition, obesity, and overweight (including cancer, diabetes, heart disease, and stroke) [2]. Growth is a physiological characteristic of infancy, and the interplay of genes throughout development and adolescence. Even though the growth indicator only includes one measurement, it may provide a quick snapshot of the child's nutritional health. The child's development is eventually impacted by changes to this indicator. The underlying causes of undernutrition in children aged 6 to 59 months were described in this research. According to the author, all socioeconomic, demographic, and environmental factors are related to children's development [3]. There are 14.3 million highly lost adults, 47 million lost children under the age of five, and 38.3 million overweight or obese people in the world. Malnourishment is responsible for about 45% of deaths among children under five. Most of these take place in low- and middle-income nations. Teen obesity and overweight are becoming more common in these same nations [4].

DOI: https://doi.org/10.54393/pjhs.v3i05.161

The majority of chronic illnesses, including diarrhea, are most common in children and account for two-thirds of all under-five fatalities in Pakistan each year. Pathogens that are present in food or water may induce diarrhea. Pakistan's inadequate food, water, and sanitation conditions lead to community-level behavioral changes, which need intervention to lower the risk of morbidity and mortality in children under the age of five [5]. According to Pakistan's National Nutrition Survey 2018 (NNS 2018), four out of every ten children under the age of five have stunted growth, and 17.7% are withering away. 28.9% of children (one in three) are underweight. Malnutrition is bearing a double load, which is becoming more and more obvious [6]. A potentially fatal loop of worse sickness and worsening undernutrition status may be caused by both undernutrition and infection. A child's development may be slowed due to poor nutrition in the first 1000 days of life, which is linked to cognitive impairment and worse performance in school and the workplace [7]. One-third of all child fatalities worldwide are caused by malnutrition. One of the main causes of mortality in infants aged between six and 59 months is improper feeding practices. Low food intake and food with poor nutritional content are the primary contributors to undernutrition in Pakistan. The frequency of child mortality has increased as a result of sociocultural influences, more males than girls nurse, gender hierarchy, and traditional techniques of treating undernutrition. Additionally, this study discussed the immediate determinants of stunting, such as fertility, low birth weight, dietary diversity, and diarrhea, which have serious effects on children's health. These immediate determinants include open defecation, sanitation, access to water sources, antennal visits, vaccination coverage, breastfeeding practices, complementary feeding practices, and food security [7]. A lack of calories, carbs, proteins, fats, essential vitamins, minerals, and other micronutrients (iron, vitamin-A, zinc, folic acid, iodine, and vitamin-D) that are crucial for a child's early growth may result in malnutrition [8]. Children of all ages may suffer from malnutrition, but young children are the most susceptible. The greatest serious hazard to global public health is malnutrition. Malnutrition is thought to be the primary factor in 3.1 million child deaths each year and to be the source of long-term harm for millions of other children. Children who are malnourished are more susceptible to serious illness. A child's physical and cognitive capacities may be permanently damaged by chronic malnutrition and stunting if they have not gotten appropriate nourishment, care, or are living in unclean conditions [9]. Young children continue to experience high levels of chronic malnutrition worldwide. Poverty and other relevant factors including mothers' mental health and their own health-seeking behaviors are intimately linked to this illness (such as physical exercise, sleep, and food) [10]. Maternal malnutrition may start the process of linear growth faltering in utero, which can result to intrauterine growth restriction and low birth weight. Inadequate feeding habits used during infancy along with a high frequency of infectious diseases are other factors that indicate poor child development. Linear growth restriction, a demonstrable physical indicator of persistent childhood malnutrition, is defined as a height-for-age z score (HAZ) 2 SDs underneath the average. According to reports, 17% of deaths in children under the age of five are related to stunting. Compared to children with HAZ > -1, children with HAZ between -2 and -3 had a 118% (HR:2.18) and 138% (HR:2.38) higher risk of dying from pneumonia or diarrhea, accordingly [11, 12].

METHODS

The study design was cross sectional community-based study. Pakistan's Baluchistan province's district Gwadar was where the research was done. According to NNS 2018, the prevalence of malnutrition in Baluchistan was 31% underweight, 18.9% wasted, and 46.6% stunted among children under the age of five relative to the provincial level. Regarding the variables impacting under-five malnutrition in district Gwadar, there were no substantial statistics available. According to the 2017 census, district Gwadar has a total area of 12637 square kilometers and a population of 263514, of whom 53.8% are men and 46.2% are women. 38.7% of people live in rural areas, compared to 61.3% who live in cities. Data were collected from children under five and their primary care givers or parents through specifically designed questionnaire. Study population was children under-five year of district Gwadar. Convenient sampling technique was used in this study, permission from municipal corporations of district and tehsil Gwadar were taken from district EPI coordinator of Gwadar. Household provided consent was included in sample of the study after following inclusion criteria. A training session was held where concerned female health workers from randomly selected union councils and municipal corporations of district and tehsil of Gwadar were trained about child's weight and anthropometric measurements and questionnaire after receiving written ethical permission and approval from district health officer and nutritional officer of district Gwadar. They received the stationery, blank questionnaires, and transportation to the location of the data collecting. Through the use of semi-structured questionnaires, data were gathered. Each and all child's anthropometric measurements were taken; they were weighed automatically by a weighing machine, measured for length by an infant meter for children under 2 years old and for the previous 24 hours' worth of food and

DOI: https://doi.org/10.54393/pjhs.v3i05.161

meals by parents or the primary caregiver using a semi-structured questionnaire that was adapted from a WHO and UNICEF instrument for primary caregiver/pare questions. Data were analyzed by using SPSS 23 version.

RESULTS

Table 1 lists the sociodemographic characteristics of the sample's under-five-year-old children. The educational level of the parents was quite low, and 86% of the moms had no formal schooling. We gathered data from 480 kids, 51% of whom were boys and 49% of whom were girls. Of them, 52% were infants under the age of two, and 48% of the children were between the ages of 2 and 5. The study's prevalence of stunting was 21.2%, and it was shown that males were somewhat more likely than girls to be stunted.

N		Stunted		Mean Z Score (SD)
		<- 2 z score	<- 3 z score	
All children	480	46.2 (44.1-49.2)	21.2 (20.5-23.2)	-1.72 (1.53)
Sex				
Boys	245	50.2 (44.4-53.4)	25.4 (22.5-26.3)	-1.87 (1.54)
Girls	235	43.1 (44.2-46.8)	21.2 (21.4-23.2)	-1.76 (1.50)

Table 1: Prevalence of Stunting according to Gender

In this study, the prevalence of wasting was 16.5%. There was no discernible difference in loss between males and girls. Research found that loss rose with age, peaking at 20.8% in infants between the ages of 24 and 35 months. 38.5% of children under the age of five were overweight overall. The frequency of underweight was the same for both sexes. According to the study, prevalence rises with age, peaking at 45% among children between 24 and 35 months of age before falling to 35% among those between 48 and 59 months (Table 2).

	N	Stunted		Mean Z Score (SD)
		<- 2 z score	<- 3 z score	
Age group	480			
0-5 months	27	5.6 (4.4 -6.3)	4.4 (3.4 – 5.1)	-0.87 (1.53)
6-11 months	52	10.8 (31.0 – 35.8)	9.6 (8.2 -10.3)	-0.99 (1.55)
12-23 months	75	15.6 (52.3 -62.3)	14.6 (13.4-16.2)	-2.14 (1.3)
24-35 months	140	29.1(21.5 – 32.7)	21.4 (20.0 – 25.2)	-2.21 (1.33)
36-47 months	125	26.0 (25.4 – 34.1)	17.7 (15.0 -22.2)	-2.31 (1.32)
48-59 months	61	12.7 (11.3 – 14.2)	11.0 (10.8 – 16.1)	-1.77 (1.2)

Table 2: Stunting as per age bracket

The table 3 lists the underweight prevalence and gender of the sample's under-five-year-old children. The underweight level of the children was quite moderate 39.1%. In boys this is 37.2% and in girls 36.0%. The mean of all children is -1.62 and Z score is 1.33. The mean of boys is -1.87 and z score is 1.31 the mean of girls is -1.66 and z score is 1.30. The study's prevalence of stunting was 39.1%, and it was shown that males were somewhat more likely than girls to be stunted.

N		Underweight		Mean Z Score (SD)
		<- 2 z score	<- 3 z score	
All children	480	39.1 (38.1 – 42.2)	14.5 (13.0 – 16.4)	-1.62 (1.33)
Sex				
Boys	245	37.2 (35.6 – 40.3)	14.0 (13.2 – 16.0)	-1.87 (1.31)
Girls	235	36.0 (35.8- 41.1)	13.2 (12.0 – 15.7)	-1.66 (1.30)

Table 3: Underweight Prevalence and Gender of children under five

The research that was presented examined the rates of underweight, stunting, and wasting by economic position. According to a study, children from impoverished families were more likely to have stunting, underweight, and wasting than those from the richest homes. 40% more children in poorer homes had stunted growth than those in the richest ones. Children who live in low-income homes (20%) have a higher risk of being wasted. In this research region, 43% of the poorest families had underweight children, whereas 26.4% of the richest households had underweight children. Stunting, wasting, and underweight were factors that were provided in a table, however factors like educational level, parity, and family size were not linked to any of these conditions. On the other hand, malnutrition was substantially correlated with the gender of the kid, age, and socioeconomic position. Diarrhea in children has been linked to underweight. The P-value for stunting in boys was much larger than in girls and displays 0.0001, however the results for wasting and underweight are not statistically significant (Table 4).

Variables	Stunting		Wasting	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age				
6 – 11 months	1.91 (1.41 – 2.50)	<0.0001	1.22 (1.1 – 1.45)	0.031
12 -23m	4.88 (3.87 – 6.30)	<0.0001	+01.44 (1.03 – 01.84)	0.033
24 – 35m	05.44 (04.41 – 07.10)	<0.0001	+01.77 (1.43 – 02.50)	0.034
36 -47m	06.80 (05.12 – 09.10)	<0.0001	+01.31 (0.91-0 1.67)	0.000
48-59m	02.99 (02.20 – 04.10)	<0.0001	+01.21 (0.77- 01.87)	0.141
Variables	**Underweight**		**All three outcomes**	
	OR (95% CI)	**P-value**	**OR (95% CI)**	**P-value**
Age				
6 – 11 months	1.40 (1.09- 1.81)	0.261	3.29 (1.03 -3.55)	<0.0001
12 -23m	+02.66 (2.09 – 03.43)	<0.0001	+03.16 (1.66-05.45)	<0.0001
24 – 35m	+04.20 (3.33 – 05.44)	<0.0001	+04.34 (2.66-07.44)	<0.0001
36 -47m	+04.17 (3.13-0 5.44)	<0.0001	+03.41 (2.23-06.88)	<0.0001
48-59m	+02.52 (1.87-03.45)	<0.0001	+02.46 (1.09- 03.86)	+0.029

Table 4: Association of Age and Malnutrition

DISUCSSION

The goal of this research project was to better the nutritional condition of children under the age of five by offering practical solutions to this problem. The study's results showed that malnutrition was pervasive among children under five in the area of Gwadar and had not improved during the previous two decades. This research offers important details on variables impacting malnutrition, including as socioeconomic status, feeding

DOI: https://doi.org/10.54393/pjhs.v3i05.161

habits, parenting styles, and parental education and knowledge [13]. According to World Health Organization standards, the prevalence of stunting in SAM cases was 21.2%, in MAM cases it was 46.2%, and it affects 50.2% of boys and 43.1% of girls. These findings may be compared to national findings published in PDHS 2012–2013 and to a meta-analysis for the study of Sub-Saharan Africa [14]. The sharp rise in children's stunting between the ages of 12-35 months in the study region calls for serious concern and the chance to learn more about the prevalence of stunting at this age range. According to this research, children in this age group have a greater risk of being stunted, wasted, and underweight, and their socioeconomic position has an impact as well. Children's malnutrition is greatly impacted by poor socioeconomic conditions, according to research from the African area [15]. It is crucial to keep in mind that there is no direct correlation between influencing variables and child development outcomes, according to the research of this study. Due to the absence of nutrition-specific variables and the lack of variance in the metrics characterizing the primary drivers of infant development, this research is expected to fall short [16]. The prevalence of diarrhea has been linked to childhood stunting; it may not directly impede a child's development, but it does point to inflammation and intestinal abnormalities. According to recent research, children who had enteric infections were more likely to develop enteric inflammation. This conclusion was supported by studies on the causes, risk factors, and consequences of enteric infection and malnutrition on children [17]. To combat undernutrition among children aged 6-59 months in Pakistan, particular focus must be paid to raising birth size and birth spacing. The majority of households in the Gwadar area are determined to be low socioeconomic level or in poverty. Additionally, due to the district's socioeconomic position, vaccination coverage and supplementing conditions are subpar. For example, in our society, women are often overlooked by poorer people and are the last to eat in the household, which compromises their nutritional health [18]. Given that the majority of women in our study area were illiterate, research studies had found that lack of maternal formal education was one of the causes of childhood malnutrition. We also found that maternal education had a limited impact on inter-household variations in nutrition, and these findings were compared to those of other studies [19]. In our research, food insecurity was also linked to wasting but not to stunting and underweight. Several other nations, including Bangladesh, Ethiopia, and Vietnam, have reported more cases of food insecurity [20].

CONCLUSIONS

The results of this research showed that malnutrition was widespread among children under the age of five. The three types of nutritional outcomes were all strongly correlated with household income. Particularly in Baluchistan's underdeveloped regions, more labor and study are needed. For the improvement of Baluchistan's nutritional condition, more research should be conducted.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Peixoto Paes-Silva R, Correia de Macedo ÉM, Oliveira Tomiya MT, Machado Barbosa de Castro CM. Immune Response of Severe Malnutrition Children Treated According to the Protocol of The World Health Organization. Nutrition Hospital. 2015 Aug; 32(2):638-44. doi: 10.3305/nh.2015.32.2.9048

[2] Debika S and Kumari S. A Cross Sectional Study to Determine the Prevalence of Obesity and Its Perceived Health Problems among Adult Women who are Residing in Gautambudha Nagar, UP.

[3] Ibrahim S. Anthropometric patterns and correlates of growth attainment in under-five Pakistani children. The Pakistan Development Review. 1999 Jul:131-52.

[4] Hassan B, Ahmed R, Li B, Noor A, Hassan ZU. A comprehensive study capturing vision loss burden in Pakistan (1990-2025): Findings from the Global Burden of Disease (GBD) 2017 study. PLoS One. 2019 May; 14(5):e0216492. doi: 10.1371/journal.pone.0216492

[5] Arif A and Naheed R. Socio-economic determinants of diarrhoea morbidity in Pakistan. Academic Research International. 2012 Jan; 2(1):490.

[6] Habib MA, Raynes-Greenow C, Soofi SB, Ali N, Nausheen S, Ahmed I, et al. Prevalence and determinants of iron deficiency anemia among non-pregnant women of reproductive age in Pakistan. Asian Pacific Journal of Clinical Nutrition. 2018; 27(1):195-203. doi: 10.6133/apjcn.042017.14

[7] Black RE, Victora CG, Walker SP, Bhutta ZA, Christian P, de Onis M, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet. 2013 Aug; 382(9890):427-451. doi: 10.1016/S0140-6736(13)60937-X

[8] Vaivada T, Akseer N, Akseer S, Somaskandan A, Stefopulos M, Bhutta ZA. Stunting in childhood: an overview of global burden, trends, determinants, and drivers of decline. The American Journal of Clinical Nutrition. 2020 Sep; 112(Suppl 2):777S-791S. doi: 10.1093/ajcn/nqaa159

DOI: https://doi.org/10.54393/pjhs.v3i05.161

[9] Jonah CMP, Sambu WC, May JD. A comparative analysis of socioeconomic inequities in stunting: a case of three middle-income African countries. Archives of Public Health. 2018 Dec; 76:77. doi: 10.1186/s13690-018-0320-2

[10] Pravana NK, Piryani S, Chaurasiya SP, Kawan R, Thapa RK, Shrestha S. Determinants of severe acute malnutrition among children under 5 years of age in Nepal: a community-based case-control study. BMJ Open. 2017 Aug; 7(8):e017084. doi: 10.1136/bmjopen-2017-017084

[11] Bhutta ZA, Nizami SQ, Isani Z. Zinc supplementation in malnourished children with persistent diarrhea in Pakistan. Pediatrics. 1999 Apr; 103(4):e42. doi: 10.1542/peds.103.4.e42

[12] World Health Organization. Department of Child, Adolescent Health, UNICEF. Management of the child with a serious infection or severe malnutrition: guidelines for care at the first-referral level in developing countries. World Health Organization; 2000.

[13] Planning Commission. Planning and Development Division, Government of Pakistan. National Nutrition Survey. 2011.

[14] Wamani H, Astrøm AN, Peterson S, Tumwine JK, Tylleskär T. Boys are more stunted than girls in sub-Saharan Africa: a meta-analysis of 16 demographic and health surveys. BMC Pediatrics. 2007 Apr; 7:17. doi: 10.1186/1471-2431-7-17

[15] Novignon J, Aboagye E, Agyemang OS, Aryeetey G. Socioeconomic-related inequalities in child malnutrition: evidence from the Ghana multiple indicator cluster survey. Health Economics Review. 2015 Dec; 5(1):34. doi: 10.1186/s13561-015-0072-4

[16] Headey D, Hoddinott J, Ali D, Tesfaye R, Dereje M. The other Asian enigma: explaining the rapid reduction of undernutrition in Bangladesh. World Development. 2015 Feb; 66:749-61. doi: 10.1016/j.worlddev.2014.09.022

[17] Kosek MN; MAL-ED Network Investigators. Causal Pathways from Enteropathogens to Environmental Enteropathy: Findings from the MAL-ED Birth Cohort Study. EBioMedicine. 2017 Apr; 18:109-117. doi: 10.1016/j.ebiom.2017.02.024

[18] Hong R. Effect of economic inequality on chronic childhood undernutrition in Ghana. Public Health Nutrition. 2007 Apr; 10(4):371-8. doi: 10.1017/S1368980007226035

[19] McDonald CM, McLean J, Kroeun H, Talukder A, Lynd LD, Green TJ. Household food insecurity and dietary diversity as correlates of maternal and child undernutrition in rural Cambodia. European Journal of Clinical Nutrition. 2015 Feb; 69(2):242-6. doi: 10.1038/ejcn.2014.161

[20] Ali D, Saha KK, Nguyen PH, Diressie MT, Ruel MT, Menon P, et al. Household food insecurity is associated with higher child undernutrition in Bangladesh, Ethiopia, and Vietnam, but the effect is not mediated by child dietary diversity. The Journal of Nutrition. 2013 Dec; 143(12):2015-21. doi: 10.3945/jn.113.175182

DOI: https://doi.org/10.54393/pjhs.v3i05.96

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Frequency of Abnormal Pap Smear Cytology in Women with Post-coital Bleeding

Saba Khan[1*], Varsha Bai[2], Memoona Rehman[1], Erum Majid[1], Geeta Dembra[3], Piria Dembra[1] and Khadija Bano[4]

[1]Jinnah Postgraduate Medical Centre, Karachi, Pakistan
[2]Aga Khan University Hospital, Karachi, Pakistan
[3]Sheikh Hamdan Bin Muhammad Talika Hospital, Khanpur, Ghotki, Pakistan
[4]Department of Obstetrics and Gynecology, Al-Tibri Hospital and Medical College, Karachi, Pakistan

ARTICLE INFO

Key Words:
cervical cancer, PAP smear, post-coital bleeding

How to Cite:
Khan, S. ., Bai, V. ., Rehman, M. ., Majid, E. ., Dembra, G. ., Dembra, P. ., & Bano, K. . (2022). Frequency of Abnormal Pap Smear Cytology in Women with Post-Coital Bleeding: Abnormal Pap Smear Cytology in Women with Post-Coital Bleeding. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.96

***Corresponding Author:**
Saba Khan
Jinnah Postgraduate Medical Centre, Karachi, Pakistan
sksabatanveer@gmail.com

Received Date: 8th September, 2022
Acceptance Date: 21st October, 2022
Published Date: 31st October, 2022

ABSTRACT

Risk of development of cervical carcinoma has been identified in patients with abnormal cytology on Pap smear. A long duration of prior to development of invasive cervical carcinoma is governed by a precancerous lesion. Consequently, screening and proper treatment reduces the overall risk of cervical carcinoma. **Objective:** Aim of study was to identify the frequency of abnormal cervical cytology detected by Papanicolaou smear in married child bearing female presenting with bleeding following coitus. **Methods:** A Descriptive, Cross-sectional study was carried from 15th November 2021 to 31st May 2022 in the Department of Obstetrics and Gynecology, Jinnah Post graduate Medical Centre, Karachi. A total of 218 females of reproductive age group (18-50 years) presenting with post-coital bleeding were included. Patients with previously histo pathological diagnosis, ablative or excisional treatment modalities of cervix and trauma to genital tract were excluded. All cases underwent Pap smear testing with standard technique by utilization of Ayre's spatula and were fixated with 95% ethanol on microscopic slides. Two specimens were prepared for each patient and were assessed for abnormalities. **Results:** Patients encountered were between 18 to 50 years with mean of 32.20 ± 7.80 years. Majority (139; 67.43%) of the patients were between 18 to 35 years. Mean parity was 3.53 ± 1.51. Mean BMI was 29.12 ± 2.37 kg/m2. Frequency of abnormal cervical cytology was found in 37(16.97%). **Conclusions:** This study concluded that Pap smear is an easy, effective and a cheap method for detecting women with cervical pathology.

INTRODUCTION

Tumors of female genital tract have different patterns of dispensation throughout the world with discrepancies based on ethnicity, geography and environment. As a result, their presentation may vary from place to place and they are responsible for ~10% of all malignancies diagnosed in females [1]. Globally cervical carcinomas (CC) are the second most prevalent tumors among women. They constitute 500,000 of the newly diagnosed cases and 250000 of deaths each year. More than two third of cases are encountered in third world countries, where they are found to be the main cause of female mortality secondary to malignancies [2]. More than 90% of females affected with CC have found to be infected with Human papillomavirus (HPV). However, this should not be inferenced that all women with HPV infections will develop cervical carcinoma [3]. Less important but other factors contributing to CC are smoking, poor immune response, birth control pills, early age for sexual activities and multiple partners [4]. Unlike many cancers, easy accessibility of cervix permits earlier diagnosis and prevention. Economical methods have aided in identification of abnormal cervical tissues before they advance to invasive cervical cancers [5]. United States and other developed countries reported dramatic reductions in both the incidence and mortality of female with CC following application of organized screening programs. This decline has been attributed to earlier diagnoses, easily obtainable treatment, reduction in parity and other factors

DOI: https://doi.org/10.54393/pjhs.v3i05.96

[6]. Developing countries when compared to United States and other developed regions still report a higher incidence of cervical carcinoma which is likely to the lack of screening with Papanicolaou (Pap) smears [3]. Papanicolaou smear detects cervical cancer in its early precancerous stage, as a consequence it can be treated effectively [3]. The Papanicolaou (Pap) test is a screening test that is carried out by obtaining cells from the uterine cervix. In 1943 George Papanicolaou introduced it as a tool for screening the cervix, which led to the test being credited to his name. It is quick, simple and painless [4-8]. In a study, abnormal Pap smear cytology was found in 56% women presenting with vaginal bleeding [9]. In another study, abnormal Pap smear cytology was found in 14.1% women [10]. Kolawole OM et al [11] has shown abnormal cervical cytology on PAP smear in 7.0% women. Duru CB et al [12] has shown the prevalence of abnormal PAP smear cytology in up to one fourth of women. Since the likely hood of developing cervical cancers in abnormal Pap smear females are high they should be subjected to appropriate triage and medical care to reduce the overall risk of developing CC [5]. Post-coital bleeding (PCB) is considered as one of the important indicators for the presence of invasive cervical carcinoma. On this account, these women should always be investigated. Pap smear remains an easy, effective and a cheap method for detecting cervical pathology. This conducted was study to identify the frequency of abnormal cervical cytology detected by papanicolaou smear in married females of reproductive age presenting with PCB in local population. Majority of our population does not consult the clinicians for post-coital bleeding due to some religious and social concerns which led to their late diagnosis and management of the issue. Cervical screening programs should be made a norm in our and other developing countries so that a potentially curable disease may not present in its later advanced stages. Majority of our population present in late stages of disease due to lack of screening programs, health care, awareness of the disease and the decreasing number of healthcare practitioners. This study will provide empirical evidence regarding this cervical cancer and emphasize on early detection and its management. Our aim was to determine the frequency of abnormal pap smears in females presenting with post coital bleeding.

METHODS

A descriptive, cross-sectional study was conducted in the Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical Centre, Karachi from 15th November 2021 to 30th May 2022. All women of age 20-50 years and parity 0-5 with post-coital bleeding of duration >7 days (defined as bleeding unrelated to menstruation that occurs during or after sexual intercourse assessed on history was taken as positive) were included in the study. Pregnant women, or women with previously histopathological diagnosis (assessed on history and medical record), or previous total hysterectomy, or previous ablative or excisional treatment modalities of cervix or trauma to genital tract (assessed on history) were excluded. Women full filling inclusion criteria were included in study after ethical approval from institutional review board written consent was obtained from all study participants. Pap smear was done by same consultant gynecologist and cytology results was noted for inflammation, LSIL and HSIL (as per-operational definition). Abnormal Pap smear was defined as all of Inflammatory: presence of nuclear enlargement, perinuclear halos and cytoplasmic vacuolization. Low grade squamous intraepithelial lesion(LSIL): 10-40% cells show abnormal changes in squamous cells (flat, scale-like cells) with nuclear atypia, increased mitotic figures and nuclear cytoplasmic ratio >1. High grade squamous intraepithelial lesion(HSIL): 50-60% cells show abnormal changes in squamous cells (flat, scale-like cells) with nuclear atypia, increased mitotic figures and nuclear cytoplasmic ratio >1. Data including demographic data (age, parity, BMI, place of living, duration of post-coital bleeding, menopausal status, family history of cervical cancer and abnormal PAP smear cytology i.e. inflammation, LSIL and HSIL) were recorded on a specially designed proforma. Sample size calculated with 95% confidence level for this study was 164 with a 3% margin error and anticipated percentage of 4% of HSIL on Pap smear in females presenting with PCB. SPSS version 20.0 was utilized for data entry and analysis. Age, parity, duration of post-coital bleeding and BMI were presented as mean and standard deviation. Place of living (rural/urban), menopausal status (pre-menopause/post-menopause), family history of cervical cancer (yes/no) and abnormal Pap smear cytology i.e. inflammation, LSIL and HSIL (yes/no) were presented as frequency and percentage.

RESULTS

Age, duration of post coital bleeding, parity, BMI, family history of cervical cancer, cervical cytology with respect to age and parity, duration of bleeding, menopausal status.

Stratification of abnormal cervical cytology with respect to family history cervical cancer is presented in table 1.

Variables	Frequency(%)
Age (in years)	Mean ± SD = 32.43 ± 7.89
20-35	110(67.1%)
36-50	54(32.9%)
Duration (days)	
≤14	108(65.9%)
>14	56(34.1%)

DOI: https://doi.org/10.54393/pjhs.v3i05.96

Parity	Mean ± SD = 3.55 ± 1.54
≤3	82(50%)
>3	82(50%)
BMI (kg/m2)	Mean ± SD = 29.12 ± 2.37 kg/m2
≤30	108(65.9%)
>30	56(34.1%)
Menopausal status	
Premenopausal	128(78.1%)
Post-menopausal	36(21.9%)
Family history of cervical cancer	35(21.3%)
Abnormal Pap smear	27(16.5%)

Table 1: Stratification of patients with abnormal smears (n 164)

DISCUSSION

Post coital bleeding is the pathognomonic feature of cervical cancer. Pretorius et al., in his case series reported 6 % from 81 females suffering from cervical cancer having PCB [13]. In another case series conducted in United States, 10% of the participants had post coital bleeding. However, in a smaller case series in the United Kingdom all females with CC under the age of 65 years had PCB as their predominant symptom [15]. Although there are many causes of postcoital bleeding, cervical cancer as a cause of postcoital bleeding is seen in only a few women. In a study, inflammatory smear on PAP was seen in 32.0% women with post-coital bleeding. LSIL was in 34.7% and was seen in 18.7% women [7]. In a study on 314 women with post-coital bleeding, invasive cervical carcinoma was found in 12, CC or vaginal cancers were seen in 10 and two had cancerous lesion within the endometrium. In the CC group, 8 lesions were clinically evident whereas four women had normal smears before being referred for further evaluation of post coital bleeding. Two out of these ten cases were diagnosed with the support of colposcopy. Around 0.6% of women who visited their gynecologist with complaint of PCB had invasive cancer of the cervix but a normal looking cervix and a normal smear. Cervical intraepithelial neoplasia was found in 54 women (17.0%) and 15 women (5%) had cervical polyps. In patient with significant pathology, 30 %(19/63) had a normal or an inflammatory cervical smear. Rosenthal et al., could not identify the reason of postcoital bleeding in 155 women (49%) [16]. A three-year retrospective study in Ajman, UAE from 2007 till 2010 comprised of 150,111 patients, only 602 (0.4%) women had a Pap smear test. The study had 50.1% resident Arabs and the rest comprised of women from other nationalities. It was observed that 73% of the total patients attending outpatient clinics had active complaints, whereas, 27% had no specific complaint and came for screening purpose only. Al Eyd et al., found 3.3% of his samples having abnormal epithelial cells. Atypical squamous cells of undetermined significance (ASCUS) were seen in 1.8%, LSIL in 1.2%, and HSIL were witnessed in 0.3%. The author reported none of his patients having squamous cell carcinoma [17]. In a study conducted in Tehran, the author reported only one (0.8%) patient having cervical cancer, three (2.4%) of his patients had CIN II and CIN III [18]. Shalini et al., in their study reported a prevalence rate of 5.5% for cervical cancers and a prevalence of 3.6% for CIN II and CIN III [19]. In literature, the incidence of abnormal cervical pathologies has been reported to range from 6.9% to 17% or even 19% [20-21]. Gupta M et al., in their study reported different variants of dysplastic cervical lesions in women presenting with post coital bleeding. They found mild dysplastic lesions in 14.6% and moderated to severe dysplasia in 10.7% cases [22]. Himanshi G et al., stated that 29% of females with PCB had chronic cervicitis and 8% had invasive cervical carcinoma in HPE in their study [23]. Another author found invasive cervical cancer in 5.5% of her study participants whereas Rosenthal AN et al., saw invasive cervical cancer in 4% of women presenting with post coital bleeding [16,24]. Abdelkrim et al., in his study presented a lower incident rate by two different authors [25]. One author stated that 1% of women with postcoital bleeding had CC, similarly Ashraf GT et al., described the presence of invasive cervical cancer among 1.8% of his participants presenting with postcoital bleeding [25]. In the four-year prospective study conducted by Altaf in Saudi Arabia, he reported abnormal Pap smear (cervical dysplasia) in 4.7% cases, which was higher when compared to that reported in literature being 1.6% [26]. A study was conducted in a tertiary care hospital in Kuwait for a duration of 13-years which was aimed to identify the incidence of squamous cells abnormalities. An increasing trend of LSIL and HSIL was identified among the younger women. It can therefore be concluded from the above result that screening programs will play a vital role in the prevention of disease in young Kuwaiti women [27]. Different prevalence's have been reported by different authors conducting studies in Saudi Arabia and Kuwait [28-31]. In a tertiary hospital in Kuwait it was reported as 4.3% [28], Jamal AA et al., reported a similar rate of 5% in a larger hospital in Saudi Arabia [29]. Variations in the prevalence rate were found in different regions of Saudi Arabia [30-31]. In the western region it was as low as 1.66% [30], while a higher rate was reported in the southwestern and eastern populations of Saudi Arabia being 7.9% and 4.5% respectively [31]. Pap smear is an easy, effective and a cheap method for detecting cervical cancer. Identified risk factors for CC include marriage at a younger age, women giving birth to more than one child, smoking and long use of oral contraceptive pills.

CONCLUSIONS

In conclusion, Pap smear is an easy, effective and a cheap

DOI: https://doi.org/10.54393/pjhs.v3i05.96

method for detecting women with cervical pathology. So, study recommend that Pap smear should be used regularly in married females of reproductive age group presenting with post-coital bleeding, this will permit precise and earlier identification of cervical cancers therefore reducing both morbidity and mortality.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Wan YL, Edmondson RJ, Crosbie EJ. Intermenstrual and postcoital bleeding. Obstetrics, Gynaecology & Reproductive Medicine. 2015 Apr; 25(4):106-12.

[2] Tarney CM and Han J. Postcoital bleeding: a review on etiology, diagnosis, and management. Obstetrics & Gynecology International Journal. 2014;192087. doi: 10.1155/2014/192087.

[3] Abdelkrim M, Abedelnacer T, Abdelkrim S. Frequency of Significant Cervical Pathology in Women Attending a Teaching Gynaecological Service for Postcoital Bleeding with Normal Cytology. In International Journal of Gynecological Cancer.Two Commerce Sq, 2001 Market St, Philadelphia, Pa 19103 Usa: Lippincott Williams & Wilkins 2016 Sep.

[4] Catarino R, Petignat P, Dongui G, Vassilakos P. Cervical cancer screening in developing countries at a crossroad: Emerging technologies and policy choices. World Journal of Clinical Oncology. 2015 Dec; 6(6):281-90. doi: 10.5306/wjco. v6. i6.281.

[5] Maleki A, Ahmadnia E, Avazeh A, Mazloomzadeh S, Molaei B, Jalilvand A. Prevalence of Abnormal Papanicolaou Test Results and Related Factors among Women Living in Zanjan, Iran. Asian Pacific journal of cancer prevention. 2015; 16(16):6935-9. doi: 10.7314/apjcp.2015.16.16.6935.

[6] Liu HL, Chen CM, Pai LW, Hwu YJ, Lee HM, Chung YC. Comorbidity profiles among women with postcoital bleeding: a nationwide health insurance database. Archives of Gynecology and Obstetrics. 2017 Apr; 295(4):935-941. doi: 10.1007/s00404-017-4327-7.

[7] Cheraghi F, Jolodarian P, Masoumi K, Forouzan A, Jafari RM. Comparison Results of Pap Smear and Colposcopy and Histopathology in Women with Post-Coital Bleeding. Research Journal of Obstetrics and Gynecology. 2015 Jan; 8(1):10.

[8] Gupta M, Sharma A, Agarwal N, Agarwal A. Clinical profile of women with postcoital bleeding. Santosh University Journal of Health Science. 2016; 2(2):106-8.

[9] Getinet M, Gelaw B, Sisay A, Mahmoud EA, Assefa A. Prevalence and predictors of Pap smear cervical epithelial cell abnormality among HIV-positive and negative women attending gynecological examination in cervical cancer screening center at Debre Markos referral hospital, East Gojjam, Northwest Ethiopia. BMC Clinical Pathology. 2015 Sep; 15:16. doi: 10.1186/s12907-015-0016-2.

[10] Kolawole O, Olatunji K, Durowade K, Adeniyi A, Omokanye L. Prevalence, risk factors of human papillomavirus infection and papanicolaou smear pattern among women attending a tertiary health facility in south-west Nigeria. TAF Preventive Medicine Bulletin. 2015 Nov; 14(6).

[11] Duru CB, Oluoha RU, Uwakwe KA, Diwe KC, Merenu IA, Emerole CA, et al. Pattern of PAP smear test results among Nigerian women attending clinics in a teaching hospital. International journal of current microbiology and applied sciences. 2015; 4(4):986-98.

[12] Bosetti C, Bravi F, Negri E, La Vecchia C. Oral contraceptives and colorectal cancer risk: a systematic review and meta-analysis. Human reproduction update. 2009 Sep; 15(5):489-98.

[13] Pretorius R, Semrad N, Watring W, Fotheringham N. Presentation of cervical cancer. Gynecologic oncology. 1991 Jul; 42(1):48-53. doi: 10.1016/0090-8258(91)90229-x.

[14] Pardanani NS, Tischler LP, Brown WH, Feo ED. Carcinoma of cervix. Evaluation of treatment in community hospital. New York State Journal of Medicine. 1975 Jun; 75(7):1018-21.

[15] Slater DN. Multifactorial audit of invasive cervical cancer: key lessons for the National Screening Program. Journal of Clinical Pathology. 1995 May; 48(5):405-7. doi: 10.1136/jcp.48.5.405.

[16] Rosenthal AN, Panoskaltsis T, Smith T, Soutter WP. The frequency of significant pathology in women attending a general gynecological service for postcoital bleeding. British journal of obstetrics and gynaecology. 2001 Jan; 108(1):103-6. doi: 10.1111/j.1471-0528.2001.00008. x.

[17] Al Eyd GJ and Shaik RB. Rate of opportunistic pap smear screening and patterns of epithelial cell abnormalities in pap smears in ajman, United arab emirates. Sultan Qaboos University Medical Journal. 2012 Nov; 12(4):473-8. doi: 10.12816/0003173

[18] Tehranian A, Rezaii N, Mohit M, Eslami B, Arab M, Asgari Z. Evaluation of women presenting with postcoital bleeding by cytology and colposcopy. International Journal of Gynecology and Obstetrics.

DOI: https://doi.org/10.54393/pjhs.v3i05.96

2009 Apr;105(1):18-20. doi: 10.1016/j.ijgo. 2008.12. 006.

[19] Shalini R, Amita S, Neera MA. How alarming is post-coital bleeding—a cytologic, colposcopic and histopathologic evaluation. Gynecologic and obstetric investigation. 1998; 45(3):205-8. doi: 10. 1159/000009957.

[20] Sahu B, Latheef R, Aboel Magd S. Prevalence of pathology in women attending colposcopy for postcoital bleeding with negative cytology. Archives of Gynecology and Obstetrics. 2007 Nov; 276(5):471-3. doi: 10.1007/s00404-007-0362-0.

[21] Rosenthal AN, Panoskaltsis T, Smith T, Soutter WP. The frequency of significant pathology in women attending a general gynaecological service for postcoital bleeding. An International Journal of Obstetrics and Gynaecology. 2001 Jan; 108(1):103-6. doi: 10.1111/j.1471-0528.2001. 00008.x

[22] Godfrey MA, Nikolopoulos M, Povolotskaya N, Chenoy R, Wuntakal R. Post-coital bleeding: What is the incidence of significant gynaecological pathology in women referred for colposcopy? Sexual & Reproductive healthcare. 2019 Dec; 22:100462.

[23] Yarlagadda S, Diddi R, Narra PJ. Evaluation of women with postcoital bleeding by clinical examination, papsmear, colposcopy and histopathology of cervix. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2018 Jun; 7(6):2184-92.

[24] Apgar BS and Brotzman G. Management of cervical cytologic abnormalities. American Family Physician. 2004 Nov; 70(10):1905-16.

[25] Venkatesh M. A comparative study of Pap smear and colposcopy guided biopsy in the evaluation of unhealthy cervix. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2020 Jun; 9(6):2305-10.

[26] Chaudhary RD, Inamdar SA, Hariharan C. Correlation of diagnostic efficacy of unhealthy cervix by cytology, colposcopy and histopathology in women of rural areas. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2014 Mar; 3(1):213-9.

[27] Kapila K, George SS, Al-Shaheen A, Al-Ottibi MS, Pathan SK, Sheikh ZA, et al. Changing spectrum of squamous cell abnormalities observed on papanicolaou smears in Mubarak Al-Kabeer Hospital, Kuwait, over a 13-year period. Medical Principles and Practice. 2006; 15(4):253-9. doi: 10.1159/000092986.

[28] Abdullah LS. Pattern of abnormal Pap smears in developing countries: a report from a large referral hospital in Saudi Arabia using the revised 2001 Bethesda System. Annals of Saudi Medicine. 2007 Aug; 27(4):268-72. doi: 10.5144/0256-4947.2007.268.

[29] Al-Mikhlafy AA, Abdulaziz M, Shamsher A. Cervical Cytological Findings among Women Attending a Tertiary Care Hospital in Sana'a, Yemen. Yemeni Journal for Medical Sciences. 2018 May; 12(1).

[30] Balaha MH, Al Moghannum MS, Al Ghowinem N, Al Omran S. Cytological pattern of cervical Papanicolaou smear in eastern region of Saudi Arabia. Journal of Cytology. 2011 Oct; 28(4):173-7. doi: 10.4103/0970-9371.86343.

[31] Ghazal-Aswad S, Gargash H, Badrinath P, Al-Sharhan MA, Sidky I, et al. Cervical smear abnormalities in the United Arab Emirates: a pilot study in the Arabian Gulf. Acta Cytologica. 2006 Feb; 50(1):41-7. doi: 10.1159/000325893.

DOI: https://doi.org/10.54393/pjhs.v3i05.219

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Frequency of Portal Vein Thrombosis in Patients with Hepatocellular Carcinoma

Muhammad Nabeel Shafqat[1], Najam-Us-Sehar Saeed[2], Salman Javed[3*], Muhammad Adil Chouhdary[1], Ghania Shafqat[4] and Muhammad Asad Aftab[5]

[1]Department of Gastroenterology, Gujranwala Medical College/DHQ Hospital Gujranwala, Pakistan
[2]Department of Gastroenterology, Gujranwala Medical College/DHQ Hospital Gujranwala, Pakistan
[3]Department of Gastroenterology, Services Institute of Medical Sciences/Service Hospital, Lahore, Pakistan
[4]Shalamar Institute of Health Sciences, Lahore, Pakistan
[5]Punjab institute of cardiology, Lahore, Pakistan

ARTICLE INFO

Key Words:
Hepatocellular carcinoma, Portal vein thrombosis, chronic viral hepatitis

How to Cite:
Shafqat, M. N., Saeed, N. us S., Javed, S., Chouhdary, M. A., Shafqat, G., & Aftab, M. A. (2022). Frequency of Portal Vein Thrombosis in Patients with Hepatocellular Carcinoma: Portal Vein Thrombosis in Patients with Hepatocellular Carcinoma. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.219

***Corresponding Author:**
Salman Javed
Department of Gastroenterology Services Hospital, Lahore, Pakistan
drsjaved@yahoo.com

Received Date: 11th October, 2022
Acceptance Date: 19th October, 2022
Published Date: 31st October, 2022

ABSTRACT

The hepatocellular carcinoma(HCC) is a frequent complication of liver. Portal vein thrombosis is common in HCC patients and associated with poor prognosis. But evidence lacks for local population. **Objective:** To assess the frequency of portal vein thrombosis in diagnosed patients of hepatocellular carcinoma presenting at DHQ hospital, Gujranwala. **Methods:** After permission from the ethical committee, this cross sectional study was done at the Department of Gastroenterology, DHQ hospital, Gujranwala from 19-03-2021 to 19-09-2021. Total 125 patients were selected from OPD. Informed consent was taken. All patients underwent Doppler ultrasound to diagnose the portal vein thrombosis. All data was analyzed in SPSS 22. **Results**: Total of 125 patients, 16.8 %(n=21) were in age group of 20-40 years and 83.2 %/(n=104) were in age group of 41-60 years. Mean age was 45.52+45.05 years. Distribution of size of hepatocellular carcinoma was 4.03+0.906 cm. There were 72.0 %(n=90) male whereas 28.0% (n=35) were females. According to the type of hepatocellular carcinoma, 64.8% (n=81) had naive and 35.2% (n=44) recurrent hepatocellular carcinoma. Total of 125 patients, 64.0% (n=80) had single and 36.0% (n=45) had multiple hepatocellular carcinoma. Frequency of portal vein thrombosis was 29.6% (n=37) in patients with hepatocellular carcinoma. **Conclusions:** We concluded that portal vein thrombosis is common in patients with HCC. An early diagnosis of Portal vein thrombosis along with the evaluation of the volume of portal vein thrombosis on CT and an early intervention is necessary.

INTRODUCTION

The most frequent primary liver cancer is hepatocellular carcinoma (HCC), which is also the main cause of cancer-related death globally. In the US, HCC is the ninth most frequent cancer-related cause of death. In addition to 21,670 fatalities, 30,640 additional instances of liver and intrahepatic bile duct cancer were predicted to occur in 2013. Males developed HCC more frequently than females (2.4:1), and incidence rates were greater in Melanesia, Micronesia, Southern and Eastern Asia, Middle and Western Africa, and Melanesia [1-3]. The worldwide age distribution of HCC patients is influenced by the incidence of viral hepatitis in core population and the particular age at which it was contracted. HCC is diagnosed around ten years earlier in high incidence locations where HBV is the most common cause and is transmitted at birth than it is in North America and Europe where the most common cause is HCV acquired later in life. Men are more likely than women to use alcohol, have HBV and HCV infections, and develop HCC. In 80 to 90% of instances, cirrhosis and HCC co-develop [4]. Cirrhosis and/or HCC are two outcomes of persistent viral hepatitis. The two most prevalent types of chronic hepatitis in the world are hepatitis B and C [5]. Portal vein thrombosis is characterized by a blood clot that prevents normal blood flow in the portal vein. Portal vein

DOI: https://doi.org/10.54393/pjhs.v3i05.219

thrombosis is most frequently caused by thrombophilic diseases, abdominal inflammation, tumor invasion, and liver cirrhosis. Portal vein thrombosis has been reported less frequently following pancreatic cancer aspiration, radiofrequency ablation for hepatocellular carcinoma, and bariatric surgery [6]. About 35%–50% of individuals develop portal vein tumor thrombosis, and 15%–30% of these cases already involve the main stem at time of identification [7,8]. Portal vein tumor thrombosis prevalence is definitely underestimated, despite the fact that it was accidentally found in 14% of biopsies collected from carcinoma patients and about 62% of autopsied livers [9]. Malignant vascular infiltration may occur in up to 30% of people with known histories of HCC, however this risk drops to 20% in those with recent diagnoses of both thrombosis and HCC [10]. Although there have been numerous studies on this subject, none have been done locally, Consequently, this study will provide us a regional estimation of the prevalence of portal vein thrombosis in people with hepatocellular cancer. The findings of this study will help healthcare professionals and policy maker's better care for patients by identifying the disease burden in our community. To assess the frequency of portal vein thrombosis in patients with hepatocellular carcinoma presenting at DHQ hospital, Gujranwala

METHODS

This Cross sectional study was done at the Department of Gastroenterology, DHQ hospital, Gujranwala from 19-03-2021 to 19-09-2021. Total 125 patients were selected, keeping 28% [11]. prevalence of portal vein thrombosis in patients presenting with HCC, 95% confidence interval and 8% margin of error. Patients were recruited by applying Non-probability consecutive sampling. Patients were enrolled if they fall in age range 20-60 years, both genders, presenting with HCC were enrolled. HCC was identified using Triphasic CT. When all of the following characteristics appear on a triphasic CT, hepatocellular carcinoma was deemed positive: Aorta illuminates during the arterial phase when contrast fills the arteries; the IVC and portal vein appear black. When contrast enters the portal vein during this phase, the portal vein becomes as bright as the aorta. In the delayed phase, the contrast drains off, so none of the liver's arteries are illuminated. Since HCCs have a robust arterial supply via the hepatic arterial system, "amplification in arterial phase and rapid contrast washout in portal venous phase are characteristics of HCC (hypodense). Patients having nodular lesion less than 3cm in size, having non-specific vascular profile on USG were excluded from the study. Written consent was obtained. Age, gender, kind, number, and size of HCC, as well as other information, were all documented in a proforma. For the confirmation of HCC, a thorough medical history and triphasic CT were performed. All patients had USG to determine whether they had portal vein thrombosis. The presence of aberrant intraluminal echoes, which were primarily grey scale echogenic, and the absence of intraluminal color signals during color Doppler ultrasound were regarded positive signs of portal vein thrombosis. SPSS version 22.0 was used to analyze the data. Age and the size of the hepatocellular carcinoma were two quantitative criteria for which the mean and standard deviation were calculated. For gender, kind and quantity of hepatocellular carcinomas, and portal vein thrombosis, frequency and percentage were computed.

RESULTS

Out of 125 cases, 16.8% (n=21) were aged 20-40 years and 83.2% (n=104) were aged41-60 years, thus the mean age 45.52 ± 5.05 years. Out of 125 cases, 72.0%(n=90) were males whereas 28.0% (n=35) were females. The mean size of HCC mass was 4.03 ± 0.91 cm, with 64.0% (n=80) patients had single lesion but 36.0% (n=45) had multiple lesions. Among 125 cases, 64.8% (n=81) were treatment naïve while 35.2% (n=44) had recurrent HCC Table 1.

Feature	Mean ± SD, F (%)
Age 20-40 years	21 (16.8%)
Age 41-60 years	104 (83.2%)
Age (years)	45.52 ± 5.05
Gender	
Male	90 (72%)
Female	35 (28%)
Type of HCC	
Treatment Naïve	81 (64.8%)
Recurrent	44 (35.2%)
Number of lesions	
Single	80 (64%)
Multiple	45 (36%)
Number of lesions	
Single	80 (64%)
Multiple	45 (36%)
Size of HCC (cm)	4.03 ± 0.91 cm
3cm-6cm	44 (35.2%)
>6cm	81 (64.8%)

Table 1: Baseline Characteristics of Patients

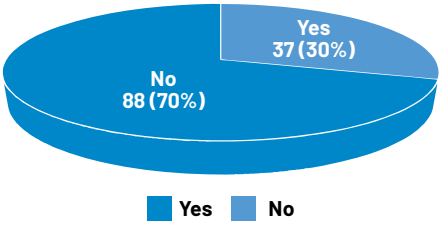

Figure 1: Distribution of portal vein thrombosis

The data was stratified for effect modifiers and it was

DOI: https://doi.org/10.54393/pjhs.v3i05.219

observed that in patients aged 20-40 years, portal vein thrombosis was 5 (23.8%) while in patients aged 41-60 years, portal vein thrombosis was 32 (30.8%) and the difference in both age groups was insignificant (p>0.05). In males, portal vein thrombosis was 27 (30%) while in females, portal vein thrombosis was 10 (28.6%) and the difference in both genders was insignificant (p>0.05). In treatment naïve patients, portal vein thrombosis was 25 (30.9%) while in patients with recurrent disease, portal vein thrombosis was 12 (27.3%) and the difference was insignificant (p>0.05). In patients with single lesion, portal vein thrombosis was 24 (30%) while in patients with multiple lesions, portal vein thrombosis was 13 (28.9%) and the difference was insignificant (p>0.05). In patients with lesion size ≤6 cm, portal vein thrombosis was 17 (38.6%) while in patients with lesion size >6 cm, portal vein thrombosis was 20 (24.7%) and this finding was insignificant (p>0.05) Table 2.

	Portal vein thrombosis		p-value
	Yes	No	
	Age Group		
20-40	5	16	0.524
	23.8%	76.2%	
41-60	32	72	
	30.8%	69.0%	
	Gender		
Male	27	63	0.875
	30%	70%	
Female	10	25	
	28.6%	71.4%	
	Type of hepatocellular carcinoma		
Naïve	25	56	0.674
	30.9%	69.1%	
Recurrent	12	32	
	27.3%	72.7%	
	Number of hepatocellular carcinoma		
Single	24	56	0.896
	30%	70%	
Multiple	13	32	
	28.9%	71.1%	
	Size of hepatocellular carcinoma		
≤6cm	17	27	0.103
	38.6%	61.4%	
>6cm	20	61	
	24.7%	75.3%	

Table 2: Portal vein thrombosis compared in groups

DISCUSSION

In current study showed that out of 125 patients, 16.8 %(n=21) were in age group of 20-40 years and 83.2 %(n=104) were in age group of 41-60 years. Mean age was 45.52 + 5.05 years. Distribution of size of hepatocellular carcinoma was 4.03 ± 0.906 cm. Gender distribution of the patients was done, it showed that 72.0 % (n=90) were male whereas 28.0% (n=35) were females. According to distribution of type of hepatocellular carcinoma, 64.8% (n=81) had naive and 35.2% (n=44) recurrent hepatocellular carcinoma. Total of 125 patients, 64.0% (n=80Q) had single and 36.0% (n=45) had multiple hepatocellular carcinoma. Distribution of portal vein thrombosis was 29.6% (n=37) in HCC patients. Patients with liver cirrhosis frequently experience this dangerous consequence called portal vein thrombosis. According to one study by Alam et al., 28% of patients with hepatocellular cancer had portal vein thrombosis [11]. When compared to the general population, which has a Portal vein thrombosis, patients with liver cirrhosis have a range of 0.6% to 26%. Portal vein thrombosis has been more frequently detected in liver cirrhosis using non-invasive imaging tools like "ultrasound, computed tomography, or magnetic resonance imaging" due to its peak occurrence during the time of liver transplantation [12]. In addition to surgical options like resection and liver transplantation, non-operative methods like chemo- & radio-therapy, percutaneous ethanol injection, microwave coagulation therapy, trans-arterial chemoembolization, and radio-frequency ablation are included [13]. Another study found that malignant portal vein thrombosis, a frequent HCC consequence, had a poor prognosis. Portal vein thrombosis might be positive in about 10-40% cases at the time of initial identification of HCC. Portal vein thrombosis will be seen in 35–44% of patients with liver cirrhosis at the time of death or liver transplant [14]. In a study by Connoli et al., they observed that in about 24% cases of HCC, portal vein thrombosis developed, who underwent liver transplantation. In their investigation, advanced HCC stage, higher cirrhotic stage, raised blood α-fetoprotein, elevated Bilirubin level, and substantial vascular assault were all indicators of portal vein thrombosis. In non-transplanted patients, Portal vein thrombosis was associated with a significantly worse overall survival rate, and this difference in survival remained even after controlling the stage and Child-Pugh classification [15]. When it comes to cancer-related thrombosis, HCC presents a special set of challenges. Even in cases of cirrhosis without HCC, a sizable portion of patients experience Portal vein thrombosis [16-18]. Cirrhosis and liver failure usually precede the development of HCC, and the risk of thrombosis is frequently believed to be reduced by thrombocytopenia and coagulation abnormalities connected to hepatic failure. Though, it has been found that people with cirrhosis had a 0.5%–1.0% incidence of deep venous thrombosis and pulmonary embolism and according to research, patients with liver failure who have elevated conventional coagulation markers are not protected against thrombotic events. In fact, a lack of the body's natural anticoagulants system in

DOI: https://doi.org/10.54393/pjhs.v3i05.219

liver failure can even cause a pro-thrombotic condition [19-20]. For potentially curative ways to cure the HCC including resection, portal vein thrombosis is not the strict contraindication in many Asian guidelines. This most likely occurs as a result of underestimating the detrimental prognostic impact of a mild portal vein tumor thrombosis, at least in part. Portal vein tumor thrombosis is also frequently overlooked in imaging during routine clinical treatment [21].

CONCLUSIONS

In current study, we found that frequency of portal vein thrombosis was 29.6% (n=37) in patients with HCC. We concluded that portal vein thrombosis is common in patients with HCC an early diagnosis of portal vein thrombosis along with the evaluation of the volume of portal vein thrombosis on CT and an early intervention is necessary.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. International Journal of Cancer. 2010 Dec; 127(12):2893-917. doi: 10.1002/ijc.25516.

[2] O'Connor S, Ward JW, Watson M, Momin B, Richardson LC. Hepatocellular Carcinoma-United States, 2001-2006. Morbidity and Mortality Weekly Report. 2010; 59(17):517-20.

[3] Crissien AM and Frenette C. Current management of hepatocellular carcinoma. Gastroenterology & hepatology. 2014 Mar;10(3):153.

[4] Mittal S and El-Serag HB. Epidemiology of hepatocellular carcinoma: consider the population. Journal of clinical gastroenterology. 2013 Jul; 47 Suppl(0):S2-6. doi: 10.1097/MCG.0b013e3182872f29.

[5] Balogh J, Victor D 3rd, Asham EH, Burroughs SG, Boktour M, et al. Jr. Hepatocellular carcinoma: a review. Journal of hepatocellular carcinoma. 2016 Oct; 3:41-53. doi: 10.2147/JHC.S61146.

[6] Mantaka A, Augoustaki A, Kouroumalis EA, Samonakis DN. Portal vein thrombosis in cirrhosis: diagnosis, natural history, and therapeutic challenges. Annals of gastroenterological surgery. 2018 Jun; 31(3):315-329. doi: 10.20524/aog.2018.0245.

[7] Manzano-Robleda Mdel C, Barranco-Fragoso B, Uribe M, Méndez-Sánchez N. Portal vein thrombosis: what is new? Annals of Hepatology. 2015 Feb;14(1):20-7.

[8] Minagawa M, Makuuchi M, Takayama T, Ohtomo K. Selection criteria for hepatectomy in patients with hepatocellular carcinoma and portal vein tumor thrombus. Annals of surgery. 2001 Mar; 233(3):379-84. doi: 10.1097/00000658-200103000-00012.

[9] Zhou Q, Wang Y, Zhou X, Peng B, Yang J, Liang L, et al. Prognostic analysis for treatment modalities in hepatocellular carcinomas with portal vein tumor thrombi. Asian Pacific journal of cancer prevention. 2011 Jan;12(11):2847-50.

[10] Piscaglia F, Gianstefani A, Ravaioli M, Golfieri R, Cappelli A, Giampalma E, et al. Bologna Liver Transplant Group. Criteria for diagnosing benign portal vein thrombosis in the assessment of patients with cirrhosis and hepatocellular carcinoma for liver transplantation. Liver Transplantation. 2010 May; 16(5):658-67. doi: 10.1002/lt.22044.

[11] Alam S and Pervez R. Validity of colour doppler sonography for evaluation of portal venous system in hepatocellular carcinoma. Journal of the Pakistan Medical Association. 2013 Mar; 63(3):365-8.

[12] Gîrleanu I, Trifan A, Stanciu C, Sfarti C. Portal vein thrombosis in cirrhotic patients - it is always the small pieces that make the big picture. World Journal of Gastroenterology. 2018 Oct; 24(39):4419-4427. doi: 10.3748/wjg.v24.i39.4419.

[13] Cerrito L, Annicchiarico BE, Iezzi R, Gasbarrini A, Pompili M, Ponziani FR. Treatment of hepatocellular carcinoma in patients with portal vein tumor thrombosis: Beyond the known frontiers. World Journal of Gastroenterology.2019 Aug; 25(31):4360-4382. doi: 10.3748/wjg.v25.i31.4360.

[14] Ashmawy MM, Mahmoud A, El-Masry MA, Abdelaal AA. Risk factors of malignant portal vein thrombosis in cirrhotic patients with hepatocellular carcinoma. Journal of Current Medical Research and Practice. 2019 May; 4(2):203.

[15] Connolly GC, Chen R, Hyrien O, Mantry P, Bozorgzadeh A, Abt P, et al. Incidence, risk factors and consequences of portal vein and systemic thromboses in hepatocellular carcinoma. Thrombosis research. 2008; 122(3):299-306. doi: 10.1016/j.thromres.2007.10.009.

[16] Okuda K, Ohnishi K, Kimura K, Matsutani S, Sumida M, Goto N, et al. Incidence of portal vein thrombosis in liver cirrhosis. An angiographic study in 708 patients. Gastroenterology. 1985 Aug; 89(2):279-86. doi: 10.1016/0016-5085(85)90327-0.

[17] Valla DC and Condat B. Portal vein thrombosis in adults: pathophysiology, pathogenesis and

DOI: https://doi.org/10.54393/pjhs.v3i05.219

management. Journal of hepatology. 2000 May; 32(5):865-71. doi: 10.1016/s0168-8278(00)80259-7.

[18] Ogren M, Bergqvist D, Björck M, Acosta S, Eriksson H, Sternby NH. Portal vein thrombosis: prevalence, patient characteristics and lifetime risk: a population study based on 23,796 consecutive autopsies. World Journal of Gastroenterology. 2006 Apr; 12(13):2115-9. doi: 10.3748/wjg. v12.i13.2115.

[19] Northup PG, McMahon MM, Ruhl AP, Altschuler SE, Volk-Bednarz A, Caldwell SH, et al. Coagulopathy does not fully protect hospitalized cirrhosis patients from peripheral venous thromboembolism. American journal of gastroenterology supplements. 2006 Jul; 101(7):1524-8; quiz 1680. doi: 10.1111/j.1572-0241.2006.00588. x.

[20] Caldwell SH, Hoffman M, Lisman T, Macik BG, Northup PG, Reddy KR, et al. Coagulation in Liver Disease Group. Coagulation disorders and hemostasis in liver disease: pathophysiology and critical assessment of current management. Hepatology. 2006 Oct; 44(4):1039-46. doi: 10.1002/hep.21303.

[21] Mähringer-Kunz A, Steinle V, Kloeckner R, Schotten S, Hahn F, Schmidtmann I, et al. The impact of portal vein tumor thrombosis on survival in patients with hepatocellular carcinoma treated with different therapies: A cohort study. PLoS One. 2021 May; 16(5):e0249426. doi: 10.1371/journal.pone.0249426

DOI: https://doi.org/10.54393/pjhs.v3i05.205

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Frequency of Various Grades of Failure and Their Number of Units Involved in Non Maintained Metal Ceramic Fixed Dental Prosthesis

Saima Afridi[1], Muhammad Sartaj Khan[1], Muhammad Raza[1], Asifullah khan[2*], Hassan Khan[1], Naila Zubair[3]

[1]Department of Prosthodontics, Peshawar Dental College, Peshawar, Pakistan
[2]Department of Prosthodontics, Khyber College of Dentistry, Peshawar, Pakistan

ARTICLE INFO

Key Words:

Metal ceramic, Bridges, Units, Grades of failures, fixed partial denture

How to Cite:

Afridi, S. ., Khan, S. ., Raza, M. ., Khan, A. ., Khan, H. ., & Zubair, N. . (2022). Frequency of Various Grades of Failure and Their Number of Units Involved in Non Maintained Metal Ceramic Fixed Dental Prosthesis: Non Maintained Metal Ceramic Fixed Dental Prosthesis. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.205

***Corresponding Author:**

Asifullah khan
Department of Prosthodontics, Khyber College of Dentistry, Peshawar, Pakistan
drasifullah@hotmail.com

Received Date: 5th October, 2022
Acceptance Date: 13th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Replacement of missing teeth with fixed partial denture is high in demand, so high are the problems and failures of these prostheses if they are not maintained well. **Objective**: This study focused on determining the frequency of various grades of failures and the number of units involved in non maintained fixed partial dentures in patients reporting to public sector dental hospital. **Methods:** A total of 216 patients, (both genders) having age ranging from 20 to 60 years, were clinically examined for failed fixed partial dentures. Various parameters of failed bridges including number of pontics and retainers were recorded by using a self structured proforma. These prostheses were divided in six different grades as proposed by Manapallil. Mild, moderate and severe groups were used depending on the severity of failure. SPSS (version 23) was used for data analysis. **Results:** Out of 216 patients, a male (91) to female (125) ratio of 0.72 was found with a mean age of 47 years (SD ± 18.553). Failed prostheses in grades 1 to 4 were having a similar rate of failures (22% to 25%), while other grades of failure were less than 5%. Prosthesis service life ranged from 2 to 5 years. Almost 82% of prostheses had 4 or 5 pontics in the design of bridge with a mean number of pontics 5 (SD ± 2.1) **Conclusions:** It was concluded that majority of failures were observed in mild and moderate groups in non-maintained fixed prostheses.

INTRODUCTION

Patients usually prefer fixed replacement for their missing teeth and metal ceramic fixed dental prosthesis has been their choice over the decades. During their service life, these prostheses fail owing to various reasons. Removal of fixed dental prostheses (FDP), extraction of abutment tooth due to fracture, gross caries and periodontal diseases are considered failure of the FDP. All abutment teeth and FDPs that require additional treatment are considered complications [1]. Dealing with such complications of fixed prosthesis can be costly, time consuming, cause discomfort to the patient and bring into question the competence of practitioner. Causes of FDP failure can be patient related, dentist related and technician-related4. Collectively these can be grouped as biological, mechanical and esthetic failures. Different studies have observed different reasons for failure. Some studies have documented mechanical failure as a major factor contributing to prosthesis failure while others observed esthetics and biological as a causal factor. A long span FPD will have lower survival rate when compared to short span, mainly due to inadequate retainer to pontics ratio, which can adversely affect its longevity [2]. A patient with risk factors such as history of periodontal disease, smoking and bruxism may demonstrate higher rates of failure and complication than a patient without such complications. Without regular maintenance, periodontal

DOI: https://doi.org/10.54393/pjhs.v3i05.205

problems may start in patients with FDP [3]. Higher survival rate is expected in the patient with chronic periodontitis having end abutment fixed dental prosthesis and lower survival rates with cantilever design [4]. Corrections of prosthesis may typically be cumbersome. Mild failure can be correctable without replacing restoration, moderate failure can also be correctable but with restoration replacement and more severe failure result in loss of abutment teeth. At times an adjacent tooth, if available, may be used as an abutment for FPD otherwise other means of replacement such as implants or removable partial denture are considered. The objective of this study was to determine the frequency of various grades of FDP failure with regards to the number of units and pontics involved in non-maintained FDPs presented by patients reporting to public sector dental hospital. This study was rationalized as it will help through assessment of cause and severity of different levels of failure and the number of units and pontics involved which will be valuable for patient education and treatment planning and will also facilitate interoperate discussion.

METHODS

This cross sectional study was conducted at Khyber College of Dentistry (Peshawar), after taking ethical approval from Institutional Review Committee. An informed verbal consent was taken from the patients. The study was completed over a period of six months (March - September, 2015). A sample size of 216 was determined using 2.30% proportion grade 1 failure, 95% confidence level and 2% margin of error, under WHO software. Consecutive, non-probability sampling technique was used for sample collection. Subjects fulfilling the inclusion criteria were invited. Patients of both genders with the age range of 20 to 60 years having fixed -fixed metal ceramic prosthesis were included in study. Exclusion criteria included all ceramic and cantilevered bridges. For the purpose of this study patients were divided in 4 different age groups, each group comprising of ten years. Group 1 included patients between 20 and 30 years, Group 2 (31 to 40 years), Group 3 (41 to 50 years) and Group 4 (51 to 60 years). Fixed dental prostheses were divided on the bases of number of retainers and pontics collectively, for example, 3-unit prosthesis was having two retainer and one pontics, 4-unit having two retainers and two pontics and so on. Depending on the grades of severity 3 groups were formed namely; mild (group 1 and 2), moderate (group 3 and 4) and severe (group 4 and 5). A detailed intraoral examination was done using standard technique of inspection, palpation, percussion, probing and, where necessary, with radiographic examination. Prosthesis was evaluated for the number of units and pontics along with grades, severity and type of failure. Data was calculated using prestructured proforma. Frequency and percentages were calculated for gender, number of units and pontics. Mean and standard deviation was calculated for age. Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 23.0.

RESULTS

Various grades of failures in non-maintained FDP were assessed in patients at prosthodontics department of a public sector dental hospital. Age distribution among 216 patients was analyzed as 13% (n=28) patients were in age range 20-30 years (Group-1), 30% (n=65) patients were in Group-2, 35% (n=75) were in Group-3 and 22% (n=48) patients were in Group-4. Mean age was 47 years with SD ± 18.5(Table-1)

Age (yr) Mean ± SD 47± 18.5	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Total
Group-1 (20-30)	3	6	8	8	1	0	28
Goup-2 (31-40)	15	16	15	15	2	2	65
Group-3 (41-50)	17	17	19	19	2	1	75
Group-4 (51-60)	11	11	12	12	1	1	48

Table 1: Frequency of different grades of failure in different age groups

Out of 216 patients 42% (n=91) were males and 58% (n=125) were females, with a male to female ratio of 0.72 as in Table 2. Almost half of the cases recorded were in moderate category of severity and less than half were in mild and severe category.

Gender	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Male (42%)	20	21	23	23	2	2
Female (58%)	28	29	31	31	4	2
Total	**Mild**		**Moderate**		**Severe**	
	95(45%)		108(50%)		10(5%)	

Table 2: Gender wise distribution of different grades of prosthesis failure

In the observed failed fixed prosthesis minimum observed units were 5 and maximum units were 7 having a mean of 5 units (SD ± 1.3). Analysis observed a mean number of pontics as 3 (SD ± 2.1) given in Table 3, and a mean service life of 3 years (SD ± 1.93) given in Table 4.

Units	**3 Units**	**4 Units**	**5 Units**	**6 Units**	**7 Units**	**Total**
	26 (12%)	60 (28%)	48 (22%)	43 (20%)	39 (18%)	216 (100%)
	Minimum=3		**Maximum=7**		**Mean= 1.3 (SD±2.1)**	
Pontics	**2 Pontics**		**3 Pontics**		**4 Pontics**	
	39 (18%)		82 (38%)		95(44%)	
	Minimum=3		**Maximum=4 (SD ± 2.1)**		**Mean= 3**	

Table 3: Number of units and pontics with mean and standard deviation

DOI: https://doi.org/10.54393/pjhs.v3i05.205

Patients were asked to recall the approximate time of prosthesis cementation. Then these were divided in different groups as given in table 3. More than half of the observed cases had a service life of 3 to 4 years at the time of assessment of failed prosthesis.

Prosthesis Service life	Frequency (%)
<2 years	35(16%)
2-3 years	45(21%)
3-4 years	136 (63%)
Total	216(100%)

Table 4: Service life rendered by the failed prosthesis at time of clinical evaluation

DISCUSSION

Fixed dental prosthesis is popular in all age groups patients for replacement of missing teeth owing to their favorable properties when compared to removable prosthesis. However with the passage of time they may show changes in the structural material of prosthesis and abutment teeth leading to several complications. Some complications are considered correctable while others are uncorrectable which may lead to failure of prosthesis. Such complications may develop early or late in the service life of prosthesis. Patient with risk factors such as history of bruxism, periodontal diseases, poor oral hygiene, smoking and prolonged service life of prosthesis may show higher rates of failure [2,6]. Literature is full of evidence regarding various reasons for failure of prosthesis. In majority of cases a prosthesis fail merely because of some technical issue/ problem rendered by practitioner or laboratory technician, such failures of fixed dental prosthesis due to technical reasons are grouped in grade-3. A variable rate of recurrence of failure has been documented in literature in similar studies.Our study observed that greater parts of failures (43%) were in grade 3 groups. This type of failure is somehow close to the one recorded earlier by Shah et al in his study, where group-3 failure was 32% [14]. The observed difference might be due the sample size dissimilarity. Fulfilling the basic needs in design of fabrication is essential for best possible service life rendered by the prosthesis. For fixed dental prosthesis the pontics more than the required optimum number may adversely affect the life of prosthesis. This is mainly because of flexion factor produced in long span prostheses and thus putting extra stresses on abutment teeth. The current study observed that majority of failed cases had 3or 4 pontics present in the design of prosthesis. This was also concluded in another study that survival rate of long span (52%) is less when compared to short span (70%) [15]. Fixed dental prostheses are considered expensive depending on the type of material; hence patient may expect a longer life rendered by the same prostheses. The cost benefit ratio must be in line with service life offered by such prosthesis.Studies conducted earlier on the subject matter have witnessed variable mean life of prosthesis from 2.8 to 8.3 years. Keeping in mind the sample size of our study, it was found that at the time of examining the patients for failed prosthesis, 63% were in the time range of 3-4 years of service life rendered by prosthesis. Though this does not reflect the failure prevalence, however the larger percentages of failure observed in this study cannot be justified when compared to the life expectancy of fixed prosthesis. On the other hand, this finding can be defended and outweighed by the actuality that successful prostheses are not considered in the current study. Out of the all failures, obviously grade-1 failure will be more clinically favorable when compared to grades 1 and 2, merely because it can be corrected easily. Our study observed 50% moderate failure cases where prosthesis neededreplacement. This finding is similar to a study done earlier by Kawaz [1], where they found 52% of such failures. The high percentage of this failure might be attributed to the negligence on part of the patient. It can also be assumed that patient keep on delaying dental treatment until a visible and annoying problem in prosthesis is observed.

CONCLUSIONS

Within the limitation of this study it can be concluded that more failures were observed in long span non maintained bridges. According to severity of failed prostheses maximum numbers were present in mild and moderate group.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Tuğçe Kavaz, Kadir Gördeli, Nuran Yanıkoğlu. An Investigation of the Reasons for Failure in Patients with A Fixed Prosthesis. International journal of oral health dentistry.4(1): 2021.

[2] Abbod EA, Al-Waily M, Al-Hadrayi ZM, Resan KK, Abbas SM. Numerical and experimental analysis to predict life of removable partial denture. In IOP Conference Series: Materials Science and Engineering 2020 Jun;870(1).

[3] Naz A, Musharraf H, Jawad A, Kumar B, Lone MA. Assessment of Failure of Prosthesis in Fixed Prosthodontics Among Patients Reporting to A Teaching Dental Hospital of Karachi. JPDA. 2020 Jul; 29(03).

[4] Al-Dabbagh RA. Quality of Fixed Dental Prostheses

DOI: https://doi.org/10.54393/pjhs.v3i05.205

and Associated Biological Complications in a Saudi Population. Journal of Contemporary Dental Practice. 2020 Oct; 21(10):1130-1136.

[5] Zavanelli AC, Mazaro JV, NÓbrega PI, FalcÓn-antenucc RM, Zavanelli RA. Data collection about failures in fixed partial dentures: 1-year monitoring. RGO-Revista Gaúcha de Odontologia. 2018 Jul; 66:250-6.

[6] Chandrakala V, Deepmala S, Srivatsa G. Different classification system for failures in tooth supported fixed partial denture: a systematic review. International Journal of Preventive and Clinical Dental Research. 2019 Jan; 6(1):17.

[7] Chandranaik MB and Thippanna RK. Fixed partial denture failures: a clinical survey for evaluation of the factors responsible. CODS Journal of Dentistry. 2017 Dec; 9(2):41-5.

[8] Riaz W, Aslam A, Aziz S. Dental Prosthesis;: Assessment Of Grades Of Failures Of Conventional Fixed Dental Prosthesis Based On Severity. The Professional Medical Journal. 2018 Aug; 25(08):1261-4.

[9] AlMogbel AA, AlOlayan AA, AlFazwan AA. Assessment of the complications associated with tooth-supported fixed dental prosthesis at Qassim Region, Saudi Arabia. International journal of medical research professionals. 2017;3(2):93-5.

[10] Prasad K, Hegde C, Desai H. A survey to assess the failures in fixed partial dentures. International journal of recent scientific research. 2017; 8(7):18770-3.

[11] Disha V. Mogućnosti uporabe mini dentalnih implantata za retenciju djelomičnih proteza Kennedy klasa I i II (Doctoral dissertation, University of Zagreb. School of Dental Medicine. Department of Removable Prosthodontics) 2021.

[12] Brägger U, Hirt-Steiner S, Schnell N, Schmidlin K, Salvi GE, Pjetursson B, et al. Complication and failure rates of fixed dental prostheses in patients treated for periodontal disease. Clinical oral implants research. 2011 Jan; 22(1):70-7. doi: 10.1111/j.1600-0501.2010.02095. x.

[13] Manappallil JJ. Classification system for conventional crown and fixed partial denture failures. Journal of Prosthetic Dentistry. 2008 Apr; 99(4):293-8. doi: 10.1016/S0022-3913(08)60064-5.

[14] Ghani F and Memon MR. Complications in metal ceramic fixed dental prostheses among patients reporting to a teaching dental hospital. JLUMHS. 2010 Jan; 9(01):17.

[15] Ikai H, Kanno T, Kimura K, Sasaki K. A retrospective study of fixed dental prostheses without regular maintenance. Journal of Prosthodontic Research. 2010 Oct; 54(4):173-8. doi: 10.1016/j.jpor.2010.04.003.

[16] Jokstad A. After 10 years seven out of ten fixed dental prostheses (FDP) remain intact and nine out of ten FDPs remain in function following biological and technical complications that have been repaired. Journal of Evidence-Based Dental Practice. 2010 Mar; 10(1):39-40. doi: 10.1016/j.jebdp.2009.11.019.

[17] Shah DS, Vaishnav K, Duseja S, Joshi R. Clinical Evaluation of Fixed Dental Prosthesis Failures in Indian Population: An in Vivo Study. Advances in Human Biology. 2014 Dec; 4(3):37-43.

[18] De Backer H, Van Maele G, De Moor N, Van den Berghe L. Long-term results of short-span versus long-span fixed dental prostheses: an up to 20-year retrospective study. International Journal of Prosthodontics. 2008 Jan; 21(1).

[19] De Backer H, Van Maele G, De Moor N, Van den Berghe L. Single-tooth replacement: is a 3-unit fixed partial denture still an option? A 20-year retrospective study. International journal of prosthodontics. 2006 Nov; 19(6).

[20] Schwarz S, Gabbert O, Hassel AJ, Schmitter M, Séché C, Rammelsberg P. Early loading of implants with fixed dental prostheses in edentulous mandibles: 4.5-year clinical results from a prospective study. Clinical oral implants research. 2010 Mar; 21(3):284-9. doi: 10.1111/j.1600-0501.2009.01843. x.

DOI: https://doi.org/10.54393/pjhs.v3i05.245

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Impact of Occupational Musculoskeletal Disorders on Dentists

Asma Shakoor[1*], Aleshba Saba Khan[2], Fariha Naz[3], Waqar Ali[4], Dilawar Sultan[4] and Maaz Ahmad[5]

[1]CMH Lahore Medical College and Institute of Dentistry, NUMS, Pakistan
[2]Shahida Islam Medical and Dental College, Lodhran, Pakistan
[3]College of Dentistry, King Khalid University, Abha, Saudi Arabia
[4]Akhtar Saeed Medical and Dental College, Lahore, Pakistan
[5]College of Dentistry, Sharif Medical and Dental College, Lahore, Pakistan

ARTICLE INFO

Key Words:
Musculoskeletal Disorders, Dentists, Dental work

How to Cite:
Shakoor , A. ., Saba Khan, A., Naz, F. ., Ali , W. ., Sultan, D. ., & Ahmad, M. . (2022). Impact of Occupational Musculoskeletal Disorders on Dentists: Occupational Musculoskeletal Disorders on Dentists. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.245

***Corresponding Author:**
Asma Shakoor
CMH Lahore Medical College and Institute of Dentistry, Lahore, Pakistan
asmashakoor@hotmail.com

Received Date: 14th October, 2022
Acceptance Date: 25th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Dentists are particularly vulnerable to ergonomically borne musculoskeletal diseases (MSDs), which decrease efficiency, productivity, and career longevity because to the exact and minute nature of their work. **Objective:** To determine different consequence of work related disorders among dentist of Lahore, Pakistan. **Methods:** In this cross-sectional survey 450 dentist of Lahore were approached and a structured proforma based survey was conducted using convenience sampling technique. In the study, dentists between the ages of 24 and 65 were included. Musculoskeletal Disorder has been presented in the form of frequency and percentage whereas age has been shown as mean and standard deviation. Chi square test has been applied to determine the association between musculoskeletal disorder and different study variables. P-value of 0.05 has been deemed significant. **Results:** In this study out of 450 dentists 236 (52.4%) were male and 214 (47.6%) were females. Mean age of the males were 37.08 ± 9.27 years and females were 33.43 ± 10.42 years. Among the subjects musculoskeletal disorders were reported by 393(87.3%) dentist. Sick leave was availed by 278 (70.7%) whereas 373 (94.9%) seek medical treatment and 325 (82.7%) prevent daily activity. According to Dentist 388 (98.7%) believes that the disorder is caused by Dental Clinic i.e. Ergonomic issue. **Conclusions:** With two thirds of dentists taking sick time owing to musculoskeletal disorders, combined with the mental stress, it would appear that dentistry is not an easy profession. This would significantly limit the career of dentists.

INTRODUCTION

Dental practice is a profession in which they are exposed to multiple risks including exposure to hazardous chemicals, infections, musculoskeletal disorders and stress related health issues. Among them Work-related musculoskeletal disorders are most common that also affects their general quality of life as well as clinical practice [1-3]. There are many contributing factors associated with musculoskeletal pain which includes longer clinical sessions, repetitive movement, ergonomic issues, higher BMI and history of trauma [4, 5]. Numerous unwelcome hazards for dental health care professionals result from different working postures in dental job setting [2]. Dentists frequently operate in constrained spaces, and the majority of the time, their work is tedious and needs focus. In order to do their task, dentists may have to undergo discomfort, underscoring the high job demand associated with this occupation [3]. The higher prevalence of work-related Musculoskeletal disorders (MSDs) causes poorer productivity due to missed work deadlines, incapacity to carry out everyday tasks, and occasionally results in harm that ends a career [2, 3]. In different studies conducted in Pakistan back pain, neck pain and wrist/hand pain were

DOI: https://doi.org/10.54393/pjhs.v3i05.245

more frequent among dentist. Among Musculoskeletal pain in at least one body site ranges from 45 to 70% [6-8]. The number of patients treated daily, years in practice, working position, and breaks between patients were all found to be strongly correlated with back pain [9]. According to a recent study position while extracting tooth leads to musculoskeletal pain among 55.53% of the dentist [10]. It is evident in different study that the musculoskeletal disorder affects the physical and social wellbeing. These disorders also increase the trend of absenteeism and reduces the perform abilities of the dentist [11, 12]. The current study was conducted to determine different consequence of work related disorders among dentist of Lahore Pakistan.

METHODS

In this cross-sectional survey 450 dentist of Lahore were approached and a structured proforma based survey was conducted using convenience sampling technique. The purpose of study was explained at the beginning of the proforma. Approval was granted by Ethical Review Board of Institute of Dentistry, CMH Lahore Medical College. After receiving ethical approval, survey monkey was used to design the structured questionnaire. In Pakistan, a study was done on dental professionals over the course of three months, from 15th June to 15th September, 2021. The research complied with STROBE recommendations for cross-sectional studies [13]. In the study, dentists between the ages of 24 and 65 were included. The study did not include dentists who had had their training abroad or who had any co-morbid disorders, such as malignancies or any bone illnesses, like muscular dystrophies or arthritis. The questions were all closed-ended. At the start of the questionnaire, the study's purpose was described. The questionnaire began with a definition of musculoskeletal pain and disorders to aid responders in understanding the term. Written consent was obtained. This questionnaire has been used in a number of previous studies, [2, 7] but five senior faculty members from different institutions have already confirmed the construct validity of the questionnaire. A pilot survey was completed by 20 dentists and dental students. It was discovered that the questionnaire has an internal reliability score of 0.865, or Cronbach's alpha value. SPSS version 23.0 was used to evaluate the questionnaire's responses. (Statistical package for social sciences, IBM, USA). Musculoskeletal Disorder has been presented in the form of frequency and percentage whereas age has been shown as mean and standard deviation. Chi square test has been applied to determine the association between musculoskeletal disorder and different study variables. P-values lower than 0.05 have been deemed significant

RESULTS

In this study out of 450 dentists 236 (52.4%) were males and 214 (47.6%) were females. Mean age of the male was 37.08 ± 9.27 years and female was 33.43 ± 10.42 years. Among the subjects musculoskeletal disorders were reported by 393 (87.3%) dentist and among all factors, number of years practicing were showing more significant results (Table 1).

Study variables	Category	Frequency
Intensity of Pain	No Pain	5 (1.3%)
	Mild Pain	124 (31.6%)
	Moderate Pain	122 (31.0%)
	Severe Pain	142 (36.1%)
Frequency of Pain	Never	5 (1.3%)
	Rarely Occur	179 (45.5%)
	Occasionally occurs	97 (24.7%)
	Often occur	96 (24.4%)
	Always occur	16 (4.1%)
Factors of Musculoskeletal Disorders	Work posture	96 (24.4%)
	Type of dental procedure	5 (1.3%)
	Number of practice hours	54 (13.7%)
	Number of years practicing	208 (52.9%)
	Overall health	30 (7.6%)
MSDs few hours last 12months	Yes	283 (72.0%)
MSDs daily minimal presence 1month for last12months	Yes	106 (27.0%)

Table 1: Frequency distribution of different sign and symptoms among dentist with musculoskeletal disorder.

Among 393 Dentist with musculoskeletal disorder Sick leave was availed by 278(70.7%) whereas 373 (94.9%) Seek Medical Treatment and 325 (82.7%) Prevent daily activity. According to Dentist 388 (98.7%) believes that the disorder is caused by Dental Clinic i.e. Ergonomic issue. Mean age of the dentist with musculoskeletal disorder were 36.82 ± 9.82years whereas without any disorder dentist's age was 25.16 ± 1.80 and P-value was also considered as significant. (Table 2).

Study variables	Category	MSD		P-value
		Yes	No	
Gender	Male	216 (91.5%)	20(8.5%)	0.005*
	Female	177 (82.7%)	37(17.3%)	
Design-ation	House officers/PG	30 (53.6%)	26(46.4%)	<0.001*
	Demonstrator/Lecturer/ Registrar	47(100.0%)	0(0%)	
	Senior Lecturer/Senior Registrar	106(100.0%)	0(0%)	
	Senior Faculty (Assist Prof., Assoc. Prof., Professor)	164(100.0%)	0(0%)	
	Private Practitioner	46(59.7%)	31(40.3%)	
Working Hours	11-20 hours	40(88.9%)	5(11.1%)	0.040*
	21-30 hours	115(83.9%)	22(16.1%)	
	31-40 hours	192(86.5%)	30(13.5%)	
	>41 hours	46(100.0%)	0(0.0%)	

Table 2: Comparison of musculoskeletal disorder according to

DOI: https://doi.org/10.54393/pjhs.v3i05.245

demographic factors
*Significant Association using Chi square test

DISCUSSION

In the previous 12 months, around 70% of the participating dentists reported one or more occurrences of musculoskeletal illnesses. Lower back discomfort was the most common complaint (65%), then neck pain (53.3%), and wrist/hand pain (37.5%). The average number of hours worked per week and musculoskeletal diseases were found to be positively (P<0.05) [7] and in the current study, lower back pain was also most common complaint (60%), then neck pain (55%). The biomechanics of sitting working postures and physiological damage or pain were the subject of some studies. While some studies looked at the negative consequences of working in one position for extended periods of time, other studies revealed that repetitive unidirectional twisting of the trunk can cause low back pain. Additional research has shown the importance of operators being aware of how to correctly adjust ergonomic equipment and the roles that flexibility and core strength may play in maintaining balanced musculoskeletal health [11, 12, 14] but the current study focused on various factors responsible for musculoskeletal disorders and current study suggested that musculoskeletal disorders are very common among dentists. 89% of the students exhibited low to moderate postural awareness, according to the evaluation of their postural awareness. According to the correlation between postural awareness and the prevalence of MSDs, 40% of students who have good awareness, 49% of students who have moderate awareness, and 75% of students with low awareness have MSDs. The findings, which were statistically significant (0.002127, or 0.005), indicated that a greater awareness of correct working postures reduces the risk of MSDs. Postural awareness scores for the students revealed that 21% had low awareness, 67% had moderate awareness, and 11% had good awareness. The analysis of the data revealed that MSD prevalence was considerably higher among students with low-to-average postural awareness. The consensus is to alternate between long, challenging cases and short, straightforward cases when scheduling patients, and to use a surgical magnification device as needed. It ought to permit a relaxed posture while preserving a clear perspective of the job at hand. Make the necessary lifestyle adjustments for a successful dental practice [14, 15]. From our research it is apparent that although there is room for improvement, the theoretical information on ergonomic neutral positions taught throughout dentistry undergraduate training can be deemed borderline adequate. The lack of emphasis on ergonomics during clinical training, however, is responsible for the result that having sufficient knowledge about ergonomic behaviors does not guarantee the adoption of ergonomically safe practices at the chairside. With a p-value of 0.67 and a Pearson's coefficient of +0.299, the results show that there is no relationship between knowledge and practices [15-17]. Qualitative findings show that having theoretical understanding may not always convert into practical practice. When acquiring new clinical skills, students focus more on getting the dental procedures right than they do on maintaining good posture. Additionally, they fail to notice when their seniors, who ought to serve as role models, do not use proper ergonomic procedures. In conclusion, dental students are only briefly introduced to ergonomics during pre-clinical training and receive minimal more instruction during their clinical rotations. For both pre-clinical and clinical rotations, focus on ergonomic work postures and behaviors needs to be raised during undergraduate training. It is essential that interns and junior teaching faculty regularly attend refresher awareness courses [16, 18-20]. In the current study, before entering the dentistry profession, the majority of the dentists in the current study were questioned about their physical condition and any severe musculoskeletal issues. Campaigns could be launched to spread awareness with the help of physiotherapists, chiropractors, and dental curriculum, emphasising how to work in an ergonomic manner, which would involve taking frequent breaks, avoiding stiff postures for extended periods of time, using magnification to prevent bending the neck, concentrating on strengthening the body's muscles through weight training and exercise, and occasionally using nerve flosses to prevent nerve irritation. CPD programmes can also be made available to lessen the physical demands of the job.

CONCLUSIONS

It can be concluded that in the present study many dentists reported musculoskeletal disorders and had an impact on their career and daily routine life. With two thirds of dentists taking sick time owing to musculoskeletal disorders, combined with the mental stress, it would appear that dentistry is not an easy profession. This would significantly limit the career of dentists. Work ergonomics must be emphasized in the curriculum at the university level, and CPD courses on how to improve workplace ergonomics must be offered.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

DOI: https://doi.org/10.54393/pjhs.v3i05.245

REFERENCES

[1] Susanti Y, Dewi FA, Djojosugito MA, Irasanti SN, Adianto SA. How employment periods and working posture lead to musculoskeletal disorders. InMedical Technology and Environmental Health. 2020 Aug 13 (pp. 342-346). CRC Press.

[2] Saadat S. Work place related health hazards among dental laboratory technicians in karachi. Journal of Pakistan Dental Association. 2017 Oct; 26(04):181.

[3] Shekhawat KS, Chauhan A, Sakthidevi S, Nimbeni B, Golai S, Stephen L. Work-related musculoskeletal pain and its self-reported impact among practicing dentists in Puducherry, India. Indian Journal of Dental Research. 2020 May; 31(3):354. doi: 10.25301/jpda.264.181

[4] Hashim R, Salah A, Mayahi F, Haidary S. Prevalence of postural musculoskeletal symptoms among dental students in United Arab Emirates. BMC Musculoskeletal Disorders. 2021 Jan; 22(1):30. doi: 10.1186/s12891-020-03887-x

[5] Nagarale R, Todkar M, Shaikh RF, Shaikh A, Shaikh R. Assessment of knowledge, attitude and practices towards postural management during dental practices among dental students. 2022

[6] Ali Z, Chishty H, Farwa A, Fletcher Nm, Ali Sm. Musculoskeletal Disorders;: Prevalence Of Musculoskeletal Disorders Among Dental Practitioners Working In Private Dental Clinics In Karachi. The Professional Medical Journal. 2019 Mar; 26(03):488-92.

[7] Rehman B, Aslam A, Ali A, Tariq A. Ergonomic Hazards To Dental Surgeons: A Cross-Sectional Study. Pakistan Oral & Dental Journal. 2016 Mar; 36(1).

[8] Tariq F, Kashif M, Mehmood A, Quraishi A. Prevalence of Neck Pain and its effects on Activities of Daily Living among dentists working in Faisalabad. Rehman Journal of Health Sciences. 2020 Jul; 2(1):10-3. doi: 10.52442/rjhs.v2i1.28

[9] Afridi S, Jamil B, Gilani S. Frequency of Musculo-Skeletal Pain in Dentists Working in Public and Private Sector Dental Hospitals of Peshawar, Pakistan. Journal of Pakistan Dental Association. 2012; 21(4):197-201.

[10] Ambarwati T, Wicaksena B, Sopianah Y, Miko H. Posture work to complaint musculoskeletal disorders at the dentist. Journal of International Dental and Medical Research. 2018; 11(1):57-61.

[11] Alnaser MZ, Almaqsied AM, Alshatti SA. Risk factors for work-related musculoskeletal disorders of dentists in Kuwait and the impact on health and economic status. Work. 2021; 68(1):213-221. doi: 10.3233/WOR-203369

[12] Sezer B, Kartal S, Sıddıkoğlu D, Kargül B. Association between work-related musculoskeletal symptoms and quality of life among dental students: a cross-sectional study. BMC Musculoskeletal Disorders. 2022 Jan; 23(1):41. doi: 10.1186/s12891-022-04998-3

[13] von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. International Journal of Surgery. 2014 Dec; 12(12):1495-9. doi: 10.1016/j.ijsu.2014.07.013

[14] Valachi B and Valachi K. Preventing musculoskeletal disorders in clinical dentistry: strategies to address the mechanisms leading to musculoskeletal disorders. Journal of American Dental Association. 2003 Dec; 134(12):1604-12. doi: 10.14219/jada.archive.2003.0106

[15] Kanaparthy A, Kanaparthy R, Boreak N. Postural awareness among dental students in Jizan, Saudi Arabia. Journal of International Society of Preventive and Community Dentistry. 2015 Dec; 5(Suppl 2):S107-11. doi: 10.4103/2231-0762.172950

[16] Mumtaz R, Haroon S, Sajjad S, Masoud S, Hashmi J. Ergonomics knowledge and practices of dental interns in Islamabad. Pakistan Oral & Dental Journal. 2018 Nov; 38(3):341-4.

[17] Zarra T and Lambrianidis T. Musculoskeletal disorders amongst Greek endodontists: a national questionnaire survey. Int Endodontic Journal. 2014 Aug; 47(8):791-801. doi: 10.1111/iej.12219

[18] Dayakar MM, Gupta S, Philip G, Pai P. Prevalence of musculoskeletal disorder among dental practitioners. ASL Muscuskeletal Diseases. 2013 Jan; 1:22-5.

[19] Hayes M, Cockrell D, Smith DR. A systematic review of musculoskeletal disorders among dental professionals. International Journal of Dental Hygience. 2009 Aug; 7(3):159-65. doi: 10.1111/j.1601-5037.2009.00395.x

[20] Alghadir A, Zafar H, Iqbal ZA. Work-related musculoskeletal disorders among dental professionals in Saudi Arabia. The Journal of Physical Therapy Science. 2015 Apr; 27(4):1107-12. doi: 10.1589/jpts.27.1107.

DOI: https://doi.org/10.54393/pjhs.v3i05.157

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Intensive Care Nurses' Knowledge and Practice of Endotracheal Suctioning Intubated Patients in Tertiary Care Public Sector Hospitals in Karachi, Pakistan

Fauzia Rafiq[1], Badil[2*], Mehwish Hussain[3], Muhammad Farooq Saeed[1] and Gohar Ur Rehman[4]

[1]National Institute of Child Health, Karachi, Pakistan
[2]Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi, Pakistan
[3]Department of Public Health, Imam Abdul Rehman Bin Faisal University, Dammam, Saudi Arabia
[4]English Faculty, School of Nursing, National Institute of Child Health, Karachi

ARTICLE INFO

Key Words:
Intensive Care Nurses, Knowledge, Practice, Endotracheal Suctioning, Intubated Patients

How to Cite:
Fauzia Rafiq, Badil, Hussain , M. ., Saeed, M. F. S., & —, G. U. R. (2022). The Intensive Care Nurses' Knowledge and Practice of Endotracheal Suctioning Intubated Patients in Tertiary Care Public Sector Hospitals in Karachi, Pakistan : Intensive Care Nurses' Knowledge and Practice of Endotracheal Suctioning. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.157

***Corresponding Author:**
Badil
Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi, Pakistan
badil@duhs.edu.pk

Received Date: 4th October, 2022
Acceptance Date: 11th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Endotracheal suctioning is a prime and most common invasive procedure accomplished by inserting an artificial tube in the patient's airway. **Objectives:** To evaluate nurses' knowledge and practice regarding intubated patients' endotracheal suctioning in the intensive care units in the tertiary care hospitals of Karachi, Pakistan. **Methods:** The descriptive cross-sectional study design was employed on intensive care unit nurses from two tertiary care public sector hospitals. A validated and adopted questionnaire was used to collect data. Data were entered and analyzed by using SPSS version 21. A p-value ≤ 0.05 was considered as significant. **Results:** Out of a total of 80 nurses, 57.5% of the participants were males. Male participants' mean knowledge level of ES was 9.0 with SD 2.1 and females with 9.9 with SD 2.3. The mean knowledge level of the female participants was higher than male. Insignificant differences were found among the mean knowledge levels of the male and female participants, with a p-value of p=0.075. Furthermore, the mean score (11.4 ± 1.1 SD) of the practice level of male participants was higher than the mean score (10.8 ± 1.3 SD) of female participants. An insignificant difference was found between the mean practice level of males and females, with a p-value of p=0.126. **Conclusions:** It was concluded that the study's participants working in ICUs of tertiary care hospitals have good knowledge and practice of endotracheal suctioning.

INTRODUCTION

Endotracheal suctioning (ES) is a prime and most common invasive procedure accomplished by inserting an artificial tube in the patient's airway [1]. This procedure removes accumulated pulmonary exudation from the respiratory airway and endotracheal tube of intubated patient [2, 3]. The available suction method is utilized only when the ventilator is removed from the patient and the ventilator is connected during a closed system [4]. The ratio of nosocomial contamination is 40% in advanced countries [5]. The suitable performance of ES directly affects the patient's prognosis [6]. Consequently, all intensive care nurses should have proper, sufficient, and appropriate training regarding the performance of this intervention [7]. Furthermore, nursing science provides the knowledge and skill to nurses to deliver quality care to the patient [8]. Performing inappropriate endotracheal tube suctioning practices is a global problem and persisting in the health care facilities [9]. In developed countries, the patient hospitalization ratio is 10% compared to developing countries, with almost 25% of hospital-acquired infections, prolonged hospital stays, and high financial burden, morbidity, and mortality. It is randomly distributed

DOI: https://doi.org/10.54393/pjhs.v3i05.157

in lower-middle-income countries, and above 90% of these infections arisen [10-12]. Nurses has not been trained for proper endotracheal training, which can lead to recurrent harmful effects and complications of ES, like hypoxia, bronchospasm, atelectasis, tracheal tissue injury, ventilator-associate pneumonia, rise in intracranial pressure, and cardiac dysrhythmia [13-15]. The gap recognized that nurses working in ICUs of Tertiary care hospitals in the region have average knowledge of ET suctioning, though their practices were sound. This study aimed to determine the knowledge and practices of intensive care nurses' performance in endotracheal suctioning intubated patients at selected hospitals in Karachi, Pakistan.

METHODS

The present cross-sectional study was accomplished at Dr. Ruth KM. Pfau Civil Hospital Karachi and Dow University Hospital, Karachi for the period of six months from July 2020 to December 2020. All bed-sided ICU nurses working full time were included in this study. Nurses with a general nursing diploma, BSN or Post RN BScN, valid licenses from the Pakistan Council, and one year in ICU were enrolled for the study. Student nurses, nursing assistants, nursing managers, and infection control nurses were excluded. Universal sampling techniques were applied to approach the subjects. Written informed consent was obtained from all participants before data collection and subjects participated voluntarily. Confidentiality of data was assured. A validated and adopted questionnaire was used for data collection. The questionnaire was explicitly explained to all participants. Ethical approval was taken from the Institutional Review Committee (IRC) of the Institute of Nursing, Dow University of Health Sciences, Karachi, and permission was obtained from respective relevant authorities of both Hospitals. Data were entered and analyzed in SPSS version 21.0. Qualitative variables were presented in frequency and percentages and quantitative variables were computed in mean and standard deviation. Moreover, the practice score of endotracheal tube suctioning among participants was determined by utilizing standard deviation. A p-value ≤ 0.05 was considered as significant.

RESULTS

Table 1 disclosed the demographic characteristics of the study participants. The sample size of this study was eighty participants (n=80), ICUs Nurses from two different tertiary care hospitals in Karachi. The larger number of the participants were males (57.5%) and the remaining were females (42.5%). The academic educational level of the majority of participants was intermediate, n=35(43.75%), matric level participants were n=23(28.45%), and Bachelor's level was n=22(27.50%). The professional qualification of the majority of the participant was a diploma in general nursing n=47(58.75%), Post RN/Generics BSN n=33(41.25%). The duration of experience of the participants was calculated. 35% of the participants had the most extended period of job experience of 5 years, 22.5% of the participants had ten years of experience, and 22.5% had 20 years of experience. 15% of the participants had 15.5% years of experience. The majority (58.8%) of participants had five years of ICU experience, 21.2% had ten years of ICU experience, 15% had 15 years of experience at ICU, and 3.8% had> 20 years of experience in ICU.

Factors	Variable	Frequency (%)
Gender	Male	46 (57.5%)
	Female	34 (42.5%)
Academic Education	Matrices	23 (28.75%)
	Intermediate	35 (43.75%)
	Bachelor	22 (27.5%)
Professional Education	Diploma	47 (58.8%)
	BSc Post RN, BSN	33 (41.2%)
Experiences	1-5 year	28 (35%)
	6-10 year	18 (22.5%)
	11-15year	12 (15%)
	16-20year	18 (22.5%)
	21-25year	4 (5%)
ICUs Experiences	1-5year	47 (58.8%)
	6-10year	17 (21.2%)
	11-15year	12 (15%)
	16-20year	3 (3.8%)
	21-25year	1 (1.2%)
Over, all age Mean	Mean + SD 32.4 + 5.444	

Table 1: Demographic Characteristics of study participants (n=80)

Table 2 exhibits the mean knowledge level of endotracheal suctioning among ICU nurses. Male participants' mean knowledge level of ES was 9.0 with SD 2.1 and females with 9.9 with SD 2.3. The results revealed that the mean knowledge level of the female participants was higher than males. Insignificant differences were found among the mean knowledge levels of the male and female participants, with a p-value of p=0.075. The study results showed that the mean knowledge level of ICU nurses regarding ES of the Dr. Ruth KM Pfau Civil Hospital was higher with a mean 10.4 (SD 1.8) compared to Dow University Hospital with a mean of 8.7 (SD 2.2). A significant difference was found among the knowledge levels of nurses working in the ICUs of Civil Hospital and Dow University Hospital with a P value of p<0.05 (0.0001). A significant difference was found among the education levels of nurses working in the ICUs of Civil Hospital and the Dow University of Hospital with a p-value of <0.05 (0.001). On the other hand, an insignificant difference was found in the professional education of nurses working in the ICUs of Civil Hospital

DOI: https://doi.org/10.54393/pjhs.v3i05.157

and Dow University Hospital with a p-value of <0.05 (0.229). In addition, a significant difference was found among the job experiences of nurses working in the ICUs of Civil Hospital and the Dow University of Hospital with a p-value of <0.05 (0.0001). ICU experiences of more than five years were high at 9.9 (SD 2.0) compared to those of less than five years of ICU experience at 8.9 (SD 2.3). Additionally, a significant difference was established among the job experiences of nurses working in the ICUs of Civil Hospital and the Dow University of Hospital with a p-value of <0.05 (0.042). Nurse patient ratio of more than three patients was high at 10.4 (SD 1.9) as compared to nurses who assigned more than 03 patients, 8.8 (SD 2.2) Significant difference was found in the nurse-patient ratio of nurses working in the ICUs of Civil Hospital and Dow University Hospital with a p-value of <0.05 (0.002).

Factors		Knowledge Score Mean ± SD	p-Value
Gender	Male	9.0 ± 2.1	0.075
	Female	9.9 ± 2.3	
Nurses I/D	Dow Hospital	8.7 ± 2.2	0.0001
	Civil Hospital	10.4 ± 1.8	
Education	Matric	10.7 ± 2.1	0.001
	Intermediate	9.0 ± 2.1	
	B. Sc	8.5 ± 2.0	
Professional Education	Diploma	9.1 ± 2.3	0.229
	Post-R/N	9.7 ± 2.1	
Job experience	<10	8.6 ± 2.0	<0.0001
	>10	10.3 ± 2.2	
ICUs Experience	<5	8.9 ± 2.3	0.042
	>5	9.9 ± 2.0	
Nurse Patient Ratio	1:<3	8.8 ± 2.2	0.002
	1:>3	10.4 ± s1.9	

Table 2: Mean of Knowledge level about Endotracheal Suctioning among ICU nurses (n=80)

Table 3 reveal the mean practice level for endotracheal suctioning among ICU nurses. The findings of this study showed that the mean score (11.4 ± 1.1 SD) of the practice level of male participants was higher than the mean score (10.8 ± 1.3 SD) of female participants. An insignificant difference was found between the mean practice level of males and females, with a p-value of p=0.126. An insignificant difference was found among nurses working in the ICUs of Civil Hospital and Dow University Hospital with a P-value of p<0.05 (0.06). A significant difference was found between Civil Hospital and Dow University Hospital's professional education, p-value <0.05 (0.01). Insignificant difference was established among the job experiences of nurses working in the ICUs of Civil Hospital and the Dow University of Hospital with a p-value of <0.05 (0.393). Insignificant difference was computed among the job experiences of nurses working in the ICUs of Civil Hospital and the Dow University of Hospital with a p-value of <0.05 (0.164). Nurse patient ratio of more than three patients was high at 11.2 (SD 1.2) as compared to nurses who assigned more than 03 patients, 10.3 (SD 1.2) Insignificant difference was determined among the nurse-patient ratio of nurses working in the ICUs of Civil Hospital and Dow University Hospital with a p-value of <0.05 (0.148).

Factors		Practice Score Mean ± SD	p-Value
Gender	Male	11.4 ± 1.1	0.126
	Female	10.8 ± 1.3	
Nurses I/D	Dow Hospital	11.2 ± 1.2	0.6
	Civil Hospital	11.0 ± 1.2	
Education	Matric	10.3 ± 1.0	0.032
	Intermediate	11.6 ± 1.1	
	B. Sc	11.2 ± 1.2	
Professional Education	Diploma	10.7 ± 1.1	0.01
	Post-R/N	11.7 ± 1.1	
Job experience	<10	11.3 ± 1.2	0.393
	>10	10.9 ± 1.1	
ICUs Experience	<5	11.0 ± 1.2	0.164
	>5	11.7 ± 1.2	
Nurse Patient Ratio	1:<3	11.3 ± 1.2	0.148
	1:>3	10.6 ± 1.1	

Table 3: Mean of Practice level for Endotracheal Suctioning among ICU nurses (n=80)

DISCUSSION

This study aimed to assess the knowledge and Practice of ICU nurses regarding ES of the intubated patient at two selected public hospitals in Karachi. At Civil hospital, nurses' knowledge was reasonable compared to Dow hospital. In contrast, practices were the same in both hospitals. It was found that the mean score and standard deviation of nurses for knowledge were (10.4 ± 1.8 SD), respectively, which disclosed that almost all nurses have a good understanding. However, the mean score and standard deviation of practice were (11.2 ± 1.2 SD) respectively. Similarly, a study conducted in Ethiopia in 2017 showed that the mean and standard deviation of nurses' knowledge was (11.14 ± 2.68 SD). In comparison, the mean score and standard deviation of practice were 16.11 ± and 4.14 SD) respectively. 80% of the participants had poor practice, and only 20% of nurses had fair practice. A good score was not observed equally in knowledge and practice [16]. In general, the consequence of this study recommends that using the standard of ES is further effective. However, the positive effects of using the unified methods in the standard ES technique are well-known by numerous nurses, but they do not apply it regularly. The reason for this can be accomplished as follows, lack of awareness of nurses about positive possessions of consuming regular ES procedure; deficiency of average

DOI: https://doi.org/10.54393/pjhs.v3i05.157

strategies or checklist in the practice of nurture involvements; training of nurses on relating to ES lack of nurses in ICU and absence of continuous supervision [17]. A similar study in Turkey in 2017 showed nurses' knowledge at a very good level (59.7%) and a reasonable level (34.7%) [18]. A study carried out in India in 2016 reported that only 42% of nurses washed hands before and 28% of nurses after suctioning, 88% used a face mask, 46% of participants kept sterility of the suction catheter up until introduced into the airway and investigator recognized that in most cases suction catheter was touched with the patient linen and with non-sterile gloves. However, ES specified on the recommendation of AARC that it was a sterilized procedure. Nurses working in India revealed that 7% of staff nurses had inadequate knowledge, 73% had moderate knowledge, and 20% had adequate knowledge [19]. While the results of a recent study presented a mean knowledge of the participants regarding ES, which was 50.04%±18.963%, and the mean practice was 80.37%±8.37. The Practice of Nurses associated with ES occupying a different part of the world was similarly significant. Nurses working at Nepal teaching hospital had better practice than knowledge [20]. The nurse's knowledge regarding the levels of pre, during, and post tracheal suctioning applies and its complications in Aga Khan University, Karachi Pakistan, determined that the suggestion based applies approaches were monitored and continued by the health care specialists and performance a dynamic role in improving and wellbeing of the patient [21].

CONCLUSIONS

It is concluded that the study's participants working in ICUs of tertiary care hospitals have good knowledge and practice of endotracheal suctioning. Knowledge of endotracheal suctioning was found to be a statistically significant association with gender and practice with professional education. Nurses need provision, education, and drill relating to endotracheal suctioning

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Kaur K. Effectiveness of Structured Teaching Programme on knowledge and practices regarding Endotracheal Suctioning among Staff Nurses working in Intensive Care Units of Selected Hospitals of Jalandhar, Punjab, 2021. International Journal of Nursing Education. 2022 Jul; 14(3):98-104. doi: 10.37506/ijone.v14i3.18358

[2] Getahun AB, Belsti Y, Getnet M, Bitew DA, Gela YY, Belay DG, et al. Knowledge of intensive care nurses' towards prevention of ventilator-associated pneumonia in North West Ethiopia referral hospitals, 2021: A multicenter, cross-sectional study. Annals of Medicine and Surgery. 2022 Jun; 78:103895. doi: 10.1016/j.amsu.2022.103895

[3] Shrestha S and Shrestha R. Knowledge and Practice Regarding Endotracheal Suctioning among Nurses of Selected Teaching Hospitals, Bharatpur, Chitwan. Acta Scientific Medical Sciences. 2018; 2(6):10-6.

[4] Bülbül Maraş G, Kocaçal Güler E, Eşer İ, Köse Ş. Knowledge and practice of intensive care nurses for endotracheal suctioning in a teaching hospital in western Turkey. Intensive and Critical Care Nursing. 2017 Apr; 39:45-54. doi: 10.1016/j.iccn.2016.08.006

[5] Asadollahi M, Arshadi Bostanabad M, Jebraili M, Mahallei M, Seyyed Rasooli A, Abdolalipour M. Nurses' knowledge regarding hand hygiene and its individual and organizational predictors. Journal of Caring Sciences. 2015 Mar; 4(1):45-53. doi: 10.5681/jcs.2015.005

[6] Naseh L, Rafiei H, Heidari M. Nurses' attitudes towards euthanasia: a cross-sectional study in Iran. International Journal of Palliative Nursing. 2015 Jan; 21(1):43-8. doi: 10.12968/ijpn.2015.21.1.43

[7] Bagheri Nejad S, Allegranzi B, Syed SB, Ellis B, Pittet D. Health-care-associated infection in Africa: a systematic review. Bull World Health Organ. 2011 Oct; 89(10):757-65. doi: 10.2471/BLT.11.088179

[8] Chen W, Hu S, Liu X, Wang N, Zhao J, Liu P, et al. Intensive care nurses' knowledge and practice of evidence-based recommendations for endotracheal suctioning: a multisite cross-sectional study in Changsha, China. BMC Nursing. 2021 Oct; 20(1):186. doi: 10.1186/s12912-021-00715-y

[9] Menegueti MG, Canini SR, Bellissimo-Rodrigues F, Laus AM. Evaluation of Nosocomial Infection Control Programs in health services. Revista Latino Americana de Enfermagem. 2015 Feb; 23(1):98-105. doi: 10.1590/0104-1169.0113.2530

[10] Nwankwo E. Isolation of pathogenic bacteria from fomites in the operating rooms of a specialist hospital in Kano, North-western Nigeria. The Pan African Medical Journal. 2012; 12:90

[11] Varghese S and Moly K. Exploratory study on the knowledge and skill of critical care nurses on endotracheal suctioning. The Journal of National Accreditation Board for Hospitals & Healthcare Providers. 2016 Jan; 3(1):13. doi: 10.4103/2319-1880.187753.

DOI: https://doi.org/10.54393/pjhs.v3i05.157

[12] Sole ML, Bennett M, Ashworth S. Clinical Indicators for Endotracheal Suctioning in Adult Patients Receiving Mechanical Ventilation. American Journal of Critical Care. 2015 Jul; 24(4):318-24; quiz 325. doi: 10.4037/ajcc2015794

[13] Pinto HJ, D'silva F, Sanil TS. Knowledge and Practices of Endotracheal Suctioning amongst Nursing Professionals: A Systematic Review. Indian Journal of Critical Care Medicine. 2020 Jan; 24(1):23-32. doi: 10.5005/jp-journals-10071-23326

[14] Zeb A, Ali F, Hussain N, Shah SH, Faisal S. Knowledge and practice of ICU nurses regarding endotracheal suctioning in tertiary care hospitals, Peshawar. JOJ Nurse Health Care. 2017; 2(4):555-95.

[15] Esayas A. Assessment of knowledge and practices of intensive care unit nurses towards an open endotracheal suction mechanical ventilated patient in public hospital In Addis Ababa, Ethiopia. Emergency Medicine. 2017GC; 1- 58. http://etd.aau.edu.et/handle/123456789/1076.

[16] Heidari M and Shahbazi S. Nurses' awareness about principles of airway suctioning. Journal of clinical and diagnostic research: Journal of Clinical and Diagnostic Research. 2017 Aug; 11(8):LC17. doi: 10.7860%2FJCDR%2F2017%2F25550.10452

[17] Jack K and Smith A. Promoting self-awareness in nurses to improve nursing practice. Nursing Standard. 2007 Apr; 21(32):47-52. doi: 10.7748/ns2007.04.21.32.47.c4497

[18] Paramjyothi BB, Daniel LE, Indira S. A study to assess the knowledge regarding ET suctioning among staff nurses and student nurses in NMCH, Nellore. International Journal of Applied Research. 2016; 2(6):150-2.

[19] Lamichhane A, Koirala D, Thapa B, Silwal M. Knowledge regarding endotracheal suctioning among Nurses of a teaching hospital of Kaski District. Journal of Gandaki Medical College-Nepal. 2020 Dec; 13(2):178-82. doi: 10.3126/jgmcn.v13i2.30160

[20] Meherali SM, Parpio Y, Ali TS, Javed F. Nurses' knowledge of evidence-based guidelines for prevention of ventilator-associated pneumonia in critical care areas: a pre and post test design. Journal of Ayub Medical College Abbottabad. 2011 Mar; 23(1):146-9

DOI: https://doi.org/10.54393/pjhs.v3i05.271

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Malignant Transformation of the Mature Cystic Teratoma of the Ovary

Mohamed Sid Ahmed[1] and Abderrahman Ahmedou[2]

[1]Cheikh Zayed hospital, Mauritania
[2]Institute Cheikh Zayed hospital, Mauritania

ARTICLE INFO

Key Words:
Malignant transformation, Cystic teratoma, Ovary

How to Cite:
Sid Ahmed, M. ., & Ahmedou, A. . (2022). Malignant Transformation of the Mature Cystic Teratoma of the Ovary: Mature Cystic Teratoma of the Ovary. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.271

***Corresponding Author:**
Mohamed Sid Ahmed
Cheikh Zayed hospital, Mauritania
med_yehdih@yahoo.fr

Received Date: 18th October, 2022
Acceptance Date: 26th October, 2022
Published Date: 31st October, 2022

ABSTRACT

The mature cystic teratoma of ovary is most prevalent type of neoplasm of ovarian germ cells. It accounts for the almost 20% of the neoplasm. **Objective:** To find the malignant transformation of mature cystic teratoma of ovary. **Methods:** The study was conducted on the 28 patients who visited Cheikh Zayed Hospital Mauritania for the duration of six months from July 2018 to December 2018 and patients who underwent surgery related to ovarian cancer. All the patients underwent tumor marker tests to see the level of cancer antigen in their serum. The level of serum SCC antigen was also tested in all patients before carrying out any surgery. The level of CA-19-9 was also measured. CEA level to check the carcinoembryonic antigen was also carried out. **Results:** Among these 28, there were 15 patients that had malignant transformation from MCT. The age of patients was ranging from 28 to 74 years. The median age was 50 years. There were 9 patients that were on a post-menopausal state. There were 4 patients that were reported as nulliparous, the remaining were parous. Almost all the patients were presented with symptoms like lower abdominal pain and feeling of palpable mass in the lower abdomen. **Conclusions:** Malignant transformation in case of MCT is rare but it has poor prognosis. Its quick detection and proper treatment is very important. The use of surgical operation along with adjuvant treatment and chemotherapy have role in controlling the malignancy.

INTRODUCTION

Dermoid cyst is the second name of the MCT. The mature cystic teratoma of ovary is most prevalent type of neoplasm of ovarian germ cells. It account for the almost 20% of the neoplasm. It is always benign in its pure form. There are many complications associated with the mature cystic teratoma, the malignant transformation is one of the rarely occurring complication associated with MCT [1-3]. The incidence and prevalence of the malignant transformation of MCT varies according to different studies. It is observed in the 1-3% of the cases presented at the hospital. Other reports suggested that the frequency can vary from 5-6%. The physicians experience difficulties in diagnosis of the malignant transformation of MCT as there are no specific symptoms associated with the complication. These are also very uncommon. The diagnosis can be made by the post-operative examinations. It is a benign ovarian cystic pathology. The higher number of MT are reported in the women of reproductive age. The three germs layers of the MCT are ectoderm, mesoderm and endoderm [4-5]. Most of the MCT are reported as asymptomatic but few have reported in literature with symptoms. The most common symptoms are the abdomen pain caused by the infection or torsion. On the other hand the pressure effect of mass cause the abdominal distension. The squamous cell carcinoma are more prone to malignant transformation. The epithelial ovarian cancer normally has the high prognosis than the MT. It has poor prognosis [6, 7]. It is a rare type of MT. MT is one of the serious complication. The MT changes can arise from any germ layer. These usually spread out from the

DOI: https://doi.org/10.54393/pjhs.v3i05.271

ovary, but there are lack of true evidences supporting the hypothesis. Preoperative diagnosis of ovarian cancer is the important risk factor for deciding the type of laparoscopic surgery [8-10]. The MT and MCT must be diagnose before the surgery as the surgical procedure for the MT and MCT are different. The one of the challenging aspects of the pre-operative diagnosis is the MCT complex contents.

METHODS

This retrospective study was conducted on 28 patients who visited Cheikh Zayed Hospital Mauritania for the duration of six months from July 2018 to December 2018. The ethical committee of the hospital approved the study. The patients were informed about the objective of the study and written consent was signed by them. The study was conducted on the patients who underwent surgery related to ovarian cancer. All the patients underwent tumor marker tests to see the level of cancer antigen in their serum. The level of serum SCC antigen was also tested in all patients before carrying out any surgery. The level of CA-19-9 was also measured. CEA level to check the carcinoembryonic antigen was also carried out. The data was stratified by using Microsoft and SPSS tool.

RESULTS

The study was carried out to find the malignant transformation of mature cystic teratoma of ovary. The study was conducted on 28 patients who visited Cheikh Zayed Hospital for a duration of six months and underwent surgery related to ovarian cancer. Among these 28, there were 15 patients that had malignant transformation from MCT. The age of patients was ranging from 28 to 74 years. The median age was 50 years. There were 9 patients that were on a post-menopausal state. There were 4 patients that were reported as nulliparous, the remaining were parous. Almost all the patients were presented with symptoms like lower abdominal pain and feeling of palpable mass in the lower abdomen. There was one patient with silent distention of abdomen. There were two patients that had torsion in the vascular pedicle and among these patients there was one that had ruptured cyst leading to hemopertioneum. All the patients underwent tumor marker tests to see the level of cancer antigen in their serum. Out of the 15 patients, there were 5 patients that have their CA 125 levels more than 35ng/mL. The level of serum SCC antigen was also tested in all patients before carrying out any surgery. The level of CA-19-9 was also measured for all the 15 patients. CEA level to check the carcinoembryonic antigen was also carried out and there was one patient in which its level was high (Table 1).

Sr. #	Age in years	Menopause	Para	Signs at diagnosis	High tumor marker	Size of tumor	Findings	Extra ovarian problem	Name of operation	FIGO stage	Adjuvant Therapy	F/U after operation (in months)
1	68	Yes	4	Pain in lower abdomen	SCC-Ag (2.2 ng/Ml)	11	Cyst (unilocular) along with solid mass	No	TAH,BSO	IA	FPx3	Alive, 98
2	49	Yes	3	Pain in lower abdomen	-	19	Cyst (unilocular) along with solid mass	No	TAH,BSO, Appe,TO	IA	-	DOD,50
3	74	Yes	2	Palpable mass	-	19	Cyst (unilocular) along with solid mass	No	TAH,RSO	IA	-	Alive,52
4	54	Yes	5	Palpable mass	-	14	-	No	TAH,PLND, BSO	IA	FPx3	Alive,134
5	45	No	1	Palpable mass	CA-125 (65.2 U/mL), SCC-Ag (13.4ng/mL)	11	Cyst (unilocular) along with solid mass and thick wall	No	BO,BSO,TAH	IA	-	DOD,21
6	62	Yes	4	Pain in lower abdomen	CEA (28.3 ng/mL)	4	Cyst (unilocular) along with solid mass	No	TAH,TO,BSO	IA	CAPx2	DOD,7
7	48	No	0	Pain in lower abdomen, weight loss	-	4	Cyst (unilocular) along with solid mass	Pelvic peritoneum of 1cm	Mass excision PLNS	IIB	-	Alive,160
8	31	No	0	Pain in lower abdomen	CA-125 (144 U/mL), SCC-Ag (22.4ng/mL)	25	Multilocular cyst	Omentum cake 3cm, bladder serosa	Appe, BSO,TO	IIIC	FPx6	DOD,1
9	28	No	1	Pain in lower abdomen	SCC-Ag (2.4ng/mL)	19	Cyst (unilocular) along with solid mass	Pelvic LN 3cm	PLND,LSO, TAH	IIIC	TPx9	Alive, 148
10	30	No	0		CA-125 (158 U/mL)	19	Cyst (unilocular) along with solid mass	Paraaortic LNs (x2)	Appe,TAH, BSO	IIIC	-	Alive, 21
11	70	Yes	4	Palpable mass	CA-125 (69.1 U/mL)	9	Cyst (unilocular) along with solid mass	Pelvic LN 5mm	PALND,PLND, TO	IIIC	CCRT TPx3	DOD,11
12	42	No	1	Pain in lower abdomen	CA-125 (35.2 U/mL)	9	Multilocular cyst	Omentum 3mm	Laparoscopic RSO	IIIC	TCx9	Alive, 12
13	49	Yes	0	Palpable mass	-	17	Cyst (unilocular) along with solid mass	Paraaortic LN (x1)	BSO,Appe,TO	IA	Capx8	Alive, 6
14	70	Yes	5	Pain in lower abdomen	-	11	Cyst (unilocular) along with solid mass	Small bowl diaphragm	PLND,TO	IIIC	TCx9	DOD, 7
15	43	No	1	Palpable mass	-	11	Multilocular cyst	Sigmoid colon	TAH,TO,BSO	IIIC	CAPx8	Alive, 125

Table 1: Features of Patients

DOI: https://doi.org/10.54393/pjhs.v3i05.271

DISCUSSION

The rate of mature cystic teratoma and its incidence (1.7% of all ovarian cancers) in our study was correlating to previous studies as well. SCC antigen was found to be most prevalent type of antigen found in our study same is the findings by previous studies as well [11]. As per studies, the average age at which the malignant transformation is commonly diagnosed is 55 to 62 years [12]. In our study most of the patients were in the post-menopausal state. As per previous studies there is a role in age of the patient and the early diagnosis. Most of the patients visited the hospital with the problem of lower abdominal pain. There were some patients that reported about the feeling of palpable mass in the lower abdominal area. Abdominal distention was also one of the complaints of the patients. As per previous studies the duration of MCT diagnosis and the malignant transformation is from 2 to 20 months that means that there can be long duration of time between MCT diagnosis and the malignant transformation [13, 14]. CA-125 along with SCC were the most successful tumor markers for making diagnosis. However, the use of SCC for the diagnosis of malignant transformation has a low success rate of 20% as per previous reports. In our study three patients have SCC levels disturbed. Therefore, SCC antigen alone is unable to diagnose malignant transformation. Another study has shown that in case where cancer reoccurrence has occurred, the use of SCC antigen can prove to be successful for diagnosis. The imaging features of tumor can help doctors diagnose about the malignant transformation more easily. As per previous studies there is a solid mass with a contrast color along with an irregular invasion that can clue towards the malignant transformation [15, 16]. It is reported by studies that a tumor of size greater than 10 cm is usually considered to be malignant. In the present study the mean size of tumor was 13 cm. multiple reports prove that MCT has a bad prognosis. The rupture of cyst, vascular invasion, tumor grading is some of the prognostic markers used for its early prognosis. Optical cytoreductive surgery has been showing good results [17]. There are several authors that suggest the use of multimodality therapy that includes aggressive cytoreduction which is then followed by chemotherapy sessions. The nature of tumor is one important factor to study, most of the tumors in this study had a cartilage like substance or greasy substance present inside it [18]. Most of the tumors were unilocular and solid mass was found in them. There was one patient who had thick wall around her cyst. There were 3 patients that had cysts with enormous solid component present in it which suspected the condition like uterine leiomyoma. In our study 12 patients had to go through primary surgical procedure, there were 4 patients that were sent from other hospitals, their surgery was incomplete and they went through secondary surgical procedure at Cheikh Zayad hospital. Peritoneal biopsies were carried out on all the patients. there were several stages of the treatment including collection of clinical data, FIGO stage, adjuvant treatment, then complete follow-up of the patient. The patients who got adjuvant treatment followed by chemotherapy had better chances to recover as compared to others [19, 20]. The most important factor to note here is that the tumor should be taken care of before it starts malignant transformation. Some of the patients reported about the mild signs and symptoms reappearing but in most of the cases there was no recurrence. Another study had demonstrated that the survival rate is increased 100% with the unilateral salpingo-oophorectomy. There is not a single case that shows reoccurrence after using this procedure irrespective, whether the patient was provided adjuvant therapy or not [21, 22]. However, in our study 6 patients died and remaining 9 lived. Only three patients out of 15 received adjuvant therapy others left their staging procedure incomplete. One of the limitations of this study was that the study time was quite less, six months are not enough for a complete follow-up of the cancer patient. Also, if study could be extended and data from more than one hospital is taken then more precise results can be drawn.

CONCLUSIONS

Malignant transformation in case of MCT is rare but it has poor prognosis. Its quick detection and proper treatment is very important. The use of surgical operation along with adjuvant treatment and chemotherapy have role in controlling the malignancy. This type of malignancy is mainly found in women of more than 50 years of age who are in their post-menopausal state and it is linked with large tumors. The SCC and CA-125 levels are increased and can be used as makers for its detection.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Park JY, Kim DY, Kim JH, Kim YM, Kim YT, Nam JH. Malignant transformation of mature cystic teratoma of the ovary: experience at a single institution. European Journal of Obstetrics and Gynecology and Reproductive Biology. 2008 Dec; 141(2):173-8. doi: 10.1016/j.ejogrb.2008.07.032

[2] Bal A, Mohan H, Singh SB, Sehgal A. Malignant transformation in mature cystic teratoma of the ovary: report of five cases and review of the

DOI: https://doi.org/10.54393/pjhs.v3i05.271

literature. Archives of Gynecology and Obstetrics. 2007 Mar; 275(3):179-82. doi: 10.1007/s00404-006-0244-x

[3] Yamanaka Y, Tateiwa Y, Miyamoto H, Umemoto Y, Takeuchi Y, Katayama K, et al. Preoperative diagnosis of malignant transformation in mature cystic teratoma of the ovary. European journal of gynaecological oncology. 2005 Jan; 26(4):391-2. doi: 10.1016/s0090-8258(03)00259-2

[4] Li C, Zhang Q, Zhang S, Dong R, Sun C, Qiu C, et al. Squamous cell carcinoma transformation in mature cystic teratoma of the ovary: a systematic review. BMC cancer. 2019 Dec; 19(1):1-2. doi: 10.22541/au.161452575.51616620/v1

[5] Hackethal A, Brueggmann D, Bohlmann MK, Franke FE, Tinneberg HR, Münstedt K. Squamous-cell carcinoma in mature cystic teratoma of the ovary: systematic review and analysis of published data. The lancet oncology. 2008 Dec; 9(12):1173-80. doi: 10.1016/s1470-2045(08)70306-1

[6] Ulker V, Numanoglu C, Akbayir O, Akyol A, Tuncel A, Akca A, et al. Malignant transformation arising from mature cystic teratoma of the ovary: a report of six cases. Journal of Obstetrics and Gynaecology Research. 2012 May; 38(5):849-53. doi: 10.1111/j.1447-0756.2011.01797.x

[7] Sakuma M, Otsuki T, Yoshinaga K, Utsunomiya H, Nagase S, Takano T, et al. Malignant transformation arising from mature cystic teratoma of the ovary: a retrospective study of 20 cases. International Journal of Gynecologic Cancer. 2010 Jun; 20(5). doi: 10.1111/IGC.0b013e3181daaf1d

[8] Rim SY, Kim SM, Choi HS. Malignant transformation of ovarian mature cystic teratoma. International Journal of Gynecologic Cancer. 2006 Jan; 16(1). doi: 10.1136/ijgc-00009577-200601000-00023

[9] Yoshioka T and Tanaka T. Immunohistochemical and molecular studies on malignant transformation in mature cystic teratoma of the ovary. Journal of Obstetrics and Gynaecology Research. 1998 Apr; 24(2):83-90. doi: 10.1111/j.1447-0756.1998.tb00057.x

[10] Wu RT, Torng PL, Chang DY, Chen CK, Chen RJ, Lin MC, et al. Mature cystic teratoma of the ovary: a clinicopathologic study of 283 cases. Chinese Medical Journal. 1996 Oct; 58(4):269-74.

[11] Oranratanaphan S and Khemapech N. Characteristics and treatment outcomes of patients with malignant transformation arising from mature cystic teratoma of the ovary: experience at a single institution. Asian Pacific Journal of Cancer Prevention. 2013; 14(8):4693-7. doi: 10.7314/APJCP. 2013.14.8.4693

[12] Dos Santos L, Mok E, Iasonos A, Park K, Soslow RA, Aghajanian C, et al. Squamous cell carcinoma arising in mature cystic teratoma of the ovary: a case series and review of the literature. Gynecologic Oncology. 2007 May; 105(2):321-4. doi: 10.1016/j.ygyno.2006.12.008.

[13] Koc S, Tapisiz OL, Turan T, Ocalan R, Ozfuttu A, Boran N, et al. Malignant transformation of mature cystic teratoma of the ovary: a case series. Journal of experimental therapeutics & oncology. 2015 Jan; 11(1).

[14] Hosokawa T, Sato Y, Seki T, Maebara M, Ito K, Kuribayashi S. Malignant transformation of a mature cystic teratoma of the ovary with rupture. Japanese Journal of Radiology. 2010 Jun; 28(5):372-5. doi: 10.1007/s11604-010-0434-0

[15] Park CH, Jung MH, Ji YI. Risk factors for malignant transformation of mature cystic teratoma. Obstetrics and gynecology science. 2015 Nov 16; 58(6):475-80. doi: 10.5468/ogs.2015.58.6.475

[16] Lai PF, Hsieh SC, Chien JC, Fang CL, Chan WP, Yu C. Malignant transformation of an ovarian mature cystic teratoma: computed tomography findings. Archives of Gynecology and Obstetrics. 2005 Apr; 271(4):355-7. doi: 10.1007/s00404-004-0676-0

[17] Chen RJ, Chen KY, Chang TC, Sheu BC, Chow SN, Huang SC. Prognosis and treatment of squamous cell carcinoma from a mature cystic teratoma of the ovary. Journal of the Formosan Medical Association. 2008 Nov; 107(11):857-68. doi: 10.1016/S0929-6646(08)60202-8

[18] Kawai M, Kano T, Kikkawa F, Morikawa Y, Oguchi H, Nakashima N, et al. Seven tumor markers in benign and malignant germ cell tumors of the ovary. Gynecologic oncology. 1992 Jun; 45(3):248-53. doi: 10.1016/0090-8258(92)90299-X

[19] Lim SC, Choi SJ, Sun CH. A case of small cell carcinoma arising in a mature cystic teratoma of the ovary. Pathology international. 1998 Oct; 48(10):834-9. doi: 10.1111/j.1440-1827.1998.tb03846.x

[20] Park SB, Cho KS, Kim JK. CT findings of mature cystic teratoma with malignant transformation: comparison with mature cystic teratoma. Clinical imaging. 2011 Jul;35(4):294-300. doi:10.1016/j.clinimag.2010.08.016

[21] Levine DA, Villella JA, Poynor EA, Soslow RA. Gastrointestinal adenocarcinoma arising in a mature cystic teratoma of the ovary. Gynecologic oncology. 2004 Aug; 94(2):597-9. doi: 10.1016/j.ygyno.2004.05.045

[22] Contreras AL and Malpica A. Angiosarcoma arising in mature cystic teratoma of the ovary: a case report and review of the literature. International Journal of Gynecological Pathology. 2009 Sep; 28(5):453-7. doi: 10.1097/pgp.0b013e31819d4574.

DOI: https://doi.org/10.54393/pjhs.v3i05.201

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Maternal and Neonatal Outcome of Women Having Decreased Fetal Movements in The Third Trimester of Pregnancy: A Cross-`Sectional Study

Naseeb Nama[1*], Shazia Ramzan[2], Sana Umer Arain[3], Nadira Kasi[4], Madhu Bala[5] and Tahmina Mahar[6]

[1]Department of Obstetrics and Gynecology, Sandeman Provincial Hospital Quetta, Pakistan
[2]Department of Obstetrics and Gynecology, Bolan Medical Complex Quetta, Pakistan
[3]Department of Obstetrics and Gynecology, Aga khan Secondary Hospital Hyderabad, Pakistan
[4]Department of Obstetrics and Gynecology, Civil Hospital Quetta, Pakistan
[5]Department of Obstetrics and Gynecology, Muhammad Medical and Dental College Mirpurkhas, Pakistan
[6]Department of Obstetrics and Gynecology, Ghulam Muhammad Mahar Medical College Teaching Hospital Sukkur, Pakistan

ARTICLE INFO

Key Words:

neonatal outcome, reduced fetal movements, trimester, stillbirth, obstetric outcome.

How to Cite:

Nama, N. ., Ramzan, S. ., Umer Arain, S. ., Kasi, N. ., Bala, M. ., & Mahar, T. . (2022). Maternal and Neonatal Outcome of Women Having Decreased Fetal Movements in The Third Trimester of Pregnancy: A Cross-Sectional Study: Maternal and Neonatal Outcome of Women Having Decreased Fetal Movements. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.201

***Corresponding Author:**

Naseeb Nama
Department of Obstetrics and Gynecology, Sandeman Provincial Hospital Quetta, Pakistan
drnaseebnama@yahoo.com

Received Date: 5th October, 2022
Acceptance Date: 13th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Every year, 2.6 million newborns are stillborn throughout the world. **Objective:** To determine the obstetric and neonatal outcomes among women presenting with reduced fetal movements in the third trimester of pregnancy. **Methods:** The pregnant women were in the low as well as a high-risk category. The pregnant women were advised to count 3 times a day post-meal or use the Count to 10 techniques to track their fetal movements in the third-trimester phase. The antenatal presentation was documented, blood pressure was taken, and a comprehensive BPP was performed All perinatal outcomes were documented, involving both pregnancies that continued as well as deliveries that occurred at a later gestational age. **Results:** A total of 110 pregnant women with reduced fetal movement (RFM) were taken as a part of this research. The average age was 35 years. A total of 56 were from the high-risk category while 54 were from the low-risk category. Out of 49% (n= 54) women, 15 women were more sensitive to the subjective experience of RFM due to factors such as an anterior placenta, overweight, as well as increased maternal stress. Out of 56 high-risk category women, 15 women revealed an abnormality in the volume of liquor. While on the other hand, out of 54 low-risk category women, 8 showed less prevalence of abnormal liquor volume. **Conclusions:** High-risk pregnancies accounted for a considerable percentage of individuals having RFM. Comparing the high-risk category with the low-risk category reveals that the rising incidence of stillbirth as well as low BPP were present at the time pregnant women were admitted.

INTRODUCTION

Every year, 2.6 million newborns are stillborn throughout the world [1]. Approximately one in every two stillbirths happens during childbirth in poor and middle-income countries. Many stillbirths that occur in high-income countries happen during the antenatal period, which may give time to reduce the chance by modifying the lifestyle and behaviour, improving comorbidity treatment, screening small-for-gestational-age (SGA) fetuses, and educating about the significance of fetal movement screening [2]. A self-screening technique for determining the well-being of the fetus is the mother's observation of fetal movements. Reduced fetal movement (RFM) has been linked to a number of unfavourable perinatal outcomes, according to research. Pregnant women accompanied by fetal growth restriction, premature childbirth, fetal distress, or stillbirth affect around one-quarter of women who arrive with RFM [3]. There is a link between RFM events and stillbirth, according to an increasing number of research. Around 55% of women who experience stillbirth report RFM prior to diagnosis. Inadequate clinician

DOI: https://doi.org/10.54393/pjhs.v3i05.201

intervention to the report of RFM is a key significant contributing factor that causes stillbirth [4], while placental dysfunction is also found to be a possible risk [5]. Fetal movement counts may enable clinicians to intervene at the right moment to optimize perinatal outcomes. After 28 gestational weeks, it is important that clinician should educate expectant mothers about the necessity of monitoring fetal movements as it enables early detection, prompt evaluation, and management for fetuses at risk of negative outcomes [6]. The efficacy of maternal-fetal movement counts to avoid having an unfavourable pregnancy outcome, nevertheless, is still being discussed in the literature. Since this strategy may lead to more medical treatments without discernible benefits, new research has cast doubt on its effectiveness [7]. Therefore, the purpose of this study was to compare the effects of any potential unneeded procedures with the pregnancy outcomes. The major goal of this observational research was to examine the pregnancy features and outcomes in women with reduced fetal movements (RFM) who presented to the hospital.

METHODS

All pregnant women having 28 weeks or more than 28 weeks of gestation with the complaint of reduced fetal movement (RFM) were included in this research. The pregnant women were in the low as well as a high-risk category. The pregnant women were advised to count 3 times a day post-meal or use the Count to 10 techniques to track their fetal movements in the third-trimester phase. Women having multiple pregnancies or pregnancies with antenatally confirmed congenital abnormalities were not allowed to participate in the research. All participants gave their written consent after being fully informed. Before the study got started, the Institutional Ethical Committee gave its approval. Medical issues and prescription drugs were recorded throughout the data-gathering process. Demographic information, pregnancy features (such as parity and gestational age), as well as perinatal risk factors, were collected. The antenatal presentation was documented, blood pressure was taken, and a comprehensive BPP was performed. Throughout BPP, the maternal impression of fetal movements was evaluated. Placental location as well as an abruption, was also evaluated during the ultrasound. Delivery was done in women having RFM or poor BPP assessment. Those women who continued their pregnancy despite of facing RFM complained of further perception of reduced movements. In the end, all perinatal outcomes were documented, involving both pregnancies that continued as well as deliveries that occurred at a later gestational age. The Poor perinatal outcome was described as one or more of the ones that follow: the poor APGAR score, resuscitation requirement, neonatal acidosis, perinatal asphyxia needing treatments, meconium-stained liquor, and NICU hospitalization.

RESULTS

A total of 110 pregnant women with RFM were taken as a part of this research. The average age was 35 years. Out of 110 pregnant women, 80 women were primigravida while on the other hand, while 30 women were multigravida. Only those women whose gestational age was either 28 weeks or more than 28 weeks were included in this research. Out of 110 pregnant women, 50 women were at 37 to 40 weeks, 20 were at 34 to 37 weeks, 15 were at 28 weeks and 25 were at more than 40 weeks of gestational age when presented with RFM. Out of 110 women, a significant number of pregnant women were from the high-risk category (n= 56) which is shown in the table 1.

Risks	Frequency(%)
Pre-eclampsia	15(13.6%)
Fetal Growth Restriction	10(9.1%)
Gestational Diabetes	7(6.4%)
Placenta previa	5(4.5%)
Abruption	2(1.8%)
Oligohydramnios	9(8.2%)
Polyhydramnios	8(7.3%)
Total	56(50.9%)

Table 1: High-Risk Category

Both the mother and the fetus have high risk factors. The pathological NST or a bad fetal activity pattern on the USG were both indicators of poor BPP. Despite the fact that just 39% (n= 22 / 56) of women from the high-risk category had low BPP, 58% were delivered regardless of gestational age. Indications included RFM, having a term or close to term, as well as the high-risk pregnancies, which made the obstetrician concerned. A greater percentage (49%) of low-risk pregnancies showed RFM later. Out of 49% (n= 54) women, 15 women were more sensitive to the subjective experience of RFM due to factors such as an anterior placenta, overweight, as well as increased maternal stress. About 11 women presented with more than one episode of reduced fetal movement, 6 women showed bad BPP as abnormal NST, oligoamnios, and poor fetal activity pattern on USG as shown in table 2.

DOI: https://doi.org/10.54393/pjhs.v3i05.201

Risks	Frequency(%)
Anterior Placenta	8(7.3%)
Obesity	4(3.6%)
Stress/ Anxiety	3(2.7%)
>1 RFM	11(10.0%)
Poor BPP	3(2.7%)
Oligoamnios	1(0.9%)
Poor fetal behavioral pattern	2(1.8%)
Total	32(29.1%)

Table 2: Low Risk Pregnancy

All patients who developed RFM after receiving steroid prophylaxis had excellent BPP with the exception of slow gross motor movements and lower variation in NST, which progressively improved. Nevertheless, just a few were delivered at the time of presentation, both in the high as well as low-risk categories. Their neonatal outcomes were all favorable. Out of 56 high-risk category women, 15 women revealed an abnormality in the volume of liquor. While on the other hand, out of 54 low-risk category women, 8 showed less prevalence of abnormal liquor volume given in table 3.

Liquor Volume And Rfm	Pregnancy		Total
	High risk category	Low risk category	
More than 20	9	3	12
Less than 8	6	5	11
Normal	41	46	87
Total	56	54	110

Table 3: Liquor Volume and Rfm

DISCUSSION

Pregnant women frequently have subjective perceptions of RFM. Regardless of the obvious risks, such complaints worry both pregnant women and those who provide care. These women should be given special consideration due to the clear link between maternal perception and stillbirth [8]. But in the majority of the circumstances, the mother soon realizes that this is just a temporary perception and that her fetus is actually acting normally. Sheikh et al., investigated 729 normotensive pregnancies that resulted in healthy term babies [9]. In this study, 110 pregnant women with complaints of RFM were analyzed for the outcomes. All women were either from high-risk or low-risk categories. The purpose of this research was to identify the subgroup of pregnant women who are expected to experience a poor perinatal outcome and require delivery. As a result, our study demonstrates that even one episode of reduced fetal movement in a high-risk category should be addressed carefully. The majority of such neonatal deaths may have been avoided with prompt delivery. According to research, around 40% of women wait until they had noticed no movements for 24 hours before seeking medical help. As a result, it is crucial to advise RFM patients that they require immediate medical assistance rather than waiting until they experience no movements [10]. The feeling of diminished fetal movements by the mother has been linked to poor pregnancy consequences, such as stillbirth. Other factors of reported fetal activity are not well understood. While the perception of decreased fetal activity is linked to a higher chance of late stillbirth, rising fetal movement during the third trimester is an indication of fetal well-being [11]. Another research evaluated 292 low-risk category pregnant women with C/O RFM; 5 (1.7%) died on initial assessment, and 4.4% of patients underwent rapid delivery due to abnormal maternal as well as fetal analysis [12]. In another research which was performed to analyze low-risk pregnancy outcomes with complaints of RFM, it was found that RFM was strongly related to the IUFD, nulliparity, and smoking as well as mild adverse neonatal outcomes [13]. Therefore, even in low-risk women, recurrent bouts of RFM should be addressed carefully. In this population, delivering on time reduces a high percentage of stillbirths, primarily due to unknown factors. (Such as Fetal Growth Restriction). According to research, the multiparous women who sought treatment for reduced fetal movements along with an IVF pregnancy had the second-highest chance of experiencing poor fetal outcomes, as determined. A prior Canadian study indicated that IVF pregnancies are far more likely to result in intrauterine growth restriction [14]. A strong correlation between RFM and placental insufficiency was found in another study. Those women that experienced RFM before stillbirth were considerably less prone to suffer significant proteinuria as well as previous pregnancy miscarriages at less than 24 weeks than women without RFM. Furthermore, RFM was found to be a sign of placental insufficiency, resulting in diminished nutritional or oxygen supply and the fetus saving energy. FGR, on the other hand, was not shown to be substantially linked with RFM [15]. RFM may be associated with liquor abnormalities, including oligohydramnios as well as polyhydramnios. Several investigations have found that fetuses having oligohydramnios had higher perinatal morbidity. It is advised to perform Doppler velocimetry, liquor testing, and fetal growth centile assessments in addition for women experiencing RFM. This aids in the identification of undiagnosed placental insufficiency accompanied or unaccompanied by cerebral redistribution. The results of a study showed that the incidence of a composite bad newborn outcome ranged from 6.2% to 18.4% among women seeking therapy for diminished fetal activity. The group of women with a small-for-gestational-age fetus had the highest risk for a poor neonatal outcome (18.4%). Another high-risk category (12.8%) included women who had in vitro fertilization pregnancies and had fetuses that were normal birthweight or large for gestational age [16].

DOI: https://doi.org/10.54393/pjhs.v3i05.201

The results of a study point to a connection between the frequency of stillbirth and the occurrence of changes in fetal movements' amount and quality in the weeks before conception. After educating and enlightening the expectant mothers about the significance of the interventions on fetal movement counting, which address both the number and density of fetal movements, the poor perinatal outcomes may be reduced to some extent [17]. In an Indian study, the majority of women experiencing decreased fetal movements were Primigravida (80%), between the ages of 20 and 30, and 72.5% were carrying term babies [18]. In another study in 26% of cases, decreased fetal movements were linked to unfavourable pregnancy outcomes, such as preterm birth and fetal growth limitation [19]. After RFM, 22.1% of pregnancies resulted in poor perinatal outcomes. Infants that were small for gestational age were the most prevalent problem [20].

CONCLUSIONS

High-risk pregnancies accounted for a considerable percentage of individuals having RFM. Comparing the high-risk category with the low risk category reveals that the rising incidence of stillbirth as well as low BPP were present at the time they were admitted. A considerable percentage of such fetuses showed poor BPP, as well as most of them, had been compromised during delivery, thus > 2 bouts of RFM, even in the low-risk category of pregnant women, seems important. It is best to prevent unnecessary deliveries, particularly in low-risk pregnancies, as the prophylactic use of steroids for fetal lung maturation produces temporary alterations in BPP.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Huang C, Han W, Fan Y. Correlation study between increased fetal movement during the third trimester and neonatal outcome. BMC Pregnancy Childbirth. 2019 Dec; 19(1):467. doi: 10.1186/s12884-019-2637-4.

[2] Turner JM, Flenady V, Ellwood D, Coory M, Kumar S. Evaluation of Pregnancy Outcomes Among Women with Decreased Fetal Movements. JAMA Network Open. 2021 Apr; 4(4): e215071. doi: 10.1001/jamanetworkopen.2021.5071.

[3] Poojari VG, Kumar SS, Vasudeva A. Obstetric and neonatal outcome among women presenting with reduced fetal movements in third trimester. International journal of reproduction, contraception, obstetrics and gynecology. 2017;7(1):88-93.

[4] Saastad E, Vangen S, Frøen JF. Suboptimal care in stillbirths - a retrospective audit study. Acta Obstetricia et Gynecologica Scandinavica. 2007;86(4):444-50. doi: 10.1080/00016340701207724.

[5] Warrander LK and Heazell AE. Identifying placental dysfunction in women with reduced fetal movements can be used to predict patients at increased risk of pregnancy complications. Medical hypotheses. 2011 Jan; 76(1):17-20. doi: 10.1016/j.mehy.2010.08.020.

[6] Winje BA, Saastad E, Gunnes N, Tveit JV, Stray-Pedersen B, Flenady V, et al. Analysis of 'count-to-ten' fetal movement charts: a prospective cohort study. British journal of obstetrics and gynecology. 2011 Sep; 118(10):1229-38. doi: 10.1111/j.1471-0528.2011.02993.x.

[7] Maslovich MM and Burke LM. Intrauterine fetal demise. In Stat Pearls [Internet] 2021 Nov.

[8] Stacey T, Thompson JM, Mitchell EA, Ekeroma A, Zuccollo J, McCowan LM. Maternal perception of fetal activity and late stillbirth risk: findings from the Auckland Stillbirth Study. Birth. 2011 Dec; 38(4):311-6. doi: 10.1111/j.1523-536X.2011.00490.x.

[9] Sheikh M, Hantoushzadeh S, Shariat M. Maternal perception of decreased fetal movements from maternal and fetal perspectives, a cohort study. BMC Pregnancy Childbirth. 2014 Aug; 14:286. doi: 10.1186/1471-2393-14-286.

[10] Olagbuji BN, Igbarumah S, Akintayo AA, Olofinbiyi BA, Aduloju PO, Alao OO. Maternal understanding of fetal movement in third trimester: a means for fetal monitoring and reducing stillbirth. Nigerian journal of clinical practice. 2014 Aug; 17(4):489-94. doi: 10.4103/1119-3077.134049.

[11] Thompson JMD, Wilson J, Bradford BF, Li M, Cronin RS, Gordon A, et al. A better understanding of the association between maternal perception of fetal movements and late stillbirth-findings from an individual participant data meta-analysis. BMC Medicine. 2021 Nov; 19(1):267. doi: 10.1186/s12916-021-02140-z.

[12] Levy M, Kovo M, Barda G, Gluck O, Koren L, Bar J, *et al.* Reduced fetal movements at term, low-risk pregnancies: is it associated with adverse pregnancy outcomes? Ten years of experience from a single tertiary center. Archives of Gynecology and Obstetrics. 2020 Apr; 301(4):987-993. doi: 10.1007/s00404-020-05516-3.

[13] Bhatia M, Mitsi V, Court L, Thampi P, El-Nasharty M, Hesham S, et al. The outcomes of pregnancies with reduced fetal movements: A retrospective cohort

DOI: https://doi.org/10.54393/pjhs.v3i05.201

study. Acta Obstetricia et Gynecologica Scandinavica. 2019 Nov; 98(11):1450-1454. doi: 10.1111/aogs.13671.

[14] McPherson NO, Zander-Fox D, Vincent AD, Lane M. Combined advanced parental age has an additive negative effect on live birth rates-data from 4057 first IVF/ICSI cycles. Journal of Assisted Reproduction and Genetics. 2018 Feb; 35(2):279-287. doi: 10.1007/s10815-017-1054-8.

[15] Ter Kuile M, Erwich JJHM, Heazell AEP. Stillbirths preceded by reduced fetal movements are more frequently associated with placental insufficiency: a retrospective cohort study. Journal of perinatal medicine. 2021 Jul; 50(6):668-677. doi: 10.1515/jpm-2021-0103.

[16] Sterpu I, Pilo C, Koistinen IS, Lindqvist PG, Gemzell-Danielsson K, Itzel EW. Risk factors for poor neonatal outcome in pregnancies with decreased fetal movements. Acta Obstetricia et Gynecologica Scandinavica. 2020 Aug; 99(8):1014-1021. doi: 10.1111/aogs.13827.

[17] Bekiou A and Gourounti K. Reduced Fetal Movements and Perinatal Mortality. Materia Socio-Medica. 2020 Sep; 32(3):227-234. doi: 10.5455/msm.2020.32.227-234.

[18] Nandi N and Agarwal R. Prospective study of maternal perception of decreased fetal movement in third trimester and evaluation of its correlation with perinatal compromise. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2019 Feb; 8(2):687-92.

[19] Holm Tveit JV, Saastad E, Stray-Pedersen B, Børdahl PE, Frøen JF. Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy. Acta Obstetricia et Gynecologica Scandinavica. 2009; 88(12):1345-51. doi: 10.3109/00016340903348375.

[20] Dutton PJ, Warrander LK, Roberts SA, Bernatavicius G, Byrd LM, Gaze D, et al. Predictors of poor perinatal outcome following maternal perception of reduced fetal movements—a prospective cohort study. PLoS One. 2012; 7(7): e39784. doi: 10.1371/journal. pone. 0039784.

DOI: https://doi.org/10.54393/pjhs.v3i05.178

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Outcome of Volar Barton Fractures Treated with Locking Compression Plates: A Cross-Sectional Study

Ahmed Raza Laghari[1*], Sijad Ahmed Mahar[2], Hussain Bux Palh[3], Waseem Ahmed[4], Ali Muhammad Bhutto[1], Farukh Hussain[5] and Niaz Hussain Keerio[4]

[1]Department of Orthopaedics, Ghulam Mohammed Mahar Medical College / Civil Hospital Sukkur, Pakistan
[2]Department of Orthopaedics, Ghulam Mohammed Mahar Medical College Sukkur, Pakistan
[3]Department of Orthopaedics, Gambat Medical college Pir Syed Abdul Qadir Shah Jellani Institute of Medical Science GIMS Gambat, Pakistan
[4]Department of Orthopaedics, Muhammad Medical College and Hospital Mirpurkhas, Pakistan
[5]Department of Orthopaedics, Jinnah Postgraduate Medical Center, Karachi, Pakistan

ARTICLE INFO

Key Words:
locking compression plates, open reduction and internal fixation, volar Barton fracture.

How to Cite:
Raza Laghari, A. ., Ahmed Mahar, S. ., Bux Palh, H. ., Ahmed, W. ., Bhutto, A. M. ., Hussain, F. ., & Keerio, N. H. . (2022). Outcome of Volar Barton Fractures Treated with Locking Compression Plates: A Cross-Sectional Study: Volar Barton Fractures Treated with Locking Compression Plates. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.178

***Corresponding Author:**
Ahmed Raza Laghari
Department of Orthopaedics, Ghulam Mohammed Mahar Medical College / Civil Hospital Sukkur, Pakistan
drahmed25@hotmail.com

Received Date: 30th September, 2022
Acceptance Date: 10th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Volar Barton fracture is the fracture of distal radius bone associated with ventral displacement. It is an oblique intra-articular fracture. **Objective:** To investigate the results, both functional and radiological, of open reduction and internal fixation with locking compression plates of the volar Barton fracture. **Methods:** A total of fifteen patients were included in this study. All of the participants had volar fragment type B3 fractures of the wrist. All the patients underwent open reduction to treat the fracture. Internal fixation was done using a locking compression plate (LCP). Out of a total of 15 patients, 10 were male and 5 females. The most common cause, almost 67 %, of the fracture was a road traffic accident (RTA). The mean age of the patients was 33 years, ranging from 21 to 55 years. All the patients had their respective surgeries within 7 days of the fracture accident. Quick Dash score-, and Gartland and Werley score were used to assess the function of the hand and wrist. **Results:** All the fractures took the meantime of 8 weeks for the bone union. The mean Quick Dash score was 10, ranging from 0 to 60. According to Gartland and Werley's score, 9 patients were excellent, 4 patients were good and 2 were fair. No postoperative complication occurred. **Conclusions:** Open reduction and internal fixation with locking compression plates of the volar Barton fracture is an effective treatment for functional and radiological restoration.

INTRODUCTION

Volar Barton fracture is the fracture of distal radius bone associated with ventral displacement. It is an oblique intra-articular fracture. Volar Barton fracture is also called reverse Barton fracture or Smith's type II fracture [1]. Volar Barton fracture is more common than Barton fracture. Its most common cause is falling on the outstretched hand or direct trauma injury, such as in the case of road traffic accidents [2]. Severe trauma or bolt can also be one of the causes of volar Barton fracture. Its incidence is almost 1.5 % of all distal radius fractures [3]. Its symptoms include pain, swelling, restricted wrist movement, bruising, tenderness, and deformity of the wrist. It is more common in females as compared to males. It is diagnosed through the radiograph of the wrist. The treatment method depends upon the age of the patient, degree of damage, stability of the fractured bone, extent of fracture

DOI: https://doi.org/10.54393/pjhs.v3i05.178

displacement, and recovery demand. In most cases, open reduction and internal fixation (ORIF) are required to treat the fracture. Volar Barton fracture can also cause complications like median nerve neuropathy, flexor pollicis longus rupture, extensor pollicis longus rupture, malunion of the fractured bone, compartment syndrome, etc [4]. The main aim of the treatment of volar Barton fracture is fracture stability, restoration of movement, and evading complications. It also decreases the possibility of wrist stiffness. Open reduction and internal fixation via locking compression plates are considered the gold standard treatment of the volar Barton fracture [5]. The high-speed impact on the articular surface of the wrist and carpal joints during volar flexion (leading to volar marginal fractures) or dorsiflexion is the mechanism of damage for these fractures (causing dorsal marginal fractures). PA and radiographs of the outside of the wrist show palmar and dorsal marginal fractures. The side image (lateral), on the other hand, best demonstrates the degree of fracture displacement related to the degree of joint region involvement (figure 1) [5]. Some of the treatment approaches can also cause complications. For instance, fixation with plates and screws can rupture the extensor tendon [6]. Replacement with dorsal plate does not show any significant difference in the results of surgery and postoperative complications [7]. On the other hand, the use of compression locking plates via the volar approach shows better results and lesser soft tissue-related complications [8]. The purpose of this study was to investigate the results, both functional and radiological, of open reduction and internal fixation with locking compression plates of the volar Barton fracture.

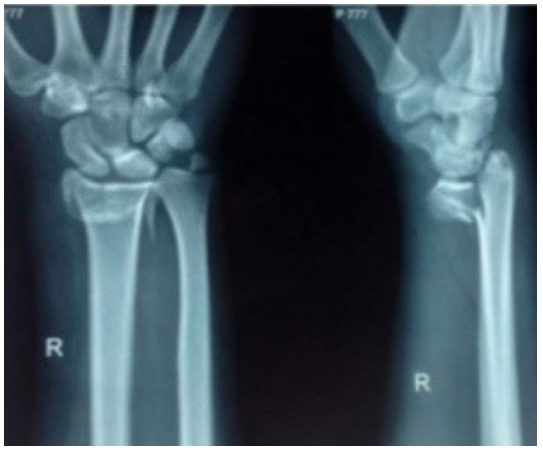

Figure 1: AP and a lateral view showing volar Barton fracture

METHODS

A total of fifteen total patients were included in this study. All of the participants had volar fragment type B3 fractures of the wrist. Only patients with epiphyseal closure were included in this study. Patients with compound fractures were excluded from the study. Permission was taken from the ethical review committee of the institute. Arbeitsgemeinschaftfür Osteosynthesefragen (AO) classification system was used to classify volar Barton fractures. All 15 patients had type B3 fractures-, and partial volar rim fractures. For further elaboration, subtypes were classified. A total of 5 cases were of the B3.1 subtype, having only one small volar fragment. A total of 8 cases were of subtype B3.2, having only one but a large volar fragment, and 2 cases were of subtype B3.3, having multiple fragments of volar rim [9]. Initial emergency treatment of all the patients was the same, closed reduction and splint. After this, open reduction and internal fixation were done using a locking compression plate (As shown in figure 2) [5]. All the patients had their respective surgeries within 7 days of the fracture accident.

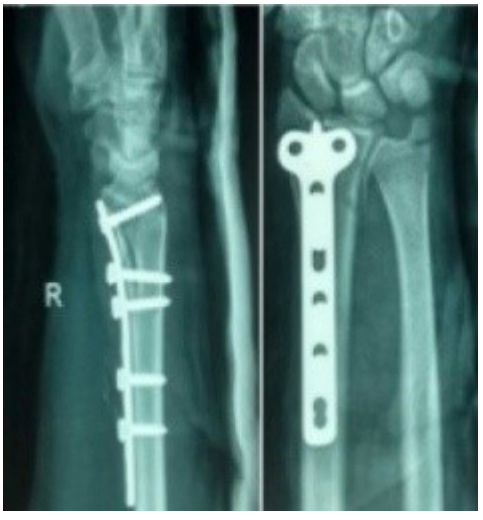

Figure 2: Post-Operation AP And Lateral Views Showing Locking Compression Plates

All surgeries were held with the patients under the effect of general anesthesia. For restricting the blood flow towards the surgical area, the pneumatic tourniquet was used. Volar approach the of radius (Henry) was used to expose the fracture [10]. The main focus of reduction in all the cases was the restoration of joints and their functioning. In 3 patient's alignment of the distal radio-ulnar joint was not proper. For these patients, K-wire was used for temporary fixation. For three weeks after the surgery, a plaster slab was applied below the elbow. After 3 weeks, active movement of the wrist was begun. Patients were asked for follow up checkups after every three weeks to six weeks. Then follow-up duration was increased to every six weeks to three months and then every three months to a year. The absence of pain at the fracture site during palpation was considered as fracture union. AP and lateral wrist radiographs of the patients were compared to the healthy radiographs for radio graphical control. The radiographs were compared to assess radial height, radial inclination,

DOI: https://doi.org/10.54393/pjhs.v3i05.178

the tilting angle of radius and ulnar differences. Quick Dash score-, and Gartland and Werley score were used to assess the function of the hand and wrist.

RESULTS

A total of 15 patients with volar Barton fractures were treated with open reduction and internal fixation. Out of total 15 patients, 10 (67 %) were male and 5 (33 %) female. This is shown in table 1.

Gender	Number (%)
Male	10 (67 %)
Female	5 (33 %)
Total	15

Table 1: Gender Distribution

The mean age of the patients was 33 years, ranging from 21 to 55 years. The mean follow-up time was 15 months, ranging from 10 to 20 months. Out of 15 patients, 9 had right-hand fractures, 60 per cent and 6, (40 per cent), had left-hand fractures. This is shown in table 2.

Fracture side	Number (%)
Right hand	9 (60 %)
Left hand	6 (40 %)

Table 2: Fracture side Distribution

The most common cause, almost 67 % (10 patients), of the fracture was road traffic accidents (RTA). Other causes were falling in 26 % of cases (4 patients), and direct hits in 7 % (1 patient). All the fractures took 8 weeks of mean time for bone union, ranging from 5 to 10 weeks. No post-surgery complication occurred. Post-surgery radiographic examination was done, and the results showed Hulten (ulnar) variance equalized in 67 % of patients, (10 cases). A total of 80% of patients, (12 cases), had radial inclination the same as that of the healthy radius bone. In the rest of the 20 per cent patients, (3 cases), operated sides mean angle was 22.5°, ranging from 20° to 30°. While healthy sides' mean angle was 25°, ranging from 23° to 30°. In 12 patients, (80 % of cases), the tilting angle of the radius was the same as that of the healthy side. In 3 patients, (20 % of cases), on the healthy side, the mean value of tilting angle was 7 degrees towards the volar side, ranging from 0 to 15 degrees. On the operated side, however, the mean angle was 3.9 degrees towards the volar side. Radius height was the same on both sides, healthy and operated, in 13 (87 %) patients. On the final follow up, the mean angle of flexion was 56degrees, ranging from 0 to 80 degrees. The mean angle of an extension was 44 degrees, range 25 to 60 degrees. The mean angle of pronation was 65 degrees, ranging from 0 to 75 degrees. The mean angle of supination was 80 degrees, ranging from 0 to 90 degrees as shown in table 4. The mean deviation of the radius was 22 degrees, ranging from 10 to 30 degrees. The mean Quick Dash score was 10, ranging from 0 to 60. According to Gartland and Werley's score, 9 patients were excellent, 4 patients were good and 2 were fair as shown in Table 3. At the end of the mean follow-up of 1 year, significant recovery was seen in all patients radiographically. Only one patient had dehiscence early on after the surgery. In this case, the wound healed via secondary wound healing. None of the patients had any post-operative infection or neuropathy. Loss of reduction resulting in malunion was seen as a late complication in 2 patients. MCP joint stiffness was reported in 1 patient as a late complication. This patient recovered with physiotherapy.

Category	Number (%)
Excellent	9 (60%)
Good	4 (26.7 %)
Fair	2 (13.3%)

Table 3: Gartland and Werley score

Causes of Fractures	
Road Traffic Accidents	10 (67%)
Falls	4 (26%)
Direct Hit	1 (7%)
Mean time of bone union (weeks)	8±3
Post-surgery radiographic examination	
Hulten (ulnar) variance	10 (67%)
Radial Inclination	12 (80%)
Mean angle at follow-up	
Flexion	56 degree
Extension	44 degree
Pronation	65 degree
Supination	80 degree

Table 4: Various preoperative and postoperative parameters of study participants

DISCUSSION

Volar Barton fracture is not a very common fracture. Its incidence is almost 1.5 % of all distal radius fractures [3]. Many treatment methods are available. Gartland and Werley's score in our study were: 60 % of patients were excellent, 26.7 % of patients were good, and 13.3 % were fair and no poor patients. While in the study of Julfiqar et al., Gartland and Werley's score was: 47.8 % excellent patients, 39.1 % good, 8.7 % fair and 4.4 % poor [5]. Some of the methods are: closed reduction, cast immobilization, external fixation, percutaneous pinning, open reduction and internal fixation via plates. Almost all of the treatment methods are somehow related to one or another complication. For instance, closed reduction is difficult to maintain. Percutaneous pinning is not adequate to uphold the reduction position, also there is the risk factor of infection at the pin site [10]. Infection at the pin site and reduction in the length of radius are the complications

DOI: https://doi.org/10.54393/pjhs.v3i05.178

associated with external fixation [11]. Formation of soft tissue adhesions, tendonitis and tendon tearing occur with dorsal plates. On the other hand, volar plates are linked with lesser complications [7]. In a study, the mean time of bone union was 7.5 weeks, while in our study it was 8 weeks [9]. In our study, the mean Quick dash scores were 10, while in another study it was 8. Gartland and Werley's score in our study were: 60 % of patients were excellent, 26.7 %of patients were good and 13.3 % were fair. While in the study of Jalil et al., Gartland and Werley's score was: 72.7 % excellent patients, 18.2 % good and 9.1 % fair [9]. In this study, volar locking compression plates were used and satisfactory results, bone alignment and stability, were achieved. As a result, all the patients started active movement early on after the surgery. Unlike another study, sudeck's atrophy did not develop in any of the patients included in our study [10]. No nerve dysfunction or neuropathy was reported in our study. These results are similar to Julfiqar et al., and Jalil et al., studies [5,10]. This suggests that nerve decompression, especially of the median nerve, is not essential in the case of open reduction and internal fixation done for the treatment of the volar Barton fracture. Only a few studies have reported the use of open reduction and internal fixation for the treatment of volar Barton fracture [3,5,10,12]. The main goal of volar Barton fracture treatment is fracture reduction and stability [10]. A total of 70% of Barton fractures occur in young male employees or motorcycle riders. Barton's fractures are particularly unstable and must be treated with open reduction and internal fixation (ORIF). The key to treating intra-articular dislocation fractures is the surgical anatomical reduction and wrist stability. Wrist-neutral disaccharide forceps sprint fixation and rapid patient referral to an orthopedic specialist should be the initial treatment [13,14]. Recently locking compression plates are slowly replacing the old support plates. This is because of the advantages they offer over the support plates. For instance, locking compression plates have more strength in terms of biomechanics, which is useful against the forces of fractured fragments. This is because of the interlocking mechanism of the screw plate [15]. This is why locking compression plates are being successfully used in the treatment of distal radius fractures [16,17]. Locking compression plates hold the reduction position and provide adequate stability because of their biomechanical strength [18]. As a result, early post-surgery mobilization is possible. Conventional treatments require a long-term immobilization and movement restriction as stability requires longer duration [19]. Its result is poor functioning in the long run [20].

CONCLUSIONS

Open reduction and internal fixation with locking compression plates of the volar Barton fracture is an effective treatment for functional and radiological restoration. Early postoperative mobilization and fracture stability are achievable through the use of locking compression plates. It provides fast recovery of the movements and activities.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Szymanski JA, Reeves RA, Carter KR. Barton's Fracture. [Updated 2022 Jun 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan.

[2] White JS. Fractures of the distal radius. Advanced Emergency Nursing Journal. 2013 Jan; 35(1):8-15.

[3] Pillai HB, Sankar S, Rawat SS, Arya S, Jadhav P. The functional outcome volar Barton fracture treated by open reduction and internal fixation with T plate–a prospective study. International Journal of Contemporary Medical Research. 2020;7(6): F7-11.

[4] Nellans KW, Kowalski E, Chung KC. The epidemiology of distal radius fractures. Hand clinics. 2012 May; 28(2):113-25.

[5] Von Recum J, Matschke S, Jupiter JB, Ring D, Souer JS, Huber M, et al. Characteristics of two different locking compression plates in the volar fixation of complex articular distal radius fractures. Bone & Joint Research. 2012 Jun;1(6):111-7.

[6] Rosenauer R, Pezzei C, Quadlbauer S, Keuchel T, Jurkowitsch J, Hausner T, et al. Complications after operatively treated distal radius fractures. Archives of Orthopaedic and Trauma Surgery. 2020 May; 140(5):665-673. doi: 10.1007/s00402-020-03372-z.

[7] Carli PD. Dorsal Plating of Distal Radius Fractures. In Wrist and Elbow Arthroscopy with Selected Open Procedures 2022;471-492.

[8] Abdel-Wahed M, Khater AA, El-Desouky MA. Volar locking plate fixation for distal radius fractures: did variable-angle plates make difference? International orthopaedics. 2022 Sep; 46(9):2165-2176. doi: 10.1007/s00264-022-05469-z.

[9] Plant CE, Hickson C, Hedley H, Parsons NR, Costa ML. Is it time to revisit the AO classification of fractures of the distal radius? Inter- and intra-observer reliability of the AO classification. The Bone & Joint Journal. 2015 Jun; 97-B(6):818-23. doi: 10.1302/0301-620X.97B6.33844.

DOI: https://doi.org/10.54393/pjhs.v3i05.178

[10] Jalil SA, Mughal RA, Haque SN, Shah RA. Treatment outcome of volar Barton fracture fixed with locking compression plates. Journal of surgery Pakistan. 2010; 26(4):265-8.
[11] Fu Q, Zhu L, Yang P, Chen A. Volar Locking Plate versus External Fixation for Distal Radius Fractures: A Meta-analysis of Randomized Controlled Trials. Indian journal of orthopaedics. 2018 Dec; 52(6):602-610. doi: 10.4103/ortho.IJOrtho_601_16.
[12] Qayoom I, Shafi T, Rafeeq M. Evaluation of clinical and functional outcome of open reduction and internal fixation with volar plating in Volar Barton's fracture of distal radius.
[13] Dai M, Wu C, Liu H, Wang I, Yu C, Wang K, et al. Treatment of volar Barton's fractures: comparison between two common surgical techniques. Chang Gung medical journal. 2006 Jul; 29(4):388.
[14] Mirarchi AJ and Nazir OF. Minimally Invasive Surgery: Is There a Role in Distal Radius Fracture Management? International musculoskeletal medicine. 2021 Feb;14(1):95-100. doi: 10.1007/s12178-020-09689-x.
[15] Selles CA, Mulders MAM, Winkelhagen J, van Eerten PV, Goslings JC, Schep NWL; VIPAR Collaborators. Volar Plate Fixation Versus Cast Immobilization in Acceptably Reduced Intra-Articular Distal Radial Fractures: A Randomized Controlled Trial. The Journal of Bone and Joint Surgery. 2021 Nov; 103(21):1963-1969. doi: 10.2106/JBJS.20.01344.
[16] Chung KC, Cho HE, Kim Y, Kim HM, Shauver MJ; WRIST Group. Assessment of Anatomic Restoration of Distal Radius Fractures Among Older Adults: A Secondary Analysis of a Randomized Clinical Trial. JAMA Network Open. 2020 Jan; 3(1): e1919433. doi: 10.1001/jamanetworkopen.2019.19433.
[17] Quadlbauer S, Pezzei C, Jurkowitsch J, Rosenauer R, et al. Early complications and radiological outcome after distal radius fractures stabilized by volar angular stable locking plate. Archives of Orthopaedic and Trauma Surgery. 2018 Dec;138(12):1773-1782. doi: 10.1007/s00402-018-3051-5.
[18] Alter TH, Sandrowski K, Gallant G, Kwok M, Ilyas AM. Complications of Volar Plating of Distal Radius Fractures: A Systematic Review. The Journal of Wrist Surgery. 2019 Jun; 8(3):255-262. doi: 10.1055/s-0038-1667304.
[19] Kong L, Kou N, Wang Y, Lu J, Tian D, Zhang B. The Necessity of Restoration of Radiologic Parameters by Closed Reduction in Elderly Patients with Distal Radius Fractures. Medical science monitor basic research. 2019 Sep; 25:6598-6604. doi: 10.12659/MSM.915824.
[20] Çalbıyık M and Ipek D. Use of Volar Locking Plate Versus Intramedullary Nailing for Fixation of Distal Radius Fractures: A Retrospective Analysis of Clinical and Radiographic Outcomes. Medical science monitor basic research. 2018 Jan; 24:602-613. doi: 10.12659/msm.908762.

DOI: https://doi.org/10.54393/pjhs.v3i05.179

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Outcomes and Pattern of Bimalleolar Ankle Fracture in Adults: A Cross-Sectional Study

Sartaj Lakhani[1*], Sajjad Hussain Bhatti[2], Zulfiqar Ali Jatoi[3], Muhammad Shuaib Chandio[4], Azizullah[5], Abdul Rahman Khan[6], Niaz Hussain Keerio[7]

[1]Department of Orthopaedic, Civil Hospital Mithi Tharparkar, Pakistan
[2]Department of Orthopaedics, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences GIMS Gambat, Pakistan
[3]Department of Orthopaedics, King Abdul Aziz Naval Base Hospital Jubail Eastern Province, Kingdom of Saudia Arabia
[4]Department of Orthopaedics, Shaheed Mohtarama Benazir Bhutto Medical University Larkana, Pakistan
[5]Department of Orthopaedics, Ghulam Muhammad Mahar Medical College (GMMMC) Sindh, Pakistan
[6]Department of Orthopaedics, DIMC, Dow University of Health Sciences, Karachi, Pakistan
[7]Department of Orthopedics, Muhammad Medical College and Hospital Mirpurkhas, Pakistan

ARTICLE INFO

Key Words:

visual analog pain scale, bimalleolar fracture, weber classification, outcomes, American orthopedic foot and ankle score

How to Cite:

Lakhani, S. ., Hussain Bhatti, S. ., Ali Jatoi, Z. ., Shuaib Chandio, M. ., ullah, A., Rahman Khan, A. ., & Keerio, N. H. . (2022). Outcomes and Pattern of Bimalleolar Ankle Fracture in Adults: A Cross-Sectional Study: Outcomes and Pattern of Bimalleolar Ankle Fracture in Adults. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.179

***Corresponding Author:**

Sartaj Lakhani
Department of Orthopaedic, Civil Hospital Mithi Tharparkar, Pakistan
dr_crown41@yahoo.com

Received Date: 30th September, 2022
Acceptance Date: 11th October, 2022
Published Date: 31st October, 2022

ABSTRACT

A total of 10% of all bone fractures are found in the ankle, making it the most often broken bone in the body. **Objective:** To assess the outcome and the pattern of bimalleolar ankle fractures in adults. **Methods:** A total of 72 individuals with bimalleolar ankle fractures were recruited in this study and followed up for a total of 12 weeks. An evaluation of the results after 12 weeks was done using the American Orthopedic Foot and Ankle Score & the Visual Analog Pain Scale. The amount of discomfort, functional ability, and alignment were the three key indicators of the results. **Results:** The average age of the patients was 36.4 10.4 years, ranging from 19 to 60 years. There were 3:2 more men than women. Half of the fractures were due to falls, 36.1% by automobile accidents, and 13.9% by motorcycle accidents. Of the cases, 63.9 percent included closed fractures. According to the Weber classification, B and C fractures were the most frequent, occurring in 33 (45.8%) and 31 (43.1%) individuals, respectively. The mean AOFAS at three months was 78.2. Between 1 and 3, the VAS was 43.1%. 38.8% of the patients, or 28, reported no discomfort. **Conclusions:** Patients tended to be young in this study. Delaying final care for up to a week after a fracture does not seem to have a negative impact on the result. The medial clean space (less than 4mm) was the primary indicator of a successful result.

INTRODUCTION

A total of 10% of all bone fractures are found in the ankle, making it the most often broken bone in the body. It is anticipated that there would be a threefold rise in the total number of cases over the course of the next 15 years. Bimalleolar fractures account for twenty-five percent of all ankle fractures, and the hospital treats twelve patients with bimalleolar fractures on a monthly basis, on average.

Both surgical and non-surgical treatment options are available for patients with bimalleolar fractures. The ankle joint is a kind of synovial joint that is a mortise and tenon joint, and it has a uniaxial functional orientation. The medial, lateral, distal tibiofibular, cross-joint, tendons, bone forms, and capsular attachments all support the ankle [1]. Both the medial malleolus of the distal tibia and

DOI: https://doi.org/10.54393/pjhs.v3i05.179

the lateral malleolus of the distal fibula are damaged in a bimalleolar fracture of the distal tibia and fibula [2,3]. Bimalleolar ankle fractures affect medial and lateral ankle joint structures. These fractures originate from indirect translational, axial, and rotational forces. These induce the talus to dislocate from the ankle mortise [4]. The Anteroposterior (AP), Mortise, and Lateral views are included in the typical ankle radiographs [5]. In a 30-year period, people over the age of 60 years had a considerable increase in the number as well as the frequency of ankle fractures that were caused by low-impact trauma: Total fractures doubled from 369 in 1970 to 1545 in 2000, and incidence increased from 57 to 150. By the year 2030, it is predicted that the number of these fractures would have tripled [1]. Two-thirds of ankle fractures are solitary malleolar fractures, with 25 percent of patients experiencing bimalleolar fractures and the remaining 5 to 10 percent experiencing trimalleolar fractures [2]. The current study was planned to assess the outcome and the pattern of bimalleolar ankle fractures in adults.

METHODS

This was a cross-sectional study on patients with bimalleolar ankle fractures. Permission was taken from the ethical review committee of the institute. All patients with solitary bimalleolar fractures who received treatment at Hospital within three weeks of the incident met the inclusion criteria. Radiographs, at least the anteroposterior and lateral views, were done on patients who had isolated ankle injuries. Bimalleolar fracture sufferers were included in the research and monitored. The age and gender of the patients were noted on a proforma. Weber A, B, or C classification was given to fractures. As the patients returned for evaluation at the fracture clinic, the modality of therapy was tracked down for them. Evaluations were conducted at 2, 6, and 12 weeks. The ORIF group was evaluated at two weeks for surgical site infection as well as the maintenance of reduction, at six weeks for clinical and radiological union, and at twelve weeks for the administration and documentation of the Visual Analog Pain Scale as well as the American Orthopaedic Foot and Ankle Score.

RESULTS

Patients between the ages of 30 and 39, represented by n = 22, followed by patients between the ages of 19 and 29 by 24 (33.8%) patients. A total of 64.8% of the patients belong to these 2 categories. Male patients experienced the majority of bimalleolar fractures (42, or 58.3%). The male to female ratio was almost 3:2, with 30 (41.7%) of the patients with bimalleolar fractures being female. 62 percent of the patients had involvement of the right limb. (n=46) Of the total fractures, 63.9 percent were closed. Weber B and C fractures were the most frequent, occurring in 45.8% and 43.18% of cases, respectively. While 58 (84.1%) of the tibial fractures were transverse, 50% of obliquetype fibular fractures. The most common cause of bimalleolar fractures was falls (50 percent). One Weber A fracture was open, seven Weber B fractures were closed, twelve Weber C fractures were closed, and thirteen were open. Weber A, B and C fractures were among the 35 surgically treated fractures as shown in table 1.

Bimalleolar fracture	Frequency (%)
Fractured limb	
Left	27(38%)
Right	44(62%)
Injury type	
Closed	46(63.9%)
Open	26(36.1%)
Fracture's weber classification	
A	8(11.1%)
B	33(45.7%)
C	31(43.1%)
Fracture of tibia	
Comminuted	2(2.9%)
Oblique	9(13%)
Transverse	58(84.1%)
Fibular fracture	
Comminuted	15(20.8%)
Transverse	21(29.2%)
Oblique	36(50%)

Table 1: Bimalleolar fractures are presented according to the site and type of fracture.

Indications for surgical treatment included fractures that were either open or displaced (defined as having a lateral displacement of more than 2mm), as well as dislocations. In 2 (5.7%) of the patients who had surgical management, a superficial surgical site infection was observed (As shown in Table 2).

Frequency (%)	
Non-operative	37(51%)
Operative	35(49%)
Infection at surgical site	
Yes	2(5.7%)
No	33(94.3%)
Radiologic and clinical union at week	
Yes	70(97.2%)
No	2(2.8%)

Table 2: Bimalleolar fracture patients' management and reevaluation

In 6 (8.3%) of the patients with radiographs at two weeks, there was a medial clear space more than 4mm. Three had been well managed. The other five were Weber C, and one was Weber B. No patients (VAS score ≥7) reported experiencing excruciating pain. Most patients, who gave pain ratings between 1 and 3, experienced very modest degrees of discomfort (43.1 percent). A total of 28 patients

DOI: https://doi.org/10.54393/pjhs.v3i05.179

(38.8%) gave a pain score of 0, while 18.1% of participants felt significant pain. The level of pain reported by patients on the VAS did not differ significantly by manner of therapy (p = 0.759). In comparison, only fifty percent of patients whose medial clear space was more than four millimeters reported having VAS<3, whereas the vast majority of fifty-six patients whose medial clear space was between zero and four millimeters reported having VAS>3 (p = 0.034). At the hospital, patients with bimalleolar fractures had an average AOFAS score of 78.2 (SD 20.7), ranging from 17 to 100. Weber A, B, and C had mean AOFAS values of 96.6, 80.3, and 72.9, respectively as shown in Table 3.

	Mean ±SD	ANOVA	P-value
Treatment 'types			
Non-operative	85.6±17.5	12.28	0.001
Operative	69.6±20.6		
Treatment 'types			
<48hours	77.0 ±20.7	0.12	0.891
<7days	81.7±15.6		
>7days	77.7±21.8		
Injury types			
Open	68.3±21.1	10.65	0.002
Closed	83.8±18.4		
Treatment 'types			
A	90.6±12.9	2.77	0.070
B	80.3±21.2		
C	72.9±20.5		

Table 3: Average AOFAS scores by injury type and intervention

Patients receiving operational therapy as opposed to non-operative care had significantly different mean AOFAS scores (p 0.001), while participants with open injury as opposed to closed had significantly different scores (p 0.002). The patient's degree of education and AOFAS score were substantially correlated (p = 0.03). Patients with secondary education had an average AOFAS score, 15.5 points more than those with elementary education, according to an ANOVA analysis (p = 0.03), indicating that they had less discomfort. There was no difference between the secondary and tertiary level results (p = 0.435). Open and closed Weber B fractures, as well as surgical and non-operative ones, did not significantly vary from one another. With scores of 63 and 84.3, respectively, surgically treated Weber C fractures performed considerably worse than conservatively treated fractures. AOFAS score is shown in Table 4

Parameter	Clinical radiologic union	Median VAS	Mean AOSAF	p-value
	6week	12week	12week	
Open n=26				0.821
Weber A	1	-		
Weber B	12	2	68.3	
Weber C	13	3	66.3	
Closed n=42				
Weber A	6	1	90	
Weber B	21	0	87.1	0.121
Weber C	17	2	77.6	
Medial clear space				
Space <4(n=66)	64	2	80.2	0.008
Space >4(n=6)	6	3.5	57.2	
Treatment				
Operative (n=35)				0.117
Weber A	1	-	-	
Weber B	18	2	74.1	
Weber C	16	3	63	
Non-operative (n=37)				
Weber A	6	1	90	0.523
Weber B	15	0	87.7	
Weber C	14	1	83.4	

Table 4: Clinical pain ratings using the AOFAS and the VAS, as well as Weber-classified clinical outcomes

DISCUSSION

In this study most patients were under 40 years of age and were males. RTAs and falls caused 50% of fractures. Contrary to Caucasian research, where most fractures were caused by falls and largely women, other studies showed a preponderance of RTAs as the leading factor for fractures, with most being males [6-8]. It was consistent with studies from Nigeria and South Africa that found falls to be the primary cause of 53 percent of injuries and 46.3 percent of ankle fractures, respectively. Due to socioeconomic inequality, at-risk road users including cyclists, pedestrians, and passengers of buses and minibuses, road accidents are a typical occurrence in third-world nations [9,10]. In contrast to Caucasian research, where open bimalleolar fractures were less than 5%, there were 26 open fractures, or 36% of total fractures [11]. It's possible that this has something to do with the underlying cause of the fractures; although the majority of ankle fractures in Caucasians were caused by low-energy falls, the fractures in Pakistanis were caused by high-energy trauma. According to prior research conducted by Hughes, Reuwer, and Schweiberer, the Weber B fracture was shown to be the most common kind of fracture, accounting for 45.8 percent of all cases [12,13]. A total of 49% of participants were treated surgically. These participants suffered open fractures and displaced Weber B and C injuries. The AOFAS score did not significantly vary between the surgically treated and non-treated Weber B fractures. However, compared to non-surgical Weber C fractures, operational bimalleolar (Weber C) fractures had a significantly lower score. The syndesmotic damage or the severity of the injury may have contributed to the poor operative AOFAS score rather than the operational procedure. Operationally treated fractures were likely to have severe, displaced, comminuted ankle injuries. After a week, the final therapy was completed by 61% of patients. The reasons for the delayed treatment included late

DOI: https://doi.org/10.54393/pjhs.v3i05.179

admission to the hospital owing to resource or infrastructural limitations, septic open fractures, blistering, edema, and a lack of available theatre space. Bimalleolar fractures treated early and late did not significantly vary from one another. These results concurred with another study, who found no differences in treatment outcomes for patients who delayed care for up to 8 days [14]. Also, Konvath found that the results of treating bimalleolar fractures were the same whether they were treated early or late (mean 13.6 days from injury to surgery) [15]. Period of 11 days was the longest time since there wasn't enough theatre space. Early surgery may minimize a patient's hospital stay and save money, but swelling or blistering should delay treatment [16,17]. Sixty-one and two percent of the patients reported mild to severe discomfort. According to earlier research, pain increases between 23 to 60 percent after a year [18,19]. Due to the short follow-up period in this trial, the incidence of pain was greater. With time, it is anticipated to diminish [20]. Physiotherapy, surgical care, and a high medial clean space all decreased the functional capacity. Previous research indicates that operational therapy either yields superior results or yields results that are comparable to operative and non-operative treatment. The non-operative group had a higher functional capability, according to Makwana's research, even if the total results were the same for both groups [15,21]. The older subjects in the bulk of the research mentioned above experienced trauma due to low energy. The most of the participants in this research were young, and those who needed surgery were probably suffering from displacement and syndesmotic injuries caused by high intensity trauma. Operative management of the open fractures was linked to a lower score. One fourth of the patients received PT, yet even they had diminished functional ability. These are probably the people whose functional impairment was predicted as a result of their serious injuries, necessitating rehabilitation. The majority of the patients had only completed their basic or secondary school; these people are probably low-income and long-distance walkers. This might help to explain why, despite not receiving PT, the functional result was satisfactory.

CONCLUSIONS

Most of The Patients in This Study Was Young. Delaying Final Treatment For Up To A Week After The Fracture Does Not Seem To Have A Negative Impact On Outcomes, Despite The Fact That Physiotherapy Was Not Properly Monitored. The Medial Clean Space Was The Most Important Factor In Determining A Favorable Result; If It Was Less Than 4mm, The Outcome Was Favorable.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Kannus P, Palvanen M, Niemi S, Parkkari J, Järvinen M. Increasing number and incidence of low-trauma ankle fractures in elderly people: Finnish statistics during 1970-2000 and projections for the future. Bone. 2002 Sep; 31(3):430-3. doi: 10.1016/s8756-3282(02)00832-3.

[2] Hong CC, Roy SP, Nashi N, Tan KJ. Functional outcome and limitation of sporting activities after bimalleolar and trimalleolar ankle fractures. journal of the American Orthopaedic Foot & Ankle Society (AOFAS). 2013 Jun; 34(6):805-10. doi: 10.1177/1071100712472490.

[3] Gray H and Standring S. Gray's anatomy: the anatomical basis of clinical practice. Churchill Livingstone; 2008.

[4] Canale ST and Beaty JH. Campbell's operative orthopaedics 11th ed. Pensylvania (USA): Mosby & Elsevier. 2008;2421.

[5] Kashmiri N. Pattern of Bimalleolar Ankle Fractures. Journal of Rawalpindi Medical College. 2017 Jun; 21(2):148-52.

[6] Twagirayezu E, Dushimiyimana JM, Bonane A. Open fractures I Rwanda: The Kigali experience. East and Central African Journal of Surgery. 2008;13(1).

[7] Kuubiere CB, Alhassan A, Majeed SF. Management of complex ankle fracture: A Ghanaian experience. Journal of Medical and biomedical sciences. 2012;1(4):1-6.

[8] Lin CW, Moseley AM, Herbert RD, Refshauge KM. Pain and dorsiflexion range of motion predict short- and medium-term activity limitation in people receiving physiotherapy intervention after ankle fracture: an observational study. The Australian journal of physiotherapy. 2009;55(1):31-7. doi: 10.1016/s0004-9514(09)70058-3.

[9] Jensen SL, Andresen BK, Mencke S, Nielsen PT. Epidemiology of ankle fractures. A prospective population-based study of 212 cases in Aalborg, Denmark. Acta orthopaedica Scandinavica. 1998 Feb; 69(1):48-50. doi: 10.3109/17453679809002356.

[10] Ameratunga S, Hijar M, Norton R. Road-traffic injuries: confronting disparities to address a global-health problem. Lancet. 2006 May; 367(9521):1533-40. doi: 10.1016/S0140-6736(06)68654-6.

[11] Hunt KJ and Hurwit D. Use of patient-reported outcome measures in foot and ankle research. The Journal of Bone and Joint Surgery. 2013 Aug; 95(16):

DOI: https://doi.org/10.54393/pjhs.v3i05.179

e118(1-9). doi: 10.2106/JBJS.L.01476.
[12] Wronka KS, Salama H, Ramesh B. Management of displaced ankle fractures in elderly patients—is it worth performing osteosynthesis of osteoporotic bone? Ortopedia, traumatologia, rehabilitacja. 2011 May; 13(3):293-8.
[13] Dietrich A, Lill H, Engel T, Schönfelder M, Josten C. Conservative functional treatment of ankle fractures. Archives of Orthopaedic and Trauma Surgery. 2002 Apr; 122(3):165-8. doi: 10.1007/s004020100342.
[14] Clements JR, Motley TA, Garrett A, Carpenter BB. Nonoperative treatment of bimalleolar equivalent ankle fractures: a retrospective review of 51 patients. Journal of Foot and Ankle Surgery. 2008 Feb; 47(1):40-5. doi: 10.1053/j.jfas.2007.10.005.
[15] Hancock MJ, Herbert RD, Stewart M. Prediction of outcome after ankle fracture. Journal of Orthopaedic and Sports Physical Therapy. 2005 Dec; 35(12):786-92. doi: 10.2519/jospt.2005.35.12.786.
[16] Breederveld RS, van Straaten J, Patka P, van Mourik JC. Immediate or delayed operative treatment of fractures of the ankle. Injury. 1988 Nov; 19(6):436-8. doi: 10.1016/0020-1383(88)90142-8.
[17] Rowley DI, Norris SH, Duckworth T. A prospective trial comparing operative and manipulative treatment of ankle fractures. The Journal of Bone and Joint Surgery. 1986 Aug; 68(4):610-3. doi: 10.1302/0301-620X.68B4.3090049.
[18] Makwana NK, Bhowal B, Harper WM, Hui AW. Conservative versus operative treatment for displaced ankle fractures in patients over 55 years of age. A prospective, randomised study. The Journal of Bone and Joint Surgery. 2001 May; 83(4):525-9. doi: 10.1302/0301-620x.83b4.11522.
[19] Ifesanya AO and Alonge TO. Operative stabilization of open long bone fractures: A tropical tertiary hospital experience. Niger Delta Medical Journal. 2012 Jan; 53(1):16-20. doi: 10.4103/0300-1652.99825.
[20] Clare MP. A rational approach to ankle fractures. International Journal of Foot and Ankle. 2008 Dec;13(4):593-610. doi: 10.1016/j.fcl.2008.09.003.
[21] Wukich DK and Kline AJ. The management of ankle fractures in patients with diabetes. The Journal of Bone and Joint Surgery. 2008 Jul; 90(7):1570-8. doi: 10.2106/JBJS.G.01673.

DOI: https://doi.org/10.54393/pjhs.v3i05.174

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Perceived Social Support as a Predictor of General Health in HIV+ Patients: Moderating Role of Gender

Saima Ehsan[1] and Syeda Shahida Batool[2*]

[1]Department of Psychology, Foundation University, Islamabad, Pakistan
[2]Department of Psychology, Government College University, Lahore, Pakistan

ARTICLE INFO

Key Words:
Social support, Gender, General health, HIV+ Patients, Cross-sectional study

How to Cite:
Ehsan, S. . ., & Shahida Batool , S. . (2022). Perceived Social Support as a Predictor of General Health in HIV+ Patients: Moderating Role of Gender: Social Support as a Predictor of General Health in HIV+ Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.174

***Corresponding Author:**
Syeda Shahida Batool
Department of Psychology, Government College University, Lahore, Pakistan
dr.shahidabatool@gcu.edu.pk

Received Date: 30th September, 2022
Acceptance Date: 15th October 2022
Published Date: 31st October, 2022

ABSTRACT

Human Immunodeficiency Virus (HIV) affects the functioning of the human immune system (HIS). **Objectives:** To evaluate the predictive role of social support in general health among HIV+ patients, and the moderating role of gender between social support and general health. **Methods:** Cross-sectional study was carried out at the Jinnah Hospital Lahore, Pakistan Institute of Medical Sciences (PIMS), Association of people living with HIV and AIDS Islamabad, and New Light AIDS control program (NGO) Rawalpindi from February 2019 to March 2020. Berlin Social Support Scale and General Health Questionnaire were used to assess perceived social support and general health among HIV patients. **Results:** Social support significantly predicted general health components ($p < .001$), and significant moderating effect of gender ($\beta = -.32$, $t = 2.49$, $p<.05$) was found between social support and general health among HIV patients. **Conclusions:** Social support emerged as a protective factor of general health in HIV+ patients in Pakistan that helped them to manage stress and fight with their illness. The high level of social support system tends to decrease general health problems among HIV + patients; however relationship between perceived social support and general health was stronger among women as compared to men.

INTRODUCTION

Human Immunodeficiency Virus (HIV) affects the functioning of the human immune system (HIS). The progressive weakening of the HIS by HIV infection can lead to the more life-threatening conditions of Acquired Immune Deficiency Syndrome (AIDS) [1]. Since 1981, when the first reported case of AIDS emerged, to date, around 1.7 million people have suffered from this infectious virus of HIV. According, to an estimated report around 36.7 million people, all over the globe are infected with HIV+, and an additional 2.1 million new cases were reported in the year of 2015 [2]. The number of HIV patients is increasing dramatically in Pakistan. According to UNAIDS, roughly 98,000 HIV cases were reported in Pakistan in the year 2009 with a prevalence rate surpassing 0.05 percent [3]. The latest UNAIDS Pakistan Global AIDS Monitoring report (2020), Pakistan has an estimated 183,705 people living with HIV (PLHIV). Statistics on the HIV prevalence in Pakistan are indicating the gravity of the medical issue. Pakistan is included in 10 top countries comprising more than 95% newly diagnosed cases of HIV. Akin considering the lethal effects of HIV spreading in Pakistani society, developing knowledge related to HIV risk behavior is important to minimize the negative effect of HIV among the general population of Pakistan [4]. HIV is a life-threatening condition, if left untreated for several years can develop into AIDS [5]. In the time of this strenuous life adversity for ill-being, a strong support system provided by family and peers can act as a buffer against serious chronic ailments

DOI: https://doi.org/10.54393/pjhs.v3i05.174

and helps to ensure vigorous wellbeing and general health. Israr and Ahmad defined social support as constitutes of caring, appreciative, and significant feelings which are shown by loved ones like; family members, peers, academic figures which are considered as role models, and a society [6]. General health (GH) refers to health system strategies that comprise of social activities and approaches based on preventive measures [7]. It is well understood that HIV can harm GH of HIV+ diagnosed patients by inducing negative schema in the patient's mind. Several empirical shreds of evidence in the field of health psychology have highlighted that HIV infection critically impairs the mental wellbeing of HIV patients [8]. Empirical studies have reported high prevalence of mental health problems like depression, anxiety, drug addiction, and suicide attempts among HIV+ patients [9, 10]. Empirical studies have indicated that female HIV+ patients report more mental health and sexual health problems than their male counterparts [11, 12]. Social support plays significant positive role in improving mental health among HIV+ patients via improved self-esteem, and perceived quality of life. Stress-buffering hypothesis identifies the moderating impact of social support between HIV-related distress and mental health problems such as anxiety and depressive indicators [13]. Studies have shown that social support of friends in HIV+ female patients decreased the risky sexual behaviors, while for male patients, social support by family helped to reduce the HIV risky behaviors [14]. Considering the literature gap, and the critical social health crisis of HIV+ patients in Pakistan, it is important to examine the impact of social support on the general health of HIV+ patients, moderated by gender. To the best of our knowledge, the present study was the first in its attempt to investigate the moderating effect of gender between social support and general health among diagnosed HIV+ patients in Pakistan.

METHODS

The cross-sectional study was carried out at the Jinnah Hospital Lahore, Pakistan Institute of Medical Sciences (PIMS), Association of people living with HIV and AIDs Islamabad, and New Light AIDs control program (NGO) Rawalpindi from February 2019 to March 2020, comprising diagnosed and registered HIV+ patients. For ethical considerations, the approval to execute the study was taken from the ASRB of the University. Before data collection, formal permission was also taken from the official authorities of the Punjab AIDS Control Program (PACP), and the National AIDS Control Program (NACP). The sample size was calculated using the Raosoft website's calculator, keeping 50.0% response division, 0.5% margin-error, and 95% confidence interval (CI) [15]. Purposive sampling technique protocols were followed in data collection. The sample age ranged between 18-67 years with a mean 36.4 ± 10.3. Patients of AIDS were excluded from the study as their health condition was not allowing them to take part in the study. After receiving consent from the patients, data were collected via demographic datasheet, Urdu version of the Berlin Social Support Scale (BSS-S) [16], Urdu version of General Health Questionnaire (GHQ- 28) [17]. Higher score on GHQ indicates lower general health. Data were analyzed using SPSS-version 23.

RESULTS

Variables		Frequency (%)
Gender	Men	291 (80.6 %)
	Women	70 (19.4 %)
Marital Status	Married	233 (64.5 %)
	Unmarried	89 (24.7 %)
	Divorced	12 (3.3 %)
	Widow	27 (7.5 %)
Age category	18-25 years	51 (14.1 %)
	26-35 years	152 (42.1 %)
	36-45 years	84 (23.3 %)
	46-54 years	54 (15.0 %)
	55 years and above	20 (5.5 %)

Table 1: Demographic frequency of HIV patients (N=361)

In Table 2, most of the subscales of social support and general health show significant negative correlations that indicates that higher social
support leads to better general health of HIV + patients.

Variables	1	2	3	4	5	6	7	8	Mean ± SD
1.IS	-	.77**	.55	.58**	-.34**	-.50**	-.00	-.18**	27.76±5.10
2.NS		-	.57**	.61**	-.34**	-.02	.01	-.25**	10.04±2.17
3.SSK			-	.55**	-.38**	-.05	-.10*	-.22**	16.45±3.32
4.AR				-	-.38**	-.05	-.13**	-.27**	45.65±9.07
5.SOM					-	.31**	.32**	.42**	14.4± 5.20
6.ANX						-	.51**	.19**	12.9±5.51
7.DEP							-	.23**	14.1±4.54
8.SDYS								-	10.6±5.11

Table 2: Correlations among Study Variables (N=361)

**p< .01, IS=Interpersonal Support; NS=Need of Support; SSK=Support Seeking; AR=Actually Received; SOM= Somatic; ANX= Anxiety; DEP= Depression; SDYS= Social Dysfunctioning

Linear regression analysis indicates that SS negatively predicted SOM (β= -.24, p <.001), and brought about 6% change in SOM{R2= .06, F (1, 359), p<.001}, ANX(β= -.29, p <.001), and showed 8% change in ANX{R2= .08, F (1, 359), p<.001}, and SDYS (β= -.31, p <.001) and explained 9% change in SDYS {R2= .09, F (1, 359), p<.001}. SS also predicted DEP (β= -.37, p <.001), and showed total of 12 % variance in DEP {R2= .12, F (1, 359), p<.001} (Table 3).

DOI: https://doi.org/10.54393/pjhs.v3i05.174

Predictors	B	SE B	B	R^2
SOM				
SS	-.08	.02	-.24***	.24
ANX				
SS	-.10	.01	-.29***	.08
SDYS				
SS	-.09	.01	-.31***	.09
DEP				
SS	-.20	.01	-.34***	.12

Table 3: Social Support as a Predictor of General Health (N=361)

Note. SS=Social Support; SOM= Somatic; ANX= Anxiety; SDYS= Social Dysfunctioning; DEP= Depression. ***p<.001.

The moderation analysis was carried out in three steps. In first step SS model significantly {ΔR^2= .11, F (1, 359), p >.001}, predicted GH (β = .34, p>.001). In the 2nd step, gender was entered, which appeared as a non-significant predictor of GH (β = -.01, p =.91) and explained 1 % change in the GH {ΔR^2= .12, F (2, 358), p < .001}. In 3rd step moderation model was tested by combining the effects of SS × G moderation effect was significant R2= .13, F (3, 357) = 18.73, p < .001} and combine product of SS and G significantly predicted GH in total (β= -.32, t = 2.49, p<.05). The moderating model brought about a 1 % additional change in GH. The table showed significant moderating effect of gender when combined with social support (Table 4).

(Y)GH				
Predictors	ΔR^2	B	SE	B
Step 1	.11			
(X)SS		-5.97	.85	-.34***
Step II	.12			
(X)SS		-5.98	.85	-.34***
(M)G		-.23	1.98	-.01
Step III	.13			
(X)SS		-.79	2.24	-.04
(M)G		-1.12	1.99	.-.02
(X)SS × (M)G		-4.07	1.63	-.32*
Total R2	.14			

Table 4: Summary of Predicting General Health (GH) from Social Support (SS), Moderated by Gender (G)

Note. SS=Social Support; GH= General Health; G=Gender. X = Predictor; M = Mediator; Y = Outcome. ***p < .001, *p < .05.

The figure 1 shows that female patients perceive more social support that helps them to enhance their general health as compared to male patients.

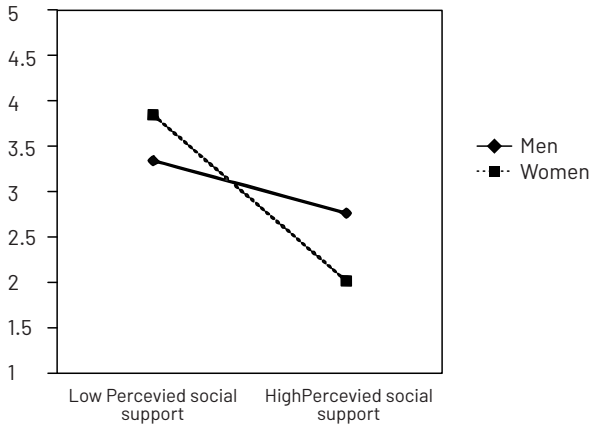

Figure 1: Relationship between perceived social support and general health moderated by gender.

DISCUSSION

The current study was carried out to investigate predictive strength of social support in general health, moderated by gender in diagnosed HIV+ patients in Pakistan. Pearson moment correlations have shown negative relationships between social support and different dimensions of general health among HIV patients, and a significant amount of variance in general health was accounted for by social support (Table 2 and 3), showing that higher social support decreases the general health issues of these patients like; anxiety, depression, and social problems. Social support by family, friends, and closer ones act as a buffer against life stresses and reduced the severity of emotional and physical problems as it gives us the strength to recover from life trauma in a shorter period [18]. Results are consistent with the empirical evidences shown the positive impact of social support in improving quality of life, mental health needs, self-respect, life satisfaction, and health-related quality of life of HIV+ patients. The negative effects of HIV illness are diverse as it leads to stigma, self-isolation, and loneliness [19]. A significant moderating effect of gender was found between the relationship of social support and general health. Moderation analysis revealed that relationship between social support and general health was stronger among female patients as compared to the male patients. Social support by loved ones helps the female patients to better cope with HIV illness and enables them to deal with emotional traumas effectively related to their general health. These findings are in line with previous studies which indicated that women perceiving more social support were lesser inclined to stress [19, 20]. One possible explanation for this finding is that gender wise, women turn more towards family support and more social interactions in traumatic life situations as compared to men. As supported by other studies, availability of social support enhanced the psychological well-being of women as compared to men.

DOI: https://doi.org/10.54393/pjhs.v3i05.174

When women receive lesser social support, they become more prone to develop depressive symptomology, so this denotes that women tend to benefit more from social support as compared to men. Men are less likely to spot their mental health needs and they rarely seek mental health treatment and amenities [21]. In Pakistan's cultural context, masculine gender roles are emphasized that weakens men's attitude towards basic mental health needs and hinder help-seeking behaviors and social support by loved ones [22, 23]. Keeping the above discussion in mind there is a dire need to address the psychosocial needs of HIV+ patients. In addition to psychotherapies, these patients need social support from their families, friends and co-workers that definitely mitigates the negative impact of illness on their health in general. Clinical and health professionals should also consider the gender-based mental health needs and decision processes, while developing interventions for HIV patients of both genders in the indigenous culture. Clinicians and counselors may consider focusing on finding ways in which family and friends could offer support in order to effectively buffer the negative impact of HIV on all human functioning. The results of the current study should be cited with caution due to certain limitations. Data were collected from one province of Pakistan (i.e., Punjab), which does not represent the whole country, so in future data should be collected from other provinces of Pakistan for better representation and generalizability of the results. Due to self-report measures, we should keep in mind the risk of common method variance. Cross-sectional data were utilized, so we cannot establish causation in the study variables, so the future researchers are encouraged to carry out longitudinal studies.

CONCLUSIONS

Present study has validated the role of social support in determining the general health of HIV positive patients. Current research findings have shown that the general health of HIV is significantly affected by the love and support they receive from their families. The high level of social support tends to decrease general health issues among chronic HIV + patients. For that, there is a dire need to develop awareness among the family of HIV patients, about the significance of social support. Stronger negative relationship between perceived social support and general health among women as compared to men reveals that women are more prone to seek social support as compared to men. It indicates that men should also find ways for creating social networks and interacting with other people in a more affirmative and effective manner, so that they can better manage their illness and reduce illness related stress.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] U.S. National Institute of Allergy and Infectious Diseases, HIV and AIDS. Fact Sheet. [Online] 2018 [Cited 2018 July 22]. Available From URL: https://www.niaid.nih.gov/diseases-conditions/hivaids

[2] U.S. Department of Health and Human Services. Signs & symptoms. [Online] 2012 [Cited 2012 June 6]. Available from URL: http://aids.gov/hiv-aids-basics/hiv-aids-101/signs-andsymptoms/index.html

[3] National AIDS Control Program, Ministry of Health, Govt. of Pakistan. Survey report. [Online] 2017.

[4] U.S. Department of Health and Human Services. What is HIV/AIDS? [Online] 2012 [Cited 2012 June 6]. Available from URL: http://aids.gov/hiv-aids-basics/hiv-aids-101/what-is-hiv-aids/

[5] World Health Organization. Fact Sheet. [Online] 2017 [Cited 2017 August 12]. Available from URL: http://www.who.int/news-room/fact-sheets/detail/hiv-aids

[6] Israr Z and Ahmad ZR. Perceived Social Support and its Association with Mental Health of Mothers of Children with Chronic Medical Conditions. FWU Journal of Social Sciences. 2019 Jul; 13(1):105-19.

[7] World Health Organisation. Mental health: concepts, emerging evidence, practice. Geneva: University of Melbourne. 2010.

[8] Rendina HJ, Millar BM, Parsons JT. The critical role of internalized HIV-related stigma in the daily negative affective experiences of HIV-positive gay and bisexual men. Journal of Affective Disorders. 2018 Feb; 227:289-297. doi: 10.1016/j.jad.2017.11.005

[9] Niu L, Luo D, Liu Y, Silenzio VM, Xiao S. The Mental Health of People Living with HIV in China, 1998-2014: A Systematic Review. PLoS One. 2016 Apr; 11(4):e0153489. doi: 10.1371/journal.pone.0153489

[10] Medley AM, Kennedy CE, Lunyolo S, Sweat MD. Disclosure outcomes, coping strategies, and life changes among women living with HIV in Uganda. Quality Health Research. 2009 Dec; 19(12):1744-54. doi: 10.1177/1049732309353417

[11] Tsuyuki K, Pitpitan EV, Levi-Minzi MA, Urada LA, Kurtz SP, Stockman JK, et al. Substance Use Disorders, Violence, Mental Health, and HIV: Differentiating a Syndemic Factor by Gender and Sexuality. AIDS and Behavior. 2017 Aug; 21(8):2270-2282. doi:

DOI: https://doi.org/10.54393/pjhs.v3i05.174

10.1007/s10461-017-1841-3
[12] Cook JA, Burke-Miller JK, Steigman PJ, Schwartz RM, Hessol NA, Milam J, et al. Prevalence, Comorbidity, and Correlates of Psychiatric and Substance Use Disorders and Associations with HIV Risk Behaviors in a Multisite Cohort of Women Living with HIV. AIDS and Behavior. 2018 Oct; 22(10):3141-3154. doi: 10.1007/s10461-018-2051-3
[13] Bekele T, Rourke SB, Tucker R, Greene S, Sobota M, Koornstra J, et al. Direct and indirect effects of perceived social support on health-related quality of life in persons living with HIV/AIDS. AIDS Care. 2013; 25(3):337-46. doi: 10.1080/09540121.2012.701716
[14] Velloza J, Watt MH, Abler L, Skinner D, Kalichman SC, Dennis AC, et al. HIV-Risk Behaviors and Social Support Among Men and Women Attending Alcohol-Serving Venues in South Africa: Implications for HIV Prevention. AIDS and Behavior. 2017 Nov; 21(Suppl 2):144-154. doi: 10.1007/s10461-017-1853-z
[15] Raosoft.com. Sample Size Calculator by Raosoft, Inc. [Online] [Cited 2018 Jan 02]. Available from: URL: http://www.raosoft.com/samplesize.html.
[16] Nawaz S and Batool S. Psychosocial factors and determinants of depression after limb loss (M.Phil dissertation). Department of Psychology, Government College University Lahore, Pakistan. 2013.
[17] Riaz H and Reza H. The evaluation of an Urdu version of the GHQ-28. Acta Psychiatrica Scandinavica. 1998 Jun; 97(6):427-32. doi: 10.1111/j.1600-0447.1998.tb10027.x
[18] Rasoolinajad M, Abedinia N, Noorbala AA, Mohraz M, Badie BM, Hamad A, et al. Relationship Among HIV-Related Stigma, Mental Health and Quality of life for HIV-Positive Patients in Tehran. AIDS and Behavior. 2018 Dec; 22(12):3773-3782. doi: 10.1007/s10461-017-2023-z
[19] Noroozi M, Kadivar M, Madani M, Salari P. To Tell, or Not to Tell; Confidentiality in an Iranian HIV Positive Patient: A Viewpoint. Journal of Family and Reproductive Health. 2017 Mar; 11(1):50-55
[20] Chuah FLH, Haldane VE, Cervero-Liceras F, Ong SE, Sigfrid LA, Murphy G, et al. Interventions and approaches to integrating HIV and mental health services: a systematic review. Health Policy Plan. 2017 Nov; 32(suppl_4):iv27-iv47. doi: 10.1093/heapol/czw169
[21] Chukwuorji JC, Chukwu CV, Uzuegbu CN, Ifeagwazi CM, Ugwu C. Social support serves emotion regulation function in death anxiety among people living with HIV/AIDS. South African Journal of Psychology. 2020 Nov; 50(3):395-410. doi: 10.1177/0081246319894700
[22] Althoff MD, Theall K, Schmidt N, Hembling J, Gebrekristos HT, Thompson MM, et al. Social support networks and HIV/STI risk behaviors among Latino immigrants in a new receiving environment. AIDS and Behavior. 2017 Dec; 21(12):3607-17. doi: 10.1007/s10461-017-1849-8
[23] Ssewamala FM, Bermudez LG, Neilands TB, Mellins CA, McKay MM, Garfinkel I, et al. Suubi4Her: a study protocol to examine the impact and cost associated with a combination intervention to prevent HIV risk behavior and improve mental health functioning among adolescent girls in Uganda. BMC Public Health. 2018 Dec; 18(1):1-1. doi: 10.1186/s12889-018-5604-5

DOI: https://doi.org/10.54393/pjhs.v3i05.203

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Perception of Faculty Teachers Towards Objective Structured Clinical Evaluation in Public Nursing Colleges of Peshawar

Sheraz Khan[1], Najma Naz[2], Sabiha Khaum[2], Malika Zabeeda[3], Usama Siddique[4], Muhammad Salman[5]

[1]Bacha Khan Medical Complex Swabi, Pakistan
[2]Khyber Medical University, Institute of Nursing Science Peshawar, KPK, Pakistan
[3]Government Nursing College Abbottabad, Pakistan
[4]DHQ Hospital Karak, Pakistan
[5]Quaid-e-Azam Institute of Nursing and Health Science Swabi, Pakistan

ARTICLE INFO

Key Words:
Perception, OSCE, Nursing, Teachers, Medical, clinical competencies

How to Cite:
Khan, S. ., Naz, N. . ., Khaum , S. ., Zabeeda , M. ., Siddique , U. ., & Salman, M. . (2022). Perception of Faculty teachers towards OSCE in Public Nursing Colleges of Peshawar: Perception of Faculty teachers towards OSCE. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.203

***Corresponding Author:**
Najma Naz
Khyber Medical University, Institute of Nursing Science Peshawar, KPK, Pakistan
najma.ins@kmu.edu.pk

Received Date: 5th October, 2022
Acceptance Date: 16th October, 2022
Published Date: 31st October, 2022

ABSTRACT

There are different methods of evaluating clinical competencies in medical field students, among which the objective structured clinical examination is considered the most reliable and effective way of assessing clinical skills. Most popular method for assessment of clinical skills in Nursing Education. **Objective:** The study aims to explore and compare the perceptions of nursing faculty members regarding objective structured clinical examination application in the evaluation and assessment of the clinical skills of the nursing students. **Methods:** A descriptive cross-sectional design was used to collect data from 46 Faculty teachers through simple random sampling. Content validity of the adopted questionnaire was verified by (5) experts in the field of nursing education and the internal consistency of the scale was found to be excellent (Cronbach's Alpha =0.949). **Results:** The mean age of study participants was 38.23±9.69. The majority of Participants 82.6 % (n=38) were females Half of the participants were Post RN BSN in qualification (n=23). Perceptions were categorized into positive and negative by the median cut-off value. 93.5 % faculty teacher's express positive attitude regarding training and conducting of Objective Structured Clinical Examination. **Conclusions:** The study concluded that, the faculty teacher's knowledge skills and attitude were positive regarding the Objective Structured Clinical Examination (OSCE) exam. The study revealed that OSCE is an appreciated practical learning experience and maximum of the faculty teachers agreed that OSCE facilitated the assessment and develop their psychomotor skills. P=0.05 so there is no association found between age group, gender, level of education and perception.

INTRODUCTION

One of the basic and important components of the education system is its evaluation. There are different methods of evaluating clinical competencies in medical field students, among which the objective structured clinical examination is considered the most reliable and effective way of assessing clinical skills [1]. It is defined as, "the method of choice for evaluation of learner's clinical competence and underpinning knowledge, mostly in simulated condition." [2]. OSCEs provide a simulated work environment where the students are given short assessment tasks, and are assessed objectively using pre-determined criteria or checklist. Currently, objective structured clinical examination is a broadly used and most popular method for evaluation of clinical skills in Nursing Education [3]. Currently it is also emerged in other fields like dentistry and pharmacy to investigate clinical skills performance [4]. The objective structured, clinical evaluation (OSCE) was used in medicine in 1975 and has

DOI: https://doi.org/10.54393/pjhs.v3i05.203

been developed by Roland harden in Scotland [5]. In 1984, the school of nursing at McMaster University develop OSCE to assess clinical competencies among primary health care nursing in third-year student's, but in 1985 become a more adopted method of all nursing skills in Canada (Ross et al., 2014). Harden developed OSCE in the 90's to be more formative and summative and along with this, he was trying to make OSCE more objective [6]. OSCE is used to evaluate practice using objectivity in nature, in practice, nursing faculty can assess knowledge and skills at a time [7]. Nursing is considered to be a highly significant and effective psychomotor domain, which allows students to apply principles that learned in the classroom safely and competently [2]. Nursing will still depend on practice, which occupied the cornerstone in the healthcare system [8]. Nursing includes the knowledge domain, affective domain to ensure safety among patient and psychomotor domain to make nurses' more skillful [9]. Nursing faculty has a higher chance to influence students' learning and can make a positive or negative shape on nursing practice [10,5]. Using OSCE is considered an imperative reason for client safety; minimizing risk, students' motivation, and progression of clinical competences [11]. Assessment and evaluation of clinical skills have a vital role in nursing education and the selection of appropriate methods has been a matter of permanent concern for faculty members and course coordinators. OSCE is used worldwide in nursing education and it's considered as a valid and reliable tool, but its practice is very limited in developing countries including Pakistan, still not in use in nursing colleges of KPK. Although a good chunk of knowledge is available regarding the format and organizational aspects of OSCE and its administration but very rare studies published on the perception and attitudes of nursing faculty about OSCE. The study aims to explore and compare the perceptions and attitude of nursing faculty members regarding objective structured clinical examination application in evaluation and assessment of the clinical skills of the nursing students and provide recommendations on OSCE is best evaluation method in the clinical exam and should be involved in all practical nursing subjects.

METHODS

In this study Descriptive cross-sectional design was used to learn the perception of Faculty teachers toward OSCE in public Nursing colleges of Peshawar KPK. Data were collected from January 3, 2022 to January 15, 2022. The study sample included teachers with at least one-year of experience and had the experience to conducted any OSCE, skill sign-up and examination. The study sample size was 46 and was selected through simple random sampling. Data was collected through an adopted questionnaire and consist of two sections [12]. The first section on demographic characteristics: Age gender, level of education and years of experiences. The second section consists of 28 questions regarding the perception of faculty toward OSCE. The Questionnaire includes 5- point Likert scale (1= Strongly disagree, 2= Disagree, 3= Uncertain, 4= Agree, 5= Strongly agree) Content validity of the adopted questionnaire was verified by (5) nursing experts in the field of education to decide the application and extensiveness. Reliability analyses were run for the perception of the OSCE tool and it was found that the internal consistency of the tool was measured to be excellent (Cronbach's Alpha =0.949).

Reliability Statistics	
Cronbach's Alpha	N No of Items
.949	28

RESULTS

The demographic information of the participants as given in Table .1 showed that the participants included in this study were from five Public nursing collages of Peshawar. The mean age of study participants was 38.23±9.69. Majority of Participants 82.6 % (n=38) were females and 17.4% (n=8) were males. Half of the participants Were Post RN BSN in qualification (n=23), followed by Master in Nursing which was 37 % (n=17), Generic Bachelor of Science in Nursing 10.9 % (n=5), and Ph.D 2.2% (n=1). The mean years of experience of study participants were 13.04±8.69.

Demographic details	n=46	Percentage
Gender		
Female	38	82.6%
Male	08	17.4%
Education Level		
Generic BSN	05	10.9%
Post RN BSN	23	50%
Master in Nursing	17	37%
PHD in nursing	01	2.2%
Age		
Mean ±SD	38.23±9.69	
Years of experience		
Mean ±SD	13.04±8.69	

Table 1: Demographic Information

Faculty perceptions were divided into two categories negative and positive with a median cut-off value less than the median indicating negative perception, and above the median indicating positive perception as (Jaiswal P, Mehta RK, 2019). More than nine-tenths 93.5% (n=43) of Faculty teachers reported a positive perception regarding OSCE, while merely, 6.5% (n=3) responded with a negative perception toward OSCE as shown in Table 2.

DOI: https://doi.org/10.54393/pjhs.v3i05.203

Perception	Frequency (%)	Valid %
Negative perception	3(6.5%)	6.5%
Positive Perception	43(93.5%)	93.5%
Total	46 (100.0%)	100.0%

Table 2: Categorical distribution of Perception

More than fourscore (84.7%) of faculty teachers responded with strongly agree and agree regarding the involvement of OSCE is helpful in the nursing syllabus. It helps students to acquire more information. It also enables students to get enough confidence to link their learning skills in the clinical setting. The majority of the faculty teacher (93.5%) of the faculty teachers were agreed that OSCE offers a new educational experience for both lecturer and students as shown in Table 3. Almost nine tenth (89.1%) of faculty teachers reported that OSCE helps students to develop their psychomotor skills and realized it a better technique to assess students' psychomotor skills. They also agreed that OSCE also facilitate faculty members to measure their psychomotor skills. The majority (74%) of the participants reported that OSCE addressed a true assessment technique for psychomotor abilities while the same number of the participants was reported that OSCE is one of the most interesting physical examinations. More than a third of Quartile (78.3%) faculty teachers agreed and strongly agreed that OSCE is clear and free from biases. (76.1%) of the study participants agreed that OSCE is a fair method for all students. Third quarter (76%) of the study participants strongly agreed that OSCE is less stressful while more than one-half (54.6%) of the participants were not agreed with it. The majority of the Faculty teacher (82.6%) were agreed and strongly agreed that one of the advantages of OSCE is it enables Faculty teachers to evaluate their level of knowledge More than nine tenths (91.3%) of the study participants were strongly agreed that OSCE enables Faculty teachers to gain more skills and different specialty. Four Fifth (80.5%) of the participants were strongly agreed. that questions asked in OSCE were related to the course. Almost nine tenths (89.1%) of the faculty teachers strongly agreed and agreed that they could be able to prepare for the process of OSCE. More than fifty percent of the participants strongly agreed that OSCE is the right option for all levels of students. The majority of the faculty teacher (93.5%) of the faculty teacher were agreed that OSCE offers new educational experiences for both lecturer and students. While More than two third (67.4%) of the participants agreed that OSCE is beneficial in assessing future performance as shown as Table 3. Chi-Square test has been run for the association of Categorical variables. Categorical distribution of perception is distributed into positive and negative perception. Gender and level of education have been tested with these categorical distributions of perception. Chi-square tests were run for the association of demographic variables and Categorical distribution of perception. It was found that there is no relation between these categorical variables as a P value greater than 0.05.

Items	Strongly Agree	Agree	Uncertain	Disagree	Strongly disagree	Mean	SD
	%	%	%	%	%		
The OSCE is a useful to be a part in nursing syllabus	54.3	32.6	4.3		8.7	4.24	1.158
It is the exact technique of assessment knowledge	21.7	54.3	10.9	6.5	6.5	3.78	1.073
OSCE assist students to get more knowledge	30.4	54.3	4.3	2.2	8.7	3.96	1.15
It is the only way for assessment of students psychomotor skills	39.1	50	4.3	2.2	4.3	4.17	.950
OSCE helps students develop their psychomotor skills	45.7	43.5	8.7		2.2	4.30	.813
OSCE supports students to get confidence while performing learn skills in the clinical settings	41.3	43.5	8.7	2.2	4.3	4.15	.988
It aids the students to be prepare for challenges of working as staff nurse	37	47.8	8.7	2.2	4.3	4.11	.971
OSCE enable faculty staff to evaluate their level of knowledge	23.9	58.7	8.7	4.3	4.3	3.93	.952
OSCE allows faculty members to assess their own psychomotor skills	34.8	54.3	6.5		4.3	4.15	.894
OSCE support faculty members to acquire more skills and different specialty	34.8	56.5	4.3		4.3	4.17	.877
OSCE is clear and biases free	37	41.3	17.4	2.2	2.2	4.09	.915
OSCE is fair to all students	28.3	47.8	15.2	4.3	4.3	3.91	1.007
OSCE evaluate all the students objectively	28.3	56.5	8.7	2.2	4.3	1.007	.931
The OSCE question are relevant to the course	28.3	52.2	13	4.3	2.2	4.00	.894
OSCE should be summative evaluation	13	56.5	10.9	15.2	4.3	3.59	1.045
It should be summative and formative	30.4	56.5	2.2	6.5	4.3	4.02	1.000
Take more time in organizing scenario compared to customary method	28.3	41.3	15.2	10.9	4.3	3.78	1.114

DOI: https://doi.org/10.54393/pjhs.v3i05.203

Items	Strongly Agree	Agree	Uncertain	Disagree	Strongly disagree	Mean	SD
	%	%	%	%	%		
I can able to fix and practice the OSCE	41.3	47.8	2.2	2.2	6.5	4.15	1.053
OSCE is interesting	39.1	47.8	6.5	2.2	4.3	4.15	.965
OSCE Covered wide area of knowledge?	32.6	39.1	10.9	13	4.3	3.83	1.161
OSCE can be Easily passed?	10.9	39.1	15.2	23.9	10.9	3.15	1.229
OSCE is less stressful	6.5	30.4	8.7	47.8	6.5	2.83	1.141
OSCE is Exhausting and lengthy	4.3	34.8	26.1	32.6	2.2	3.07	.975
Suitable for all level of students	17.4	41.3	21.7	15.2	4.3	3.52	1.090
OSCE is Helpful to assess future performance	21.7	45.7	13	17.4	2.2	3.67	1.076
OSCE Enhances teaching level?	32.6	50	6.5	8.7	2.2	4.02	.977
OSCE Improve evaluation method?	23.9	63	4.4	6.5	2.2	4.00	.869
OSCE deals new educational practice for both lecturer and students	41.3	52.2	2.2	2.2	2.2	4.28	.807

Table 3: Perception of Faculty teachers toward OSCE

DISCUSSION

The finding of this study found that perceptions of Faculty teachers were positive regarding OSCE as an evaluation tool. It is fair, and free of baseness supported by the study of showed a positive perception by teachers towards OSCE/ OSPE [15]. They accepted it as a fair, unbiased, valid, reliable assessment method as compared to traditional practical examination. Matching with the result of the faculty teacher's showed positive attitude regarding readiness and handling of OSCE exam and the overall results were positive in the questionnaire and the entire perception of Faculty members toward OSCE exam was very positive [12,14]. Nursing schools' faculty evaluate OSCE a valuable and appropriate examination technique for practical skills [19]. In our study more than one-half (54.6%) of the participants reported that OSCE is stressful. Matching with report of [16]. More than three-quarters of the participants reported that the OSCE made higher levels of stress compared to other examination methods.69.3% of the participants strongly agreed that the preparation of the Scenario for OSCE took more time as compared to the traditional method. These apprehensions in the link were emphasized by [17], who stated that more than 50 percent of study participants observed that exam was a major concern. While on other hand 69.5% of the faculty teachers were strongly agreed and agreed that OSCE evaluation should be summative. The matching result with [9], 80% of faculty members said it should remain to be summative. More than third of Quartile (78.3%) faculty teachers were strongly agreed that OSCE is clear and bias-free. (76.1%) of the study participants were strongly agreed that OSCE is fair to all students. Matching with 90% of faculty [9] members said OSCE was transparent, bias free and fair to all students [18]. 70.6% emphasized that the OSCE is unbiased assessment method. Another study reported by [13]. 80% of the participants were reported that OSCE is a fair process of assessing students' skills as well as a better assessment technique than the traditional short case exams. Almost nine tenth (89.1%) of faculty teachers reported that OSCE helps students to develop their psychomotor skills and realized it a better technique to assess students' psychomotor skills. They also agreed that OSCE also facilitate faculty member to measure their own psychomotor skills. The same result is shown by the study reported by [12]. that the majority (74%) of the participants were reported that OSCE addressed a true assessment technique for psychomotor abilities while the same number of the participants was reported that OSCE is one of the most interesting physical examinations. In addition, several studies reported the importance of OSCEs for the nursing students in terms of evaluating them in their practical skills [20-21].

CONCLUSION

The study concluded that, the faculty teacher's knowledge skills and attitude was positive regarding Objective Structured Clinical Examination (OSCE) exam. The faculty teacher's express positive attitude regarding training and conducting of Objective Structured Clinical Examination. Teachers were gratified with Objective Structured Clinical Examination (OSCE) as an assessment and evaluation tool and cherished the learning practices. The study showed that OSCE is valued as a hands-on learning opportunity, and the majority of faculty teachers agreed that OSCE helped them gauge and improve their psychomotor abilities. Furthermore, it was found by the study that faculty teachers concurred that OSCE is impartial and fair to all learner.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Alam MK, Basak SR, Alam S. Khaya anthotheca (Welw.) C. DC. (Meliaceae)-an exotic species in Bangladesh. Bangladesh Journal of Plant Taxonomy. 2012 Jun;19(1):95-7.

[2] Muhi Abbood Al-Saegh R, JJA Scherpbier A, A

DOI: https://doi.org/10.54393/pjhs.v3i05.203

Alhibaly H, Rajooj Hmood A, AM Almkhtar M. Perception of OSCE examination in Iraqi undergraduate medical students. Kerbala Journal of Medicine. 2015 Jun; 8(1):2056-69.

[3] Walsh M, Bailey PH, Koren I. Objective structured clinical evaluation of clinical competence: an integrative review. Journal of advanced nursing 2009 Aug; 65(8):1584-95. doi: 10.1111/j.1365-2648.2009.05054. x.

[4] Eswi A, Samy A, Shaliabe H. OSCE in maternity and community health nursing: Saudi nursing student's perspective. American journal of research communication. 2013;1(3):143-62.

[5] Sukhato K, Sumrithe S, Wongrathanandha C, Hathirat S, Leelapattana W, Dellow A. To be or not to be a facilitator of reflective learning for medical students? a case study of medical teachers' perceptions of introducing a reflective writing exercise to an undergraduate curriculum. BMC medical education. 2016 Apr; 16:102. doi: 10.1186/s12909-016-0624-2.

[6] Courteille O, Bergin R, Stockeld D, Ponzer S, Fors U. The use of a virtual patient case in an OSCE-based exam—a pilot study. Medical Teacher. 2008; 30(3): e66-76. doi: 10.1080/01421590801910216.

[7] Brown C, Ross S, Cleland J, Walsh K. Money makes the (medical assessment) world go round: The cost of components of a summative final year Objective Structured Clinical Examination (OSCE). Medical Teacher. 2015 Jul; 37(7):653-659. doi: 10.3109/0142159X.2015.1033389.

[8] Chabeli MM. Nurse educators' perceptions of OSCE as a clinical evaluation method. Curationis. 2001 Mar; 24(1):84-92. doi: 10.4102/curationis. v24i1.808.

[9] Omu FE. Attitudes of nursing faculty members and graduates towards the objective structured clinical examination (OSCE). Open Journal of Nursing. 2016; 6(05):353.

[10] Wahab S, Razali R, Ismail AK, Kamarudin MA, Tohit NM, Durai RP, et al. Training standardized patients for undergraduate Psychiatry examinations: experience of a Malaysian university. Malaysian Journal of Medicine and Health Sciences. 2015 Jan;11(2):29-34.

[11] Mitchell ML, Henderson A, Groves M, Dalton M, Nulty D. The objective structured clinical examination (OSCE): optimising its value in the undergraduate nursing curriculum. Nurse Education Today. 2009 May; 29(4):398-404. doi: 10.1016/j.nedt.2008.10.007.

[12] Elbilgahy AA, Eltaib FA, Mohamed RK. Implementation of Objective Structured Clinical Examination (OSCE): Perceiving Nursing Students and Teachers Attitude & Satisfaction. American Journal of Nursing. 2020;8(2):220-6.

[13] Alsaid AH and Al-Sheikh M. Student and Faculty Perception of Objective Structured Clinical Examination: A Teaching Hospital Experience. Saudi Journal of Medicine & Medical Sciences.2017 Apr; 5(1):49-55. doi: 10.4103/1658-631X.194250.

[14] El-aty NS, Othman AM, Abd Elrahem AS. Perception of Nursing Teaching Staff on the Use of Objective Structured Clinical Examinations (OSCE): Assessment Method 2017.

[15] Rathi B and Rathi R. Perception of Teachers and Students Towards OSCE and OSPE as an Assessment Tool. Journal of Indian System of Medicine. 2017 Apr;5(2):147.

[16] Majumder MAA, Kumar A, Krishnamurthy K, Ojeh N, Adams OP, Sa B. An evaluative study of objective structured clinical examination (OSCE): students and examiners perspectives. Advances in medical education and practice. 2019 Jun; 10:387-397. doi: 10.2147/AMEP.S197275.

[17] Abraham RR, Raghavendra R, Surekha K, Asha K. A trial of the objective structured practical examination in physiology at Melaka Manipal Medical College, India. American Journal of Physiology - Advances in Physiology Education. 2009 Mar; 33(1):21-3. doi: 10.1152/advan.90108.2008.

[18] Fouad S, Gouda E, Nasser AA, Kamal D. Perception of Students, Staff and Simulated Patients towards Objective Structured Clinical Examination (OSCE). Education in Medicine Journal. 2019 Jun;11(2).

[19] Solà-Pola M, Morin-Fraile V, Fabrellas-Padrés N, Raurell-Torreda M, Guanter-Peris L, Guix-Comellas E, et al. The usefulness and acceptance of the OSCE in nursing schools. Nurse Education in Practice. 2020 Jan; 43:102736. doi: 10.1016/j.nepr.2020.102736.

[20] Chen SH, Chen SC, Lai YP, Chen PH, Yeh KY. The objective structured clinical examination as an assessment strategy for clinical competence in novice nursing practitioners in Taiwan. BMC Nursing. 2021 Jun; 20(1):91. doi: 10.1186/s12912-021-00608-0.

[21] Eze BU, Edeh AJ, Ugochukwu AI. Comparing Objective Structured Clinical Examinations and Traditional Clinical Examinations in the Summative Evaluation of Final-Year Medical Students. Nigerian Journal of Surgery. 2020; 26(2):117-21.

DOI: https://doi.org/10.54393/pjhs.v3i05.258

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Prevalance of Prolonged Qt Interval In Patients with Chronic Liver Disease

Marium Kanwal[1*], Waqar Hussain[1], Aqsa Soomro[1], Razia Aijaz[1], Sumon Khalique[1], Maliha Sadaf[1]

[1]Department of Medicine, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

ARTICLE INFO

Key Words:

QT interval prolongation, Cirrhotic cardiomyopathy, Liver cirrhosis.

How to Cite:

Kanwal, M., Hussain, W. ., Soomro, A. ., Aijaz, R. ., Khalique, S. ., & Sadaf, M. . (2022). Prevalence of Prolonged QT Interval In Patients With Chronic Liver Disease: Prolonged Qt Interval in Patients with Chronic Liver Disease. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.258

***Corresponding Author:**

Marium Kanwal
Department of Medicine, Jinnah Postgraduate Medical Centre, Karachi, Pakistan
Dr.maryamkanwal@gmail.com

Received Date: 14th October, 2022
Acceptance Date: 21st October, 2022
Published Date: 31st October, 2022

ABSTRACT

The incidence of QT prolongation in CLD patients is greater than 45% compared to approximately 5% in the general population. Multiple researches have revealed that end-stage liver disease is related with a variety of changes in electrophysiological parameters; especially in our population, a higher incidence of QT interval prolongation is observed. Prolonged QT intervals in chronic liver disease patients are related with augmented mortality and morbidity. **Objective:** To determine the frequency of QT prolongation in patients with chronic liver disease. **Methods:** A cross-sectional and descriptive study. 96 total patients aged 20-85 years of both sexes with chronic liver disease (CLD) were included. Patients with a history of coronary artery disease and the use of any anti-arrhythmic medication were excluded from the study. The 12-lead ECG was performed and interpreted by an electrophysiologist with over five years of experience. The Bazett-based QT interval (QTc) was automatically obtained using a computerized electrocardiograph to avoid inter-observer variability. **Results:** 20 to 60 years was the patients age in this study, with 39.44 ± 9.91 years of mean age. The maximum patients, 86 (89.58%), were 20-40 years of age. Among the 96 patients, 17 (17.71%) were female and 79 (82.17%) were male, with a M: F ratio of 1.3: 1. While the incidence of QT prolongation was found in 47 (48.96%) patients, 49 (51.04%) patients did not have QT prolongation. **Conclusions:** In this study it was found that the frequency of QT prolongation is quite high in patients with chronic liver disease.

INTRODUCTION

Cirrhosis of the liver, which continues to be a serious health problem in both developed and developing countries, is a disease that causes end stage liver disease and portal hypertension with characteristic clinical signs and histologically progression of regenerative nodules enclosed by fibrous bands in response to CLD [1-2]. The 12th important cause of mortality worldwide is liver cirrhosis, with over 27,000 deaths and over 421,000 hospitalizations annually [3-4]. While alcoholic liver disease and chronic hepatitis C virus infection are the communal reasons of cirrhosis in developed countries, chronic hepatitis B virus infection is the major source in under developed countries [5]. For the past several years, cardiac dysfunction related with cirrhosis caused by direct alcohol effect on heart [6]. Though, Abelmann and Kowalski in 1953 demonstrated the presence of a circulatory disturbance characteristic of CLD [7]. Subsequently then, few researches have constantly exhibited these results. Subsequent, clinical and experimental studies have introduced the notion that cirrhotic cardiomyopathy (CCM) is a medical condition separate from alcoholic heart disease [8-9]. Given that the liver receives 25% of cardiac output, an interaction of liver disease with circulatory and cardiac output can be anticipated. Cirrhosis of the liver results in circulatory hyperdynamic state that results in the cardiac dysfunction characteristic of CCM [10-11]. This clinical disorder sometimes comprises, hyperdynamic circulation,

DOI: https://doi.org/10.54393/pjhs.v3i05.258

prolonged repolarization of the ventricles, a combination of diastolic and systolic dysfunction and the incapability of the sinus node to rise heart rate (HR) during exercise [12]. The incidence of QT prolongation in liver cirrhosis patients is greater than 45% compared to approximately 5% in the general population. Multiple researches have revealed that ESLD is related with a variety of changes in electrophysiological parameters; in particular, there is a higher incidence of prolongation of QT in our people. QT prolongation in CLD patients is related with augmented mortality and morbidity [13]. In a study by Ali et al, 48% of QT prolongation was reported and found to be directly proportional to the severity of cirrhosis [14]. The aim of the study was to determine the frequency of QT prolongation in patients with chronic liver disease.

METHODS

This cross-sectional descriptive study was conducted at JPMC Medical Unit III, Karachi, October 15, 2019 to April 14, 2020. 96 total patients with chronic liver disease (CLD) and 20 to 30 patients, 85 years of age, of both sexes were evaluated. included in the non-probabilistic sequential sampling technique. Inclusion criteria were patients of both sexes aged 20-85 years with chronic liver disease and patients who did not consent to the study, patients with coronary artery disease and patients taking medications. e.g. quinidine gluconate, procainamide hydrochloride and disopyramide phosphate etc. Before entering the study, all participants were explained the purpose and benefits of the study, and the principal investigator obtained oral consent from all patients for their participation in the study. Patient demographic characteristics such as age (year) and gender were recorded. The Child-Pugh Score was obtained according to the operational definition, and the severity of the disease was classified according to the operational definition. The 12-lead ECG was performed and interpreted by an electrophysiologist with over five years of experience. The Bazett-based QT interval (QTc) was automatically obtained using a computerized electrocardiograph to avoid inter-observer variability. Using Bazett's principle, the interval of QT was estimated from the start of the QRS complex to the end of the T wave and divided by the R-R interval square root in seconds. SPSS version 21.0 was used for analysis of data. The percentages and frequencies were calculated for categorical variables such as age group, gender, prolonged QT interval and disease severity. Effect modifiers such as age groups, gender, and disease severity were controlled by stratification. The Fisher's exact test and chi-square test was used post-stratification. Two-sided p value ≤ 0.05 taken as a criterion of statistical significance.

RESULTS

Among the 96 patients, 17 (17.71%) were female and 79 (82.17%) were male, with a M:F ratio of 1.3: 1 as shown in Figure I.

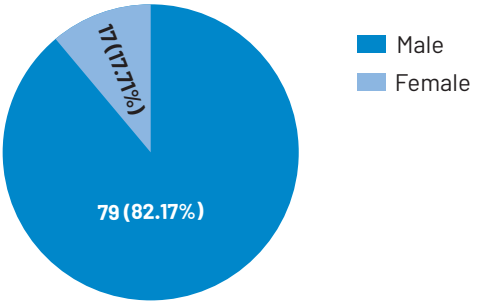

Figure 1: The patient's distribution conferring to gender (n=96)

Distribution of patients conferring to child pugh class and are shown in Figure 2. The males were 17.7% and females were 82.3%.

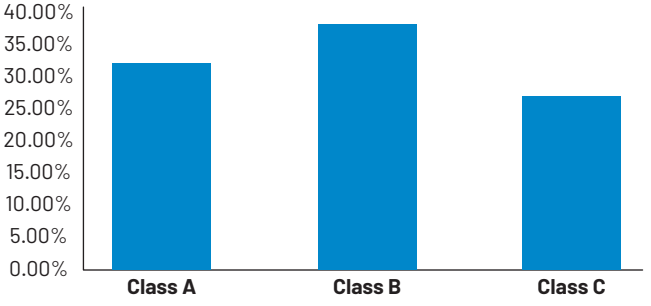

Figure 2: Distribution of patients according to Child Pugh Class (n=96)

32.29% of the patients were in the Class A, 39.58% in the class B and 28.13 were from Class C according to Child Pugh class. 20 to 60 years was the patients mean age in this study, with 39.44 ± 9.91 years of mean age. The maximum patients, 86 (89.58%), were 20-50 years of age as shown in Table 1.

Age (in years)	No. of Patients (%)
20-50	86 (89.58%)
51-85	10 (10.42%)
Total	96 (100.0%)

Table 1: shows the patients distribution with reference to age-groups (n=96)

Frequency of prolonged QT interval was found in 47 (48.96%) patients, whereas there was no prolonged QT interval in 49 (51.04%) patients as shown in Figure 3.

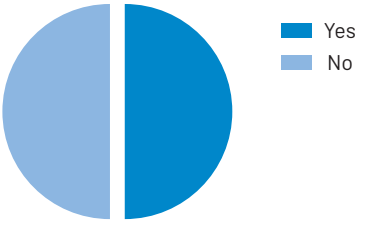

Figure 3: Frequency of prolonged QT interval in patients with

DOI: https://doi.org/10.54393/pjhs.v3i05.258

chronic liver diseases (n=96)

The frequency of patients with prolonged QT interval was seen in 48.9% of patients with chronic liver disease. When Stratification of prolonged QT interval was done on age groups and no significant change was found among the various age groups as given in Table 2 while the prolonged QT interval stratification with respect to gender is given in Table 3 which also exhibited no significant change between females and males.

Age (years)	Prolonged QT interval		P-value
	Yes	No	
20-50	42	44	0.944
51-85	05	05	

Table 2: Stratification of prolonged QT interval with respect to age

With respect to age, 42 patients have prolonged QT interval in 20-50 years of age group and with respect to gender 42 males have prolonged QT interval as shown in Table 2 and 3.

Gender	Prolonged QT interval		P-value
	Yes	No	
Male	42	37	0.076
Female	05	12	

Table 3: Stratification of prolonged QT interval with respect to gender

Table 4 has shown the stratification of prolonged QT interval with respect to Child pugh class. The child Pugh Class shows that 15 patients in Class A, 20 in class B and 12 in class C have prolonged QT interval with respect to Child Pugh Class

Child Pugh Class	Prolonged QT interval		P-value
	Yes	No	
Class A	15	16	0.807
Class B	20	18	
Class C	12	15	

Table 4: Stratification of prolonged QT interval with respect to Child Pugh Class

DISCUSSION

Cirrhosis of the liver is a progressive pathological process considered by regeneration of nodules and fibrosis. The common causes of liver cirrhosis, including infection with hepatitis B and C viruses, autoimmune diseases, medications (including alcohol), non-alcoholic steatohepatitis and genetic diseases [15]. In addition to liver damage, patients with cirrhosis have pulmonary, renal, cardiac and hemodynamic dysfunctions that upsurge the mortality and morbidity. This study shows that chronic cardiac dysfunction is the characteristic feature in cirrhotic cardiomyopathy in patients with liver cirrhosis without prior any cardiac anomaly as shown by the results of Møller S et al [16]. It is well-defined by the presence of one of the subsequent variations: electrophysiological changes, increased or normal resting systolic function but poor stress response; structural abnormalities in the ventricles and diastolic dysfunction. These anomalies may be seen in up to 50% of subjects with cirrhosis in Ali M et al study as in our study [17]. Mostly, people with cardiomyopathy along with cirrhosis are symptomless, therefore follow-up testing is important to identify them [18-19]. An electrocardiogram (EKG) is a non-invasive, low-cost method that can support to recognize subjects with cirrhosis cardiomyopathy [20]. The most important cardiac abnormality, QT prolongation mostly associated with cirrhosis and can be simply detected by EC. A prolonged QT interval is associated with augmented mortality in chronic liver disease patients as exhibited by this study and the results of Tangerman A and Suurmond D exhibited the same results [21-22]. The mechanism accountable for the QT interval prolongation is unknown. Modifications at the molecular level have been suggested [23]. Other factors include electrolyte abnormalities, myocardial ischemia, and changes in the activity of the autonomic nerves, which, through various mechanisms, may affect heart rate and electromechanical abnormalities [24]. It has been suggested that the disturbances of gonadal hormone metabolism in advanced cirrhosis contribute to the prolongation of the QT interval in this condition. In the present study, we found that the QTc interval was significantly longer in women [25]. There are reports that women are more susceptible to torsade's de pointes than men, which correlates with the quantitative sex difference in the electrocardiographic manifestation of myocardial repolarization. This gender difference has been confirmed and applied to various ECG markers.

CONCLUSIONS

This study found that the frequency of QT prolongation in patients with chronic liver disease was quite high. Therefore, study commend considering QT prolongation and early detection and treatment in all chronic liver disease patients to reduce morbidity and mortality in the population.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Rimbaş RC, Baldea SM, Guerra RDGA, Visoiu SI, Rimbaş M, Pop CS, et al. New Definition Criteria of Myocardial Dysfunction in Patients with Liver Cirrhosis: A Speckle Tracking and Tissue Doppler

DOI: https://doi.org/10.54393/pjhs.v3i05.258

Imaging Study. Ultrasound in Medicine and Biology. 2018 Mar; 44(3):562-574. doi: 10.1016/j.ultrasmedbio.2017.11.013.

[2] Voiosu AM, Daha IC, Voiosu TA, Mateescu BR, Dan GA, Băicuş CR, et al. Prevalence and impact on survival of hepatopulmonary syndrome and cirrhotic cardiomyopathy in a cohort of cirrhotic patients. International journal of hepatology. 2015 Dec; 35(12):2547-55. doi: 10.1111/liv.12866.

[3] Zardi EM, Abbate A, Zardi DM, Dobrina A, Margiotta D, Van Tassell BW, et al. Cirrhotic cardiomyopathy. American College of Cardiology. 2010 Aug; 56(7):539-49. doi: 10.1016/j.jacc.2009.12.075.

[4] Hammami R, Boudabbous M, Jdidi J, Trabelsi F, Mroua F, Kallel R, et al. Cirrhotic cardiomyopathy: is there any correlation between the stage of cardiac impairment and the severity of liver disease? Libyan Journal of Medicine. 2017 Dec; 12(1):1283162. doi: 10.1080/19932820.2017.1283162.

[5] Nagueh SF, Smiseth OA, Appleton CP, Byrd BF 3rd, Dokainish H, Edvardsen T, et al. Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography: An Update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging. Journal of the American Society of Echocardiography. 2016 Apr; 29(4):277-314. doi: 10.1016/j.echo.2016.01.011.

[6] Kosar F, Ates F, Sahin I, Karincaoglu M, Yildirim B. QT interval analysis in patients with chronic liver disease: a prospective study. Angiology. 2007 May; 58(2):218-24. doi: 10.1177/0003319707300368.

[7] Kim SM, George B, Alcivar-Franco D, Campbell CL, Charnigo R, Delisle B, et al. QT prolongation is associated with increased mortality in end stage liver disease. World Journal of Cardiology. 2017 Apr; 9(4):347.

[8] Schooling CM, Zhao J, Zhang Y. The association of androgens with QT interval and heart rate in US men. International Journal of Cardiology. 2014 Dec; 177(2):592-4. doi: 10.1016/j.ijcard.2014.08.146.

[9] Detta N, Frisso G, Zullo A, Sarubbi B, Cozzolino C, Romeo E, et al. Novel deletion mutation in the cardiac sodium channel inactivation gate causes long QT syndrome. International journal of cardiology. 2013 May; 165(2):362-5. doi: 10.1016/j.ijcard.2012.08.032.

[10] Tarapués M, Cereza G, Arellano AL, Montané E, Figueras A. Serious QT interval prolongation with ranolazine and amiodarone. International journal of cardiology. 2014 Mar; 172(1):e60-1. doi: 10.1016/j.ijcard.2013.12.061.

[11] Bal JS and Thuluvath PJ. Prolongation of QTc interval: relationship with etiology and severity of liver disease, mortality and liver transplantation. Liver International. 2003 Aug; 23(4):243-8. doi: 10.1034/j.1600-0676.2003.00833. x.

[12] Wong F. Cirrhotic cardiomyopathy. International journal of hepatology. 2009 Mar; 3(1):294-304. doi: 10.1007/s12072-008-9109-7.

[13] Negru RD, Cojocaru DC, Felea M, Trifan A. QT interval parameters and ventricular arrhythmic events in liver cirrhosis correlation with severity and etiology. Biomedical Research. 2017 Jun; 28(3):1130-4.

[14] Marafioti V, Benetti V, Montin U, Carbone V, Petrosino A, Tedeschi U, et al. QTc interval prolongation and hepatic encephalopathy in patient's candidates for liver transplantation: A valid inference? International Journal of Cardiology. 2015 Jun; 188:43-4. doi: 10.1016/j.ijcard.2015.04.026.

[15] Møller S, Hove JD, Dixen U, Bendtsen F. New insights into cirrhotic cardiomyopathy. International Journal of Cardiology. 2013 Aug; 167(4):1101-8. doi: 10.1016/j.ijcard.2012.09.089.

[16] Josefsson A, Fu M, Björnsson E, Kalaitzakis E. Prevalence of pre-transplant electrocardiographic abnormalities and post-transplant cardiac events in patients with liver cirrhosis. BMC Gastroenterology. 2014 Apr; 14:65. doi: 10.1186/1471-230X-14-65.

[17] Ali M. Frequency of corrected qt interval in patients with cirrhosis. Journal of Rawalpindi Medical College. 2016 Jun; 20(2):79-91.

[18] Bazett HC. An Analysis of the Time-Relations of. Heart. 1920; 7:353.

[19] Rodríguez-Roisin R, Krowka MJ, Hervé P, Fallon MB; ERS Task Force Pulmonary-Hepatic Vascular Disorders (PHD) Scientific Committee. Pulmonary-Hepatic Vascular Disorders (PHD). European clinical respiratory journal. 2004 Nov; 24(5):861-80. doi: 10.1183/09031936.04.00010904.

[20] Kim MY, Choi H, Baik SK, Yea CJ, Won CS, Byun JW, et al. Portal hypertensive gastropathy: correlation with portal hypertension and prognosis in cirrhosis. Journal of digestive diseases. 2010 Dec; 55(12):3561-7. doi: 10.1007/s10620-010-1221-6.

[21] Tangerman A, Meuwese-Arends MT, Jansen JB. Cause and composition of foetor hepaticus. Lancet. 1994 Feb; 343(8895):483. doi: 10.1016/s0140-6736(94)92729-4.

[22] Fitzpatrick TB, Johnson RA, Wolff K, Polano MK, Suurmond D. Color atlas ans synopsis of clinical dermatology: common and serious diseases. InColor atlas ans synopsis of clinical dermatology: common and serious diseases 1997.

[23] Halfon P, Munteanu M, Poynard T. FibroTest-ActiTest

DOI: https://doi.org/10.54393/pjhs.v3i05.258

as a non-invasive marker of liver fibrosis. Clinical journal of gastroenterology. 2008 Sep; 32(6):1.22-39. doi: 10.1016/S0399-8320(08)73991-5.

[24] Okazaki H, Ito K, Fujita T, Koike S, Takano K, Matsunaga N. Discrimination of alcoholic from virus-induced cirrhosis on MR imaging. AJR. American journal of roentgenology. 2000 Dec; 175(6):1677-81. doi: 10.2214/ajr.175.6.1751677.

[24] Harbin WP, Robert NJ, Ferrucci JT Jr. Diagnosis of cirrhosis based on regional changes in hepatic morphology: a radiological and pathological analysis. Radiology. 1980 May; 135(2):273-83. doi: 10.1148/radiology.135.2.7367613.

DOI: https://doi.org/10.54393/pjhs.v3i05.163

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Prevalence and Correlates of Comprehensive HIV/AIDS Knowledge among Women Aged 15–49 Years in Pakistan

Hira Siddique[1], Saira Abbas[1], Muhammad Rizwan Safdar[1*], Muhammad Atif Ayoub[1] and Mahnoor Shahzad[1]

[1]Department of social and cultural studies, University of the Punjab, Lahore, Pakistan

ARTICLE INFO

Key Words:

HIV/AIDS, comprehensive knowledge, HIV/AIDS knowledge in women, PDHS, Pakistan

How to Cite:

Siddique, H. ., Abbas, S. ., Rizwan Safdar, M. ., Atif Ayoub, M. ., & Shahzad, M. . (2022). Prevalence and Correlates of Comprehensive HIV/AIDS Knowledge among Women Aged 15–49 Years in Pakistan: Comprehensive HIV/AIDS Knowledge among Women Aged 15–49 Years in Pakistan. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.163

***Corresponding Author:**

Muhammad Rizwan Safdar

Department of social and cultural studies, University of the Punjab, Lahore, Pakistan

drrizwansafdar.iscs@pu.edu.pk

Received Date: 24th September, 2022

Acceptance Date: 10th October, 2022

Published Date: 31st October, 2022

ABSTRACT

Pakistan is ranked second among the countries in pacific Asia where the AIDS epidemic is spreading rapidly. **Objectives:** This study examines the comprehensive HIV/AIDS knowledge and measures the relationship between knowledge and socio-demographic characteristics of women aged 15-49 in Pakistan. **Methods:** It is based on secondary data analysis of the Pakistan Demographic and Health Survey 2017-2018. Data were collected from 50,495 married women aged 15-49 through the questionnaire. Descriptive statistics were applied to summarize the data while bivariate analysis was conducted to find out the correlations. **Results:** The study found that Pakistani women have a low level of knowledge regarding HIV/AIDS. Moreover, a significant relationship was found between comprehensive HIV/AIDS knowledge and wealth index as well as with the level of access to information. It shows that women from the richest households with moderate access to information had a high level of HIV/AIDS knowledge. **Conclusions:** Social stigmas regarding HIV/AIDS are rooted in Pakistani traditional society which is consequently the cause of the lack of knowledge regarding this epidemic among people in Pakistan.

INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) emerged in the world as a global pandemic [1]. Until today, HIV/AIDS is an increasing concern in developing countries as a major public health issue [2]. Pakistan is ranked 2nd among the countries in pacific Asia where the AIDS epidemic is spreading rapidly, with an increase of 20,000 new infections in 2017 [3]. This increased transmission of HIV is witnessed among vulnerable populations, such as injecting drug users (IDUs), individual who is already HIV infected, people who receive a blood transmission, and eventually, in certain rural and urban sections of developing nations [4]. HIV/AIDS is considered one of the major causes of mortality in third-world countries [5], where almost all people are heterosexual [6]. Pakistan, as a Muslim country, has different misconceptions and misinformation regarding HIV/AIDS's knowledge. Having multiple sexual partners is the most commonly perceived cause of AIDS in Pakistani society, which stigmatizes the victims [7,8]. However, Lack of education, low contraceptive prevalence, and high fertility are the primary causes of the rapid proliferation of AIDS in developing countries. In Pakistan, HIV is transmitted mainly through contaminated blood and blood products. In addition, inadequate nutrition, low access to health facilities, etc. make the pandemic of HIV/AIDS even worst [9]. Previous literature revealed that women have low knowledge regarding HIV/AIDS than males, and therefore, are at higher risk of getting infected with HIV due to epidemiological factors, physiological vulnerabilities, low socioeconomic status, and men's increased indulgence in sexual practices. Furthermore, males are

DOI: https://doi.org/10.54393/pjhs.v3i05.163

reported to have a high transmission rate of HIV than females [10]. According to the Pakistan Demographic and health survey (PDHS) 2012-13, nearly 42% and 50% of women have heard about and are aware of HIV/AIDS respectively. The literature suggests that women who belong to the richest households, have high education levels, have greater access to information, and live in urban settings have an increased awareness of HIV/AIDS [11]. Moreover, an average knowledge score of HIV/AIDS (62.7%) was observed in the university students and the knowledge of females was better than males in Rawalpindi [12]. The present research aimed to examine the level of comprehensive knowledge of HIV/AIDS among women aged 15-49 in Pakistan. Moreover, it also measures the relationship of different socio-demographic characteristics i.e. wealth index, education, age, access to information, etc. with the comprehensive knowledge of HIV/AIDS.

METHODS

This study used data from PDHS 2017-2018, a cross-sectional household survey, that provides data on human resources, health, and nutrition. The study population, which was selected using a two-stage stratified sampling, consisted of 50,495 married women. The dependent variable was comprehensive knowledge about HIV. The covariates for the present study were the age of women in the 15-49 age strata, region of residence, area of residence, qualification level, wealth index, husband/partner's educational level, and having ever been tested for HIV. After organizing and double cleaning the data, descriptive statistics were applied via SPSS version 21.0 to all the included variables of this study. To evaluate the prevalence and correlates of knowledge regarding HIV/AIDS with the socio-demographic characteristics, chi-square tests were applied among the independent variables with comprehensive knowledge. Further, binary logistics were applied to those variables that found a significant association in chi-square analysis to identify the relationship between independent variables with comprehensive knowledge of HIV/AIDS. Necessary measures were taken during the data collection phase to uphold ethical standards. Formal permission from PDHS and informed consent from the participants were taken and their confidentiality was ensured by the survey team of the DHS program.

RESULTS

Different socio-demographic characteristics and questions measuring knowledge regarding HIV/AIDS are explained and analyzed while seeking relationships among variables in the present study. The percent (%) and frequencies of the socio-demographic characteristics of the respondents. The majority of the respondents (43.3%) resided in the age group of 35-39 years and the residents of Punjab, Pakistan (21.4%). 54.3% of respondents resided in the rural areas of Pakistan, and 60.8 % are illiterate. Moreover, 77.1% of the respondents had low access to the information and 23.4% of people were from poorer households. The majority of the females' husbands had education at the secondary level (34.6%). A vast majority of the respondents (98.2%) had never been tested for HIV/AIDS as shown in tale 1.

Variables	Frequency (%)
Age (n=50495)	
15-29	10816(21.4%)
30-39	21893(43.3%)
40-49	17786(35.2%)
Region (n=50495)	
Punjab	10825(21.4%)
Sindh	9052(17.9%)
KPK	8185(16.2%)
Baluchistan	6363(12.6%)
GB	3734(7.4%)
ICT	3195(6.3%)
AJK	5324(10.5%)
FATA	3817(7.6%)
Type of place of residence (n=50495)	
Urban	23059(45.7%)
Rural	27436(54.3%)
Highest education level (n=50495)	
No education	30697(60.8%)
Primary	6848(13.6%)
Secondary	8270(16.4%)
Higher	4680(9.3%)
Wealth index combined (n=50495)	
Poorest	11483(22.7%)
Poorer	11803(23.4%)
Middle	10140(20.1%)
Richer	8709(17.2%)
Richest	8360(16.6%)
Husband/partners' education level (n=3334)	
No education	896(26.9%)
Primary	455(13.6%)
Secondary and higher	1981(59.4%)
Don't know	2(.1%)
Access to information (n=29879)	
Low access to information	23022(77.1%)
Moderate access to information	6286(21.0%)
High access to information	571(1.9%)
Ever been tested for HIV (n=3334)	
No	3274(98.2%)
Yes	60(1.8%)

Table 1: Sociodemographic characteristics of respondents (N=50495)

Demonstrates that 61.2% of women never heard about sexually transmitted infection (STI) and 68.1% never heard

DOI: https://doi.org/10.54393/pjhs.v3i05.163

of AIDS in their lives. Furthermore, 73.9% and 62.5% of women didn't know about the fact that HIV/AIDS can be transmitted through a mosquito bite and sharing a meal with a person who had AIDS respectively. However, 69.9% of women had awareness that healthy-looking people can have HIV as shown in table 2.

Variables measuring comprehensive knowledge of HIV/AIDS	Frequency (%)
Ever heard of a Sexually Transmitted Infection (STI) (n=3333)	
No	2041(61.2%)
Yes	1292(38.8%)
Ever heard of AIDS (n=3334)	
No	2269(68.1%)
Yes	1065(31.9%)
Can get HIV from mosquito bites (n=1065)	
No	787(73.9%)
Yes	278(26.1%)
Can get HIV by sharing food with a person who has AIDS (n=1064)	
No	665(62.5%)
Yes	399(37.5%)
A healthy-looking person can have HIV (n=1064)	
No	320(30.1%)
Yes	744(69.9%)

Table 2: Comprehensive knowledge of HIV/AIDS

The relation of covariates i.e. age, type of place of residence (rural, urban), education level, wealth index, husband's/partner's education, access to information, and ever been tested for HIV with the comprehensive knowledge of HIV/AIDS. The significant relationship between the wealth index (poorest, poorer, middle, richer, and richest) and access to information (low, moderate, and high) was observed with comprehensive knowledge of HIV/AIDS ($p<0.05$) as shown in table 3

Socio-demographic variables	Comprehensive knowledge of HIV/AIDS		p-value
	Low level of knowledge f (%)	High level of knowledge f (%)	
Age			
15-29	46 (23.7%)	197 (22.7%)	0.92
30-39	82 (42.3%)	380 (43.7%)	
40-49	66 (34.0%)	292 (33.6%)	
Type of place of residence			
Urban	49 (25.3%)	258 (29.7%)	0.21
Rural	145 (74.7%)	611 (70.3%)	
Education level			
No education	135 (69.6%)	580 (66.7%)	0.55
Primary	25 (12.9%)	113 (13.0%)	
Secondary	26 (13.4%)	116 (13.3%)	
Higher	8 (4.1%)	60 (6.9%)	
Husband's/partner's education level			
No education	22 (11.3%)	66 (7.6%)	0.22
Primary	14 (7.2%)	89 (10.2%)	
Secondary and higher	158 (81.4%)	713 (82.0%)	
Don't know	0 (0.0%)	1 (0.1%)	
Wealth index			
Poorest	63 (32.5%)	202 (23.2%)	<0.01*
Poorer	46 (23.7%)	229 (26.4%)	
Middle	42 (21.6%)	173 (19.9%)	
Richer	30 (15.5%)	147 (16.9%)	
Richest	13 (6.7%)	118 (13.6%)	
Access to information			
Low access to Information	57 (91.9%)	200 (73.5%)	<0.00*
Moderate access to information	4 (6.5%)	66 (24.3%)	
High access to information	1 (1.6%)	6 (2.2%)	
Ever been tested for AIDS			
No	185 (95.4%)	818 (94.1%)	0.50
Yes	9 (4.6%)	51 (5.9%)	

Table 3: Socio-demographic Characteristic Correlates with thw Comprehensive Knowledge of HIV/AIDS among Women of Age Group 15-49 Years

The binary regression relationship of independent variables i.e. wealth index and access to information with the comprehensive knowledge of HIV/AIDS. It presents that poorer households (OR=1.55, 95% CI, 1.01-2.37) were 1.55 times more likely to have a higher level of knowledge about HIV/AIDS than the poorest households. Similarly, the richest households (OR=2.83, 95% CI, 1.49-5.36) were 2.83 times more likely to have a higher level of knowledge of HIV/AIDS than the poorest households. Table 4 also highlights that people having moderate access to information (OR=4.70, 95% CI, 1.64-13.45) were 4.70 times more likely to have a higher level of knowledge than people having low access to information as shown in table 4

Comprehensive knowledge of HIV/AIDS		
Variables	**OR**	**p-value**
Wealth index		
Poorest	(1)	-
Poorer	1.553	<.042
Middle	1.285	.265
Richer	1.528	.086
Richest	2.831	<.001
Access to information		
Low access to information	(1)	-
Moderate access to information	4.70	<.00
High access to information	1.71	.62

Table 4: Binary logistic regression of wealth index and access to information with comprehensive knowledge of HIV/AIDS

DISCUSSION

Low-level of knowledge regarding HIV/AIDS is considered one of the key determinants of the high prevalence rate of HIV/AIDS in developing countries since comprehensive knowledge related to HIV/AIDS has proved to be significant in combating this deadly pandemic [13,14]. Our current study revealed that, despite the prevailing risks of HIV, comprehensive HIV/AIDS knowledge in women is significantly low. A research conducted in Malawi asserted the same results [15]. As far as the practices and prevention on the subject of HIV/AIDS are concerned, one cannot rely solely on knowledge about HIV/AIDS because knowledge itself varies with the socioeconomic status,

DOI: https://doi.org/10.54393/pjhs.v3i05.163

educational level, and access to information [16]. Contrary to that, in recent research conducted in Malawi, there is very little evidence found on the correlation between socio-demographic factors and comprehensive HIV/AIDS knowledge [15]. The present study proves that the percentage of comprehensive knowledge remains less than 50%. Similar results have been found in literature from different developing countries such as Sub-Saharan Africa [17,18] and Bangladesh [19]. Socio-demographic variables have a direct link with the comprehensive knowledge about HIV/AIDS. The present research indicates a significant relationship between comprehensive knowledge with access to information and wealth index. Similarly, The Center for Disease Control (2011a) reported that people living below the poverty line are more likely to get infected with HIV. Furthermore, people having low socioeconomic status, and low education levels are more prone to get infected with HIV. Moreover, in Bangladesh, males were found to be more aware regarding HIV/AIDS than females according to the Bangladesh Rural Advancement Committee [20]. The present study found that only 31.9% of women know about HIV/AIDS and less than 40% of women know about sexually transmitted diseases. A study conducted in Bangladesh and Tanzania showed inconsistent results with the present research study where nearly all respondents reported that they have heard about HIV/AIDS [21,22]. Following the results of the present study, exposure to mass media was significantly related to having HIV/AIDS knowledge among adolescents in Bangladesh. Media exposure can impart knowledge regarding HIV/AIDS through advertisements, news channels, documentaries, and dramas, which can greatly influence the attitudes and behavior of people (Khan, 2002). Radio and TV were reported as major medium of knowledge regarding HIV/AIDS [23]. Overall, education is needed to inculcate awareness in women regarding HIV/AIDS. Contrary to the results in Ethiopia [24], East African countries [17], and Bangladesh [19,25]; the present study shows no association between educational level and comprehensive HIV/AIDS knowledge. However, education positively contributed to the awareness of HIV/AIDS in Bangladesh [21,23]. On the other hand, the number of HIV/AIDS cases are higher among people with a low level of education and who are unemployed [6,26,27]. Moreover, there is no significant relationship between the area of residence (rural/urban) and comprehensive knowledge, hence, representing the need to educate women of both areas equally. These findings as a whole target a need to run HIV/AIDS awareness campaigns for rural as well as urban areas, providing all the women with basic education because education is the key to removing prevailing misconceptions and helping those in need to rise above this HIV pandemic [28]. Therefore, the results of this study can be utilized to improve public health strategies for imparting effective and comprehensive HIV/AIDS knowledge among women in Pakistan.

CONCLUSIONS

Our Results found that women aged 15-49 are less aware of HIV/AIDS. However, the women who have high socioeconomic status and access to information have more knowledge regarding HIV/AIDS. While keeping this scenario in mind, it is a dire need to enhance the knowledge level of women to prevent them from the dreadful disease. Therefore, this requires taking some innovative measures through different awareness programs in their native language considering their cultural context. In addition to this, the advertisements and programs on television and social media should be increased to enhance the awareness among the women of Pakistan to control this pandemic and target the vulnerable groups of the country to enhance their knowledge.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFRENCES

[1] Raheel H, White F, Kadir MM, Fatmi Z. Knowledge and beliefs of adolescents regarding sexually transmitted infections and HIV/AIDS in a rural district in Pakistan. Journal of Pakistan Medical Association. 2007;57 (1):8.

[2] Khan MA. Knowledge on AIDS among female adolescents in Bangladesh: evidence from the Bangladesh demographic and health survey data. Journal of Health, Population and Nutrition. 2002 Jun; 20(2):130-7.

[3] Ali I and Ali S. Why may COVID-19 overwhelm low-income countries like Pakistan? Disaster Medicine and Public Health Preparedness. 2022 Feb;16(1):316-20. doi.org/10.1017/dmp.2020.329

[4] Quinn TC. Population migration and the spread of types 1 and 2 human immunodeficiency viruses. Proceedings of the National Academy of Sciences. 1994 Mar; 91(7):2407-14. doi.10.1073/pnas.91.7.2407

[5] Zeng W, Shepard DS, Avila-Figueroa C, Ahn H. Resource needs and gap analysis in achieving universal access to HIV/AIDS services: a data envelopment analysis of 45 countries. Health Policy and Planning. 2016 Jun; 31(5):624-33. doi.10.1093/heapol/czv109.

[6] Centers for Disease Control and Prevention (CDC. HIV

DOI: https://doi.org/10.54393/pjhs.v3i05.163

surveillance—United States, 1981-2008. MMWR. Morbidity and mortality weekly report. 2011 Jun; 60(21):689-93.

[7] Farid-ul-Hasnain S, Johansson E, Gulzar S, Krantz G. Need for multilevel strategies and enhanced acceptance of contraceptive use in order to combat the spread of HIV/AIDS in a Muslim society: a qualitative study of young adults in Urban Karachi, Pakistan. Global journal of health science. 2013 Sep; 5(5):57. doi:10.5539/gjhs.v5n5p57

[8] Kang E, Delzell DA, Mbonyingabo C. Understanding HIV transmission and illness stigma: A relationship revisited in rural Rwanda. AIDS Education and Prevention. 2017 Dec; 29(6):540-53. doi.10.1521/aeap.2017.29.6.540

[9] Hyder AA and Khan OA. HIV/AIDS in Pakistan: the context and magnitude of an emerging threat. Journal of Epidemiology & Community Health. 1998 Sep; 52(9):579-85. doi.10.1136/jech.52.9.579

[10] Paudel V and Baral KP. Women living with HIV/AIDS (WLHA), battling stigma, discrimination and denial and the role of support groups as a coping strategy: a review of literature. Reproductive health. 2015 Dec; 12(1):1-9. doi.10.1186/s12978-015-0032-9

[11] Iqbal S, Maqsood S, Zafar A, Zakar R, Zakar MZ, Fischer F. Determinants of overall knowledge of and attitudes towards HIV/AIDS transmission among ever-married women in Pakistan: evidence from the Demographic and Health Survey 2012–13. BMC Public Health. 2019 Dec; 19(1):1-4. doi.10.1186/s12889-019-7124-3

[12] Rehan M, Waheed U, Sarwar M, Arshad M, Satti HS, Zaheer HA. Knowledge, attitude, practices and awareness regarding HIV/AIDS among university students of Islamabad and Rawalpindi, Pakistan. Annals of PIMS ISSN. 2016; 1815:2287.

[13] Sohn A and Park S. HIV/AIDS knowledge, stigmatizing attitudes, and related behaviors and factors that affect stigmatizing attitudes against HIV/AIDS among Korean adolescents. Osong public health and research perspectives. 2012 Mar; 3(1):24-30. doi.10.1016/j.phrp.2012.01.004

[14] Oljira L, Berhane Y, Worku A. Assessment of comprehensive HIV/AIDS knowledge level among in-school adolescents in eastern Ethiopia. Journal of the International AIDS Society. 2013 Jan; 16(1):17349. doi.10.7448/IAS.16.1.17349.

[15] Mandiwa C, Namondwe B, Munthali M. Prevalence and correlates of comprehensive HIV/AIDS knowledge among adolescent girls and young women aged 15–24 years in Malawi: evidence from the 2015–16 Malawi demographic and health survey. BMC Public Health. 2021 Dec; 21(1):1-9. doi.10.1186/s12889-021-11564-4.

[16] Oppong AK and Oti-Boadi M. HIV/AIDS knowledge among undergraduate university students: implications for health education programs in Ghana. African health sciences. 2013 Sep;13(2):270-7. DOI: 10.4314/ahs.v13i2.11.

[17] Teshome R, Youjie W, Habte E, Kasm NM. Comparison and association of comprehensive HIV/AIDS knowledge and attitude towards people living with HIV/AIDS among women aged 15-49 in three east African countries: Burundi, Ethiopia and Kenya. Journal of AIDS & Clinical Research. 2016;7(559):2. doi.org/10.4172/2155-6113.1000559

[18] Oginni AB, Adebajo SB, Ahonsi BA. Trends and determinants of comprehensive knowledge of HIV among adolescents and young adults in Nigeria: 2003-2013. African journal of reproductive health. 2017; 21(1):26-34. DOI: 10.29063/ajrh2017/v21i2.4

[19] Sheikh M, Uddin M, Khan JR. A comprehensive analysis of trends and determinants of HIV/AIDS knowledge among the Bangladeshi women based on Bangladesh Demographic and Health Surveys, 2007–2014. Archives of Public Health. 2017 Dec;75(1):1-1. doi.10.1186/s13690-017-0228-2

[20] Hullur N, D'Ambruoso L, Edin K, Wagner RG, Ngobeni S, Kahn K, et al. Community perspectives on HIV, violence and health surveillance in rural South Africa: a participatory pilot study. Journal of global health. 2016 Jun; 6(1). doi: 10.7189/jogh.06.010406

[21] Goel NP and Pandey MC. Awareness on AIDS & drug among college students in colleges of Meghalaya. International education journal.1997;12(1):1-6.

[22] Klepp KI and Lugoe WL. AIDS education in Tanzania: focus on school children. The AIDS Reader. 1999 Jul; 9(4):270-.

[23] Pellowski JA, Kalichman SC, Matthews KA, Adler N. A pandemic of the poor: social disadvantage and the US HIV epidemic. American psychologist. 2013 May; 68(4):197. doi.10.1037/a0032694

[24] Agegnehu CD, Geremew BM, Sisay MM, Muchie KF, Engida ZT, Gudayu TW, et al. Determinants of comprehensive knowledge of HIV/AIDS among reproductive age (15–49 years) women in Ethiopia: further analysis of 2016 Ethiopian demographic and health survey. AIDS Research and Therapy. 2020 Dec;17(1):1-9.doi.10.1186/s12981-020-00305-z

[25] Yaya S, Bishwajit G, Danhoundo G, Shah V, Ekholuenetale M. Trends and determinants of HIV/AIDS knowledge among women in Bangladesh. BMC public health. 2016 Dec;16(1):1-9. doi.10.1186/s12889-016-3512-0

[26] Song R, Hall HI, Harrison KM, Sharpe TT, Lin LS, Dean

DOI: https://doi.org/10.54393/pjhs.v3i05.163

HD. Identifying the impact of social determinants of health on disease rates using correlation analysis of area-based summary information. Public health reports. 2011 Sep; 126(3_suppl):70-80. doi.10.1177/00333549111260S312

[27] Ananth P and Koopman C. HIV/AIDS knowledge, beliefs, and behavior among women of childbearing age in India. AIDS Education and Prevention. 2003 Dec; 15(6):529. doi.10.1521/aeap.15.7.529.24049

[28] Anderson ES, Wagstaff DA, Heckman TG, Winett R, et al. Information-motivation-behavioral skills (IMB) model: Testing direct and mediated treatment effects on condom use among women in low-income housing. Annals of Behavioral Medicine. 2006 Feb; 31(1):70-9. doi.10.1207/s15324796abm3101_11

DOI: https://doi.org/10.54393/pjhs.v3i05.255

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Psychological Distress, Adaptation, And Well-Being in COVID-19 Recovered Patients: A Correlational Descriptive Study

Roosina Abbas [1], Muhammad Suliman [2], Amir Sultan [3], Sabiha Khanum [4] and Najma Naz [4]

[1]College of Nursing, Khyber Teaching Hospital Peshawar, Pakistan
[2]Upper-Swat College of Nursing, Swat, KPK, Pakistan
[3]Nursing Department, Saidu Group of teaching Hospital Swat, KPK, Pakistan
[4]Institute of Nursing Sciences, Khyber medical university Peshawar, Pakistan

ARTICLE INFO

Key Words:
Covid-19, Psychological adaptation, Mental health, Physical health, Psychological distress, Well-being.

How to Cite:
Abbas, R. ., Suliman, M. ., Sultan, A., Khanum, S. ., & Naz, N. . (2022). Psychological Distress, Adaptation, And Well-Being in COVID-19 Recovered Patients: A Correlational Descriptive Study : Psychological Distress, Adaptation, And Well-Being in COVID-19 Recovered Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.255

***Corresponding Author:**
Sabiha Khanum
Institute of Nursing Sciences, Khyber medical university Peshawar, Pakistan
sabiha.ins@kmu.edu.pk

Received Date: 12th October, 2022
Acceptance Date: 22nd October, 2022
Published Date: 31st October, 2022

ABSTRACT

The novel SARS-CoV-2 virus was reported in the province of Wuhan china and spread to more than 220 countries in no time. The patient who diagnosed corona virus has symptoms of flu, fever, sore throat and respiratory tract infection. In Pakistan the cases of covid-19 were also higher (305,671) and deaths (6416) due to six biggest populations in the world. **Objective:** The aim of the study was to explore the psychological distress, adaptation and well-being of patients diagnosed with covid-19 in Pakistan. **Methods:** A descriptive correlational study was conducted from May 2021 to September 2021 having a sample size of 173 having a consecutive sampling technique in Khyber teaching hospital and Hayat Abad medical complex Peshawar. Data was collected through valid and reliable instruments that are: Kessler Psychological Distress Scale (k-10), psychological adaptation scale (PSA), and The Warwick-Edinburgh mental well-being scale (WEMWBS) were used for data collection. Microsoft Excel and SPSS were used for analysis of mean, standard deviation, independent t-test and Pearson correlation. **Results:** In this study the number of male participants was higher (56.6%) than female participants (43.4%). The k-10 means score were (34.42), PSA (80.86) and Well-being was (59). Independent t-test findings were (k-10) p-value=0.713, (PSA) p-value= 1.501 and well-being p-value (0,795). The Pearson correlation shows that psychological distress was strongly correlated with PSA (p-value=0.002), and well-being (p-value=0.001). **Conclusions:** The study concluded that patient were physically, psychological, and emotionally affected after covid-19, so hospitalized patients received only physical treatment regimens and the other aspects of holistic care, especially psychological care, were ignored by the healthcare professionals.

INTRODUCTION

The novel coronavirus SARS-CoV-2 virus was first identified in the Wuhan province of China, where unexplained cases of patients were admitted for having symptoms of flu in December 2019 [1]. Later, on June 12th, 2020, the WHO reported the cases globally were 7410510 with a total death toll of 418294, USA stood on top regarding cases as well as mortality [2]. Pakistan in the eastern Mediterranean region had a case of 305,671 with total deaths of 6416 and recovered 292,303 [3]. More than 220 countries reported 29.3 million laboratory confirmed cases of COVID-19 on all continents except Antarctica [4]. Mental or psychological well-being encompasses a broad phenomenon in which psychological distress serves as an indicator or predictor and is defined as non-specific symptoms of stress, personality traits, functional disabilities, behavioral problems, anxiety, and depression [5]. Along with the other associated and correlated factors, psychological distress most often arises with exposure to stressful events or stressors, and the emotional turmoil leads to ineffective coping or adaptation [6]. Pandemics

DOI: https://doi.org/10.54393/pjhs.v3i05.255

such as COVID-19 are associated with an increased burden of deteriorated mental health and psychological distress along with the physical manifestations [7]. Psychological well-being has been defined as the "inter and intra-individual levels of positive functioning that can include one's relatedness with others and self-referent attitudes that include one's sense of mastery and personal growth [8]. Thus, psychological or mental well-being is mainly the emotional well-being and feelings of contemplation, joy, satisfaction, pro-social behavior, positive thinking and acting, and subjectively feeling and having good well-being [9]. Adaptation is an umbrella term encompassing a couple of types, including structural, physiological, and psychological. Psychological adaptation integrates and covers specifically the behavioral, cognitive, personality, attitude, and trait responses of the individual to cope as a result of stimulus. These include the evolved psychological mechanisms that modify the cognitive, psychomotor, and behavioral responses and the executive functions of the mind. In this regard, effective distress management necessitates successful adaptation, which includes coping strategies, improving self-esteem abilities, social integration, and spiritual well-being, among other things [10]. The purpose of this study was to explore the psychological distress, adaptation, and well-being among the survivors of COVID-19.

METHODS

The design of this study was correlational descriptive study and was conducted in the corona care units of Khyber Teaching Hospital (KTH) and Hayatabad medical complex (HMC) from May 2021 to September 2021. The study population was those patients who were diagnosed with COVID-19 and admitted to specialised corona units in both of the tertiary care hospitals in Peshawar. The sample size for the study was calculated through the Raosoft calculator having a 95% confidence level, with 5% error and 50% prevalence, which was finalised at 173. A consecutive sampling strategy was utilized by visiting the corona isolation centre units on specific days. The study was divided into two parts: part A collects demographic information about the patient, and part B collects data using three valid and reliable instruments. In this study, three instruments were used: The Kessler Psychological Distress Scale (K-10)(it contains 10 questions with a 5-point Likert scale from 5 means "all the time" to 1 means "none of the time". The instrument chronbach alpha was 0.88 [11]. Psychological adaptation scale (PSA)(25 items, each worth 5 points) On the Likert scale, 1 means not at all to 5, very much. (Cronbach's alpha = 0.94) [12]. The Warwick-Edinburgh mental well-being scale (WEMWBS) contains 14 items with 5 points. On the Likert scale, 1 means "none of the time" and 5 means "all of the time". [13] Consistency (r = 0.94). The data collection process took approximately six to eight weeks to complete after approval from the KMU Advance Studies Review Board and Ethical Board. Data was collected by the primary investigator herself in the field. The investigator filled out questionnaires with the participants in the English language medium. Descriptive analyses (frequencies, percentages, and means) were obtained and depicted in tables and graphs. An independent t test was applied to categorical variables with the mean score on the K10, PSA, and WEMWBS scales (Gender, Education, Employment, and Marital status). For continuous variables (age, disease duration), the mean and SD were calculated, and correlation were applied for association among the study instruments.

RESULTS

The total number of participants in this study was 173. The number of male participants was higher (56.6%) than female participants (43.4%). Patients aged 46 to 55 years old are the maximum number of participants in this age group. Married patients were also higher (78%) compared to singles (20.2%) as seen in table 1.

Characteristics		Frequency (n-173) (%)
Gender	Male	98(56.6%)
	Female	75(43.4%)
Age	25 and below	32(18.5%)
	26 to 35	32(18.5%)
	36 to 45	37(21.4%)
	46 to 55	38(22.0%)
	56 to 65	24(13.8%)
	66 and above	10(5.8%)
Marital status	Single	35(20.2%)
	Married	135(78.0%)
	Widowed	03(1.8%)
Religion	Islam	172(99.4%)
	Other	01(0.6%)
Education	Uneducated	70(40.5%)
	Primary to High	82(47.4%)
	Graduate and above	21(12.1%)
Profession	No jobs	74(42.8%)
	Students	12(6.9%)
	Self-business	87(51.2%)

Table 1: Demographic data of the participants

Table 2 shows the mean and standard deviation scores of the participants. The participants' psychological distress (K-10) mean score was (34.42 ± 6.46), their psychological adaptation (PSA) mean score was (80.86 ± 6.82), and their well-being was (59 ± 4.43).

DOI: https://doi.org/10.54393/pjhs.v3i05.255

Variable	Mean ±SD	Median	Min	Max
Psychological distress (K10)	34.42±6.46	35.00	18.00	48.00
Psychological adaptation (PSA)	80.86±6.82	81.00	67.00	97.00
Well-being (WEMWBS)	59.00±4.43	60.00	47.00	68.00

Table 2: Mean and standard deviation of the participants

In Table 3 An independent t-test was applied to compare the mean score of all three variables. The t-values of psychological distress were (0.713), adaptation (1.501), and well-being (0.795), while the p-value shows no significant association.

Independent t-test	Gender	N	Mean ±SD	T	p-value
Total K10 Score	Male	98	34.73±6.60	.713	.477
	Female	75	34.02±6.29		
Total PSA Score	Male	98	81.54±6.26	1.501	.135
	Female	75	79.97±7.44		
Total WEMWBS Score	Male	98	59.23±4.22	.795	.428
	Female	75	58.69±4.71		

Table 3: Independent t-test of stress, adaptation and well-being

Table 4 shows that psychological distress (K-10) has strong correlation with psychological adaptation (PSA) p-value (0.002) and well-being (WEMWBS) p-value (0.001), while the age have no association with psychological distress, psychological adaptation and well-being.

Variable	K-Distress scale		PSA		WEMWBS	
	R	p-value	R	p-value	R	p-value
Distress scale (k-10)			-.232**	.002	-.248**	.001
Age	-.032	.672	.066	.388	.012	.879

Table 4: Correlation of K-10 with selected variables

DISCUSSION

The study participants were those who had previously had a COVID-19 PCR positive and when the repeated PCR becomes negative within and up to a maximum of 10 days' time, either hospitalized or quarantined, were selected for the study. The likelihood of psychological effects such as confusion, stress, anxiety, depression, anger, fear, distress, and post-traumatic disorders increased during self-isolation and quarantine [14-16]. The Italian study in which 20,115 participants recorded their responses prior to the 14 days of quarantine reported an overall psychological impact of 48.6%, including mild to moderate (43.4%) and severe psychological impact of (5.2%) [17]. Another study in Iran also reported a psychological distress of 59% in the study participants during the COVID-19 pandemic [18]. The results of these studies are far much less as compared to the psychological distress of the current study, in which mild distress was reported by (5.8%), followed by moderate distress (13.9%), and severe distress among the participants was reported at 78.6%). These differences are explained and caused by a variety of factors, one of which is that only 9.7% of respondents in the Italian study had had close contact with Covid-19 positive patients, while the rest of the population had no health problems in the previous 14 quarantined days [17]. Similarly, health care professionals as compared to the general public show an increased level of prevalence, such as (70% in China, an Italian study, and 80% in Spain in studies) in terms of psychological distress because the health care professionals fear and emotional burnout from frequent contact with patients or viruses [19, 20, 21]. Similar psychological responses were observed in a Malaysian study in which during the early phases of the COVID-19 pandemic, 72.1% of moderate to severe anxiety responses were recorded [22]. A study conducted in Egypt on community psycho-behavioral responses during COVID-19 outbreaks found 82% mild to moderate anxiety among the participants [23]. Another reason for increased psychological distress, as reported by (85.5%) health care professionals, is the potential transmission of disease to their families and relatives [24], which may be the case and reason for increased psychological distress in the current study participants as well. A study found that the internet also plays a negative role in spreading fear regarding COVID-19 according to the study participants in Pakistan [25]. In the general population, the level or prevalence of psychological distress reported has been considerably lower as compared to front liners, migrants and expats, pre-existing mental health disorders, prisoners, etc., but a study reported 72% psychological distress or morbidity in the general population during the long down in Spain and attributed this high prevalence rate to the alarm is greater than previous pandemics and affected the people of the country in a different fashion [20]. Studies included a meta-analysis systematic review of 68 studies from 19 countries with a total of 288,830 participants reported the prevalence of anxiety and depression (33%), but interpreted that one out of three adults in the general public has the predominant risk of psychological distress during COVID-19 [26]. Contrary to the similarities in the prevalence of psychological distress with the studies, a study in Saudi Arabia on 739 participants scored 35% psychological distress on the Kessler 10 scale [27], which is notably less than the results of the current study. In psychological adaptation and mental well-being, both variables in the male gender category scored better. When these findings were compared to the majority of the studies that appeared to be in opposition, most of the studies showed that female gender usually tends to score higher on psychological distress due to additional work burden and psychophysiological differences [28-30]. The mean score of mental well-being was 48.45 + 10 on the WEMWBS scales, which was measured for students as an impact of COVID-19 on mental well-being [31]. This is far different than the mean score of 59 + 4.43 (SD) of mental well-being of the participants for the current study.

DOI: https://doi.org/10.54393/pjhs.v3i05.255

Consistent with the findings of other studies, successful adaptation, resilience, and protective coping mechanisms have appeared to be positively associated with psychological well-being [32]. Adaptive mechanisms and coping mechanisms among management students during COVID-19 played a protective and positive role by overcoming psychological distress [33]. Psychological distress is negatively associated with adaptation and mental well-being in this study. The results are concurrent with a study in which COVID-19 related perceived stress is negatively associated with mental well-being [34]. Moreover, psychological adaptation was strongly positively correlated with mental well-being in this study, which is compatible with the studies in which a group of collective coping strategies were significantly associated with the mental well-being of the participants during lock-down [35-37].

CONCLUSIONS

Along with the deleterious impact on physical health, psychological distress stigmatized and crippled individuals mentally, emotionally, socially, culturally, spiritually, and financially. This study also concluded that during hospitalization, the patients received only physical treatment regimens and the other aspects of holistic care, especially psychological care, were ignored by the healthcare professionals. Policymakers, health authorities, and health care professionals should be aware of mental health facts and consider vulnerable people and people at increased risk of negative psychological and social consequences, as well as successful adaptation strategies toward achieving mental and holistic well-being.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Sultan A. Side Effects of COVID-19 Vaccines among the Vaccine Recipients of Khyber Pakhtunkhwa, Pakistan. Journal of Farkhanda Institute of Nursing And Public Health (JFINPH). 2022 Jun; 2(1):2-8.

[2] Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. The Lancet infectious diseases. 2020 May;20(5):533-4.

[3] Pakistan N. COVID-19 Health Advisory Platform by Ministry of National Health Services Regulations and Coordination. COVID-19 Health Advisory Platform by Ministry of National Health Services Regulations and Coordination. 2020.

[4] Cennimo DJ, Bergman SJ, Olsen KM, Bronze MS, Miller MM. Coronavirus Disease 2019 (Covid19), Practice Essentials, Background, Route of Transmission. Medscape 2020.

[5] Viertiö S, Kiviruusu O, Piirtola M, Kaprio J, Korhonen T, Marttunen M, et al. Factors contributing to psychological distress in the working population, with a special reference to gender difference. BMC Public Health. 2021 Mar; 21(1):611. doi: 10.1186/s12889-021-10560-y.

[6] Vagni M, Maiorano T, Giostra V, Pajardi D. Coping with COVID-19: emergency stress, secondary trauma and self-efficacy in healthcare and emergency workers in Italy. Frontiers in psychology. 2020 Sep; 11:566912.

[7] Chao M, Chen X, Liu T, Yang H, Hall BJ. Psychological distress and state boredom during the COVID-19 outbreak in China: the role of meaning in life and media use. The European Journal of Psychotraumatology. 2020 Jul; 11(1):1769379. doi: 10.1080/20008198.2020.1769379.

[8] Burns R. Psychosocial well-being. Encyclopedia of geropsychology. 2016; 3:13-7.

[9] Ryff CD, Love GD, Urry HL, Muller D, Rosenkranz MA, et al. Psychological well-being and ill-being: do they have distinct or mirrored biological correlates? Psychotherapy and psychosomatics. 2006; 75(2):85-95.

[10] Biesecker BB, Erby LH, Woolford S, Adcock JY, Cohen JS, Lamb A, et al. Development and validation of the Psychological Adaptation Scale (PAS): use in six studies of adaptation to a health condition or risk. Patient education and counseling. 2013 Nov; 93(2):248-54.

[11] Sampasa-Kanyinga H, Zamorski MA, Colman I. The psychometric properties of the 10-item Kessler Psychological Distress Scale (K10) in Canadian military personnel. PLoS One. 2018 Apr;13(4):e0196562. doi: 10.1371/journal.pone.0196562.

[12] Berrios CD, Chakravarti A, Biesecker BB. High Levels of Interest in Reproductive Genetic Information in Parents of Children and Adults With Hirschsprung Disease. Journal of Pediatric Gastroenterology and Nutrition. 2019 Sep; 69(3):299-305. doi: 10.1097/MPG.0000000000002392.

[13] Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S, et al. The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. Health Qual Life Outcomes. 2007 Nov; 5:63. doi: 10.1186/1477-7525-5-63.

[14] Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid

DOI: https://doi.org/10.54393/pjhs.v3i05.255

review of the evidence. Lancet. 2020 Mar; 395(10227):912-920. doi: 10.1016/S0140-6736(20)30460-8.

[15] Banerjee D. The COVID-19 outbreak: Crucial role the psychiatrists can play. Asian Journal of Psychiatry. 2020 Apr; 50:102014. doi: 10.1016/j.ajp.2020.102014.

[16] Rana W, Mukhtar S, Mukhtar S. Mental health of medical workers in Pakistan during the pandemic COVID-19 outbreak. Asian Journal of Psychiatry. 2020 Jun; 51:102080. doi: 10.1016/j.ajp.2020.102080.

[17] Bonati M, Campi R, Zanetti M, Cartabia M, Scarpellini F, Clavenna A, et al. Psychological distress among Italians during the 2019 coronavirus disease (COVID-19) quarantine. BMC Psychiatry. 2021 Jan; 21(1):20. doi: 10.1186/s12888-020-03027-8.

[18] Jahanshahi AA, Dinani MM, Madavani AN, Li J, Zhang SX. The distress of Iranian adults during the Covid-19 pandemic - More distressed than the Chinese and with different predictors. Brain, Behavior, and Immunity – Health. 2020 Jul; 87:124-125. doi: 10.1016/j.bbi.2020.04.081.

[19] Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. JAMA Network Open. 2020 Mar; 3(3):e203976. doi: 10.1001/jamanetworkopen.2020.3976.

[20] Gómez-Salgado J, Domínguez-Salas S, Romero-Martín M, Ortega-Moreno M, García-Iglesias JJ, Ruiz-Frutos C. Sense of coherence and psychological distress among healthcare workers during the COVID-19 pandemic in Spain. Sustainability. 2020 Aug;12(17):6855.

[21] Simione L and Gnagnarella C. Differences Between Health Workers and General Population in Risk Perception, Behaviors, and Psychological Distress Related to COVID-19 Spread in Italy. Frontiers in Psychology. 2020 Sep; 11:2166. doi: 10.3389/fpsyg.2020.02166.

[22] Wong LP and Alias H. Temporal changes in psychobehavioural responses during the early phase of the COVID-19 pandemic in Malaysia. Journal of behavioral medicine. 2021 Feb; 44(1):18-28. doi: 10.1007/s10865-020-00172-z

[23] Srivastava D, Shekhawat H, Shelke U. Study of intrauterine insemination with hydrotubation in women with infertility. Journal of Datta Meghe Institute of Medical Sciences University. 2021 Jan; 16(1):1.

[24] Tsehay M, Belete A, Necho M. Factors Associated with Psychological Distress and Brief Resilient Coping Level During the COVID-19 Pandemic Among Health-Care Professionals in Dessie, Ethiopia. Psychology Research and Behavior Management. 2020 Dec; 13:1213-1221. doi: 10.2147/PRBM.S288562.

[25] Svensson I. Identifying inhibitors and motivatorsfor writing code with high readabilityand what we can do about it: A study of motivation to write code with highreadability 2022.

[26] Wang Y, Kala MP, Jafar TH. Factors associated with psychological distress during the coronavirus disease 2019 (COVID-19) pandemic on the predominantly general population: A systematic review and meta-analysis. PLoS One. 2020 Dec; 15(12):e0244630. doi: 10.1371/journal.pone.0244630.

[27] Abdelghani M, El-Gohary HM, Fouad E, Hassan MS. Addressing the relationship between perceived fear of COVID-19 virus infection and emergence of burnout symptoms in a sample of Egyptian physicians during COVID-19 pandemic: a cross-sectional study. Middle East Current Psychiatry. 2020 Dec; 27(1):1-9.

[28] Choi I, Kim JH, Kim N, Choi E, Choi J, Suk HW, et al. How COVID-19 affected mental well-being: An 11-week trajectories of daily well-being of Koreans amidst COVID-19 by age, gender and region. PLoS One. 2021 Apr; 16(4):e0250252. doi: 10.1371/journal.pone.0250252.

[29] Del Río-Casanova L, Sánchez-Martín M, García-Dantas A, González-Vázquez A, Justo A. Psychological Responses According to Gender during the Early Stage of COVID-19 in Spain. International journal of environmental health research. 2021 Apr;18(7):3731. doi: 10.3390/ijerph18073731.

[30] Al-Hanawi MK, Mwale ML, Alshareef N, Qattan AMN, Angawi K, Almubark R, et al. Psychological Distress Amongst Health Workers and the General Public During the COVID-19 Pandemic in Saudi Arabia. Risk Management and Healthcare Policy. 2020 Jul; 13:733-742. doi: 10.2147/RMHP.S264037.

[31] Aqeel M, Abbas J, Shuja KH, Rehna T, Ziapour A, Yousaf I, et al. The influence of illness perception, anxiety and depression disorders on students mental health during COVID-19 outbreak in Pakistan: a web-based cross-sectional survey. International Journal of Human Rights in Healthcare. 2021 Aug.

[32] Shanahan L, Steinhoff A, Bechtiger L, Murray AL, Nivette A, Hepp U, et al. Emotional distress in young adults during the COVID-19 pandemic: evidence of risk and resilience from a longitudinal cohort study. Psychological medicine. 2022 Apr; 52(5):824-833. doi: 10.1017/S003329172000241X.

[33] Sundaray BK, Sarangi P, Patra SK. Psychological vulnerability and coping among management

DOI: https://doi.org/10.54393/pjhs.v3i05.255

students during COVID-19 pandemic. The Journal of Mental Health Training, Education and Practice. 2021 Aug.

[34] Aslam N, Shafique K, Ahmed A. Exploring the impact of COVID-19-related fear, obsessions, anxiety and stress on psychological well-being among adults in Pakistan. The Journal of Mental Health Training, Education and Practice. 2021 Jul.

[35] Salman M, Asif N, Mustafa ZU, Khan TM, Shehzadi N, Tahir H, et al. Psychological Impairment and Coping Strategies During the COVID-19 Pandemic Among Students in Pakistan: A Cross-Sectional Analysis. Disaster Medicine and Public Health Preparedness . 2020 Oct; 1-7. doi: 10.1017/dmp.2020.397.

[36] Khan AA, Lodhi FS, Rabbani U, Ahmed Z, Abrar S, *et al.* Impact of Coronavirus Disease (COVID-19) Pandemic on Psychological Well-Being of the Pakistani General Population. Front Psychiatry. 2021 Jan;11:564364. doi: 10.3389/fpsyt.2020.564364.

[37] Rogowska AM, Kuśnierz C, Bokszczanin A. Examining Anxiety, Life Satisfaction, General Health, Stress and Coping Styles During COVID-19 Pandemic in Polish Sample of University Students. Psychology Research and Behavior Management. 2020 Sep;13:797-811. doi: 10.2147/PRBM.S266511.

DOI: https://doi.org/10.54393/pjhs.v3i05.200

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Quality of Multiple-Choice Questions (MCQs) as Perceived by the Postgraduate Residents Appearing in Mid Training Assessment (MTA) During January 2022 at Rawalpindi Medical University

Rizwana Shahid[1], Muhammad Asad[2], Rabbia Khalid[3]

[1]Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
[2]Department of Cardiology, Benazir Bhutto Hospital, Rawalpindi, Pakistan
[3]Department of Pathology, Rawalpindi Medical University, Rawalpindi, Pakistan

ARTICLE INFO

Key Words:
Multiple Choice Questions, Mid Training Assessment, postgraduate residents, Table of Specification, problem solving

How to Cite:
Shahid, R. ., Asad, M. ., & Khalid, R. . (2022). Quality of Multiple Choice Questions (MCQs) as perceived by the postgraduate residents appearing in Mid Training Assessment (MTA) during January 2022 at Rawalpindi Medical University: Quality of Multiple-Choice Questions (MCQs) as perceived by the postgraduate residents appearing in Mid Training Assessment (MTA). Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.200

***Corresponding Author:**
Rizwana Shahid
Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
drriz_shahid@yahoo.com

Received Date: 5th October, 2022
Acceptance Date: 18th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Impartiality and reliability of Multiple-Choice Questions (MCQs) render them an ideal assessment tool for measuring higher order cognition. **Objective:** To determine the perception of postgraduate medical trainees pertinent to the quality of MCQs administered in Mid Training Assessment (MTA) January 2022. **Methods**: A cross-sectional descriptive study was carried out among 40 postgraduate trainees who appeared in MTA during January 2022. About 23, 12 and 05 of these trainees were doing MS and MD training at Benazir Bhutto Hospital, Holy Family Hospital and DHQ Hospital Rawalpindi respectively. Trainees were enrolled in the study through consecutive non-probability sampling. The feedback from the trainees about quality of MCQs was gathered by means of a structured questionnaire based on 5-point likert scale. Data analysis was done by using SPSS version 25.0. **Results:** About 67% of the trainees were pleased with the quality and construct of MCQ in their assessment in terms of illustration of the information in their stems needed to understand the clinical problem. More than 82% trainees satisfied with the time allocated for attempting MCQs papers. Only 55% trainees agreed with alignment of MCQs with given Table of Specification (TOS). Most (32.5%) wanted to have difficulty level of the MCQs in accordance with level of training. Around 27.5% and 22.5% of the residents proposed to incorporate more clinical reasoning and problem solving MCQs respectively. **Conclusions:** Trainees were substantially contented with the standard of MCQs. They suggested for inclusion of more clinical reasoning and problem-solving type questions in alignment with TOS.

INTRODUCTION

Assessment in medical education is of paramount significance to verify the achievement of desired learning outcomes. Multiple Choice Questions (MCQs) are primarily designed to assess the knowledge of the students due to their validity, reliability and cost-effectiveness [1]. It is quite feasible to implement MCQs based assessment pertinent to all cognitive domains in any institute in compliance with the employed faculty [2]. MCQs are purposely constructed with meaningful and equally plausible distractors for assessing the students and promoting their deep learning [3]. They are commonly used in higher education for efficiently assessing the extensive course material in a short time period [4]. Being a user-friendly assessment, multiple choice testing is carried out in numerous educational settings globally [5]. Questions for high stake examinations like that of undergraduate and postgraduate medical education should properly be constructed and reviewed before administration by experts in order to ensure their flawlessness [6]. Apart from recall of knowledge, multiple choice questions are

DOI: https://doi.org/10.54393/pjhs.v3i05.200

also designed and administered for conceptual testing and measuring the problem-solving skills of the students [7]. MCQs are preferably used for assessing the knowledge due to easiness of scoring and non-subjectivity [8]. Moreover, high achievers can very well be differentiated from low achievers by means of well-constructed MCQs [9]. Students who cannot perform well in MCQs are incapable of adequately attempting other types of assessment [10]. Elimination of the distractors by the students from MCQ options illustrates that students have knowledge of content more than that is questioned [11]. Some experts challenge the ability of MCQs to assess higher order learning that is basically attributed to poor quality MCQs having ineffective distractors [12]. Poorly designed MCQs are also known to negatively influence the students' achievement [13]. The current study is aimed to assess the quality of one best MCQs that were predominantly designed for postgraduate residents intended to appear in Mid Training Assessment (MTA) at Rawalpindi Medical University. Being a high-stake assessment, the MCQs for this purpose should be flawless and objectively assess the knowledge, comprehension and analysis. The feedback of the trainees gathered in this study would really prove valuable for qualitatively upgrading the assessment.

METHODS

A cross-sectional descriptive study was done to get feedback of 40 postgraduate trainees who appeared in MTA during January 2022. About 23, 12 and 05 of these trainees were doing MS and MD training at Benazir Bhutto Hospital, Holy Family Hospital and DHQ Hospital Rawalpindi respectively. These 3 teaching hospitals were affiliated with Rawalpindi Medical University Rawalpindi. Trainees were enrolled in the study through consecutive non-probability sampling. The feedback from the trainees about standard of MCQs was gathered by means of a structured questionnaire based on 5-point likert scale. Residents were also asked to give their valuable suggestions for improvement. Data were analyzed by SPSS version 25.0.

RESULTS

Of the 63 postgraduate trainees appearing in Mid Training Assessment (MTA) during January 2022 at Rawalpindi Medical University, 40 trainees gave their viewpoints about the quality of Multiple-Choice Questions (MCQs) that were incorporated in their assessment. Of the 40 trainees, most (17.5%) were doing training in Obstetrics and Gynecology. The number of residents enrolled in each training program from all three teaching hospitals is revealed below in Table 1.

Training programs	Training institutes		
	Holy Family Hospital (HFH)	Benazir Bhutto Hospital (BBH)	DHQ Hospital
MS Obstetrics & Gynecology	4	2	1
MS Urology	0	5	0
MS General Surgery	0	3	0
MS Neurosurgery	2	0	2
MS Orthopedics	0		0
MS Pediatric Surgery	1	0	0
MD General Medicine	0	4	1
MD Nephrology	1	0	0
MD Cardiology	0	2	0
MD Gastroenterology	1	0	0
MD Dermatology	0	1	0
MD Pediatrics	1	0	0
MS Otorhinolaryngology	0	0	1
MS Anesthesiology	1	3	0
MD Diagnostic Radiology	1	2	0
Total	12	23	5

Table 1: No. of residents from different training programs (n = 40)

Feedback was gathered from the university residents regarding standard of MCQs and around 66.7% trainees were satisfied with their quality. In addition to the stem of MCQs, the time allocated for solving them and their problem solving aspect were agreeable among our residents as illustrated below in Table 2.

Attributes	Agree	Neutral	Disagree
Stem of the MCQs had adequate information necessary to understand the question and choose the correct answer	33 (82.5%)	04 (10%)	03 (7.5%)
MCQs scenarios were too long to read in specified time	14 (35%)	12 (30%)	14 (35%)
All the options of MCQs were of the same length	22 (55%)	11 (27.5%)	07 (17.5%)
There were no grammatical errors or spelling mistakes in MCQs	28 (70%)	02 (5%)	10 (25%)
MCQs were based on problem solving	33 (82.5%)	01 (2.5%)	06 (15%)
MCQs were designed to assess our knowledge application in addition to recall of knowledge	30 (75%)	03 (7.5%)	07 (17.5%)
Options of "all of the above" and "none of the above" were sternly avoided	31 (77.5%)	07 (17.5%)	02 (5%)
It was easily understandable what is being asked in the scenario without reading the options	20 (50%)	13 (32.5%)	07 (17.5%)
Unnecessary difficult vocabulary was avoided	30 (75%)	07 (17.5%)	03 (7.5%)
Presence of any abbreviation in the MCQs' stem that was not clear to you	17 (42.5%)	09 (22.5%)	14 (35%)
The content asked in MCQs was according to the TOS (Table of Specification) given in your MS / MD curriculum	22 (55%)	05 (12.5%)	13 (32.5%)
Time allocated for paper-I was sufficient	34 (85%)	04 (10%)	02 (5%)
Time allocated for Paper-II was adequate	33 (82.5%)	04 (10%)	03 (7.5%)

Table 2: Feedback of the trainees about MCQs of Mid Training Assessment (MTA) January 2022

DOI: https://doi.org/10.54393/pjhs.v3i05.200

Most (32.5%) of our trainees were dissatisfied with the difficulty level of MCQs and suggested for designing them in compliance with acquisition of respective competencies. About 22.5% trainees recommended for incorporation of more problem-solving questions in assessment as shown below in Figure 1.

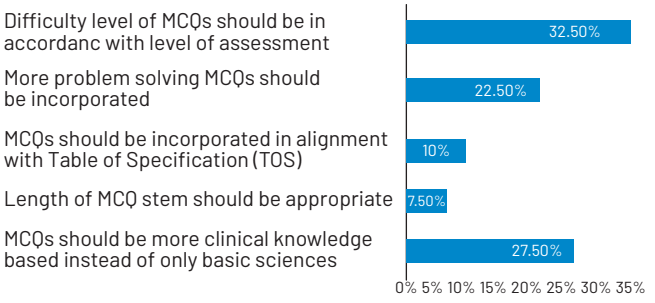

Figure 1: Suggestions of postgraduate trainees to improve the quality of MCQ

DISCUSSION

Although multiple choice questions are frequently administered assessment tool due to their objectivity, validity and reliability; their quality should be optimal for accurately differentiating the high from low performers [14]. In current study, about 82.5% postgraduate trainees appearing in Mid Training Assessment during January 2022 perceived the stem of MCQs in their theory papers appropriate with respect to illustration of considerable information deemed necessary to comprehend and choose from the given options as correct answer. About 50% of our residents confessed they chose the correct answer conveniently just be reading the stem of MCQs. Developing MCQs with suitable scenario for understanding the healthcare problem in accordance with lead in statement is not an easy job. Likewise, MCQs developed for access exam to diverse medical specialties from 2009-2013 were identified with multiple errors. One of them was negative /unfocussed stems of MCQs and this defect persisted throughout the 5 years. Such stems were quite cumbersome that candidate faced difficulty in choosing the correct answer without reviewing all the options. However, such flaws in stems were intensified periodically [15]. Similarly, a study by Dowing SM et al revealed such flaws related to construct and content of MCQs that deprived medical students from good scores in their achievement examination [16]. Such flawed items make it difficult for the candidates to attempt the paper in specified time. The faculty members involved in designing MCQs should be skilled enough to avoid technical flaws. National Board of Medical Examiners (NBME) has developed a guide for convenience of the Higher Education faculty in this regard [17]. However, faculty members should also be well-versed in recent medical advancements in order to meet the requirements of World Federation for Medical Education (WFME) [18]. The present study revealed satisfaction among 55% of our MS and MD trainees who appearing in MTA at Rawalpindi Medical University with respect to allocation of test items in accordance with Table of Specification (TOS) that was shared with them for guidance well before assessment. TOS is made available to the candidates ahead of exam in order to ensure content validity of the assessment [19]. Ideally learning objectives of a curriculum should be aligned with its assessment [20]. In addition to getting arrayed with the teaching methodologies. This is imperative to promote students' learning. Provision of TOS to students ensures content validity of an assessment; in other words, TOS reflects the course on the basis of which performance of the students is scored [21]. Continuing Professional Development (CPD) of the teaching faculty should regularly be organized in higher education institutes for capacity building and guaranteeing the assessment of the future professionals in true spirit. Although 82.5% of our respondents perceived the MCQs incorporated in their MTA assessment as based on problem solving traits, however 27.5% recommended to design items to judge their clinical reasoning more than that of their basic sciences knowledge as this has already been tested while enrolling for postgraduate training through central induction process. Being high stake assessments, clinical reasoning should substantially be merged in test items predominantly designed for postgraduate trainees for adequate comprehension of problem and to rationalize the respective treatment [22]. Clinical vignette multiple choice questions are also essential to elicit critical thinking after appraising the case [23]. Cognition level of MCQs should preferably be advanced in order to make real difference in undergraduate and postgraduate medical assessments. Most (32.5%) of our respondents opined that difficulty level of questions should be according to their level of assessment. As Mid Training Assessment (MTA) is executed for the trainees who have successfully accomplished all training requisites with respect to their training years, so their assessment should vary substantially from those who are assessed on training completion. Professional teachers are bestowed with an art of fusing knowledge of the topics taught with problem solving skills in real life scenario [24]. Although difficulty index of MCQs can accurately be determined by item analysis [25], the feedback of the trainees for improving the existing scenario also carries weightage. Developing curriculum before commencement of program and year-wise segregation of course content along with its learning objectives and assessment TOS can prove valuable in

DOI: https://doi.org/10.54393/pjhs.v3i05.200

assessing the postgraduate trainees in congruence with level of training.

CONCLUSIONS

Although candidates were substantially satisfied with the quality of MCQs; however, incorporating more clinical vignette-based items and paper setting in compliance with level of training was strongly suggested. Apart from getting trainees' feedback, MCQs should also be reviewed by the faculty involved in designing the items in addition to educationist for comprehensive review in accordance with standard MCQ writing guidelines. Faculty training for their capacity building in this regard at institutional level will also be beneficial.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Abdel-Hameed AA, Al-Faris EA, Alorainy IA, Al-Rukban MO. The criteria and analysis of good multiple-choice questions in a health professional setting. Saudi Medical Journal 2005; 26910); 1505-10.

[2] Harper R. Multiple Choice Questions – A Reprieve. Bioscience Education 2003; 2(1): 1-6. doi.10.3108/beej.2003.02000007.

[3] Vegi VAK, Sudhakar PV, Bhimarasetty DM, Pamarthi K, Edara L, Kutikuppala LVS, et al. Multiple-choice questions in assessment: Perceptions of medical students from low-resource countries. Journal of Education and Health Promotion. 2022; 11: 103. org.4103%2Fjehp.jehp_621_21.

[4] Bailey PH, Mossey S, Moroso S, Cloutier JD, Love A. Implications of multiple-choice testing in nursing education. Nurse Education Today 2012; 32(6): e40-e44. doi.10.1016/j.nedt.2011.09.011.

[5] Marsh EJ, Roediger HL, Bjorkm RA, Bjork E. The memorial consequences of multiple-choice testing. Psychonomic Bulletin and Review 2007; 14 (2): 194–199. doi.10.3758/BF03194051.

[6] Belay LM, Sendekie TY, Eyowas FA. Quality of multiple-choice questions in medical internship qualification examination determined by item response theory at Debre Tabor University, Ethiopia. BMC Medical Education 2022; 22: 635. doi.10.1186/s12909-022-03687-y.

[7] Karpicke JD and Blunt J. Retrieval practice produces more learning than elaborative studying with concept mapping. Science 2011; 331: 772-775. doi.10.1126/science.1199327.

[8] Tarrant M and Ware J. A framework for improving the quality of multiple-choice assessments. Nurse Education Today. 2012; 37: 98–104. doi.10.1097/nne.0b013e31825041d0.

[9] Abdel-Hameed AA, Al-Faris EA, Alorainy IA, Al-Rukban MO. The criteria and analysis of good multiple-choice questions in a health professional setting. Saudi Medical Journal 2005; 26(10): 1505–10. PMID: 16228046.

[10] Adhi MI and Aly SM. Student perception and post-exam analysis of one best MCQs and one correct MCQs: A comparative study. Journal of the Pakistan Medical Association. 2018; 68(4): 570-575.

[11] Harper R. Multiple-choice questions – A Reprieve. American bee journal. 2003; 2(1): 1-6. doi.10.3108/beej.2003.02000007.

[12] Braddom CL. A brief guide to writing better test questions. American journal of physical medicine. 1997; 76:514-516. doi.10.1097/00002060-199711000-00015.

[13] Clifton SL and Schriner CL. Assessing the quality of multiple-choice test items. Nurse Education today. 2010; 35: 12–16. doi: 10.1097/NNE.0b013e3181c41fa3.

[14] Brown GTL and Abdulnabi HHA. Evaluating the quality of higher education instructor-constructed multiple-choice tests: Impact on student grades. Frontiers of Education. 2017; 2: 24. doi.10.3389/feduc.2017.00024.

[15] Rodríguez-Díez MC, Alegre M, Díez N, Arbea L, Ferrer M. Technical flaws in multiple-choice questions in the access exam to medical specialties ("examen MIR") in Spain (2009-2013). BMC Medical Education. 2016;16: 47. doi.10.1186%2Fs12909-016-0559-7.

[16] Dowing SM. The effects of violating standard item writing principles on tests and students: the consequences of using flawed test items on achievement examinations in medical education. Advances in Health Sciences Education. 2005; 10:133–3. doi.10.1007/s10459-004-4019-5.

[17] Case SM, Swanson DB. Constructing written test questions for the basic and clinical sciences. Philadelphia: National Board of Medical Examiners; 1998 Oct.

[18] Fernandez RS, Méndez Díaz C, Rodríguez E. Continuing Medical Education: how to write multiple choice questions. Radiology. 2013; 55(1): 28–36. doi.10.1016/j.rx.2013.01.001.

[19] DiDonato-Barnes N, Fives H, Krause ES. Using a table of specifications to improve teacher constructed traditional tests: An experimental design. Assessment in Education: Principles, Policy, and

DOI: https://doi.org/10.54393/pjhs.v3i05.200

Practice 2013; 21(1): 90–108. doi.10.1080/0969594X.2013.808173.

[20] FitzPatrick B, Hawboldt J, Doyle D, Genge T. Alignment of learning objectives and assessments in therapeutics courses to foster higher-order thinking. American journal of pharmaceutical education. 2015 Feb; 79(1): 10. doi.10.5688%2Fajpe79110.

[21] Alade OM and Igbinosa VO. Table of specification and its relevance in educational development assessment.

[22] Derakhshandeh Z, Amini M, Kojuri J, Dehbozorgian M. Psychometric characteristics of Clinical Reasoning Problems (CRPs) and its correlation with routine multiple choice question (MCQ) in Cardiology department. Journal of Advances in Medical Education & Professionalism. 2018 Jan; 6(1):37-42.

[23] Heist BS, Gonzalo JD, Durning S, Torre D, Elnicki DM. Exploring Clinical Reasoning Strategies and Test-Taking Behaviors During Clinical Vignette Style Multiple-Choice Examinations: A Mixed Methods Study. Journal of graduate medical education. 2014; 6(4): 709-14. doi.10.4300%2FJGME-D-14-00176.1.

[24] Ma N, Xin S, Du JY. A peer coaching-based professional development approach to improving the learning participation and learning design skills of in-service teachers. Journal of Educational Technology & Society. 2018 Apr 1;21(2):291-304.

[25] Kumar D, Jaipurkar R, Shekhar A, Sikri G, Srinivas v. Item analysis of multiple-choice questions: A quality assurance test for an assessment tool. Medical Journal Armed Forces India (MJAFI). 2021; 77(1): S85-89. doi.10.1016/j.mjafi.2020.11.007.

DOI: https://doi.org/10.54393/pjhs.v3i05.231

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Reasons for Non-compliance with medication and Disease severity among heart failure patients at Benazir Bhutto Hospital Rawalpindi

Imran Saeed Ali[1], Rizwana Shahid[2*] and Muhammad Asad[3]

[1]Professor of Cardiology, PAF Hospital, Islamabad, Pakistan
[2]Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
[3]Department of Cardiology, Benazir Bhutto Hospital, Rawalpindi, Pakistan

ARTICLE INFO

Key Words:
Heart failure, Non-compliance, Medication, NYHA classification

How to Cite:
Saeed Ali, I. ., Shahid, R. ., & Asad, M. . (2022). Reasons for Non-compliance with medication and Disease severity among heart failure patients at Benazir Bhutto Hospital Rawalpindi: Disease Severity among Heart Failure Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.231.

***Corresponding Author:**
Rizwana Shahid
Department of Community Medicine, Rawalpindi Medical University, Rawalpindi, Pakistan
drriz_shahid@yahoo.com

Received Date: 11th October, 2022
Acceptance Date: 20th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Heart failure is a silent epidemic that is growing exponentially among both genders. **Objectives:** To determine the reasons for non-compliance with medication and severity of illness among heart failure patients. **Methods:** A cross-sectional descriptive study was done among 277 heart failure patients who visited Cardiology department of Benazir Bhutto Hospital during 2020 and enrolled in study through consecutive non-probability sampling. Data was gathered pertinent to demographics, hospital stay, comorbidities, drug compliance, physical activity and reasons for expiry. Severity of disease was categorized by using NYHA classification. Variations in mean age of the both genders and length of hospital stay between recovering and expiring patients were statistically determined by independent sample t-test. P-value ≤ 0.05 was taken significant. 95% CI were also computed. **Results:** Of the 277 patients, 56% and 44% were males and females respectively with mean age 56.5 ± 15.9 years. Most (65.7%) were illiterate. There was significant difference (P 0.003) (95%CI (1.85 – 9.35) in mean age of both genders. About 71.8% and 25.6% patients belonged to low and middle social class respectively and 68% of them were non-compliant with medication. 59.3% were non-compliant due to unawareness while 23.4% and 15.9% had non-compliance due to non-affordability and adversity of medicines respectively. Out of 15 expiring cases, 13 succumbed to cardiac arrest. Mean length of hospital stay was 5.92 ± 3.7 days. About 122 and 112 cases were in NYHA heart failure class III and IV respectively. **Conclusion:** Incognizance about the medication was the prime reasons for non-compliance.

INTRODUCTION

Heart failure is determined to be the speedily perpetuating epidemic with elders constituting the main chunk of the sufferers [1]. This epidemic might be attributed to longer life expectancy of the people and availability of better treatment options for Coronary Artery Disease (CAD) and cardiac arrest [2]. The expenditure of hospitalization with decompensated heart failure constitutes 60% of total heart failure treatment cost [3]. Most of the acute decompensated heart failures cases are identified with deterioration of chronic maladay [4]. Non-compliance with medication has commonly been reported among heart failure patients and is determined as the most frequent cause for hospital admissions due to resultant emergencies and fatalities [5]. Approximately 80% compliance rate is required in order to make the treatment efficacious [6]. About 125,000 preventable deaths worldwide are attributed to medication non-adherence [7]. Apart from deteriorating the patients' health, non-compliance also radically affects the healthcare system. Barriers to medication adherence have prodigious impact on patients as well as healthcare services; apt identification and prompt rectification of which is remarkably important in order to refrain from grave consequences [8]. There are numerous determinants of non-compliance with medication particularly miscommunication between patient and doctor, non-

DOI: https://doi.org/10.54393/pjhs.v3i05.231

involvement in decision making, ignorance of drug's adversity and constrained resources [9]. Being asymptomatic has also been identified as the commonest precipitating factor for non-compliance among patients of a teaching hospitals [10]. The present study is intended to scrutinize the underlying reasons for non-compliance with medication among decompensated heart failure cases who visited the Cardiology department of Benazir Bhutto Hospital Rawalpindi during 2019 and 2020 for their respective ailments. Knowing the contributing factors would guide us towards mitigating their role in non-compliance with medication and hence would be beneficial in improving the healthcare outcome of cardiac failure patients.

METHODS

A cross-sectional descriptive study was carried out among 277 heart failure patients who consulted the cardiologist via OPD or Emergency department at Benazir Bhutto Hospital Rawalpindi during 2020. The patients were enrolled in the study through consecutive non- probability sampling. Data was collected regarding demographics, length of hospital stay, history of hypertension, diabetes, medication, symptoms associated with cardiac failure and limitations of physical activity by using structured questionnaire. Moreover, reasons for non-compliance with medication were also inquired. The data was collected by interviewing the patients and their attendants and gathering the responses. Reasons for expiry among the patients succumbing to heart failure were also scrutinized. The severity of heart failure among our patients was stratified by considering New York Heart Association (NYHA) classification which is an essential tool to decide the need for cardiac intervention or medication in accordance with general condition. It is of paramount significance to identify the risk among patients presenting in outpatient cardiology clinics [11]. This classification is revealed below in Table 1.

NYHA Class	Symptoms* / Clinical impairment
Class I	Cardiac disease but no symptoms and no limitations in ordinary physical activity
Class II	Mild symptoms and slight limitation during physical activity
Class III	Significant limitation in activity due to symptoms, comfortable only at rest
Class IV	Severe limitations, symptoms while at rest

Table 1: NYHA classification of severity of heart failure
*Symptoms – dyspnea, chest pain, fatigue, palpitations

Statistical significance of gender-based variation in mean age of heart failure cases and difference in mean hospital stay duration between surviving and dying patients was determined by independent sample t-test. $P<0.05$ was considered significant.

RESULTS

Of the total 277 heart failure patients enrolled in this research, about 155 (56%) were males while 122 (44%) patients were females. Most (65.7%) were illiterate. About 13.7%, 12.6%, 6.5% and 1.4% of patients were educated up to primary, matriculation, intermediate and graduation level respectively. Mean age of the study participants was found to be 56.5 ± 15.9 years. Statistically significant difference was observed in mean age of male and female heart failure patients as illustrated below in Table 2.

Mean age of heart failure patients (n = 252)		P-value (95% CI)
Males (n = 155)	Females (n = 122)	
59.1 ± 14.6 years	53.5 ± 17.1 years	0.003 (1.85 – 9.35)

Table 2: Difference in mean age of males and females diagnosed with heart failure

Most (65.7%) of our study subjects were older than 50 years as illustrated in Figure 1.

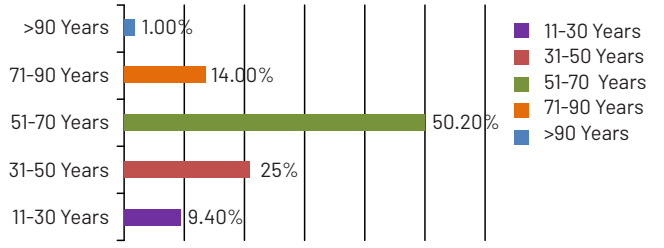

Figure 1: Age Demographics

About (199) 71.8% of the patients belonged to lower social class while 71 (25.6%) and 7 (2.6%) had middle and upper socioeconomic status respectively. Of the total 277, about 167 (60.3%) were non-diabetic while rest of the 110 (39.7%) were diabetic. Only 53 (48.2%) out of 110 diabetics were compliant with anti-diabetics. Of the total 277 heart failure patients in our research, 74 were hypertensive and among them only 12 were compliant with anti-hypertensive. About 183 patients out of 270 belonging to lower and middle social class were non-compliant with medication. Lack of proper counseling was determined to be the commonest reason for non-compliance to anti-diabetics and anti-hypertensives among our study participants as shown below in Figure 2.

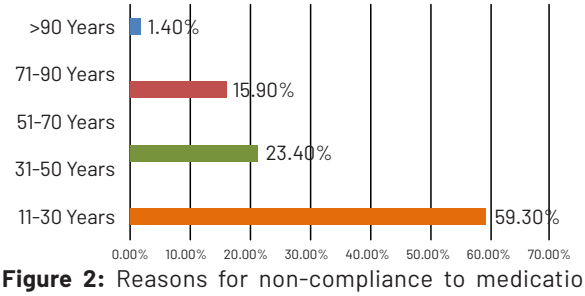

Figure 2: Reasons for non-compliance to medication (anti-hypertensives & anti-diabetics)

About 15 out of 277 heart failure patients expired and among them there were 9 males and 6 females. Of the 15

DOI: https://doi.org/10.54393/pjhs.v3i05.231

expiring cases, 01 died due to Left Ventricular Failure (LVF) and 01 succumbed to Ventricular Tachycardia (VT). Rest of the 13 patients died of cardiac arrest. However, 02 out of 262 discharging patients were later on shifted to Rawalpindi Institute of Cardiology (RIC) on personal request. Severity of illness among heart failure cases in accordance with NYHA classification is depicted below in Figure 3.

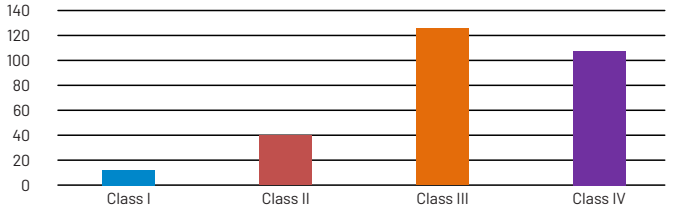

Figure 3: NYHA classification of heart failure cases (n = 277)

Mean length of hospital stay was 5.92 ± 3.7 days. Difference in mean length of hospital stay between survived and discharged patients was statistically insignificant (P = 0.20) as shown below in Table 3.

length of hospital stay (Mean ± SD)	Discharged / survived (n = 262)	Died (n = 15)	P-value (95% CI)
	5.86 ± 3.62 days	7.1 ± 4.3 days	0.20 (-0.67 – 3.15)

Table 3: Mean length of hospital stay among heart failure cases (n = 277)

DISCUSSION

Due to the propensity of heart failure to affect more than 10% of the elders in any community, world is confronted with a prime public health challenge [11]. Despite the recent advancements in treatment of this ailment, 50% of the diagnosed cases have been reported with poor survival rate [12]. Non-compliance with medication has been recognized as one of the reasons for poor prognosis [13]. Mean age of acute decompensated heart failure patients in our study was 56.5 ± 15.9 years. However, females fell victim to this sickness at relatively younger age than those of males (P<0.003). On the other hand, Framingham heart study from United States illustrated heart failure prevalence of about 0.8% among 50-59 years old males and females that can likely be escalated to 6.6% and 7.9% among 80-89 years aged females and males respectively [14]. Diagnostic and interventional procedures pertinent to cardiovascular disease have been carried out relatively less among females; this aspect also directs our attention toward sex-related variations in physiology of cardiovascular system [15]. A similar study by Maas et al., among 64-85 years old people revealed age, ischemic heart disease and 2-3 comorbidities as the factors among males linked with heart failure; however; females in addition to age also had accompanying hypertension, obesity and indulgence in smoking and alcoholism [16]. Many heart failure biomarkers are not assessed among the patients in consideration with gender based biological differences; searching this aspect might help scientists to spot the fundamental cause for this variation [17]. Such studies across multiple nations should be conducted for conceptual clarification regarding sex linked disparities pertinent to heart failure. About 71.8% and 25.6% of decompensated heart failure patients in our study had low and middle socioeconomic status. As Benazir Bhutto Hospital is location on main Murree Road Rawalpindi and is a public sector teaching hospital, it is quite convenient for the general public to get consultation for their ailments here and get free medications from its pharmacy as well [18]. About 68% of these cases belonging to low and middle social class were non-compliant with medications deemed necessary for their better health and sustainability. This non-compliance can be linked with categorization of most (84.5%) of our patients as NYHA class III and IV cases. Likewise, a study by Wu et al., carried out among western heart failure cases revealed significant statistical association of medication non-compliance with poor survival rate (P=0.006) [19]. This non-adherence to medication among our study subjects was mostly (59.3%) attributed to non-awareness or lack of counseling by healthcare providers. About 23.4% of our heart failure patients were non-compliant due to non-affordability while 15.9% and 1.4% were poorly compliant with medication due to side effects and non-availability of drugs respectively. On the other hand, heart failure patients of Netherlands had substantial compliance with medication but their adherence with healthy life style was remarkably low, so the recommendation of that study was to counsel the patients for lifestyle modification [20]. Non-adherence with medication is one of the hindrances in achievement of desirable outcomes with recommended drugs [21]. According to an international study, intentional non-compliance with medication among heart failure patients was linked with their own beliefs that seems to be one of the major motives for disregarding the healthcare providers' advice [22]. Beliefs of the patients can well be molded undoubtedly by proper counseling sessions and adequate awareness pertinent to their illness and its prognosis. As majority of the patients visiting our public sector healthcare facilities are illiterate or less educated, counseling and awareness by healthcare providers can prove valuable in improving the well-being of our patients in broad spectrum by adhering them to the prescribed medicines. In current study, mean length of hospital stay among heart failure patients was 5.92 ± 3.7 days with comparatively longer duration of stay among expiring cases than those who survived (Table 2); however, this difference was determined to be statistically insignificant (P=0.20). On the other hand, mean hospital stay duration

DOI: https://doi.org/10.54393/pjhs.v3i05.231

among heart failure cases admitted in a University Hospital of Ethiopia was 17.29 ± 7.27 days [23]. In a similar study carried out by Mitani et al., among Japanese heart failure hospitalized cases revealed median length of hospital stay equivalent to 17 days during which patients were also subjected to diagnostic procedures [24]. The length of hospital stay in our study was comparatively shorter than those reported among Ethiopian and Japanese heart failure hospitalized cases. Staying in hospital for longer period during initial heart failure is known to be associated with poor healthcare outcome and is determined as the leading cause of subsequent readmission [25]; the scenario is different among patients identified with severity of their ailment [26]. Nation-wise variations in duration of hospital stay among heart failure cases should thoroughly be studied with an intention to improve their prognosis.

CONCLUSIONS

Non-awareness about the need for medication and its benefits was the key contributing reason for non-compliance among heart failure patients. Non-affordability was attributed to their Poor socio-economic status. Proper counseling of the patients by consultants and facilitating them in procuring medicines can prove valuable in mitigating the magnitude of cardiac failure in our set up.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Khangura J and Goodlin SJ. Heart failure treatment in the elderly. Expert Review of Cardiovascular Therapy. 2011 Sep; 9(9):1171-9. doi: 10.1586/erc.11.128

[2] Joseph SM, Cedars AM, Ewald GA, Geltman EM, Mann DL. Acute decompensated heart failure: contemporary medical management. Texas Heart Institute Journal. 2009; 36(6):510-20

[3] Gheorghiade M, Adams KF, Cleland JG, Cotter G, Felker GM, Filippatos GS, et al. Phase III clinical trial end points in acute heart failure syndromes: a virtual roundtable with the Acute Heart Failure Syndromes International Working Group. American Heart Journal. 2009 Jun; 157(6):957-70. doi: 10.1016/j.ahj.2009.04.010

[4] O'Connor CM, Stough WG, Gallup DS, Hasselblad V, Gheorghiade M. Demographics, clinical characteristics, and outcomes of patients hospitalized for decompensated heart failure: observations from the IMPACT-HF registry. Journal of Cardiac Failure. 2005 Apr; 11(3):200-5. doi: 10.1016/j.cardfail.2004.08.160

[5] Ruppar TM, Cooper PS, Mehr DR, Delgado JM, Dunbar-Jacob JM. Medication Adherence Interventions Improve Heart Failure Mortality and Readmission Rates: Systematic Review and Meta-Analysis of Controlled Trials. Journal of the American Heart Association. 2016 Jun; 5(6):e002606. doi: 10.1161/JAHA.115.002606

[6] Kumar A, Mohammadnezhad M, May W. Patients' Perception of Factors Influencing Noncompliance with Medication among Cardiac Patients in Fiji: A Qualitative Study. Patient Prefer Adherence. 2021 Aug; 15:1843-1852. doi: 10.2147/PPA.S322731

[7] Osterberg L and Blaschke T. Adherence to medication. New England journal of medicine. 2005 Aug; 353(5):487-97. doi: 10.1056/NEJMra050100

[8] Jimmy B and Jose J. Patient medication adherence: measures in daily practice. Oman Medical Journal. 2011 May; 26(3):155-9. doi: 10.5001/omj.2011.38

[9] Brown MT and Bussell JK. Medication adherence: WHO cares? Mayo Clinic Proceedings. 2011 Apr; 86(4):304-14. doi: 10.4065/mcp.2010.0575

[10] Akhtar Y, Rahman Afridi MA, Ali Z, Khan AM. Factors Affecting Adherence to Medications in Hypertensive Patients Visiting a Teaching Hospital in Khyber Pakhtunkhwa. JPMI: Journal of Postgraduate Medical Institute. 2022 Apr; 36(2). doi: 10.54079/jpmi.36.2.3060

[11] Kajimoto K and Sato N. Sex Differences in New York Heart Association Functional Classification and Survival in Acute Heart Failure Patients With Preserved or Reduced Ejection Fraction. Canadian Journal of Cardiology. 2020 Jan; 36(1):30-36. doi: 10.1016/j.cjca.2019.08.020

[12] Mosterd A and Hoes AW. Clinical epidemiology of heart failure. Heart. 2007 Sep; 93(9):1137-46. doi: 10.1136/hrt.2003.025270

[13] Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al. Heart disease and stroke statistics—2015 update: a report from the American Heart Association. Circulation. 2015 Jan; 131(4):e29-322. doi: 10.1161/CIR.0000000000000152

[14] Wu JR and Moser DK. Medication Adherence Mediates the Relationship Between Heart Failure Symptoms and Cardiac Event-Free Survival in Patients With Heart Failure. Journal of Cardiovascular Nursing. 2018 Feb; 33(1):40-46. doi: 10.1097/JCN.0000000000000427

[15] Ho KK, Pinsky JL, Kannel WB, Levy D. The epidemiology of heart failure: the Framingham

DOI: https://doi.org/10.54393/pjhs.v3i05.231

Study. Journal of the American College of Cardiology. 1993 Oct; 22(4 Suppl A):6A-13A. doi: 10.1016/0735-1097(93)90455-a

[16] Maas AH and Appelman YE. Gender differences in coronary heart disease. Netherlands Heart Journal. 2010 Dec; 18(12):598-602. doi: 10.1007/s12471-010-0841-y

[17] Cesaroni G, Mureddu GF, Agabiti N, Mayer F, Stafoggia M, Forastiere F, et al. Sex differences in factors associated with heart failure and diastolic left ventricular dysfunction: a cross-sectional population-based study. BMC Public Health. 2021 Feb; 21(1):415. doi: 10.1186/s12889-021-10442-3

[18] Cediel G, Codina P, Spitaleri G, Domingo M, Santiago-Vacas E, Lupón J, et al. Gender-Related Differences in Heart Failure Biomarkers. Frontiers in Cardiovascular Medicine. 2021 Jan; 7:617705. doi: 10.3389/fcvm.2020.617705

[19] Wu JR and Moser DK. Medication Adherence Mediates the Relationship Between Heart Failure Symptoms and Cardiac Event-Free Survival in Patients With Heart Failure. Journal of Cardiovascular Nursing. 2018 Feb; 33(1):40-46. doi: 10.1097/JCN.0000000000000427

[20] van der Wal MH, Jaarsma T, Moser DK, Veeger NJ, van Gilst WH, van Veldhuisen DJ. Compliance in heart failure patients: the importance of knowledge and beliefs. European Heart Journal. 2006 Feb; 27(4):434-40. doi: 10.1093/eurheartj/ehi603

[21] Hauptman PJ. Medication adherence in heart failure. Heart Failure Reviews. 2008 Feb; 13(1):99-106. doi: 10.1007/s10741-007-9020-7

[22] Lehane E and McCarthy G. Intentional and unintentional medication non-adherence: a comprehensive framework for clinical research and practice? A discussion paper. International Journal of Nursing Studies. 2007 Nov; 44(8):1468-77. doi: 10.1016/j.ijnurstu.2006.07.010

[23] Tigabe Tekle M, Bekalu AF, Tefera YG. Length of hospital stay and associated factors among heart failure patients admitted to the University Hospital in Northwest Ethiopia. PLoS One. 2022 Jul; 17(7):e0270809. doi: 10.1371/journal.pone.0270809

[24] Mitani H, Funakubo M, Sato N, Murayama H, Rached RA, Matsui N, et al. In-hospital resource utilization, worsening heart failure, and factors associated with length of hospital stay in patients with hospitalized heart failure: A Japanese database cohort study. Journal of Cardiology. 2020 Oct; 76(4):342-349. doi: 10.1016/j.jjcc.2020.05.010

[25] Zaya M, Phan A, Schwarz ER. Predictors of re-hospitalization in patients with chronic heart failure. World Journal of Cardiology. 2012 Feb; 4(2):23-30. doi: 10.4330/wjc.v4.i2.23

[26] Foraker RE, Rose KM, Chang PP, Suchindran CM, McNeill AM, Rosamond WD. Hospital length of stay for incident heart failure: Atherosclerosis Risk in Communities (ARIC) cohort: 1987-2005. The Journal of Healthcare Quality. 2014 Feb; 36(1):45-51. doi: 10.1111/j.1945-1474.2012.00211.x

DOI: https://doi.org/10.54393/pjhs.v3i05.265

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Renal Function Status in Patients with Diabetes Mellitus Having Diabetic Foot Infection and Role of Antibiotics

Shabab Hussain[1], Arrham[2], Syeda Javeriya Saeed[3*], Ahmad Murtaza Anwar[4], Asif Khan[5] and Saifullah Brohi[6]

[1]Khyber Medical University Institute of Medical Sciences, Kohat, Pakistan
[2]Department of General surgery, Dr Akbar Niazi Teaching Hospital, Islamabad, Pakistan
[3]Bacha Khan Medical Complex, Sawabi, Pakistan
[4]Divisional Headquarters Teaching Hospital Mirpur, AJK, Pakistan
[5]Jinnah Teaching Hospital, Peshawar, Pakistan
[6]Bilawal Medical College for Boys LUMHS, Jamshoro, Pakistan

ARTICLE INFO

Key Words:
Diabetic foot, Infection, Glomerular filtration rate and Antibiotics

How to Cite:
Hussain, S. ., Arrham, ., Javeriya Saeed, S. ., Murtaza Anwar, A. ., Khan, A. ., & Brohi, S. . (2022). Renal Function Status in Patients with Diabetes Mellitus Having Diabetic Foot Infection and Role of Antibiotics: Renal Function Status in Patients with Diabetes Mellitus. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.265

***Corresponding Author:**
Syeda Javeriya Saeed
Bacha Khan Medical Complex, Sawabi, Pakistan
Drsyedajaveriya@hotmail.com

Received Date: 13th October, 2022
Acceptance Date: 22nd October, 2022
Published Date: 31st October, 2022

ABSTRACT

It has been shown that antibiotic therapy in diabetic foot ulcers has a toxic effect on renal function. **Objective:** To assess the renal function among patients with diabetes mellitus having diabetic foot infection. **Methods:** It was a cross-sectional retrospective study in the surgical Unit of DHQ Teaching Hospital KDA Kohat for six-month duration from January 2022 to June 2022. 130 patients with diabetic foot ulcers were selected for this study. The patients receiving antibiotic with a low renal toxicity risk were included in Group-A and patients receiving antibiotics with an increased renal toxicity risk were included in group B. GFR was calculated and measured from Cockcroft-Gault equation and serum creatinine levels. SPSS 20.0 was applied for data analysis with paired t-tests, t-test and chi-square tests. **Results:** In group A there were 65 (50%) participants and 65 (50%) in group B. GFR after and before antibiotic therapy was 58.30±31.13 cm^3 / min and 65.98±35.76 cm^3 / min ($p = 0.004$), correspondingly. The GFR in group B was reduced significantly after antibiotic therapy ($p = 0.003$). **Conclusions:** Conferring to this study, renal function decreased and nephrotoxicity was noted after antibiotic treatment, the percentage of decline in GFR being greater in patients who received higher nephrotoxic antibiotics.

INTRODUCTION

Type-II diabetes is the common chronic ailment that results in heavy load on the healthcare system because of its increasing vascular complications and prevalence [1, 2]. 2.85 billion people are affected worldwide [3, 4]. Diabetic foot followed by infection is a common diabetic complication in both developing and under-developed states and is the communal reason of premature death and morbidity in diabetic patients [5, 6]. It is also high-cost treatment and is predictable to affect 26% of all diabetics in their life because of neuropathy and possible concomitant vascular disease. The process of diabetic foot begins with an often-unrecognized traumatic ulcer, often instigated by diabetic arteriopathy and neuropathy. Lacking quick and accurate valuation, it often results in ulcer formation and amputation of the lower limbs [7]. Antibiotic therapy has a vital part in the treatment of these diabetic foot infection. Wounds deprived of bone or soft tissue infection usually do not need antibiotic management [8]. Empirical treatment with gram-positive cocci cover is used to treat mild to moderate infections, while infections in severe form require broad-spectrum treatment with antibiotics covering both obligate anaerobes and aerobic

DOI: https://doi.org/10.54393/pjhs.v3i05.265

gram-negative bacteria [9, 10]. The nephrotoxicity is the main side effect of aminoglycosides seen in about 21% of cases [11]. Also, in the early stages of DM, the kidneys enlarge and the GFR exceeds the predictable range. The significant factor in major amputation up to 2.5 to 3 times and ulceration is End stage renal disease (ESRD) [12]. The objective of this analysis was to assess the renal function among patients with diabetes mellitus having diabetic foot infection.

METHODS

This retrospective cross-sectional study was held in the surgical unit of DHQ Teaching hospital KDA Kohat for six-month duration from January 2022 to June 2022 for one-year duration from January 2021 to December 2021. The criteria of inclusion were the presence of infected lower limb ulcers and the diagnosis of diabetes mellitus. The criteria of exclusion were below-knee amputation and ESRD. The patients receiving antibiotics with a low renal toxicity risk were included in Group-A (clindamycin, ceftriaxone and ciprofloxacin) and patients receiving antibiotics with an increased renal toxicity risk were included in group B (imipenem, vancomycin and aminoglycosides. Patient data like gender, age, diabetes duration, location, body mass index (BMI), diabetes control method, creatinine after and before the antibiotic treatment, wound severity, Renal function and GFR after and before the antibiotic treatment was taken from the hospital record. The Wagner criteria was used to classify the diabetic foot ulcer. Grade-0 ulcers are pre- and post-ulcerative lesions, Grade-I ulcers are superficial with partial or full thickness involvement of skin, Grade-II ulcers penetrate the joint capsule and ligaments and are deeper and Grade-III ulcers are deeper lesions with osteomyelitis or abscesses. GFR was calculated and measured from Cockcroft-Gault equation and serum creatinine levels. SPSS 20.0 was applied for data analysis with paired t-tests, t-test and chi-square tests. The standard deviations, mean, relative and absolute frequencies were determined for descriptive statistical analysis. Statistical analysis was accomplished by means of t-test. X2 tests were executed for categorical data in command for comparison of the variables among the both groups. The association between Wagner stages and GFR were performed using the non-parametric Spearman coefficient test.

RESULTS

gram-negative bacteria [9, 10]. The nephrotoxicity is the main side effect of aminoglycosides seen in about 21% of cases [11]. Also, in the early stages of DM, the kidneys enlarge and the GFR exceeds the predictable range. The significant factor in major amputation up to 2.5 to 3 times and ulceration is End stage renal disease (ESRD) [12]. The objective of this analysis was to assess the renal function among patients with diabetes mellitus having diabetic foot infection.

Variable	Mean± SD	Minimum	Maximum
Age in years	59.06±11.12	30	90
Height (cm)	168.30±11.01	144	195
Diabetes duration (year)	15.12±6.87	9	42
BMI (kg/m2)	27.17±4.08	19.62	35.55
Weight (kg)	73.20±11.28	50	117
Serum creatinine after antibiotic therapy (mg/dL)	1.75±1.10	0.9	5.8
Serum creatinine before antibiotic therapy (mg/dL)	1.82±0.95	0.8	3.8
GFR after antibiotic therapy (cc/min)	58.30±31.13	14.00	123.00
GFR before antibiotic therapy (cc/min)	65.98±35.76	14.00	123.00

Table 1: Mean quantitative variables of the studied patients

There were 80 women (61.5%), 75 (57.7%) lived in the rural areas, 90 (69.2%) patients have glycemic control, 95 (73.1%) were on oral hypoglycaemic drugs, 72 (55.4%) patients were of Wagner's grade-II and 25 (19.2%) were of Wagner's grade-III. Table 2 shows the variables of decreased renal function. The studied variables were compared after and before antibiotic therapy. The GFR reduced in both sexes, but was substantial decrease was seen in women (64.92±31.48 vs. 57.51±32.45 cm3 / min, p = 0.004). Also, very high BMI patients (obese subjects) had a significant reduction in renal function (70.50±33.31 vs 57.49±23.69 cm3 / min, P = 0.005). The renal function was better in patients with glycemic control by insulin after antibiotic treatment (64.70±35.39 vs. 63.61±33.82 cm3 / min, p = 0.54).

Variable	Renal function before treatment Mean±SD	Renal function after treatment Mean±SD	P-value
Age group (years)			
Less than 30	110.10±0.02	105.30±00	-
31-55	68.14±34.19	65.15±30.29	<0.001
55-80	61.79±32.89	53.51±28.10	<0.001
Gender			
Male	67.51±32.67	65.38±28.15	0.42
Female	64.92±31.48	57.51±32.45	0.004
Drug regimen			
High risk	69.01±33.08	51.42±33.58	0.003
Low risk	71.52±30.42	61.79±29.73	0.03
Diabetes duration (years)			
Less than 10	67.54±31.23	62.89±30.50	0.33
11-25	62.50±36.90	56.32±32.67	0.05
25-35	59.91±30.81	53.67±24.27	0.15
35-45	73.49±40.15	59.28±30.82	0.08
Body mass index (kg/m2)			
Normal	56.71±31.90	58.20±28.30	0.60
Obese	70.50±33.31	57.49±23.69	0.005
Overweight	67.38±32.09	60.08±33.67	0.12

DOI: https://doi.org/10.54393/pjhs.v3i05.265

Glycemic control			
Insulin	64.70±35.39	63.61±33.82	0.54
oral agent	66.15±33.78	52.06±31.48	0.004
Nothing	62.91±31.08	57.99±28.60	0.42
Wound severity			
I	68.21±39.10	54.79±32.48	0.02
II	65.71±39.90	55.22±30.59	0.04
III	62.02±31.59	60.79±28.29	0.03
IV	63.50±32.84	66.08±31.76	0.49

Table 2: Renal function after and before treatment with antibiotics

According to Wagner's category, renal function was significantly reduced in the 1st three stages, but not substantial in the final stage (p = 0.52). GFR after and before antibiotic therapy was 58.30±31.13 cm3 / min and 65.98±35.76 cm3 / min (p = 0.004), correspondingly. It was reduced significantly in the high-risk group (57.50 ± 36.90 vs 49.46 ± 33.59cm3 / min, p = 0.003). Although there was a decrease in the low-risk group but not substantial (71.25 ± 30.76 vs 64.54 ± 27.98 cm3 / min, P = 0.94; Table 3).

Variable	Renal function before treatment Mean±SD	Renal function after treatment Mean±SD	P-value
Group A (low risk regimen)	71.25 ± 30.76	64.54 ± 27.98	0.94
Group B (high risk regimen)	57.50 ± 36.90	49.46 ± 33.59	0.003

Table 3: Status of renal function in the studied groups

DISCUSSION

Foot infections and ulcers are the main reasons of disability in diabetic people. The foot ulcers are developed in about 15% of cases [13]. The infection in the foot ulcer caused by diabetes takes a long time to heal. Today, renal complications are usually caused by diabetes in both the developed and developing world [14]. In renal failure advanced stages, when GFR drops below 15-20 cm3 / mint, renal insulin clearance declines. This is of greater clinical value in diabetes mellitus treatment. In our analysis, GFR reduced later to antibiotic treatment in patients with diabetes [15]. Adeleye et al., stated that renal failure mostly developed in diabetic patients having foot ulcers [16]. Rubio et al., believed that loss of kidney function was recognized as an important factor in the formation of foot ulcers [17]. The uremic toxins accumulation and elevated levels of parathyroid hormone in chronic renal failure patients have been shown to result in resistance of insulin in tissues, especially in skeletal muscle, mostly because of insulin-binding receptor damage and impaired metabolism of glucose and glycogen formation [18]. A 2009 study by Barwell et al., showed a strong relationship between diabetic foot and renal function. Moreover, a substantial inverse association was found between the Wagner grades and GFR of the diabetic foot [19]. Kateel et al., determined that impaired renal function in patients with diabetes rises levels of creatinine and lowers GFR [20]. A drop in GFR above normal in diabetic patients leads to exacerbation of the infection in diabetic foot and eventually results in the amputation. This is possibly because of metabolic acidosis, increased parathyroid hormone levels and reduced secretion of insulin in patients with impaired renal function, which may be because of low vitamin D levels [21]. Hicks et al., showed that GFR is significantly related to diabetes and autonomously influence renal function. In our analysis, patients receiving antibiotics have deteriorated renal function [22]. Renal function deterioration was much greater in people taking antibiotics with increased nephrotoxicity. Antibiotics are widely used to treat infections [23]. Its use may damage the kidneys. In addition, kidneys are the main source of antibiotics clearance from the body. In Liu et al., study; it was noted that gentamicin has few side effects on the kidneys [24]. Though, irrespective of the mechanism and nature, the antibiotic toxicity be contingent on the concentration, dose, other underlying diseases and its duration. Antibiotic therapy in patients with diabetes must be carefully observed as these patients mostly have renal dysfunction and this tendency is enhanced by the usage of antibiotics [25]. In this analysis, all age group patients have significantly reduced renal function. Though, there was a severe decrease in older patients. This was apparent that the underlying disease worsens with age, organ function deteriorates, and the body's ability to tolerate and remove waste from the body decreases.

CONCLUSIONS

According to this study results, renal function deteriorated afterwards treatment with antibiotics. The antibiotics having greater nephrotoxicity causes a huge decrease in GFR in diabetic patients. This study outcomes may be cast-off to recognise aspects having effect on renal function in diabetic people having diabetic foot infection. The treatment with an antibiotic is not operative in preventing infection in diabetic foot and must be used in the event of an infection. When vancomycin is administered, creatinine and blood urea levels must be observed periodically and the concurrent nephrotoxic drugs must be avoided like aminoglycosides if possible. Treatment of aminoglycoside induced renal injury is mainly supportive, with drug discontinuation and replacement with another antibiotic drug which is non-nephrotoxic. If possible, the duration between dosages of aminoglycosides should be increased. In addition, the usage of various drugs causing nephrotoxicity must be evaded to maintain electrolyte and fluid balance.

Conflicts of Interest

The authors declare no conflict of interest

DOI: https://doi.org/10.54393/pjhs.v3i05.265

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Akbari R, Javaniyan M, Fahimi A, Sadeghi M. Renal function in patients with diabetic foot infection; does antibiotherapy affect it? Journal of Renal Injury Prevention. 2016 Nov; 6(2):117-121. doi: 10.15171/jrip.2017.23

[2] Raspovic KM, Ahn J, La Fontaine J, Lavery LA, Wukich DK. End-Stage Renal Disease Negatively Affects Physical Quality of Life in Patients With Diabetic Foot Complications. The International Journal of Lower Extremity Wounds. 2017 Jun; 16(2):135-142. doi: 10.1177/1534734617707081

[3] Wukich DK, Raspovic KM, Suder NC. Patients With Diabetic Foot Disease Fear Major Lower-Extremity Amputation More Than Death. Foot and Ankle Specialist. 2018 Feb; 11(1):17-21. doi: 10.1177/1938640017694722

[4] Hinchliffe RJ, Forsythe RO, Apelqvist J, Boyko EJ, Fitridge R, Hong JP, et al. Guidelines on diagnosis, prognosis, and management of peripheral artery disease in patients with foot ulcers and diabetes (IWGDF 2019 update). Diabetes Metabolism Research and Reviews. 2020 Mar; 36 Suppl 1:e3276. doi: 10.1002/dmrr.3276

[5] Jeyaraman K, Berhane T, Hamilton M, Chandra AP, Falhammar H. Mortality in patients with diabetic foot ulcer: a retrospective study of 513 cases from a single Centre in the Northern Territory of Australia. BMC Endocrine Disorders. 2019 Jan; 19(1):1. doi: 10.1186/s12902-018-0327-2

[6] Ishigami J and Matsushita K. Clinical epidemiology of infectious disease among patients with chronic kidney disease. Clinical and Experimental Nephrology. 2019 Apr; 23(4):437-447. doi: 10.1007/s10157-018-1641-8

[7] Huang YY, Lin CW, Yang HM, Hung SY, Chen IW. Survival and associated risk factors in patients with diabetes and amputations caused by infectious foot gangrene. Journal of Foot and Ankle Research. 2018 Jan; 11:1. doi: 10.1186/s13047-017-0243-0

[8] Lin CW, Armstrong DG, Lin CH, Liu PH, Hung SY, Lee SR, et al. Nationwide trends in the epidemiology of diabetic foot complications and lower-extremity amputation over an 8-year period. BMJ Open Diabetes Research and Care. 2019 Oct; 7(1):e000795. doi: 10.1136/bmjdrc-2019-000795

[9] Wukich DK, Ahn J, Raspovic KM, Gottschalk FA, La Fontaine J, Lavery LA. Comparison of Transtibial Amputations in Diabetic Patients With and Without End-Stage Renal Disease. Foot and Ankle International. 2017 Apr; 38(4):388-396. doi: 10.1177/1071100716688073

[10] Monteiro-Soares M, Russell D, Boyko EJ, Jeffcoate W, Mills JL, Morbach S, et al. Guidelines on the classification of diabetic foot ulcers (IWGDF 2019). Diabetes/metabolism research and reviews. 2020 Mar; 36:e3273. doi: 10.1002/dmrr.3273

[11] Uivaraseanu B, Bungau S, Tit DM, Fratila O, Rus M, Maghiar TA, et al. Clinical, Pathological and Microbiological Evaluation of Diabetic Foot Syndrome. Medicina (Kaunas). 2020 Jul; 56(8):380. doi: 10.3390/medicina56080380

[12] Lin KD, Hsu CC, Ou HY, Wang CY, Chin MC, Shin SJ. Diabetes-related kidney, eye, and foot disease in Taiwan: An analysis of nationwide data from 2005 to 2014. Journal of the Formosan Medical Association. 2019 Nov; 118 Suppl 2:S103-S110. doi: 10.1016/j.jfma.2019.07.027

[13] Bandyk DF. The diabetic foot: Pathophysiology, evaluation, and treatment. Seminars in Vascular Surgery. 2018 Dec; 31(2-4):43-48. doi: 10.1053/j.semvascsurg.2019.02.001

[14] He Y, Qian H, Xu L, Zhang S, Gu X, Gu J, et al. Association between estimated glomerular filtration rate and outcomes in patients with diabetic foot ulcers: a 3-year follow-up study. European Journal of Endocrinology. 2017 Jul; 177(1):41-50. doi: 10.1530/EJE-17-0070

[15] Lynar SA, Robinson CH, Boutlis CS, Commons RJ. Risk factors for mortality in patients with diabetic foot infections: a prospective cohort study. Internal Medicine Journal. 2019 Jul; 49(7):867-873. doi: 10.1111/imj.14184

[16] Adeleye OO, Ugwu ET, Gezawa ID, Okpe I, Ezeani I, Enamino M. Predictors of intra-hospital mortality in patients with diabetic foot ulcers in Nigeria: data from the MEDFUN study. BMC Endocrine Disorders. 2020 Aug; 20(1):134. doi: 10.1186/s12902-020-00614-4

[17] Rubio JA, Jiménez S, Lázaro-Martínez JL. Mortality in Patients with Diabetic Foot Ulcers: Causes, Risk Factors, and Their Association with Evolution and Severity of Ulcer. Journal of Clinical Medicine. 2020 Sep; 9(9):3009. doi: 10.3390/jcm9093009

[18] Rubio JA, Jiménez S, Álvarez J. Clinical characteristics and mortality in patients treated in a Multidisciplinary Diabetic Foot Unit. Endocrinology, Diabetes and Nutrition. 2017 May; 64(5):241-249. doi: 10.1016/j.endinu.2017.02.012

[19] Barwell ND, Devers MC, Kennon B, Hopkinson HE,

DOI: https://doi.org/10.54393/pjhs.v3i05.265

McDougall C, Young MJ, et al. Diabetic foot infection: Antibiotic therapy and good practice recommendations. International Journal of Clinical Practice. 2017 Oct; 71(10). doi: 10.1111/ijcp.13006

[20] 20.Kateel R, Augustine AJ, Prabhu S, Ullal S, Pai M, Adhikari P. Clinical and microbiological profile of diabetic foot ulcer patients in a tertiary care hospital. Diabetes and Metabolic Syndrome. 2018 Mar; 12(1):27-30. doi: 10.1016/j.dsx.2017.08.008

[21] Lee JH, Yoon JS, Lee HW, Won KC, Moon JS, Chung SM, et al. Risk factors affecting amputation in diabetic foot. Yeungnam University Journal of Medicine. 2020 Oct; 37(4):314-320. doi: 10.12701/yujm.2020.00129

[22] Hicks CW, Canner JK, Mathioudakis N, Lippincott C, Sherman RL, Abularrage CJ. Incidence and Risk Factors Associated With Ulcer Recurrence Among Patients With Diabetic Foot Ulcers Treated in a Multidisciplinary Setting. Journal of Surgical Research. 2020 Feb; 246:243-250. doi: 10.1016/j.jss.2019.09.025

[23] Rastogi A, Goyal G, Kesavan R, Bal A, Kumar H, Mangalanadanam, et al. Long term outcomes after incident diabetic foot ulcer: Multicenter large cohort prospective study (EDI-FOCUS investigators) epidemiology of diabetic foot complications study: Epidemiology of diabetic foot complications study. Diabetes Research and Clinical Practice. 2020 Apr; 162:108113. doi: 10.1016/j.diabres.2020.108113

[24] Liu L, Li Z, Liu X, Guo S, Guo L, Liu X. Bacterial distribution, changes of drug susceptibility and clinical characteristics in patients with diabetic foot infection. Experimental and Therapeutic Medicine. 2018 Oct; 16(4):3094-3098. doi: 10.3892/etm.2018.6530

[25] Schmidt BM, Munson ME, Rothenberg GM, Holmes CM, Pop-Busui R. Strategies to reduce severe diabetic foot infections and complications during epidemics (STRIDE). Journal of Diabetes and its Complications. 2020 Nov; 34(11):107691. doi: 10.1016/j.jdiacomp.2020.107691.

DOI: https://doi.org/10.54393/pjhs.v3i05.202

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Risk Factors of Eclampsia and Its Maternal Effects at A Tertiary Hospital: A Retrospective Study

Erum Bano[1*], Tahmina Mahar[2], Pushpa Malhi[3], Saira Hashmi[4], Anbia Soomro[5], Sumaira Khoso[6]

[1]Patel Hospital Karachi, Pakistan
[2]Department of Obstetrics and Gynecology, Ghulam Muhammad Mahar Medical College Teaching Hospital Sukkur, Pakistan
[3]Department of Obstetrics and Gynecology, Aga khan Maternal and Childcare Center Hyderabad, Pakistan
[4]Department of Gynecology, Sandeman Provincial Hospital Quetta, Pakistan
[5]Department of Gynecology, Civil Hospital Hyderabad, Pakistan
[6]Department of Gynecology, Bolan Medical College and Hospital Quetta, Pakistan

ARTICLE INFO

Key Words:
Eclampsia, perinatal mortality, antenatal care, hypertension

How to Cite:
Bano, E. ., Mahar, T. ., Malhi, P. ., Hashmi , S., Soomro, A. ., & Khoso, S. . (2022). Risk Factors of Eclampsia and Its Maternal and Perinatal Effects at A Tertiary Hospital: A Retrospective Study: Risk Factors of Eclampsia and Its Maternal Effects at A Tertiary Hospital. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.202

***Corresponding Author:**
Erum Bano
Patel Hospital Karachi, Pakistan
erum_33@yahoo.com

Received Date: 5th October, 2022
Acceptance Date: 20th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Eclampsia is responsible for 34% of maternal mortality in Pakistani tertiary care hospitals among women admitted for delivery. **Objective:** To evaluate risk factors associated with eclampsia patients as well as the perinatal maternal effects in patients. **Methods:** Overall, 250 patients were involved in this research who were diagnosed with eclampsia. The data were collected from the medical records of the patients. The medical records contained information related to the patient's pregnancy history, characteristics, medical history, obstetric history, information related to admission to the hospital, maternal outcomes, and treatment provided at the hospital. For statistical analysis, SPSS version 21.0 was used. **Results:** There were 21689 women who gave birth in the hospital during the research process and 250 patients (1.15%) were diagnosed with eclampsia out of which 4 women died and had a case fatality rate of 1.6 %. The major risk factors associated were young age, already existing medical conditions, education level being low, low antenatal attendance, and nulliparity. HELLP syndrome was the most common consequence with a percentage of 15.6. All patients were provided with medication of magnesium sulfate. However, there was an absence of parenteral antihypertensive therapy. A total of 46 women (18.4 %) gave birth through vaginal delivery. **Conclusions:** According to our findings, eclampsia is still a key risk to maternal survival. Poor socioeconomic status, lack of education, and inadequate antenatal care were found as major risk factors.

INTRODUCTION

According to a recent systemic review of global mortality, Pakistan has the third-highest rate of maternal, fetal, and child mortality. Eclampsia is responsible for 34% of maternal mortality in Pakistani tertiary care hospitals among women admitted for delivery. According to a local study Pre-eclampsia and eclampsia occurred 5.6% of the time (n=112/2212). Hypertension (28.7%), gestational diabetes (25.9%), anaemia (14.9%), maternal age > 35 years (9.3%), BMI greater than 30 kg/m2 (8.1%) and 35 kg/m2 (11.7%), nulliparity (6.5%), unbooked status (i.e., lack of antenatal care; 6.4%), and low education level (5.8%) were among the risk factors for pre-eclampsia and eclampsia [1]. Hypertensive disorders (HD), which affect 5% to 10% of people on average, are the most common medical condition that contributes to problematic pregnancies. They are also a significant contributor to maternal and perinatal mortality and morbidity globally [2, 3]. Eclampsia is a significant life-threatening consequence of hypertensive disorders of pregnancy which is described as the presence of convulsions in conjunction with

DOI: https://doi.org/10.54393/pjhs.v3i05.202

preeclampsia [4]. Eclampsia's morbidity and prevalence vary substantially between developed and underdeveloped countries. In Europe, the crude incidence of eclampsia ranges from 0-0.1 % while in other countries, it ranges up to 4 % [5, 6]. In developed nations, also called high-income nations, the number of deaths or cases of eclampsia fluctuates between 0-17.7 % [7]. These figures show how the severity of the issue is influenced by socioeconomic level and the accessibility of medical care. In our society, hypertensive disorders of pregnancy are responsible for 14.9 % of maternal mortality [8]. Nevertheless, no clear records are found that estimate the exact mortalities, morbidities and incidence linked with eclampsia. The purpose of this research was to assess the perinatal and maternal effects of eclampsia at a tertiary hospital.

METHODS

Our hospital caters thousands of patients monthly around sixty thousand people were being served by our hospital. This hospital also accepts cases that were referred from other central hospitals. Recent sources estimate that the government has a population of about 400 million people. Annually, 5,000-10,000 deliveries were performed in this hospital. The referral system here was not well managed that's why most of the cases were self-referred. Most of these cases were very complicated and bring difficulty for hospital caregivers. All patients' medical records were obtained for the duration of the research. The medical records contained information related to the patient's pregnancy history, demographics, medical history, obstetric history, information related to admission to the hospital, investigations, perinatal and maternal outcomes, and treatment provided at hospital. Data were entered anonymously into data collection sheets. Those patients who gave birth within the time period of the research were compared by adding their demographics to the data collection sheets. Eclampsia cases that were described as a consistent history of seizures at home, in connection with high blood pressure and proteinuria inside the hospital or on the way to the hospital were included in this research. Cases of encephalopathy, meningitis, epilepsy, diabetic ketoacidosis, fever, hypoglycemia, and toxic drug ingestion were eliminated from this research. For statistical analysis, SPSS version 21.0 was used. Patient characteristics and outcomes were investigated through descriptive analysis. A single logistic regression model was employed to characterize the relationship between the risk factors as independent variables and eclampsia as the outcome. P-value lesser than 0.05 was considered significant. The ethical review committee approved this research. This research was retrospective due to which the content from patients was not taken.

RESULTS

There were 21689 women who gave birth during the time period of the research and 250 patients 1.15% were diagnosed with eclampsia out of which 4 women died and had a case fatality rate of 1.6 percent. Table 1 shows the symptoms and signs of cases which were seen at the time of admission. Out of 250 patients who were diagnosed with eclampsia, there were 100 patients who had seizures after the delivery, 148 had antenatal and 2 had intrapartum. At the time of admission, 36% of patients had mild hypertension (blood pressure less than 110 mmHg), 62% of patients had severe hypertension (blood pressure greater than 110 mmHg), and 2% of patients had a diastolic blood pressure.

Signs and symptoms	Frequency (%)
Seizures	41(15.2%)
Headaches	59(26.1%)
Visual disturbances	24(8.9%)
Labour pain	19(7%)
Proteinuria	250(95%)
Jaundice	11(4.9%)
Vaginal bleeding	4(1.9%)
Oedema	60(19.9%)

Table 1: Symptoms and signs of cases

The beginning and mode of deliveries in the research population are shown in Table 2. A total of 77 cases were of C-sections, 151 cases were of primary C-sections, and assisted birth was used in 22 cases.

Mode of Deliveries	Frequency (%)
Onset of labour	
-Spontaneous	22(7.9%)
-Induced labour	77(29.2%)
-Primary C-section	151(59%)
Mode of Deliveries	
-Vaginal delivery	53(21.5%)
-Instrumental delivery	24(8.5%)
-Intrapartum C-section:	
C-section after spontaneous labour	3(2.6%)
C-section after induced labour	19(7.9%)

Table 2: Onset and mode of deliveries in the research population

Table 3 shows the maternal mortalities and morbidities. There was a total of 4 deaths that occurred of which 2 were because of hemorrhage, 1 was because of postpartum hemorrhage, and 1 was because of HELLP syndrome. It was seen that the death rate was 1.6 %.

	No (%)
Placental abruption	5(3.9%)
DIC	18(5.6%)
Postpartum hemorrhage	23(9.9%)
Intracranial hemorrhage	4(0.6%)
HELLP syndrome	40(14.9%)
Acute pulmonary oedema	3(0.7%)

DOI: https://doi.org/10.54393/pjhs.v3i05.202

Renal dysfunction	19(7%)
Liver dysfunction	15(10.6%)
Complications of anesthesia	5(2.9%)
Massive blood transfusion	6(3.2%)
Complications of sepsis	8(4%)

Table 3: Maternal mortalities and morbidities

Table 4 shows that the most common age of eclampsia was below the age of 20-years. Similarly, nulliparous women have more chances of eclampsia as compared to nulliparous women. The women having body mass index between 30-35 has more eclampsia along with women whose marriage duration was less than 6 months and pregnancy interval of less than 5 years. Pre-existing hypertension before pregnancy was also associated with more chances of eclampsia in women.

Factors	No. of deliveries	Eclampsia	95% CI	p-value
Age (years)				
Below 20	3730	106	2.04	<0.001
20 to 29	12421	89	Reference	
30 to 34	4107	37	1.30	0.189
Above 34	1431	18	1.68	0.06
Parity				
Multipara	13726	57	Reference	0.001
Nullipara	7963	193	3.60	
Body mass index				
Below 20	1482	25	0.86	0.60
20-25	5012	53	Reference	
25-30	7532	42	0.54	0.001
30-35	6422	75	1.22	0.186
Above 35	1241	55	5.00	<0.001
Marriage duration (months)				
Less than 6	2546	124	3.04	0.01
6 to 12	4220	55	Reference	
More than 12	1196	13	0.77	0.045
Second marriage	223	12	7.59	<0.001
Pregnancies interval (years)				
Less than 5	5912	15	Reference	
5 to 10	1341	17	2.78	<0.001
Above 10	712	25	7.34	<0.001
Education				
None	2377	166	8.22	0.001
Primary	7422	61	2.44	0.001
Secondary	8538	22	Reference	
Tertiary	3351	1	0.27	0.049
Preeclampsia family history				
Sister	174	18	3.08	0.001
Mother	192	18	3.08	0.001
Medical conditions (pre-existing)				
Hypertension	199	54	8.11	0.001
Diabetes mellitus	193	38	5.36	<0.001
Renal disease	45	7	3.01	0.001
Cardiac disease	326	15	1.09	0.897
Anaemia	1866	79	2.55	0.001
Known thrombophilia	76	12	2.24	<0.001
Preeclampsia	886	34	2.66	0.001
Multiple pregnancy	453	11	1.16	0.045
Care visits				
Zero	1040	72	4.37	0.001
One to three	13622	162	1.28	0.533
Four to eight	5768	14	Reference	
More than eight	1259	2	0.33	0.014

Table 4: Risk factors of eclampsia in study participants

DISCUSSION

In this research, patients with eclampsia were 1.15% which is more than the incidence that was recorded in European nations [9-12]. But this percentage was lesser than the incidence that was recorded in Asian countries [13-16]. This disparity is clearly due to differences in socioeconomic status and antenatal care standards. It was evaluated that maternal age is a major risk factor (<20 years) with 106 patients, which represents 42.2 %. This symbolizes marriage at young age in the study's locality, which is associated with low economic and educational standards and, as a result, low prenatal attendance, which can be a significant confounder. Another risk associated with eclampsia is nulliparity [17-18]. A total of 77.2 % of patients in the current research were nulliparous. A total of 69 % of individuals had a body mass of greater than twenty-five, and 21.9 % had a body mass of greater than thirty-five, indicating that obesity plays a role in the pathogenesis of preeclampsia, mostly through placental vasculopathy and endothelial dysfunction. A preeclampsia family history has been shown to triple the chance of developing preeclampsia [17]. Pre-existing hypertension was detected in fifty-four (22.2%) individuals, diabetes mellitus in thirty-eight (14.9%) cases, renal illness in seven (3.1%) cases, and thrombophilia in twelve (4.6%) cases. This is most likely related to the vasculopathy connected with these illnesses, which plays a significant role in causing preeclampsia. Anemia was found in seventy-nine (32.4%) of the cases, which warrants additional investigation into a possible relationship and the influence of antenatal therapy of anemic individuals on their risk of growing preeclampsia [18, 19]. Perinatal mortality in preeclampsia and eclampsia was found to be 3.26 % in American studies. African studies found rates ranging from 11.39 % in Algeria to 22 % in the Democratic Republic of the Congo. In Tanzania, the perinatal death rate from eclampsia was just 30% [20]. In underdeveloped Asian nations, the perinatal mortality rate in preeclampsia and eclampsia ranges from 1.2 % to 14.94 %. Further in this research, the risk of eclampsia increases with the small time span of marriage

DOI: https://doi.org/10.54393/pjhs.v3i05.202

which was found in 65% of patients who get pregnant within six months of marriage. A proper reason is still not found. However, according to Yousefi et al., the duration of exposure to sperm influences the risk of preeclampsia, which could be a plausible description [21]. The risk of pre-eclampsia increases with every year that passes after the last pregnancy. A total of 34/57 (59.6 %) of the cases had a history of preeclampsia or PIH. These findings are consistent with those of earlier studies on regional distributions [22]. There were 22 patients in which assisted birth was given. 151 patients had primary C-sections while 77 patients had induction of labor. Of the 22 patients who presented in labor, 6 of them had intrapartum C-sections and of the 77 patients who had induction of labor, 22 of them had intrapartum C-sections. This high rate of C-sections could be attributed to a variety of factors, including poor monitoring facilities during vaginal delivery as well as a lack of antihypertensive therapy, which makes doctors concerned about observing individuals with BP not being controlled during vaginal delivery. Insufficient fetal monitoring technology and a lack of fetal scalp sampling at the hospital where the study was carried out are to blame for the low threshold for performing C-sections on laboring patients. Previous research has linked C-sections to an increased risk of difficulties in cases of preeclampsia [23]. More research related to the mode of delivery on perinatal and maternal outcomes in the same area is required.

CONCLUSIONS

According to our findings, eclampsia is still a key risk to both maternal survivals. Poor socioeconomic status, lack of education, and inadequate antenatal care were found as major risk factors. Health policies must be established to improve antenatal care and increase awareness of the necessity of early detection of instances of greater BP during pregnancy in order to avoid consequences. To improve critical case care, health professionals must have the proper knowledge and training. Making parental antihypertensive treatment available, as well as strengthening neonatal services, can help to lower the number of maternal problems.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Soomro S, Kumar R, Lakhan H, Shaukat F. Risk Factors for Pre-eclampsia and Eclampsia Disorders in Tertiary Care Center in Sukkur, Pakistan. Cureus. 2019 Nov;11(11): e6115. doi: 10.7759/cureus.6115.

[2] Eiland E, Nzerue C, Faulkner M. Preeclampsia 2012. Journal of pregnancy 2012 Oct.

[3] Canobbio MM. Health care issues facing adolescents with congenital heart disease. Journal of pediatric nursing. 2001 Oct; 16(5):363-70. doi: 10.1053/jpdn.2001.26570.

[4] Mahran A, Fares H, Elkhateeb R, Ibrahim M, Bahaa H, Sanad A, et al. Risk factors and outcome of patients with eclampsia at a tertiary hospital in Egypt. BMC Pregnancy Childbirth. 2017 Dec; 17(1):435. doi: 10.1186/s12884-017-1619-7.

[5] Giordano JC, Parpinelli MA, Cecatti JG, Haddad SM, Costa ML, Surita FG, et al. The burden of eclampsia: results from a multicenter study on surveillance of severe maternal morbidity in Brazil. PLoS One. 2014 May; 9(5):e97401. doi: 10.1371/journal.pone.0097401.

[6] Elnesr NE and Gammo RA. Faeto Maternal and Perinatal Outcome of Patients with Complicated Sever Pre-Eclampsia in Libya 2021.

[7] Mishra PP and Narain B. A prospective case control study to discover and evaluate the significance of the neonatal outcomes of eclamptic mothers. European Journal of Molecular & Clinical Medicine (EJMCM). 2020;7(11).

[8] WHO U. UNFPA, the World Bank, and the United Nations Population Division. Trends in maternal mortality: 1990 to 2013. World Health Organization. 2014.

[9] Aali BS, Ghafoorian J, Mohamad-Alizadeh S. Severe preeclampsia and eclampsia in Kerman, Iran: complications and outcomes. Medical science monitor: international medical journal of experimental and clinical research. 2004 Apr;10(4): CR163-7.

[10] Sobande AA, Eskandar M, Bahar A, Abusham A. Severe pre-eclampsia and eclampsia in Abha, the south west region of Saudi Arabia. Journal of Obstetrics and Gynaecology. 2007 Feb; 27(2):150-4. doi: 10.1080/01443610601113961.

[11] Kullberg G, Lindeberg S, Hanson U. Eclampsia in Sweden. Hypertens Pregnancy. 2002; 21(1):13-21. doi: 10.1081/PRG-120002906.

[12] Fallatah AM, Babatin HM, Nassibi KM, Banweer MK, Fayoumi MN, Oraif AM. Maternal and Neonatal Outcomes among Obese Pregnant Women in King Abdulaziz University Hospital: A Retrospective Single-Center Medical Record Review. Medical research archives. 2019 Dec;73(6):425-432. doi: 10.5455/medarh.2019.73.425-432.

[13] Steegers EA, von Dadelszen P, Duvekot JJ, Pijnenborg R. Pre-eclampsia. Lancet. 2010 Aug;

DOI: https://doi.org/10.54393/pjhs.v3i05.202

376(9741):631-44. doi: 10.1016/S0140-6736(10)60279-6.

[14] World Health Organization. WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia: summary of recommendations. World Health Organization; 2011.

[15] Agida ET, Adeka BI, Jibril KA. Pregnancy outcome in eclamptics at the University of Abuja Teaching Hospital, Gwagwalada, Abuja: a 3-year review. Nigerian journal of clinical practice. 2010;13(4).

[16] Mooij R, Lugumila J, Mwashambwa MY, Mwampagatwa IH, van Dillen J, Stekelenburg J. Characteristics and outcomes of patients with eclampsia and severe pre-eclampsia in a rural hospital in Western Tanzania: a retrospective medical record study. BMC Pregnancy Childbirth. 2015 Sep; 15:213. doi: 10.1186/s12884-015-0649-2.

[17] Mukherjee C. Studies in Toxaemias of Pregnancy. University of Glasgow (United Kingdom); 1950.

[18] Bukowska B, Woźniak E, Sicińska P, Mokra K, Michałowicz J. Glyphosate disturbs various epigenetic processes in vitro and in vivo - A mini review. Active Serial. 2022 Dec; 851(Pt 2):158259. doi: 10.1016/j.scitotenv.2022.158259.

[19] Schaap TP, Knight M, Zwart JJ, Kurinczuk JJ, Brocklehurst P, van Roosmalen J, et al. Eclampsia, a comparison within the International Network of Obstetric Survey Systems. British journal of obstetrics and gynaecology. 2014 Nov;121(12):1521-8. doi: 10.1111/1471-0528.12712.

[20] Coppage KH and Polzin WJ. Severe preeclampsia and delivery outcomes: is immediate cesarean delivery beneficial? American Journal of Obstetrics and Gynecology. 2002 May; 186(5):921-3. doi: 10.1067/mob.2002.124041.

[21] Reyes LM, García RG, Ruiz SL, Camacho PA, Ospina MB, Aroca G, et al. Risk factors for preeclampsia in women from Colombia: a case-control study. PLoS One. 2012;7(7): e41622. doi: 10.1371/journal.pone.0041622.

[22] Burton GJ, Redman CW, Roberts JM, Moffett A. Pre-eclampsia: pathophysiology and clinical implications. British Medical Journal. 2019 Jul; 366: l2381. doi: 10.1136/bmj.l2381.

[23] Mayrink J, Souza RT, Feitosa FE, Rocha Filho EA, Leite DF, Vettorazzi J, et al. Preterm SAMBA study group. Incidence and risk factors for Preeclampsia in a cohort of healthy nulliparous pregnant women: a nested case-control study. Scientific reports. 2019 Jul; 9(1):9517. doi: 10.1038/s41598-019-46011-3.

DOI: https://doi.org/10.54393/pjhs.v3i05.238

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Science of Dental Materials as Subject's Perception, Understanding, And Learning by BDS Students

Nadia Munir[1], Naveed Inayat[2], Zahra Shafqat[1], Aneela Qaiser[3], Zenab Yaasir[4] and Mahvish Wahad Khan[2]

[1]Department of Dental Materials, Avicenna Dental College, Lahore, Pakistan
[2]Department of Prosthodontics, Avicenna Dental College, Lahore, Pakistan
[3]Department of Dental Materials, FMH College of Medicine and Dentistry, Lahore, Pakistan
[4]Department of Dental Materials, Akhtar Saeed Medical & Dental College, Lahore, Pakistan

ARTICLE INFO

Key Words:

Effective learning, Dental Materials, Assessment Tools, Feedback, Learning outcomes, BDS second year

How to Cite:

Munir, N. ., Inayat, N. ., Shafqat, Z. ., Qaiser, A. ., Yaasir, Z. ., & Wahad Khan, M. . (2022). Science of Dental Materials as Subject's Perception, Understanding, And Learning by BDS Students : Dental Materials as Subject's Perception, Understanding, And Learning. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.238

***Corresponding Author:**

Naveed Inayat
Department of Prosthodontics, Avicenna Dental College, Lahore, Pakistan
naveedinayat092@gmail.com

Received Date: 13th October, 2022
Acceptance Date: 21st October, 2022
Published Date: 31st October, 2022

ABSTRACT

A better understanding of the Science of Dental materials as a subject depends upon theoretical knowledge and its clinical application. The multitude of teaching methodologies in the dental curriculum has been incorporated to determine learning outcomes. **Objective:** This study aimed to found the perception of BDS second-year students toward the subject of dental materials and evaluate the difficulty in learning and acquisition of concepts in this preclinical year. **Methods:** This cross sectional study was conducted among 130 students of BDS second year registered with University of Health Sciences, Lahore. Pre-designed questionnaire was used as research tool to determine the students' perceptions towards teaching methodologies and understanding of dental Materials. **Results:** Only 53.7% of the students reported DM as an interesting subject. Satisfaction with content was 90% and delivery and pace of the lectures were reported at 79.3%. Majority of the student (86.8%) reported lecture materials easy to understand. The most useful method for learning and understanding this subject is group discussion 76.15%, followed by PowerPoint presentation 73.85%. The favored mode of assessment was MCQs (80%) followed by practical lab 66.93%. To improve learning 82.3% of the students recommended group discussion and integrated teaching method (77.6%). **Conclusions:** The majority of students found Dental material a difficult subject. A better understanding of this subject needs improvement in already applied teaching methodologies with an integrated teaching mode.

INTRODUCTION

The current trend in dental education depends upon effective learning with suitable assessment tools. Science of Dental materials taught as a pre-clinical subject in the BDS curriculum builds the foundation for upcoming practical learning [1,2]. This subject needs cognitive knowledge of dental materials used in dentistry along with their clinical applications [3]. The didactic lecture with no clinical sessions is ineffective in retaining the knowledge, interpretation and analytical ability of the dental student's in their early years, ultimately making this subject boring and dry [4]. This pre-clinical year in dental education requires a lot of suggestions to have a positive influence on learning outcomes. There should be a definitive mechanism to access and increase the ability of students to apply cognitive knowledge to clinical application. So need for time is to improve the clinical application of student skills rather than increasing syllabus content [5]. Feedback and assessment are the insurance and guarantee for the quality of medical and dental educations [6]. To determine effective learning and teaching strategies, lot of research has been going on, but actual need of time is to work on student's preferences strategies [7]. Giving and receiving feedback can effectively determine loophole in any educational system. One of the common practices is to use circulation of structured questionnaires among students to determine weakness

DOI: https://doi.org/10.54393/pjhs.v3i05.238

and strengths of their teaching system [8]. Curriculum for dental material should incorporate student perception and understanding of their difficulty to absorb the concepts [9]. There should be a definite problem-solving mechanism to provide sufficient time for students to interact and integrate into learning different aspects of the subject. Timely executed feedback could enhance an effective teaching environment [10]. Assessment methods should ensure the achievement of learning competency with good clinical implications, innovative approaches, and critical thinking in our future dental practitioners [11]. Multiple teaching tools like interactive lectures, small and large group discussions, pre-clinical laboratory sessions, and blended learning have been adopted by various institutes to promote the effectiveness of teaching. Assessment methods like MCQs, SEQs, SAQs, OSCE, OSPE, and Viva's voice are the common assessment tools practiced in Pakistan [12]. Everybody has its own capacity of learning. To comprehends new information utilization of different theories like visual to auditory, kinesthetic to tactile should be opted [13]. To ensure equalize attention for different students, facilitators should have the ability to be aware of need of students and then modify teaching as per learner capacity [14,15]. This study aimed to find second-year BDS students' perception of the science of dental material as a subject and problems associated with learning and understanding concepts during their preclinical years.

METHODS

This Cross sectional study was conducted in colleges affiliated with University of Health Sciences, Lahore (UHS). The BDS second year students of regular batch were included in the study. Repeaters, detainees and debarred students from the university exam were excluded. WHO calculator was used for sample size calculation and the standard formula applied was; n= (Z) 2 P (1-P) / (d) 2. The estimated sample size was 150. Data was collected by predesigned structured questionnaire [16], which determined students' perception, effective learning methods, and understanding of subject concepts. The questionnaire was distributed among 150 participants. Of these, 130 students responded to the online survey form. The overall response rate was, therefore, 86.66%. Prior data collection electronic informed consents were taken from students and use of the information for the said objective was ensured. Data was entered and analyzed in SPSS version 25.0. Percentages were used to analyze the data. Percentages and frequencies were calculated and reported.

RESULT

Out of 130 participants, males were 32 (24.61%) and females were 98(75. 38%).Majority of the study sample was based on females, Figure 1.

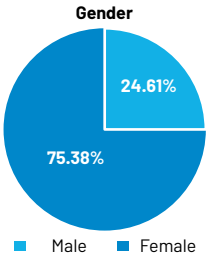

Figure 1: Gender wise data distribution

Group discussion were reported the most useful methods (76.15%) for learning and understanding dental material followed by PowerPoint presentations 73.85%, integrated teaching 64.6%. Black board teaching 67.7% and Seminars, quizzes and Presentation 76% were reported negatively by majority by students. MCQs were reported positively by majority of students (80%).Whereas SEQs, OSCE, VIVA, and Practical exam helpful in improving knowledge and application of skills were reported 46.15%, 53.1%, 33.1% and 66.93% respectively. Majority of students want to have integrated teaching method 101(77.6%). Introduction of case based learning was supported by 97(74.6%). Introduction of group discussions was supported by 107(82.3%)students.

		Yes	No	I don't know
Students' Perception about Dental Materials as a Subject	Are you interested in DM	74 (53.7%)	49 (38.3%)	7 (5.4%)
	Does combining DM instruction with clinical topics aid in conceptual understanding?	98(75.3%)	26 (20%)	6 (4.6%)
	Is DM more difficult than other dental clinical subjects?	96(73.8%)	29(22.3%)	5(3.8%)
Teaching Methodology: Content and Quality.	Are you happy with the lectures' subject matter?	117(90%)	11(8.4%)	2(1.5%)
	Do you think key themes were sufficiently emphasized in the lectures and practical classes?	112(86%)	16(12.5%)	2(1.5%)
	Are you satisfied with the explanations given during lectures and practical classes?	110(84.4%)	17(12.8%)	3(2.8%)
		Yes	**No**	**May be**
	Are you satisfied with the delivery and pace of the lectures?	103(79.3%)	19(14.5%)	8(6.2%)
		Yes	**No**	**I don't know**
	Are you encouraged to ask questions and give answers during the classes?	113(86.9%)	13(9.8%)	4(3.3%)
	Are the numbers of classes taken in DM adequate?	113(86.9%)	15(11.3%)	2(1.8%)
	Is duration of each of the class adequate?	123(94.7%)	5(3.6%)	2(1.7%)
Teaching Tools	Are the displayed lecture material easy to follow and satisfactory?	113(86.8%)	15(11.9%)	2(1.3%)

DOI: https://doi.org/10.54393/pjhs.v3i05.238

	Are the images, flow charts and graphics used during the lectures are relevant to the topic?	109(83.7%)	17(13.2%)	4(3.1%)

Table 1: Perception of students about Dental Materials (DM)

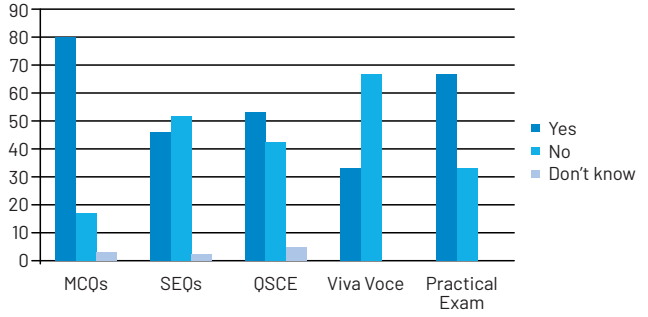

Figure 2: Methods useful for learning and understanding Dental Materials

Recommendations	Yes	No	May be
should we Introduce integrated teaching method	101(77.6%)	15(11.5%)	14(10.7%)
should we Introduce Case based learning	97(74.6%)	13(10%)	20(15.3%)
Introduce group discussions	107(82.3%)	16(12.3%)	7(5.3%)

Table 2: Recommendations to improve learning in Dental Materials as a subject

DISCUSSION

The current study found that 53.7% of participants considered the science of dental materials as an interesting subject. In another study, only 48.85% of the participants were found to consider dental materials as an interesting subject [17]. Whereas a study conducted at Islamabad Medical and Dental College reported that 71.4% of the students found this subject interesting [18]. For a better understanding of clinical applications in dentistry, the majority of the students 75.3% desired the integrated teaching of the subject. The participants were found with a high motivation of learning with integrated teaching of this subject. Integrated teaching enhances students' perception and understanding of dental materials subject better than the traditional methods [19,20]. Regarding the teaching and classroom environment, the students were satisfied with the lecture delivery (79%) and they were encouraged by the teacher to ask questions to clarify the difficult concepts. The results of our study are similar to that of Mussaret et al. who reported student's satisfaction to lectures and tutorials given by the faculty [21]. In another study majority of the participants showed satisfaction with competency of teachers [22].Most of the respondents (83.7%) were satisfied with the images and charts shown by the teacher to enhance their learning abilities. Our results are similar to the of Suran and Kumar, they reported that the inclusion of innovative tools during didactic teaching improved the cognitive skills of the students (64%). Incorporating flowcharts and relevant pictures may facilitate the students to become life-long learners [23].To achieves the learning outcomes, a good student-teacher relationship is mandatory [24]. The current study showed that 86.9% of students were satisfied with the appreciation and encouragement to ask the question and they received answers to their questions. Another study conducted in different dental colleges in Karachi concluded that 60.8% of the participants received proper attention from their teachers [25]. The current study revealed that 80% of the participant reported MCQs as the preferred mode of assessment followed by practical exams and OSCE, whereas VIVA (33.1%) was considered the least desirable tool. These results are in accordance with another study conducted in Islam Dental College, Sialkot which reported MCQs as a favorite and most preferred method whereas only 15% students favored viva voce for assessment [12]. BDS students affiliated with UHS were satisfied with the current educational strategies but they recommended integrated teaching 77.6%, case-based learning 74.6%, and group discussion 82.3%. As per our study, 2nd year BDS students of Foundation University College of Dentistry (FUCD) also strongly advocated and appreciated integrated teaching, case-based and group based learning methods [17]. To receive adequate knowledge of dental materials and better responses from the students, every didactic lecture should be associated with and accompanied by a clinical application session. The preclinical lab should provide an opportunity for learning the manipulation and handling of various materials used in clinical practice and should also provide the gateway to address the queries of students regarding storage and usage of the materials [25]. Out of 130 participants, males were 32 (24.61%) and females were 98(75. 38%).Majority of the study sample was based on females, Figure 1.

CONCLUSIONS

The students of second-year BDS were less interested in learning Dental Materials; they found difficulty in understanding the concepts due to conventional teaching with inadequate clinical exposure. Group discussion joined with integrated teaching methodologies should be the best option that can enhance the interest of students and learning outcomes.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Althubaiti S and Althubaiti N. Saudi Medical Students' Interest in Basic Medical Sciences and the Factors

DOI: https://doi.org/10.54393/pjhs.v3i05.238

Affecting It. Global Journal of Health Science. 2018;10(4):1-30.
[2] Heer E, Saadat S, Bhatti OA. Interest and Attitudes of Medical, Dental Students and Graduates Towards Pursuing Career in Basic Sciences. Journal of Bahria University Medical and Dental College. 2021 Oct;11(4):168-73.
[3] Feldens CA, Portella FF, Kramer PF. Traumatic Dental Injuries. In Oral Epidemiology 2021;133-158.
[4] Gali S, Shetty V, Murthy NS, Marimuthu P. Bridging the gap in 1(st) year dental material curriculum: A 3 year randomized cross over trial. Journal of Indian Prosthodontic Society (JIPS) 2015 Sep;15(3):244-9. doi: 10.4103/0972-4052.161565.
[5] Ford PJ and Hibberd K. Creating effective and engaging information literacy programs for the dental curriculum. European journal of education 2012 Feb;16(1): e41-6. doi: 10.1111/j.1600-0579.2010.00671. x.
[6] Gupta S, Latoo SH, Dar MS. Problems Encountered by Dental Students in Understanding Oral Histology and Dental Anatomy: A Cross-Sectional Study. Annals of international medical and dental Research. 2019;5(4):40.
[7] AlHamdan EM, Tulbah HI, AlDuhayan GA, AlBedaiwi LS. Preferences of dental students towards teaching strategies in two major dental colleges in Riyadh, Saudi Arabia. Education Research International. 2016 Jan.
[8] Jawaid M and Aly SM. 'E-learning' modalities in the current era of Medical Education in Pakistan. Pakistan journal of medical sciences quarterly. 2014 Sep; 30(5):1156-8. doi: 10.12669/pjms.305.4351.
[9] Al-Ansari AA and El Tantawi MM. Predicting academic performance of dental students using perception of educational environment. Journal of dental education. 2015 Mar;79(3):337-44.
[10] Shariati B, Kanji Z, Soheilipour S, Patrick L, Sharif A. Enhancing learning in an online oral epidemiology and statistics course. Canadian Journal of Dental Hygiene. 2021 Feb; 55(1):17-29.
[11] El-Kishawi M, Khalaf K, Al-Najjar D, Seraj Z, Al Kawas S. Rethinking Assessment Concepts in Dental Education. International journal of dentistry. 2020 Oct; 2020:8672303. doi: 10.1155/2020/8672303.
[12] Inayat N, Munir N, Sajjad M, Muneer MU, Muddassar M, RAUF MA. Feedback on Teaching and Assessment Methodologies, being practiced in Islam Dental College-cross sectional study. Pakistan Journal of Medical and Health Sciences. 2021; 15(5):1115-7.
[13] Asiry MA. Learning styles of dental students. The Saudi Journal for Dental Research. 2016 Jan; 7(1):13-7.
[14] Taheri M, Falahchai M, Javanak M, Hemmati YB, Bozorgi MD. Analyzing the relationship between learning styles (Kolb and VARK) and creativity with the academic achievement of dental students. Journal of Education and Health Promotion. 2021.
[15] Mozaffari HR, Janatolmakan M, Sharifi R, Ghandinejad F, Andayeshgar B, Khatony A. The Relationship Between the VARK Learning Styles and Academic Achievement in Dental Students. Advances in medical education and practice. 2020 Jan; 11:15-19. doi: 10.2147/AMEP.S235002.
[16] Vijayan P and Ponniah A. A survey study based on undergraduate medical students' feedback regarding pathology and the teaching-learning methodologies employed. Tropical Journal of Pathology and Microbiology. 2017;3(2):149-54.
[17] Aamer S, Khan RA, Saleem A, Zia AU, Hassan F, Afzal A. Undergraduate dental students' perceptions of educational strategies at Foundation university college of dentistry. Pakistan Orthodontic Journal. 2019 Sep;11(1):39-44.
[18] Qazi HS, Ashar A, Ahmad SA. Impact of an innovative approach of teaching science of dental materials on the learning experiences of undergraduate students. Pakistan Armed Forces Medical Journal (PAFMJ). 2019 Jun;69(3):582-88.
[19] Deshpande S, Lambade D, Chahande J. Development and evaluation of learning module on clinical decision-making in Prosthodontics. The Journal of the Indian Prosthodontic Society. 2015 Apr; 15(2):158.
[20] Hammad HG and Hamed MS. Integration of dental education for knowledge retention: review of literature. Indian Journal of Multidisciplinary Dentistry. 2016 Jan; 6(1):25.
[21] Mussarat U, Ehsan F, Zainub A, Saeed MH, Hassan U, Jahan S. MEDICAL EDUCATION: Comparative Evaluation of Peer Assisted Learning and Teacher Assisted Learning Using Small Group Discussion. Journal of Islamic International Medical College (JIIMC). 2022 Mar; 17(1):56-60.
[22] Hussein KS. Perceptions of an integrated curriculum among dental students in a public university in Saudi Arabia. Electronic physician. 2017 Jul; 9(7):4828.
[23] Saran R and Kumar S. Use of crossword puzzle as a teaching aid to facilitate active learning in dental materials. Indian journal of applied research 2015 Apr; 5(4):456-7.
[24] Ansary JA, Ara I, Talukder HK, Alam AS, Amin S, Rahman SM. Views of students regarding effective clinical teaching and learning in dental education. Bangladesh Journal of Medical Education.Indian journal of applied research. 2011; 2(1):1-5.

DOI: https://doi.org/10.54393/pjhs.v3i05.238

[25] Gul M, Asghar S, Sami Z. Dental students' perception on preclinical operative dentistry course. Journal of Bahria University Medical and Dental College. 2015 Dec; 5(4):178-83.

DOI: https://doi.org/10.54393/pjhs.v3i05.232

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Self-Esteem and its Impact on Academic Performance among Undergraduate Nursing Students of Khyber Pukhtunkhwa Pakistan; A Correlational Study

Salma Khan [1], Nasir Anwar [2], Imran Khan [3], Shakir Ullah [4], Muhammad Suliman [5] and Amir Sultan [6]

[1]Northwest College of Nursing, Peshawar, Pakistan
[2]National College of Nursing, Khyber Pakhtunkhwa, Pakistan
[3]Health Care Institute of Nursing, Peshawar, Pakistan
[4]Florence Institute of Medical Sciences and Nursing, Khyber Pakhtunkhwa, Pakistan
[5]Upper Swat College of Nursing, Khyber Pakhtunkhwa, Pakistan
[6]Saidu Group of Teaching Hospital, Khyber Pakhtunkhwa, Pakistan

ARTICLE INFO

Key Words:
Self-esteem, Nursing students, Motivation, Academic performance, Clinical education

How to Cite:
Khan, S. . ., Anwar , N. ., Khan, I. ., Ullah, S. ., Suliman, M. ., & Sultan, A. (2022). Self-Esteem And Its Impact On Academic Performance Among Undergraduate Nursing Students Of Khyber Pukhtankhwa Pakistan; A Correlational Study : Self-Esteem and its Impact on Academic Performance. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.232

***Corresponding Author:**
Amir Sultan
Saidu Group of Teaching Hospital, Khyber Pakhtunkhwa, Pakistan
nursingwithamir@gmail.com

Received Date: 11th October, 2022
Acceptance Date: 20th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Self-esteem is defined as self-value and the combination of skills and emotional states that describe how highly people respect themselves or think about themselves. **Objective:** To identify the correlation between self-esteem and academic performance. **Methods:** The study design was correlational descriptive, which was conducted from August 2022 to September 2022, with a sample size of 185 nursing students and a non-probability sampling technique. The self-esteem of the participants was assessed through a valid and reliable scale. **Results:** Among the study participants, the majority of the students were male (64.5%). In the collected data, the majority of students' self-esteem was average (91.90%), while the academic performance of the participants was average (61.1%). The most frequent answers to the scale questions were "agree" and "strongly agree. The overall self-esteem of male participants was higher compared to female participants, while the 4th year students' self-esteem was higher compared to other years' students. In the academic performance, the performance was best and average. The academic performance of males were higher than female participants. The findings show that there is no correlation between self-esteem and academic performance and also no correlation with selected demographic variables. ***Conclusions:*** The study demonstrates that students with higher self-esteem are more confident, have a lower stress level, and are energetic, good problem solvers. Senior students' self-esteem has higher self-esteem compared to other class students.

INTRODUCTION

Self-esteem is the combination of skills and emotional states that describe how highly people respect themselves or think about themselves [1]. Self-esteem is self-value. That is the gap between the ideal and real self [2]. According to Rosenberg (1985), self-esteem is an internal belief system that is an evaluation of self-made by someone regarding himself in a negative or positive way, as explained by Rosenberg [3]. The idea and perception of self reflects on the value of an individual towards himself and toward the capabilities of skills performed in clinical and academic performance. Self-esteem is considered an evaluation of self-knowledge. Therefore, self-evaluation could be positive or negative. People with low self-esteem are associated with a negative perception of themselves, while higher self-esteem is considered a good evaluation of them [1]. According to Maslow's hierarchy of human needs, positive self-esteem is the key towards self-actualization. Nursing education consists of theoretical sessions and clinical duties; therefore, students go through multiple evaluations and experiences [4]. In clinical duties, nursing

DOI: https://doi.org/10.54393/pjhs.v3i05.232

students interact with patients, so they perform the roles of caregiver, health promoter, advocate, and collaborator with patients and other clinical health workers. Self-esteem supports the students' ability to cope with difficult and stressful situations because it plays an important role in the development of psychological development [5, 6]. According to previous studies, self-esteem is associated with life satisfaction and low self-esteem can be associated with psychological symptoms like stress, depression, and anxiety [7-9]. During this transition period, nursing students entering degree programmes go through multiple semesters and different roles, so exploring self-esteem is important because of the changes in experiences associated with study and life. Those individuals who face low self-esteem are suffering from insecurity, inferiority, loss of confidence, self-respect and pathological changes such as insomnia, stress and depression that lead to poor academic performance and low quality care [10]. Those students who have higher self-esteem have all the qualities that are required for psychological development, such as confidence, being highly motivated, energetic, problem-solvers, and decision-makers in difficult situations, and have a low stress level [11]. There was a lack of studies in the context of Pakistan to identify the level of self-esteem among the undergraduate students of nursing. Therefore, the aim of this study was to evaluate self-esteem and correlate it with academic performance.

METHODS

This study was conducted from August 2022 to September 2022 in the registered nursing colleges of Khyber Pukhtankhwa using a descriptive correlation study design. The study population was undergraduate nursing students enrolled in public and private nursing institutes in Khyber Pukhtankhwa. Those students who are currently enrolled in any semester of a 4-year degree program and agree to be the participants voluntarily were the inclusion criteria, while those nursing students who were performing clinical duties during the duration of this study were excluded from the study. A sample size of 185 students was chosen while using the non-probability sampling technique. The study instrument was the Rosenberg self-esteem valid and reliable questionnaire, having a chronbach alpha (0.81) that contained 10 items on a 4 point Likert scale [12]. The cutoff values were set for self-esteem:

- Score 20 and below—Poor self-esteem
- Self-esteem ranges from 21 to 30 for average self-esteem,
- Score between 31 and 40. high self-esteem

The responses to Items 2, 5, 6, 8, and 9 were reversed as a part of the requirements of the questionnaire.

The second instrument used in the study was academic performance

- GPA below 2.80 were poor performance
- GPA 2.81 to 3.40 average performance
- GPA above 3.41 good performances

RESULTS

The participants of this study were undergraduate nursing students from Khyber Pakhtankhwa, Pakistan. The total number of participants was 185, where the majority of the participants were males (65.4%) and females (34.6%). In the category of age, the age group of 22 to 25 years was higher (62.2%), while the age group of 18 to 21 years was lower (22.2%) and the age group of 26 years and above was lower (15.7%). The students of semester 7th and 8th (4th year) were the maximum participants (39.5%), followed by 3rd and 4th semester (2nd year) participants (25.4%), then (3rd year) 5th and 6th semester (22.7%), and the 1st year (1st and 2nd semester) students (12.4%). The participants living in rural areas were higher (63.2%) than urban students (36.8%). The students from private colleges were higher (85.9%) than government college students (14.1%) (Table 1).

Characteristics		Frequency (n=185) (%)
Gender	Male	121 (65.4%)
	Female	64 (34.6%)
Age	18 -21 years	41 (22.2%)
	22 – 25 years	115 (62.2%)
	26 – and above	29 (15.7%)
Year of BSN	1st year (1st and 2nd semester)	23 (12.4%)
	2nd year (3rd and 4th semester)	47 (25.4%)
	3rd year (5th and 6th semester)	42 (22.7%)
	4th year (7th and 8th semester)	73 (39.5%)
Living in	Urban	68 (36.8%)
	Rural	117 (63.2%)
	Private	159 (85.9%)
	Public	26 (14.1%)

Table 1: Demographic characteristics of the participants

The Rosenberg scale contains 10 items, where the responses of the participants were noted on a 4-point Likert scale. The responses to questions 1, 3, 4, 7, and 10 were noted as exactly as received, while the responses to questions 2, 5,6,8,9 were reversed as required. In table 2, the most frequent answers to every question with the mean and standard deviation score were noted. While the self-esteem of the participants is further divided into gender and years of study (Table 2).

Question	Most frequent	Mean ± SD
1	3-Agree	3.07 ± 0.83
2	4-strongly agree	3.25 ± 0.81
3	2-Disagree	2.38 ± 0.99
4	4-strongly agree	3.42 ± 0.76
5	3-Agree	2.64 ± 0.95
6	3-Agree	2.98 ± 0.88

DOI: https://doi.org/10.54393/pjhs.v3i05.232

7	4-strongly agree	3.16 ± 0.84
8	3-Agree	3.02 ± 0.82
9	2-Disagree	2.75 ± 1.01
10	2-Disagree	2.75 ± 1.01

Self-Esteem according to cutoff and selected variables			
	High self-esteem	**Average self-esteem**	**Poor self-esteem**
Overall self-esteem	13 (7%)	170 (91.9%)	2 (1.1%)
Self-esteem Gender basis			
Male	6 (3.2%)	114 (61.6%)	1 (0.5%)
Female	7 (3.7%)	56 (30.2%)	1 (0.5%)
Self-esteem year basis (semesters)			
1st year	1 (0.5%)	22 (11.8%)	0 (0%)
2nd year	5 (2.7%)	42 (22.7%)	0 (0%)
3rd year	2 (1.08%)	38 (20.8%)	2 (0%)
4th year	5 (2.7%)	68 (36.7%)	0 (0%)

Table 2: Self-esteem of the participants with most frequent answer of the questions

Table 3 shows the academic performance of the students, further elaborated on the basis of gender and year of study.

	Best performance	**Average performance**	**Poor performance**
Total participants	50 (27%)	113 (61%)	22 (12%)
Academic performance on gender basis			
Male	43 (22.2%)	68 (36.7%)	10 (5.4%)
Female	7 (3.7%)	45 (24.3%)	12 (6.4%)
Academic performance on year basis			
1st year	8 (4.3%)	15 (8.1%)	0 (0%)
2nd year	13 (7.0%)	32 (17.2%)	2 (1.0%)
3rd year	10 (5.4%)	23 (12.4%)	9 (4.8%)
4th year	19 (10.2%)	43 (23.2%)	11 (5.9%)

Table 3: Academic performance of the participants

Table 4 shows that there is no significant association of self-esteem with academic performance and selected variables

	Academic performance	**Gender**	**Age**	**Semesters**
Self-esteem ®	0.043	0.09	0.11	-0.01
p-value	0.56	0.22	0.11	0.56

Table 4: Correlation of Self-esteem and Academic performance

DISUCUSSION

In this study, the majority of the participants were male (65.4%) compared to female students (34.6%). That is different from the study where the majority of the participants were females (81.9%) [13]. In this study, the highest number of students had average self-esteem (91.8%), followed by higher and then poorer lower esteem. The findings are similar to a study that shows the majority of the students' self-esteem was average (52.2%) [14]. The findings are also consistent with the study that reveals that (54.7%) were of average self-esteem, followed by high and low [15]. The results were also similar to a study where the majority of student self-esteem was moderate (73.3%) [13]. The finding of the study is also similar to our findings that show that among the participants, a higher number of students had average self-esteem [16]. The results are different in a study where high self-esteem was (95.3%) maximum among the participants [17], while another study also had different findings, where the majority of the participants had high self-esteem [18]. In our study, the level of self-esteem in the high self-esteem category was higher (3.7%) compared to male participants (3.2%). While in the average category, males perform better than female participants. The findings of higher self-esteem are contradicted by a study and similar with average self-esteem, which shows that the mean score for male self-esteem is higher (30.4 ± 1.2) than female students' (29.1 ± 0.1) [15]. Another two studies show that male students have a higher level of assertiveness and self-esteem compared to female students [19, 20]. On the basis of year, the self-esteem in the high category, the 2nd and 4th year students perform well, while in the overall category, the percentage of 4th year students perform well in all categories. The results are supported by a study which shows that four-stage students have the highest self-esteem compared to other grades [15]. Another study result also shows similarity with our findings that fourth-year students have maximum self-esteem compared to other students [21]. In this study, there was no correlation of self-esteem with academic performance and other selected variables. The study contradicts our study; there is an association ($p = 0.034$) between level of education and level of self-esteem [17].

CONCLUSIONS

The study concluded that nursing students have awareness regarding self-esteem and that as the students are promoted to higher classes, their self-esteem increases. Self-esteem enhances the capabilities of students, such as confidence, being highly motivated, energetic, problem-solvers, and decision-makers in difficult situations, and having a low stress level. The study also determined that there is no correlation between academic performance and self-esteem.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Ghezelbash S, Rahmani F, Peyrovi H, Inanloo M, Shekarchian S. Comparison of self-esteem among first to fourth year nursing students from Universities

DOI: https://doi.org/10.54393/pjhs.v3i05.232

of Medical Sciences in Tehran. Thrita. 2015 Mar; 4(1). doi: 10.5812/thrita.24336

[2] Fiassa C and Nader-Grosbois N. De la perception à l'estime de soi: Concept, évaluation et intervention. De Boeck Supérieur; 2016 May 9.

[3] Wilson TD and Dunn EW. Self-knowledge: its limits, value, and potential for improvement. Annual Review of Psychology. 2004; 55:493-518. doi: 10.1146/annurev.psych.55.090902.141954

[4] Sultan A, Khan S, Bibi A, Jamal H, Rafeeque S. Attitude of Under-graduate Nursing Students towards Clinical Duties-A cross sectional study. Pakistan Journal of Medical and Health Sciences. 2022 Jul; 16(07):139-.

[5] Feng D, Su S, Wang L, Liu F. The protective role of self-esteem, perceived social support and job satisfaction against psychological distress among Chinese nurses. Journal of Nursing Management. 2018 May; 26(4):366-372. doi: 10.1111/jonm.12523

[6] Wang Z, Liu H, Yu H, Wu Y, Chang S, Wang L. Associations between occupational stress, burnout and well-being among manufacturing workers: mediating roles of psychological capital and self-esteem. BMC Psychiatry. 2017 Nov; 17(1):364. doi: 10.1186/s12888-017-1533-6

[7] Liu Y, Wang Z, Zhou C, Li T. Affect and self-esteem as mediators between trait resilience and psychological adjustment. Personality and individual differences. 2014 Aug; 66:92-7. doi: 10.1016/j.paid.2014.03.023

[8] Sung C, Muller VR, Ditchman N, Phillips B, Chan F. Positive coping, self-efficacy, and self-esteem as mediators between seizure severity and life satisfaction in epilepsy. Rehabilitation Research, Policy, and Education. 2013 Jan; 27(3):154-70. doi: 10.1891/2168-6653.27.3.154

[9] Servidio R, Gentile A, Boca S. The Mediational Role of Coping Strategies in the Relationship Between Self-Esteem and Risk of Internet Addiction. European Journal of Psychology. 2018 Mar; 14(1):176-187. doi: 10.5964/ejop.v14i1.1449

[10] Olea MT, Bernal MM, Hernandez RM. Self-esteem and its correlates among University Freshmen Biotechnology Major. International Journal of Educational Research and Technology. 2012; 3(3):64-70.

[11] Naderi H, Abdullah R, Aizan HT, Sharir J, Kumar V. Self-esteem, gender and academic achievement of undergraduate students. American Journal of Scientific Research. 2009 Jan; 3(1):26-37.

[12] Rosenberg M. Society and the adolescent self-image. Princeton university press; 2015 Dec 8.

[13] Banappagoudar S, Ajetha DS, Parveen A. Self-Esteem of Undergraduate Nursing Students: A Cross-Sectional Study. International Journal of Special Education. 2022; 37(3).

[14] Pandey RA and Chalise HN. Self-esteem and academic stress among nursing students. Kathmandu University medical journal. 2015; 13(4):298-302. doi: 10.3126/kumj.v13i4.16827

[15] Ibrahim RH. Assessment of selfesteem among nursing students. Assessment. 2015; 16.

[16] Mane S. A study to assess self-esteem among the third year nursing students in selected Institute of Nursing Education, Andheri. Asian Journal of Nursing Education and Research. 2016 Dec; 6(4):497-502. doi: 10.5958/2349-2996.2016.00093.8

[17] Shrestha K, Limbu G, Twati S, Shrestha P. Study of self-esteem of nursing students in a nursing college in Kathmandu. Global Journal of Medicine and Public Health. 2018; 7:1-8.

[18] Emil S. Self-esteem and stressful life events of university students. Ankara: Middle East Turkey University. 2003 Sep

[19] Larijani TT, Aghajani M, Baheiraei A, Neiestanak NS. Relation of assertiveness and anxiety among Iranian University students. Journal of Psychiatric and Mental Health Nursing. 2010 Dec; 17(10):893-9. doi: 10.1111/j.1365-2850.2010.01607.x

[20] Ghodrati F, Tavakoli P, Heydari N, Akbarzadeh M. Investigating the relationship between self-esteem, assertiveness and academic achievement in female high school students. Health Science Journal. 2016; 10(4):1-5.

[21] Kanna RK, Prasath TM, Vasuki R. Performance Analysis of FPGA Based Fund Us Image Processing. Indian Journal of Public Health Research & Development. 2019 Nov; 10(11). doi: 10.5958/0976-5506.2019.03999.8.

DOI: https://doi.org/10.54393/pjhs.v3i05.168

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Serum Vitamin-D Levels and Severity of Clinical Depression in Patients of a Psychiatric Clinic in Pakistan

Mian Mukhtar Ul Haq[1], Mian Ayaz Ul Haq[2*], Talha Durrani[3], Omama Humayun[3], Imran Ullah[3] and Daniyal Durrani[4]

[1]Lady Reading Hospital, Peshawar, Pakistan
[2]Hayatabad Medical Complex, Peshawar, Pakistan
[3]Khyber Teaching Hospital, Peshawar, Pakistan
[4]Khyber Medical College, Peshawar, Pakistan

ARTICLE INFO

Key Words:
Vitamin-D, Depression, Severity

How to Cite:
Ul Haq, M. M. ., ul Haq, M. A., Durrani, T., Humayun, O., Ullah, I. ., & Durrani, D. (2022). Serum Vitamin-D Levels And Severity Of Clinical Depression In Patients Of A Psychiatric Clinic in Pakistan: Serum Vitamin-D Levels and Severity of Clinical Depression. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.168

***Corresponding Author:**
Mian Ayaz Ul Haq
Hayatabad Medical Complex, Peshawar, Pakistan
drayazulhaq@gmail.com

Received Date: 27th September, 2022
Acceptance Date: 11th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Vitamin D deficiency is often correlated with nervous system disorders like major depression, Parkinson's disease and dementia. While much of the clinical literature suggests its association with clinical depression, very few studies have looked into the relationship between vitamin D levels and clinical depression severity. **Objectives:** To find out the association between vitamin D levels in patients suffering from different severities of clinical depression with the confounding socio-cultural factors of a third-world country i.e., Pakistan. **Methods**: The cross-sectional study was conducted in Lady Reading Hospital, Peshawar for five months with convenience sampling. **Results:** Overall, the study had 132 (36.57%) males and 229 (63.43%) females, and 236 diagnosed cases of Clinical Depression. In terms of Vitamin D levels, 242 (67.04%) had deficient, while 77 (21.33%) and 42 (11.63%) had insufficient and normal vitamin D levels, respectively. There was a statistically significant difference in the serum Vitamin D levels between at least two groups ($F(3,232)=[38.64]$, $p<0.05$). **Conclusions:** Vitamin D levels showed a dose-dependent, inverse relation with the severity of clinical depression in the Pakistani population.

INTRODUCTION

In recent years, Vitamin D has gained much attention among the public at large and most medical specialties in specific. This is because it is involved in many physiologic functions, some of which are yet to be discovered [1]. It has mainly two forms, i.e., D2, gained from plants, and D3, from fish and eggs. While the dietary sources are important, 80-90% of its supply comes from the UV light from the sun, in a process that converts 7-dehydrocholesterol to Vitamin D. At present, we have an epidemic of Vitamin D deficiency in the world, which is unrelated to the gender, age or racial factors. In Europe alone, 40% of its people have vitamin D deficiency, which is thought to increase with time [2]. Furthermore, 13% have severe Vitamin D deficiency, which prompts supplementation. Even the U.S shows a similar statistic of 41.6%, furthering its argument [3]. In third-world countries, women of child-bearing age have multiple nutritional deficiencies, and vitamin D is no exception [4]. Furthermore, the statistics in these countries are far more alarming than the developed nations as this links directly to infant mortality and severe disease. The incidence of vitamin D deficiency is usually associated with an inadequate intake of Vitamin-D-containing foods, low sunlight exposure, and obesity, leading to adipose tissue sequestration [5, 6]. Although inadequate intake would make an excellent causal argument in the case of third-world countries, decreased sunlight exposure and obesity

DOI: https://doi.org/10.54393/pjhs.v3i05.168

do not [7]. This is because people living in these countries usually have higher exposure and lower prevalence of obesity than in the U.S. and Europe, which makes the population set unique. This population has wide physiological and psycho-social variation versus the usually taken U.S. or European-based populations, which is well established in the literature. Hence, one can assume that the disease manifestations of Vitamin D deficiency might also be different. These can include respiratory, dermatological, gastrointestinal, and neuropsychiatric issues, in addition to the traditionally highlighted, musculoskeletal ones [1, 8, 9]. Vitamin D is essential for the good health of the nervous system and is often inversely correlated with nervous system disorders like Major Depression, Parkinson's disease and Dementia, etc [10, 11]. Among these diseases, we aimed to investigate Clinical Depression and its relation to Vitamin D deficiency. This is because, in addition to being a debilitating disease, it can cause psychosomatic symptoms like chronic fatigue syndrome, hyperventilation, irritable bowel syndrome, unexplained abdominal pain, tension headache, chronic pelvic pain, and atypical facial and chest pain [12, 13]. Hence, somatization can lead to a diagnostic paradox for clinicians that can overlap with many systemic symptoms, especially Vitamin D deficiency symptoms. The problem is magnified when different severities of Clinical Depression are taken into account, as mild Depression is more likely to be masked by psychosomatic symptoms imitating Vitamin D deficiency. Therefore, the line between clinical Depression in the Pakistani population caused by psycho-social factors versus biological factors, specifically, a vitamin D deficiency, is blurred. While most of the epidemiological literature hypothesizes that vitamin D deficiency might be related to clinical depression, very few studies have looked into the relationship between vitamin D levels and clinical depression severity. To the best of our knowledge, no study has been reported on the association between vitamin D levels in patients suffering from different severities of Clinical Depression with the confounding socio-cultural factors of a third-world country i.e., Pakistan.

METHODS

After approval from the IRB, ethical board, a prospective, cross-sectional study was conducted in the Department of Neurology and Psychiatry in Lady Reading Hospital, Peshawar, for five months. Based on significance level of 0.05 and power of 80%, the sample size was calculated using OpenEpi software, applying the formula: Sample size n = [DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1)+p*(1-p)] . The sample size came out to be 384. We selected the patients based on specific diagnostic and ethical criteria: 1. Adult patients (18 and higher age), 2. Suffering from Unipolar Clinical Depression, as per PHQ-9, 3. Willing to participate in the study, 4. Pregnant patients were excluded; 5. Patients with co-morbid diagnosed psychiatric conditions were also excluded. The diagnosis of clinical Depression is made based on the DSM-V criteria and employs ab already validated questionnaire called the PHQ-9. The PHQ-9 is a self-rating tool widely used in clinical research to diagnose and monitor clinical Depression. The tool was formed in 1999 by Spitzer et al., and it monitors the presence and severity of Depression based on the DSM criteria. We used a modified version of the PHQ-9, which was first translated to the national language, i.e., Urdu, and double-checked for cultural fitness with the help of a Pakistani Expert. The meaning and layout were maintained to the original version, and the subject matter was kept in line with cultural astuteness, based on Research and Development Health Corporation (RAND). The internal reliability of the modified questionnaire was tested using a pilot study of 31 patients, and the Cronbach's alpha value was >0.92; hence we proceeded to carry out the investigation further. Depression Severity was established as: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe. Patients who presented in the outpatient clinic of Lady Reading Hospital were included. Complete physical examination was done for all the patients to rule out organic causes of the diseases, and a certified psychiatrist undertook the psychiatric interviews to assess their mental state. The affective symptoms were evaluated, and the diagnosis of clinical Depression was made based on the DSM-V criteria. Afterward, the patients were invited to be checked for serum 25-Hydroxy Vitamin D concentrations under a fasting state using the Electrochemiluminescence method. Reference ranges included: equal to, or more than 30 ng/ml as normal, less than 20 ng/ml as deficient, and between 21-29, ng/ml was defined as insufficient. Terms of non-disclosure were ensured and mentioned to all the participants. Out of the 384 patients approached, 361 patients fulfilled the inclusion criteria, but 24 were lost on follow-up; hence, 337 patients participated in the study. Among that number, 101 patients were later diagnosed with co-morbid psychiatric illnesses that did not fulfill the inclusion criteria; hence a total of 236 patients were finally selected. SPSS version 26.0 was used for the data analysis, and the results were reported. Descriptive variables were reported as frequencies and percentages, while continuous variables were reported as means with standard deviation (S.D.). Normality for all the continuous variables was also checked, by using the skewness and kurtosis method and confirmed it by checking the presentation with a histogram. Statistical tests including the Chi-square test, independent student t-test, and

DOI: https://doi.org/10.54393/pjhs.v3i05.168

logistic regression were performed as per data needs. A p-value of <0.05 was taken as significant.

RESULTS

Overall, our study had 132 (36.57%) males and 229 (63.43%) females, and 236 diagnosed cases of clinical depression. In terms of Vitamin D levels, 242 (67.04%) had deficient, while 77 (21.33%) and 42 (11.63%) had insufficient and normal vitamin D levels, respectively. A total of 162 (44.88%) patients had normal BMI, while 85 (23.55%) were underweight and 114 (31.58%) were either overweight or obese (Table 1).

Variables	Number (%)
Gender	
Male	132 (36.57%)
Female	229 (63.43%)
Diagnosis	
Clinical Depression	236 (65.37%)
Other	125 (34.63%)
Vitamin D levels	
Deficient	242 (67.04%)
Insufficient	77 (21.33%)
Normal	42 (11.63%)
BMI	
Normal	162 (44.88%)
Overweight	114 (31.58%)
Underweight	85 (23.55%)

Table 1: Demographics and General Characteristics

Mild depression was the most common severity observed with a total of 143 (39.61%) patients, while moderate depression affected 46 (12.74%), moderately severe 31 (8.59%) and a total of 16 (4.43%) patients suffered from severe depression (Table 2).

Severity of Clinical Depression	Number (%)
Mild	39.61 (143%)
Moderate	12.74 (46%)
Moderately severe	8.59 (31%)
Severe	4.43 (16%)

Table 2: Frequency of different severities of clinical depression

We found no statistically significant difference between gender, presence or absence of clinical depression, and BMI with the status of vitamin D deficiency via the Chi-Square Test ($p>0.05$). However, the serum Vitamin D values for mild depression were 20.26 ± 14.42, while for moderate depression, it was 13.87 ± 9.21, moderately severe depression showed 10.63 ± 6.40, and severe depression showed a 2.73 ± 2.06 level. A one-way ANOVA was performed to compare vitamin D levels (independent variable) with the severity of clinical depression (dependent variable). It revealed that there was a statistically significant difference in the serum Vitamin D levels between at least two groups ($F(3,232) = [38.64]$, $p < 0.05$). Levene's test showed that the variances among the different Vitamin D levels were not equal. Therefore, Welch and Games-Howell tests were applied for posthoc analysis instead of Tukey HSD tests, which showed that the mean value of serum Vitamin D was significantly different between mild and moderate, moderately severe, and severe groups. ($p=0.003$, 95% C.I. = [1.65, 11.12]). A similar trend was observed between moderate and severe ($p=0.00$, 95% C.I. = [7.26, 15.00]) and moderate-severe to severe groups ($p=0.00$, 95% C.I. = [4.52, 11.29]). There was no statistically significant difference in Vitamin D levels between moderate and moderately severe ($p=0.27$) depression (Table 3, 4).

Variable		Vitamin D Deficiency	Vitamin D Insufficiency	Sufficient	Total	p-value
Gender	Male	83	34	16	133	0.125
	Female	170	33	25	228	
Diagnosis	Clinical Depression	158	37	39	234	0.08
	Other	94	29	4	127	
BMI	Normal Range	52	21	11	84	0.28
	Overweight	17	39	21	236	
	Underweight	623	8	10	41	

Table 3: Chi-square Test – Vitamin D status with gender, diagnosis and BMI

Mild	Moderate	Moderately Severe	Severe
Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
20.26 ±14.42	13.87 ± 9.21	10.63 ± 6.40	2.73 ± 2.06

Table 4: Vitamin D Levels and Severity of Clinical Depression

DISCUSSION

Our study intended to find the association between vitamin D levels and the severity of clinical depression, in a Pakistani population. This is different from much of the published literature in the aforementioned population that mainly shows the mere presence or absence of the illness. Our study also looked into the relationship between vitamin D deficiency and obesity, as it has been suggested to be an important covariate [14, 15]. The ANOVA findings demonstrate a dose-response gradient of vitamin D deficiency and depression, where the severity of clinical depression is inversely related to the levels of serum vitamin D. These findings echo the published studies by Esnafoglu et al., and Di et al., in which the tested population was predominantly ethnic white [16, 17]. The similar result indicates that even though, depression has multivariate causality, the vitamin D deficiency is inversely related to the severity of clinical depression, irrespective of the patient ethnicity and economic status in the country [17, 18]. Hence, this trend seen in first world countries is also the same in third world countries. As far as obesity and vitamin D is concerned, our study did not show any significant relationship between the two. This contrasts with many other studies in which obesity was significantly

DOI: https://doi.org/10.54393/pjhs.v3i05.168

associated with vitamin D deficiency [14, 19]. As mentioned in the work done by Vranić et al., obese populations have a high tendency to have vitamin D deficiency. This is most often attributed to the volumetric dilution into the body tissues, including fat and muscle [20]. While it is difficult to presume the exact reason for which obesity did not have a significant relation to vitamin D levels in our target population, there are likely some important physiological processes behind it, that require further exploration. Even though there seems to be a uniform relation between vitamin D levels and the severity of clinical depression, epidemiological evidence is disputed for the use of vitamin D for treating it. There are some studies, including a clinical trial that support the use of Vitamin D supplementation for the reduction of symptoms of clinical depression [21, 22]. However, other studies revealed the opposite results, showing that vitamin D supplementation does not contribute to the prevention or treatment of clinical depression [23-25]. Therefore, even though, serum vitamin D levels have an inverse correlation with clinical depression, the evidence in support of universal supplementation in it is not strong. This is a possible area of further research that needs to be explored so that subgroups, who are likely to benefit from supplementation in treatment can be identified so that patients may maximally benefit from this approach [26].

CONCLUSIONS

Vitamin D levels showed a dose-dependent, inverse relation with the severity of clinical depression in the Pakistani population. Furthermore, Vitamin D levels did not have any significant association with obesity in the population. In the long run, clinical trials with different patient ethnicities can open doors for identification and possible addon supplementation treatments for clinical depression.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Refaat B and El-Boshy M. Effects of supraphysiological vitamin D3 (cholecalciferol) supplement on normal adult rat ovarian functions. Histochemistry and Cell Biology. 2021 Jun; 155(6):655-668. doi: 10.1007/s00418-021-01975-0

[2] Amrein K, Scherkl M, Hoffmann M, Neuwersch-Sommeregger S, Köstenberger M, Tmava Berisha A, et al. Vitamin D deficiency 2.0: an update on the current status worldwide. European Journal of Clinical Nutrition. 2020 Nov; 74(11):1498-1513. doi: 10.1038/s41430-020-0558-y

[3] Parva NR, Tadepalli S, Singh P, Qian A, Joshi R, Kandala H, et al. Prevalence of Vitamin D Deficiency and Associated Risk Factors in the US Population (2011-2012). Cureus. 2018 Jun; 10(6):e2741. doi: 10.7759/cureus.2741

[4] Mustafa G, Asadi MA, Iqbal I, Bashir N. Low vitamin D status in nursing Pakistani mothers in an environment of ample sunshine: a cross-sectional study. BMC Pregnancy Childbirth. 2018 Oct; 18(1):426. doi: 10.1186/s12884-018-2062-0

[5] Wortsman J, Matsuoka LY, Chen TC, Lu Z, Holick MF. Decreased bioavailability of vitamin D in obesity. The American Journal of Clinical Nutrition. 2000 Sep; 72(3):690-3. doi: 10.1093/ajcn/72.3.690

[6] Nimitphong H, Park E, Lee MJ. Vitamin D regulation of adipogenesis and adipose tissue functions. Nutrition Research and Practice. 2020 Dec; 14(6):553-567. doi: 10.4162/nrp.2020.14.6.553

[7] Kanani FH, Zubairy M, Taimoor M. Frequency and trend of vitamin D deficiency in correlation with demographic and selected biochemical parameters in Karachi, Pakistan. Journal of Pakistan Medical Association. 2020 Nov; 70(11):1913-1917. doi: 10.5455/JPMA.28290

[8] Haq A, Hasnain SE, Razzaque MS. Diverse functions of vitamin D in health and disease. The Journal of Steroid Biochemistry and Molecular Biology. 2020 Jun; 200:105668. doi: 10.1016/j.jsbmb.2020.105668

[9] Zugic Soares J, Pettersen R, Saltyte Benth J, Knapskog AB, Selbæk G, Bogdanovic N. Higher Vitamin D Levels Are Associated with Better Attentional Functions: Data from the NorCog Register. The Journal of Nutrition and Health Aging. 2019; 23(8):725-731. doi: 10.1007/s12603-019-1220-z

[10] Liu HL, Chuang HY, Hsu CN, Lee SS, Yang CC, Liu KT. Effects of Vitamin D Receptor, Metallothionein 1A, and 2A Gene Polymorphisms on Toxicity of the Peripheral Nervous System in Chronically Lead-Exposed Workers. International Journal of Environmental Research and Public Health. 2020 Apr; 17(8):2909. doi: 10.3390/ijerph17082909

[11] Norlin M. Effects of vitamin D in the nervous system: Special focus on interaction with steroid hormone signalling and a possible role in the treatment of brain cancer. Journal of Neuroendocrinology. 2020 Jan; 32(1):e12799. doi: 10.1111/jne.12799

[12] Stein B, Müller MM, Meyer LK, Söllner W; CL Guidelines Working Group. Psychiatric and Psychosomatic Consultation-Liaison Services in General Hospitals: A Systematic Review and Meta-Analysis of Effects on

DOI: https://doi.org/10.54393/pjhs.v3i05.168

Symptoms of Depression and Anxiety. Psychotherapy and Psychosomatics. 2020; 89(1):6-16. doi: 10.1159/000503177

[13] Zhang X and Zhang X. Somatization Symptoms in Lung Cancer Patients and Correlative Analysis between Anxiety, Depression and Somatization Symptoms. Zhongguo Fei Ai Za Zhi. 2017 Jul; 20(7):473-478. doi: 10.3779/j.issn.1009-3419.2017.07.06

[14] Kamalzadeh L, Saghafi M, Mortazavi SS, Jolfaei AG. Vitamin D deficiency and depression in obese adults: a comparative observational study. BMC Psychiatry. 2021 Nov; 21(1):599. doi: 10.1186/s12888-021-03586-4

[15] Saji Parel N, Krishna PV, Gupta A, Uthayaseelan K, Uthayaseelan K, Kadari M, et al. Depression and Vitamin D: A Peculiar Relationship. Cureus. 2022 Apr; 14(4):e24363. doi: 10.7759/cureus.24363

[16] Esnafoglu E and Ozturan DD. The relationship of severity of depression with homocysteine, folate, vitamin B12, and vitamin D levels in children and adolescents. Child and Adolescent Mental Health. 2020 Nov; 25(4):249-255. doi: 10.1111/camh.12387

[17] Di Gessa G, Biddulph JP, Zaninotto P, de Oliveira C. Changes in vitamin D levels and depressive symptoms in later life in England. Scientific Reports. 2021 Apr; 11(1):7724. doi: 10.1038/s41598-021-87432-3

[18] Okereke OI, Reynolds CF, Mischoulon D, Chang G, Vyas CM, Cook NR, et al. Effect of Long-term Vitamin D3 Supplementation vs Placebo on Risk of Depression or Clinically Relevant Depressive Symptoms and on Change in Mood Scores: A Randomized Clinical Trial. JAMA. 2020 Aug; 324(5):471-480. doi: 10.1001/jama.2020.10224

[19] Mousa A, Naderpoor N, de Courten MPJ, de Courten B. Vitamin D and symptoms of depression in overweight or obese adults: A cross-sectional study and randomized placebo-controlled trial. The Journal of Steroid Biochemistry and Molecular Biology. 2018 Mar; 177:200-208. doi: 10.1016/j.jsbmb.2017.08.002

[20] Vranić L, Mikolašević I, Milić S. Vitamin D Deficiency: Consequence or Cause of Obesity? Medicina. 2019 Aug; 55(9):541. doi: 10.3390/medicina55090541

[21] Stokes CS, Grünhage F, Baus C, Volmer DA, Wagenpfeil S, Riemenschneider M, et al. Vitamin D supplementation reduces depressive symptoms in patients with chronic liver disease. Clinical Nutrition. 2016 Aug; 35(4):950-7. doi: 10.1016/j.clnu.2015.07.004

[22] Shipowick CD, Moore CB, Corbett C, Bindler R. Vitamin D and depressive symptoms in women during the winter: a pilot study. Applied Nursing Research. 2009 Aug; 22(3):221-5. doi: 10.1016/j.apnr. 2007.08.001

[23] Di Gessa G, Biddulph JP, Zaninotto P, de Oliveira C. Changes in vitamin D levels and depressive symptoms in later life in England. Scientific Reports. 2021 Apr; 11(1):7724. doi: 10.1038/s41598-021-87432-3

[24] Mousa A, Naderpoor N, de Courten MPJ, de Courten B. Vitamin D and symptoms of depression in overweight or obese adults: A cross-sectional study and randomized placebo-controlled trial. The Journal of Steroid Biochemistry and Molecular Biology. 2018 Mar; 177:200-208. doi: 10.1016/j.jsbmb.2017.08.002

[25] Jorde R, Sneve M, Figenschau Y, Svartberg J, Waterloo K. Effects of vitamin D supplementation on symptoms of depression in overweight and obese subjects: randomized double blind trial. Journal of Internal Medicine. 2008 Dec; 264(6):599-609. doi: 10.1111/j.1365-2796.2008.02008.x

[26] Menon V, Kar SK, Suthar N, Nebhinani N. Vitamin D and Depression: A Critical Appraisal of the Evidence and Future Directions. Indian Journal of Psychological Medicine. 2020 Jan; 42(1):11-21. doi: 10.4103/IJPSYM.IJPSYM_160_19.

DOI: https://doi.org/10.54393/pjhs.v3i05.194

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Variations in Gonadal Steroids in Workers Occupationally Exposed to Toxicants at Automobile Workshops and Petrol Filling Stations

Bilal Javed[1], Muhammad Amir Iqbal[1], Shaaf Ahmad[2], Husna Ahmad[1] and Nabila Roohi[1*]

[1]Department of Zoology, University of the Punjab, Lahore, Pakistan
[2]King Edward Medical University/Mayo Hospital, Lahore, Pakistan

ARTICLE INFO

Key Words:
LH, FSH, Testosterone, Estradiol, Steroids

How to Cite:
Javed, B., Amir Iqbal, M. ., Ahmad, S. ., Ahmad, H. ., & Roohi, N. . (2022). Variations in Gonadal Steroids in Workers Occupationally Exposed to Toxicants at Automobile Workshops and Petrol Filling Stations: Variations in Gonadal Steroids in Workers. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.194

***Corresponding Author:**
Nabila Roohi
Department of Zoology, University of the Punjab, Lahore, Pakistan
nabilaruhi@gmail.com

Received Date: 27th September, 2022
Acceptance Date: 5th October, 2022
Published Date: 31st October, 2022.

ABSTRACT

The most at risk for occupational toxicity brought on by exposure to heavy metals and PAHs among various vocations are gas station attendants and auto workers. The gonadal and its regulating hormonal pattern were identified in the current investigation in gas station attendants and car employees. **Objective:** This study's goal is to ascertain the impact of various occupational toxicants on the ovarian health of gasoline station attendants (PPA) and car technicians (AMM). Gonadal steroids and the hormones that control them were examined for this reason and their relationship to gonadal function was established. **Methods:** For this, blood samples from 19 gas station attendants and 29 auto mechanics were obtained from various gas stations and car shops, respectively. The University of the Punjab in Lahore provided the blood samples for the 24 controls. Using commercially available ELISA kits, the levels of serum estradiol, follicle stimulating hormone (FSH), luteinizing hormone (LH), and testosterone were examined. The significance of changes was evaluated using the one-way ANOVA test. **Results:** When compared to the control group, there was a little decrease in the levels of estradiol, follicle-stimulating hormone, luteinizing hormone, and testosterone among fuel station attendants and car employees. **Conclusions:** Pertinently, reduced reproductive and their regulatory hormonal levels predispose future risk of manifesting reproductive health issues.

INTRODUCTION

Occupational environments are major source of different varieties of harmful chemical substances. In Pakistan due to poor economic and health conditions, a number of uneducated people are forced to do work in these hazardous working environments. Due to the lack of awareness, these people are not familiar of basic health conditions. Chemicals are omnipresent anthropogenic pollutants they are poisonous, carcinogenic, and can induce mutations in all organisms, including humans [1]. Automobile workers belong to such occupational section of the society which are most likely to get harmed by chronic toxicity of lead and the reason behind that is their daily working processes which include motor vehicle spray painting, assembly, welding, brazing and processing of radiators. The toxicity of lead become a community problem when the family members especially children get harmed by indirect method and source of this indirect toxicity is uniforms or clothes of workers which they use at their occupational sites [2]. Polycyclic aromatic hydrocarbons (PAHs) may covalently attach with proteins and deoxyribonucleic acid (DNA), which results in biochemical disturbance and cell damage in various animals and cause cancer in human. The main source of these harmful pollutants in the environment includes forest fire, petroleum leakage, burning of oil and coal. These pollutants have adverse effects on male reproductive system [3]. Low antioxidant capacity and free radical genesis, in occupationally exposed workers,

DOI: https://doi.org/10.54393/pjhs.v3i05.194

evidences an early biochemical sign of a deranged metabolic state [4]. Gonadal functions are controlled via feedback loops which involves hypothalamic periodic pulses of gonadotropin releasing hormone (GnRH) to the adenohypophysial cells which in turn synthesize luteinizing hormone (LH) and follicle stimulating hormone (FSH) [5]. LH acts on the Leydig cells where they start testosterone synthesis, and FSH which stimulates sperm production [6]. Unusual synthesis of prolactin by pituitary tumors can effect and depress the production of both LH and FSH resulting in gradual decrease in testosterone formation in the testes [7]. Infertility is an increasing problem all over the globe, affecting 8–15% of couples in reproductive life [8]. Impotency in men is manifested by different lethal factors which encompasses, testicular blockage, metabolic alterations, and environmental toxins [9,10]. Occupational and unintentional exposure to chemicals, use of alcohol, drugs, and use of androgenic steroids are capable of exerting deep oppressive effect on the formation of sperm and androgens by the testes [11]. Estimation of reproductive hormones and oxidative indices interaction in serum of males occupationally exposed to chemicals is important in envisaging those who may develop serious disease together with infertility [12]. According to current research, oxidative stress is caused by an imbalance between the levels of the antioxidants peroxidative and antioxidative in plasma. As a consequence, the metabolic and functional problems of the male reproductive cells are reduced in many types of infertility [13,14]. This study's goal is to ascertain the impact of various occupational toxicants on the ovarian health of gasoline station attendants (PPA) and car technicians (AMM). Gonadal steroids and the hormones that control them were examined for this reason and their relationship to gonadal function was established.

METHODS

Male attendants and mechanics' blood samples were gathered from several Lahore gas stations and vehicle repair businesses, respectively. Healthy controls were sampled from the University of the Punjab's Quaid-e-Azam Campus with age and sex matching. A comprehensive Proforma was prepared to know the entire medical history of participants and their demographic features. After giving detailed explanation to every participant about the aim and purpose of research work, written consent was taken by them. Questionnaire was filled by each participant individually before taking the blood sample from them. Demographic data included systolic and diastolic blood pressure, history of smoking, age, gender, weight, height, any kind of drug addiction, medication, HBV, HCV, HIV screening and any past ailment history. Inclusion criteria setup for the petrol pump workers and automobile mechanics was at least, more than six months (6-8 hours daily) of exposure in the hazardous occupational environments having dust and exhaust fumes, petroleum vapors and aromatic hydrocarbons. Total forty-eight male exposed subjects (Age; 17-60 years) were recruited in this research work. Nineteen were petrol pump attendants, twenty-nine were automobile mechanics or workers and twenty-four were healthy control individuals, selected from general population. Blood samples of both workers and control samples were analyzed for their LH FSH, estradiol and testosterone level by using ELISA kits. Subjects whose sampling was done were categorized in two groups as follow:

Control group Healthy Males
Group I Petrol Pumps attendants (PPA)
Group II Auto-Mobile Mechanics (AMM

RESULTS

Comprehensive presentation of studied parameters in all studies groups are depicted in Table I.

Parameters	Controls (n=24)	Petrol Pump Attendants (n=19)	AMM (n=29)	P-value
Estradiol (pg/mL)	32.63 ± 2.37	27.76 ± 2.77	31.15 ± 1.98	0.3
FSH(mIU/mL)	5.26 ± 0.64	5.19 ± 0.65	4.80 ± 0.75	0.8
LH(mIU/mL)	4.59 ± 0.58	3.38 ± 0.41	3.38 ± 0.41	0.1
Testosterone (ng/mL)	4.91 ± 0.44	4.43 ± 0.52	4.43 ± 0.43	0.7

Table 1: Levels of Gonadal and its regulatory hormones in comparable groups. Values are mean ± SEM.

Parameters	Control vs Petrol Pump Attendants	Control vs Automobile Workers	Petrol Pump Attendants vs Automobile Workers
Estradiol (pg/mL)	14.92↓	4.53 ↓	12.21↑
FSH(mIU/mL)	1.33 ↓	8.74 ↓	7.51 ↓
LH(mIU/mL)	26.36↓	26.36↓	-
Testosterone (ng/mL)	9.77 ↓	9.77 ↓	-

Table 2: Presenting percentage difference of comparable groups

Non-significant decrease of 14.92 % was evidenced in petrol pump attendants when compared to control. In control vs automobile worker's comparison mild decrease of 4.53 % was evidenced in automobile workers. Additionally, mild elevation of 12.21 % of Estradiol was present in automobile mechanics when compared with petrol pump attendants as shown in figure 1 and table 2.

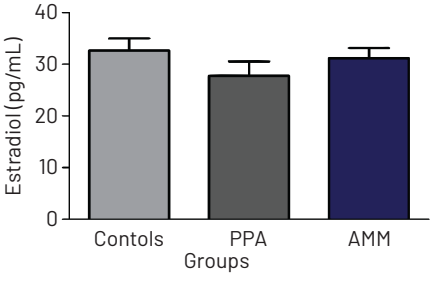

Figure1: Comparison of Estradiol (pg/mL) in studied groups.

DOI: https://doi.org/10.54393/pjhs.v3i05.194

Values are mean ± SEM

Non-significant decrease of 1.33% was evidenced in FSH levels in PPA when compared to controls. Controls vs AMM comparison demonstrated non-significant decrease of 8.74% in FSH levels as compared to controls. Moreover, mild decrease of 7.51% was observed in automobile mechanics when compared to PPA as shown in Figure 2, and Table 2.

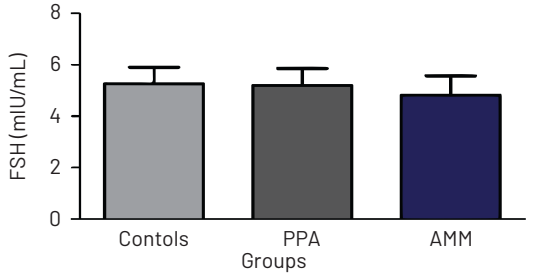

Figure 2: Comparison of Serum Follicle Stimulating Hormone (mIU/mL) in comparable groups. Values are mean ± SEM.

Levels of LH demonstrated non-significant decline of 26.36% in petrol pump attendants when compared to controls. A non-significant decrease of 26.36% was evidenced in automobile mechanics as compared to controls. Additionally, no difference was found in automobile mechanics when compared with petrol pump attendants as shown in Figure 3 and Table 2.

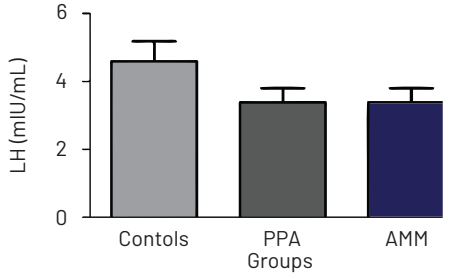

Figure 3: Comparison of Luteinizing Hormone (mIU/mL) in studied groups. Values are mean ± SEM.

There was a non-significant decrease of 9.77% in testosterone levels in both petrol pump attendants and automobile workers as compared to controls. Moreover, no difference was evidenced in automobile mechanics when compared to petrol pump attendants as shown in Figure. 4 and Table 2.

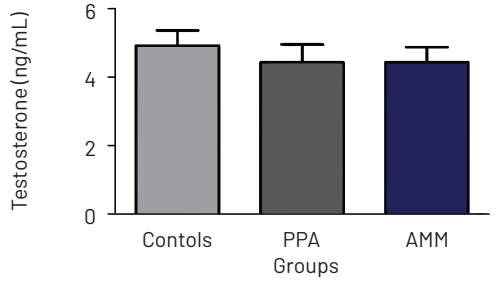

Figure 4: Comparison of Serum Testosterone (ng/mL) in studied groups. Values are mean ± SEM.

DISCUSSION

The present study was designed to determine the effect of different occupational toxicants on the gonadal health of petrol pumps attendants and automobile mechanics. Estrogens produced in testis interacts with estrogen receptors (ER), perpetuating the initiation of transcription of specific genes. Estrogen receptors (ERα and ERβ) are present in most of the cells of testis and in some other parts of the genital tract. Hence, the role of estrogens in physiology of male reproduction is of great concern [15-19]. A non-significant decrease in Estradiol concentration is observed among the members of exposed groups (Both petrol pump attendants and automobile workers). Follicle-stimulating hormone (FSH) plays an important role in reproduction of mammals. It stimulates testicular and ovarian functions through a G-protein-coupled receptor on the surface of target cells. In females, FSH induces the maturation of ovarian follicles by targeting a FSH receptor (FSHR) expressed only on granulosa cells. In males, FSH supports spermatogenesis and also stimulates sertoli cell proliferation in testes. FSH clinically used in treatment of infertile men and ovulatory women [20,21]. In our study, mild decrease in FSH concentrations was observed among the individuals of exposed groups (Both petrol pump attendants and automobile workers). Decreased level of FSH may results in number of ailments like azoospermia, oligospermia and infertility. Azoospermia is defined as a "disease in which there is absence of sperm in minimum two different samples ejaculated by same subject (including the centrifuged sediment) [22]. In the general population, 10 to 15% of couples suffer from infertility issues [23]. Of these infertile males, 10 to 20% (or 1% of all men in the general population) suffer from azoospermia (24). Detailed history, hormone profile, physical examination, genetic predisposition imaging play important role to conclude the classification of the azoospermia clinically [22,25]. Luteinizing hormone (LH) is produced in all classes of vertebrates (fishes to mammals). Basophilic cells known as gonadotrophs in the anterior pituitary gland produced and stored LH. In males, LH targets the interstitial cells (Leydig cells) present in testis, which results in production of androgens. Additionally, secondary function of the LH is to promote spermatogenesis through androgens [26]. A non-significant decrease in LH concentrations is observed among the members of exposed groups (Both petrol pump attendants and automobile workers). Decrease in LH results in the lower secretion of sex steroids, failure of ovulation and luteinization and atrophy of interstitial cells, whereas, excessive secretion of LH results in hyperplasia of testicular cells (interstitial) which is followed by atrophy, increased secretion of estrogen or androgen, super-ovulation, and accelerated sexual maturation. Low blood LH

DOI: https://doi.org/10.54393/pjhs.v3i05.194

level causes different human diseases like craniopharyngioma and adrenogenital syndrome [27]. The testis secret male sex hormones (dihydrotestosterone, androstenedione and testosterone) which are collectively referred as androgens, which include. Testosterone is abundant as compare to all other hormones, which made it more significant. Testosterone changes into more active hormone dihydrotestoterone in the target tissues. Testosterone is produced by interstitial cells of Leydig, present in the interstices of seminiferous tubules which make up 20% of the mass of the adult testes. Leydig cells are almost absent in the childhood and testes almost produce no testosterone at that time, but it is abundant in newly born male infants for first few months of life and in adult's male at any time after puberty, in both these time testes secrete large amount of testosterone [28]. In this study, non-significant decrease in Testosterone concentrations is observed among the members of exposed groups (Both petrol pump attendants and automobile workers). Decrease in the testosterone level can cause some serious problem like infertility, oligospermia and erectile dysfunction (ED). Wide interest has been showed in de ciency of testosterone in men with ED. Some physiologists favor the determination of level of testosterone only under certain circumstances for example when there is bilateral testicular atrophy or a decrease in libido [29]. Recently it was shown that a permissive role is played by in erectile function. The functioning of nitric oxide synthase relays on sufficient levels of androgen, and deficiency of androgens might affect the functioning of gene i.e. phosphodiesterase type-5(PDE-5)[30]. Recently it was reported that some patients of hypogonadism and ED might respond to androgenic supplements but they do not respond to phosphodiesterase type-5 (PDE-5) inhibitors [31]. Therefore, clarification is required on some points but it seems clear that in erectile mechanism testosterone plays important role. Low level of testosterone can cause decreased bone mineral density and muscle mass, central obesity, increased fat mass, decreased energy and libido, insulin resistance, dysphoria and irritability [32]. The occurrence of clinical deficiency of androgen (low testosterone levels and symptoms) was reported recently to be nearly 6%to12% in elderly and middle-aged men [33]. Testes are one of the complex organ in mammals which are characterized by two major functions: production of spermatozoa and synthesis of steroid hormones. It is familiar fact that maintenance of spermatogenesis and normal testicular development are controlled by gonadotrophins and testosterone whose effects are transformed by factors which are locally-produced, and among them estrogens are noticeably concerned [34]. The reproductive tract of the male has high levels of estrogens as compare to general blood compartment [35], therefore it favors the fact that testis is the source of estrogens [36]. Hypogonadotropic hypogonadism is described by low FSH serum levels in relationship with generally, low LH levels and low serum testosterone levels. According to study in University of Illinois, almost half of men who have suffered from non-obstructive azospermia (NOA) also suffer from hypogonadotropic hypogonadism. This result shows that hypogonadotropic hypogonadism may be significantly more common in the infertile males than was formerly believed. Genetic hypothalamic diseases, for instance Kallmann syndrome, and acquired pituitary deficiencies or congenital, such as pituitary tumors (functional or nonfunctional) or empty sella syndrome, can result hypogonadotropic hypogonadism. In men who suffered from azoospermia with decreased libido, gynecomastia, anosmia, visual field deficits or headaches, should be suspected for hypogonadotropic hypogonadism [37].

CONCLUSIONS

It is concluded that petrol pump attendants and automobile workers are being affected by occupational toxicity, although a non-significant decrease is observed in this study but chronic exposure to such harmful toxicants may lead towards a prominent decrease in gondal and their regulatory hormones concentration, which may cause infertility in them. Chronic exposure to occupational toxicants may also cause some other medical problems like dysfunction of kidney, liver and other major systems of the body like nervous, reproductive and endocrine. Therefore, it is recommended that they should take some precautionary measures to save themselves from such harmful toxicants. The use of facial masks, while, working in such sites and proper cleaning of the occupational sites can also prove helpful in this regard.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Ji G, Gu A, Zhou Y, Shi X, Xia Y, Long Y, et al. Interactions between exposure to environmental polycyclic aromatic hydrocarbons and DNA repair gene polymorphisms on bulky DNA adducts in human sperm. PLoS One. 2010 Oct; 5(10): e13145. doi: 10.1371/journal.pone.0013145.

[2] Pachathundikandi SK and Varghese ET. Blood zinc protoporphyrin, serum total protein, and total cholesterol levels in automobile workshop workers in

DOI: https://doi.org/10.54393/pjhs.v3i05.194

relation to lead toxicity: Our experience. Indian Journal of Clinical Biochemistry. 2006 Sep; 21(2):114-7. doi: 10.1007/BF02912924.

[3] Xia Y, Han Y, Zhu P, Wang S, Gu A, Wang L, et al. Relation between urinary metabolites of polycyclic aromatic hydrocarbons and human semen quality. Environmental Science & Technology. 2009 Jun; 43(12):4567-73. doi: 10.1021/es9000642.

[4] Anetor JI, Anetor GO, Iyanda AA, Adeniyi F. Environmental chemicals and human neurotoxicity: magnitude, prognosis and markers. African Journal of Biomedical Research. 2008;11(1).

[5] Wingfield JC, Lynn S, Soma KK. Avoiding the 'costs' of testosterone: ecological bases of hormone-behavior interactions. Brain, Behavior and Evolution. 2001 May; 57(5):239-51. doi: 10.1159/000047243.

[6] Anawalt BD, Bebb RA, Matsumoto AM, Groome NP, Illingworth PJ, McNeilly AS, et al. Serum inhibin B levels reflect Sertoli cell function in normal men and men with testicular dysfunction. Journal of clinical endocrinology and metabolism. 1996 Sep; 81(9):3341-5. doi: 10.1210/jcem.81.9.8784094.

[7] Keating NL, O'Malley AJ, Freedland SJ, Smith MR. Diabetes and cardiovascular disease during androgen deprivation therapy: observational study of veterans with prostate cancer. Journal of the National Cancer Institute. 2010 Jan; 102(1):39-46. doi: 10.1093/jnci/djp404.

[8] Dyer SJ. International estimates on infertility prevalence and treatment seeking: potential need and demand for medical care. Human Reproduction. 2009 Sep; 24(9):2379-80; author reply 2380-3. doi: 10.1093/humrep/dep219.

[9] Anetor JI and Adeniyi FA. Antioxidant status in occupational lead Toxicity in Nigeria. Biokemistri. 2001; 11:1-7.

[10] Emokpae MA, Uadia PO, Mohammed AZ, Omale-Itodo A. Hormonal abnormalities in azoospermic men in Kano, Northern Nigeria. Indian Journal of Medical Research. 2006 Sep; 124(3):299-304.

[11] Järup L. Hazards of heavy metal contamination. British medical bulletin. 2003; 68:167-82. doi: 10.1093/bmb/ldg032.

[12] Okoli SU, Charles-Davies MA, Onifade AA, Adekola S. Hypogonadism in males exposed to mixed chemicals in a mechanic village in Bodija, Ibadan. Journal of Scientific Research and Reports. 2015; 8(7):1-9.

[13] Araujo AS, Ribeiro MF, Enzveiler A, Schenkel P, Fernandes TR, Partata WA, et al. Myocardial antioxidant enzyme activities and concentration and glutathione metabolism in experimental hyperthyroidism. Molecular and Cellular Endocrinology. 2006 Apr; 249(1-2):133-9. doi: 10.1016/j.mce.2006.02.005.

[14] Martinez CS, Escobar AG, Torres JG, Brum DS, Santos FW, Alonso MJ, et al. Chronic exposure to low doses of mercury impairs sperm quality and induces oxidative stress in rats. Journal of Toxicology and Environmental Health - Part A. 2014; 77(1-3):143-54. doi: 10.1080/15287394.2014.867202.

[15] O'Donnell L, Robertson KM, Jones ME, Simpson ER. Estrogen and spermatogenesis. Endocrine reviews. 2001 Jun; 22(3):289-318. doi: 10.1210/edrv.22.3.0431.

[16] Mowa CN and Iwanaga T. Expression of estrogen receptor-alpha and -beta mRNAs in the male reproductive system of the rat as revealed by in situ hybridization. Journal of molecular endocrinology. 2001 Jun; 26(3):165-74. doi: 10.1677/jme.0.0260165.

[17] Saunders PT, Sharpe RM, Williams K, Macpherson S, Urquart H, Irvine DS, et al. Differential expression of oestrogen receptor alpha and beta proteins in the testes and male reproductive system of human and non-human primates. Molecular human reproduction. 2001 Mar;7(3):227-36. doi: 10.1093/molehr/7.3.227.

[18] Carreau S, Bourguiba S, Lambard S, Galeraud-Denis I, Genissel C, Levallet J. Reproductive system: aromatase and estrogens. Molecular and Cellular Endocrinology. 2002 Jul; 193(1-2):137-43. doi: 10.1016/s0303-7207(02)00107-7.

[19] Scobie GA, Macpherson S, Millar MR, Groome NP, Romana PG, Saunders PT. Human oestrogen receptors: differential expression of ER alpha and beta and the identification of ER beta variants. Steroids. 2002 Nov; 67(12):985-92. doi: 10.1016/s0039-128x(02)00047-8.

[20] Themmen APN and Huhtaniemi IT. Mutations of gonadotropins and gonadotropin receptors: elucidating the physiology and pathophysiology of pituitary-gonadal function. Endocrine reviews. 2000 Oct; 21(5):551-83. doi: 10.1210/edrv.21.5.0409.

[21] Dias JA, Cohen BD, Lindau-Shepard B, Nechamen CA, Peterson AJ, Schmidt A. Molecular, structural, and cellular biology of follitropin and follitropin receptor. Vitamins and Hormones. 2002; 64:249-322. doi: 10.1016/s0083-6729(02)64008-7.

[22] Menkveld R. Clinical significance of the low normal sperm morphology value as proposed in the fifth edition of the WHO Laboratory Manual for the Examination and Processing of Human Semen. Asian journal of andrology. 2010 Jan;12(1):47.

[23] Stephen EH and Chandra A. Declining estimates of infertility in the United States: 1982-2002. Fertility and Sterility. 2006 Sep;86(3):516-23. doi:

DOI: https://doi.org/10.54393/pjhs.v3i05.194

10.1016/j.fertnstert.2006.02.129.
[24] Jarow JP, Espeland MA, Lipshultz LI. Evaluation of the azoospermic patient. Urology journal. 1989 Jul;142(1):62-5. doi: 10.1016/s0022-5347(17)38662-7.
[25] Gudeloglu A and Parekattil SJ. Update in the evaluation of the azoospermic male. Clinics (Sao Paulo). 2013;(68):27-34. doi: 10.6061/clinics/2013(sup01)04.
[26] Nedresky D and Singh G. Physiology, luteinizing hormone. In Stat Pearls [Internet] 2021 Sep. Stat Pearls Publishing.
[27] Katsumi W. Brief Review of Luteinizing Hormone (LH, Lutropin) and Shibayagi's Rat LH ELISA KIT. Gunma University Technical Consultant, Shibayagi Co., Ltd. 2006:1-0.
[28] Bouwer J. The association between physical activity, blood pressure and renin in black African teachers: The SABPA Study (Doctoral dissertation, North-West University).
[29] Johnson AR 3rd and Jarow JP. Is routine endocrine testing of impotent men necessary? Urology journal. 1992 Jun; 147(6):1542-3; discussion 1543-4. doi: 10.1016/s0022-5347(17)37620-6.
[30] Aversa A, Isidori AM, Greco EA, Giannetta E, Gianfrilli D, Spera E, et al. Hormonal supplementation and erectile dysfunction. European Urology. 2004 May; 45(5):535-8. doi: 10.1016/j.eururo.2004.01.005.
[31] Shabsigh R, Kaufman JM, Steidle C, Padma-Nathan H. Randomized study of testosterone gel as adjunctive therapy to sildenafil in hypogonadal men with erectile dysfunction who do not respond to sildenafil alone. Urology journal. 2008 May;179(5):97-102. doi: 10.1016/j.juro.2008.03.145.
[32] Matsumoto AM. Andropause: clinical implications of the decline in serum testosterone levels with aging in men. Journals of Gerontology - Series A Biological Sciences and Medical Sciences. 2002 Feb; 57(2):M76-99. doi: 10.1093/gerona/57.2.m76.
[33] Araujo AB, O'Donnell AB, Brambilla DJ, Simpson WB, Longcope C, Matsumoto AM, et al. Prevalence and incidence of androgen deficiency in middle-aged and older men: estimates from the Massachusetts Male Aging Study. Journal of clinical endocrinology and metabolism. 2004 Dec; 89(12):5920-6. doi: 10.1210/jc.2003-031719.
[34] Carreau S, Genissel C, Bilinska B, Levallet J. Sources of oestrogen in the testis and reproductive tract of the male. Journal of andrology. 1999 Aug; 22(4):211-23. doi: 10.1046/j.1365-2605.1999.00172.x.
[35] Hess RA. Oestrogen in fluid transport in efferent ducts of the male reproductive tract. Reviews of reproduction. 2000 May; 5(2):84-92. doi: 10.1530/ror.0.0050084.
[36] Carreau S. Germ cells: a new source of estrogens in the male gonad. Molecular and Cellular Endocrinology. 2001 Jun;178(1-2):65-72. doi: 10.1016/s0303-7207(01)00411-7.
[37] Fraietta R, Zylberstejn DS, Esteves SC. Hypogonadotropic hypogonadism revisited. Clinics (Sao Paulo). 2013;(68):81-8. doi: 10.6061/clinics/2013(sup01)09.

DOI: https://doi.org/10.54393/pjhs.v3i05.226

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Paediatric Circumcision with Bipolar Diathermy: Our Experience of 200 Cases, Assessment of Health Benefits and Risks Corresponding Author

Naveed Haider[1*], Ferheen Shahbaz[1], Komal Varda[2], Javeria Saleem[1], ubaid Ur Rehman khizir[1], Muhammad Yasir Sultan[1]

[1]Department of Public Health, University of the Punjab, Lahore, Pakistan
[2]Akram Medical Complex Lahore, Pakistan

ARTICLE INFO

Key Words:
Ritual circumcision, bipolar diathermy, children, Circumcision operations

How to Cite:
Haider, N. H., Shahbaz, F. ., Varda, K., Saleem, J. ., khizir, U. U. R. ., & Yasir Sultan, M. . (2022). Paediatric Circumcision with Bipolar Diathermy: Our Experience of 200 Cases, Assessment of Health Benefits and Risks : Paediatric Circumcision with Bipolar Diathermy. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.226

***Corresponding Author:**
Naveed Haider
Department of Public Health, University of the Punjab, Lahore, Pakistan
relucentstar1@gmail.com

Received Date: 9th October, 2022
Acceptance Date: 17th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Ritual circumcision is the most commonly used procedure for males. Circumcision operations are routine procedures, which are done using various techniques. **Objective:** To elaborate on the advanced techniques for bipolar diathermy by describing this surgical procedure in terms of incidence of postoperative complications, bleeding, and occurrence of infections or complications. All these findings were recorded in quantitative terms and a comparative analysis was made. **Methods:** A descriptive observational study was conducted on children of age 1 week to 8 years. The method was to observe readings for children undergoing circumcision procedures of bipolar diathermy. The p-value was calculated for postoperative complications. **Results:** We selected the target population of 200 children. There was a very reduced incidence of bleeding was recorded in children undergoing circumcision by bipolar diathermy. There were no infection rates recorded and very less post-operative complications. **Conclusions:** Bipolar diathermy method is more efficient with a decrease incidence of morbidities.

INTRODUCTION

Circumcision is the most common technique, which is done to males at an early age and is a common or routine process in hospitals [1]. the penile glans is a double-layer structure, the foreskin protects the underlying structure from environmental irritation rubbing against the clothes and diapers. The double-layer structure consists of membranous skin inside and protects dry skin on the outside [2]. This elastic covering is considered as the most sensitive part of the penis. The current topic of circumcision is under consideration, despite of the evidence it causes intense pain, discomfort to the newborn in some cases change in behaviors like breast feeding behaviours. We overlooked the associated pain because it's a very mild pain [3]. circumcision is a ritual performed but it significantly decreases the incidence of urinary tract infections, invasive penile cancer, papilloma virus, and sexually transmitted diseases. The neonatal undergoing circumcision have a very reduced incidence of HPV and HIV. A ritual circumcision should be assessed according to rituals and believes of the society. We should do a comparison of risk and benefits assessing rituals and believes in social, religious and societal believes [4]. Many studies of public health stretogies work on issued guidelines of medical ethics. The assess the risk and benefits and also emphasize on benefits associated with the surgical interventions [5]. If we focus on the morbidities associated, it's a great intervention regarding the prevention of HIV and early childhood urinary tract

DOI: https://doi.org/10.54393/pjhs.v3i05.226

infections. In later age very reduced incidence of sexually transmitted diseases is documented [6]. Neonatal circumcision is sometimes followed by studies and investigations on other congenital abnormalities like epispadias, megalourethra, hypospadias, webbed pennis, mylomennigocele, and anorectal anamalies [7]. There are many surgical risks associated with the circumcisions but we cannot ignore the benefits. substantial evidences support this surgical intervention and the development of this new technique. Reducing the morbities and viral infections promotes circumcisions ignoring the ritual and religious boundaries [8]. The choice of technique should be based on results of reduced post-operative complications, decreased bleeding time and fast recovery. There should be a comparison of post-operative complications in different techniques of dorsal slit, laser and blade techniques [9]. We advocate a technique, first described in 1999 in the urological press, that is simple to perform and has, in our hands, reduced this complication to zero. In our setup most surgeons still do circumcision with conventional bone cutter method which has a high incidence of glanular injury and post-operative bleeding. at some centres circumcision is done by open method and very few surgeons use gomco clamp for circumcision [10]. With the evolution of surgical techniques and new methods development for circumcision, there should be a comparison in old and new techniques associated with lesser risk of complications. Patients safety should be our first concern. Many studies focus on the comparison on using ligatures with bipolar diathermy [11]. one third of the total world population of man is circumcised, mostly accounts in USA, Canada, Africa, and middle east or ASIA [12]. Researches mainly emphasize on the surgical techniques and important health benefits associated with male circumcision. Sexual health is one of main concern [13]. The WHO Manual of Male Circumcision under local anaesthetic was written with these objectives in mind. Paediatric methods included are the plastibell technique, the Mogen and Gomco shield method, a standard surgical dorsal slit procedure and evolving new techniques like bipolar diathermy [14]. The bipolar diathermy is associated with many decreased morbidities. Less operative time and fast recovery. About 25-33% of the total world male population is circumcised. Despite of ritual techniques, every year above one million above man are circumcised on averge in US [15]. The rate of circumcision in USA is 70% while in Britain it is 6% [16]. In Nigeria, circumcision rate is estimated to be 87% [17]. Religiously the people support circumcision include, the Jews; religious and cultural circumcision is also practiced by Muslims, Black Africans, Australian aborigines, and others [18].

METHODS

The excision or inner and outer preputial skin, by taking care of asepsis, protection of glans and urethra, and cosmesis. The aim is to expose the glans structure enough to prevent phimosis and paraphimosis. The rituals ways of circumcision are subcategorizing in Dorsal slit, Clamps and shields. Two methods were used. Excision and Laser therapy. The procedure was done under local anesthesia. The local anesthesia can be done by various methods. Penile ring blocking, Local anesthesia spray, Penile dorsal nerve blocking. Foreskin is first retracted completely and all adhesions are released, smegma is cleaned than foreskin is pulled back two artery clamps are applied on the edges of foreskin on dorsal and ventral side, assistant hold the clamp upward and foreskin is marked at the level of corona. A dissecting forcep is applied holding the foreskin above glance penis foreskin is pulled upward till markings. the whole of the skin is cut using bipolar diathermy above the dissecting forceps two stitches are applied one at dorsum and one at frenulum. sterile dressing is done. Circumcision operations using bipolar diathermy were performed by consultant surgeons on 200 patients of age group (1 week to 8 years). All the attendants or guardians of patients were counselled by the operating surgeon. all operations were one under general anaesthesia as day-case procedures and results were observed. data was analysed by post-oprational complications variable, and p-value of each variable is calculated.

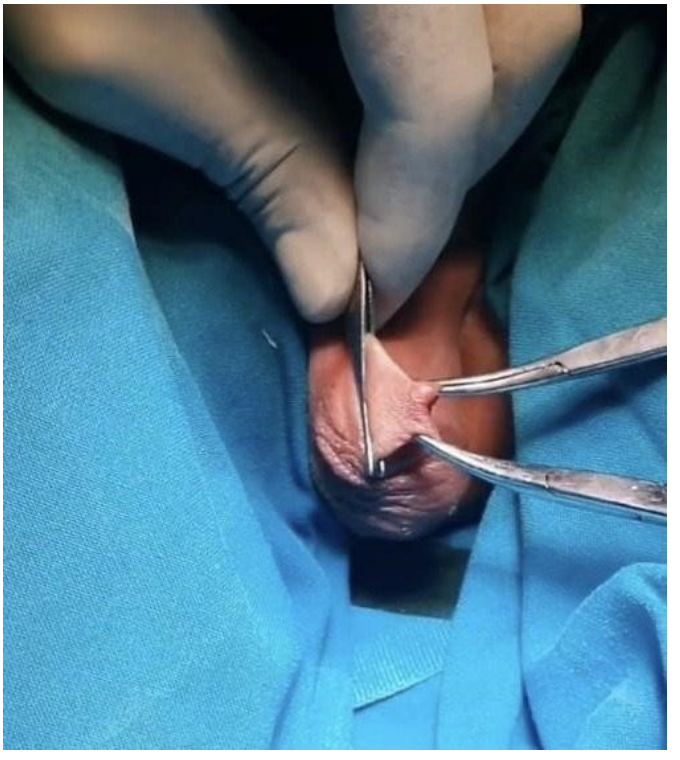

Figure 1: Foreskin is pulled and artery clamps are applied

DOI: https://doi.org/10.54393/pjhs.v3i05.226

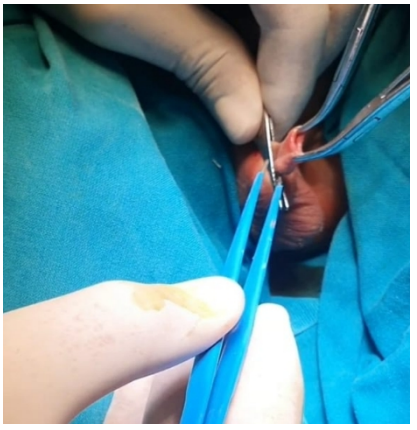

Figure 2: A dissecting forcep holding foreskin and the foreskin is cut using bipolar diathermy

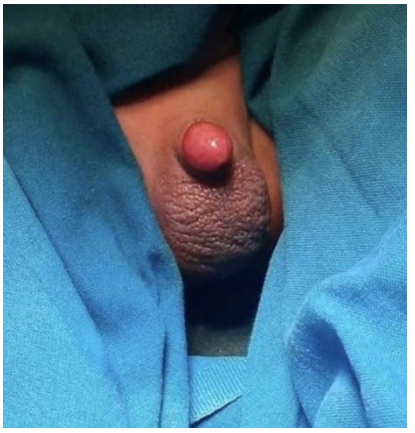

Figure 3: Final results, no incidence of trauma or bleeding

RESULTS

The blood loss has an average value of 0.2ml with a range of 0-0.8ml. the post-operative time definitely very low. Very less complications and morbidities were recorded. The results were significant. Table 1, describes the average of cases with reference to age. We observed cases of neonatal circumcision with a mean of 80% and one year of children with a mean of 20%.

Cases	Mean
No of cases (neonatal circumcision)	80%
No of cases (above 1 year of children)	20%

Table 1: Mean Calculations

Factors	Average values
Average blood loss	0.2ml (0-0.8)
Average operative time	10 to 15 minutes
Average of surgical bleeding complications	Less than 5%
Incident post-operative morbidity	Less than 5%

Table 2: Parameters to evaluate the effectiveness of new method, bipolar diathermy

Outcome	No of patients	Percentage	P value
Cured without complications	192	96%	<0.001
Failure and having complications	8	4%	

Table 3: outcome of study

Table 3 evaluated the parameters of bipolar diathermy. The average operative time for these 200 cases was 10 to 15 minutes. Less than 5% of bleeding complications and post-operative morbidities were recorded. This table also shows that 96 % of cases underwent circumcision with bipolar diathermy, cured without complications. Only 4% cases were reported with mild complications. A very significant p-value <0.001 calculated.

DISCUSSION

Bipolar diathermy has very satisfactory cosmetic results [18] and the use of this technique in circumcision reduced the risk of injuries to glans. Modalities of cutting by bipolar diathermy bestow safety and efficiencies of time in operation theatre. Diathermy scissors are not only safe but simple in describing the pitfalls of penis shaft denuding and inadequate hemostasis [19]. There are some studies on older techniques which elaborate well the complications of bleeding. inappropriate cutting off edges and reprocessing the operations. Introduction to diathermy method and reduction in complications were studied by Marsh SK, Archer similar studies were performed which support diathermy as a best procedure [20]. Many studies in continental China, where there is a very high incidence of HIV, that the HIV is considered as an epidemic. The promotion of neonatal circumcision is considered a control against HIV ans sexually transmitted diseases [21]. Dr Kevin Pringle et al, the complications of typical urinary tract infections and circumcisions are mainly associated with the uncircumcised males. The most worrisome aspect is a significant report of HIV positive males. The increasing incidence is deliberately creating a challenge to the society [22]. if we consider other infections like phimosis and balanitis, 80% of the patients respond to the steroidal creams. But definitely circumcision saves them from getting phimosis. The main concern is to compare the risks and benefits associated [23]. The advanced technique of bipolar diathermy bestows less occurrence of bleeding and post-operative complications. 25-33% of the total world male population is circumcised [24]. Researchers emphasize on a very serious point of surgical intervention that the complications are not treated or recorded to the same hospitals where the first procedure was done, due to this behaviour we cannot assess the associated risks. Definitely, it's a public health domain. But to assess the morbidities with a surgical technique there must be a strict follow-up of months [25-26]. DeMaria, Abdulla, Pemberton, et al. studied the unsatisfactory results in pediatric and

DOI: https://doi.org/10.54393/pjhs.v3i05.226

urology practice. Many practitioners are not aware of the ritual technique and the contraindications associated with the old and new techniques. In many areas still quacks perform the circumcisions and many non-surgeon persons. The main risk is they cannot handle the post-operative complications [27]. Most major organizations have cautiously neutral opinions on circumcision, stating that medical benefits are not large enough to justify routine neonatal circumcision [28].

CONCLUSIONS

Use of bipolar diathermy is a new, effective and safe technique for circumcision. With a significantly decreased incident of morbidity.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Kaplan GW. Complications of circumcision. Urologic Clinics of North America. 1983 Aug; 10(3):543-9.

[2] Gee WF and Ansell JS. Neonatal circumcision: a ten-year overview: with comparison of the Gomco clamp and the Plastibell device. Pediatrics. 1976 Dec; 58(6):824-7.

[3] Fearne C. Point of Technique. Bloodless circumcision. British Journal of Urology.1999 Apr; 83(6):717. doi: 10.1046/j.1464-410x.1999.00059. x.

[4] Miernik A, Hager S, Frankenschmidt A. Complete removal of the foreskin—why? Urologia internationalis. 2011;86(4):383-7. doi: 10.1159/000324835.

[5] Peters KM and Kass EJ. Electrosurgery for routine pediatric penile procedures. The Journal of urology. 1997 Apr;157(4):1453-5.

[6] Rickwood AM and Walker J. Is phimosis over-diagnosed in boys and are too many circumcisions performed in consequence? Annals of the Royal College of Surgeons of England. 1989 Sep; 71(5):275-7.

[7] Fraser ID and Tjoe J. Circumcision using bipolar diathermy scissors: a simple, safe and acceptable new technique. Annals of the Royal College of Surgeons of England. 2000 May; 82(3):190-1.

[8] Tang Y, Li YQ, Zhou CD, Li Q, Yang Z, Liu XH, et al. 2008 Jul; 24(4):294-6.

[9] O'Sullivan DC, Heal MR, Powell CS. Circumcision: how do urologists do it? British journal of urology. 1996 Aug; 78(2):265-70. doi: 10.1046/j.1464-410x.1996.10822. x.

[10] Van Haute C, Tailly T, Klockaerts K, Ringoir Y. Sutureless circumcision using 2-Octyl cyanoacrylate results in more rapid and less painful procedures with excellent cosmetic satisfaction. Journal of pediatric urology. 2015 Jun;11(3): 147.e1-5. doi: 10.1016/j.jpurol.2015.02.013.

[11] Kapila L and Williams N. Circumcision: current thoughts and practice. Current Practice in Surgery. 1993; 5:91-.

[12] Fariz MM, Tarmizi MN, Ainaini MH, Khairil AM, Faizal A, Sagap I. A prospective randomised comparison of bipolar diathermy versus conventional dorsal slit technique for ritual circumcision: A Malaysian experience. La Clinica terapeutica. 2011 Jan; 162(6):543-5.

[13] Méndez-Gallart R, Estévez E, Bautista A, Rodríguez P, Taboada P, Armas AL, et al. Bipolar scissors circumcision is a safe, fast, and bloodless procedure in children. Journal of pediatric surgery. 2009 Oct; 44(10):2048-53. doi: 10.1016/j.jpedsurg.2009.06.008.

[14] Hargreave T. Male circumcision: towards a World Health Organisation normative practice in resource limited settings. Asian Journal of Andrology. 2010 Sep;12(5):628-38. doi: 10.1038/aja.2010.59.

[15] Peter G. Summaries of infectious diseases: influenza. Report of the Committee on Infec-tious Diseases. 21st ed. Elk Grove Village, IL: American Academy of Pediatrics. 1988; 243-51.

[16] Wiswell TE and Geschke DW. Risks from circumcision during the first month of life compared with those for uncircumcised boys. Pediatrics. 1989 Jun; 83(6):1011-5.

[17] Kunz HV. Circumcision and meatotomy. Prim Care. 1986 Sep; 13(3):513-25.

[18] Herzog LW. Urinary tract infections and circumcision. A case-control study. American journal of paediatrics. 1989 Mar; 143(3):348-50. doi: 10.1001/archpedi.1989.02150150106026.

[19] Fergusson DM, Lawton JM, Shannon FT. Neonatal circumcision and penile problems: an 8-year longitudinal study. Pediatrics. 1988 Apr; 81(4):537-41

[20] Roberts JA. Does circumcision prevent urinary tract infection. The Journal of urology. 1986 May; 135(5):991-2. doi: 10.1016/s0022-5347(17)45950-7.

[21] Malleson P. Prepuce care. Pediatrics. 1986 Feb;77 (2):265.

[22] Beautrais AL, Fergusson DM, Shannon FT. Family life events and behavioral problems in preschool-aged children. Pediatrics. 1982 Nov; 70(5):774-9.

[23] Culter MA. Maximum utilization of the life-table method in analyzing survival. Journal of chronic diseases. 1958; 14:445-51.

DOI: https://doi.org/10.54393/pjhs.v3i05.226

[24] WHO U and Jhpiego. Manual for male circumcision under local anaesthesia, version. 2008; 2.
[25] Peng Y, Masson P, Li PS, Chang Y, Tian L, Lee R, et al. No-needle local anesthesia for adult male circumcision. The Journal of urology. 2010 Sep; 184(3):978-83. doi: 10.1016/j.juro.2010.04.080.
[26] Menif K, Khaldi A, Bouziri A, Hamdi A, Belhadj S, Ben Jaballah N. Lidocaine toxicity secondary to local anesthesia administered in the community for elective circumcision. Fetal and pediatric pathology. 2011; 30(6):359-62. doi: 10.3109/15513815.2011.555813.
[27] Sterenberg N, Golan J, Ben-Hur N. Necrosis of the glans penis following neonatal circumcision. Plastic and Reconstructive Surgery. 1981 Aug; 68(2):237-9. doi: 10.1097/00006534-198108000-00022.
[28] Ademuyiwa AO and Bode CO. Complications of neonatal circumcision: avoiding common pitfalls in a common procedure. African Journal of Paediatric Surgery. 2009 Dec; 6(2):134-6. doi: 10.4103/0189-6725.54786.

DOI: https://doi.org/10.54393/pjhs.v3i05.243

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Knowledge About Various Aspects of Diabetes Among Known Diabetic Patients attending Diabetic Clinic at Pakistan Institute of Medical Sciences Hospital, Islamabad

Muhammad Qasim[1], Muhammad Arshad Jamil[2], Yasir Hanif [3], Asif Maqsood Butt [4], Syed Mahmood ul Hassan[5], Sana Qasim[1]

[1]Department of Optometry and Vision Sciences, Ibadat International University Islamabad, Pakistan
[2]GIM and Respiratory Medicine, Sand well and West Birmingham NHS Trust, Birmingham, UK
[3]Allama Iqbal Hospital, Khariyan, Pakistan
[4]Department of Community Medicine, Rawalpindi Medical University (RMU), Rawalpindi, Pakistan
[5]Services Hospital, Lahore, Pakistan

ARTICLE INFO

Key Words:

Diabetes knowledge, diabetes awareness, diabetic complications, cause of diabetes, diabetes prevention

How to Cite:

Hameed, S. ., Qasim, M. ., Arshad Jamil, M., Hanif, Y. ., Maqsood Butt, A. . ., Mahmood ul Hassan, S. ., & Qasim, S. . (2022). Knowledge About Various Aspects of Diabetes Among Known Diabetic Patients Attending Diabetic Clinic at Pakistan Institute of Medical Sciences Hospital, Islamabad: Knowledge About Various Aspects of Diabetes Among Known Diabetic Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.243

***Corresponding Author:**

Asif Maqsood Butt
Department of Community Medicine, Rawalpindi Medical University (RMU), Rawalpindi, Pakistan
rcap2017dme@gmail.com

Received Date: 13th October, 2022
Acceptance Date: 21st October, 2022
Published Date: 31st October, 2022

ABSTRACT

Diabetes Mellitus (DM) knowledge of various aspects is critical for disease prevention, management, and control. Several studies, however, have consistently shown that the general population is unaware of diabetes. **Objective:** To assess Knowledge about various aspects of diabetes among known diabetic patients attending diabetic clinic at Pakistan Institute of Medical Sciences (PIMS) Hospital, Islamabad. **Methods:** During this descriptive cross-sectional study data were collected from 200 patients through a self-structured questionnaire. patient was questioned about their demographic information as well as their personal and diabetes-related history. Participants were asked to respond to each question in the questionnaire using their knowledge and understanding. Data were obtained in frequency and percentage to examine sociodemographic variables. **Results:** In the current study, more females, 108 (54 %) contributed in the study as opposed to males, 92 (46 %). Results showed that 170 (85%) of diabetic patients had type 2 diabetes, 24 (12.0 %) were suffering from type 1 diabetes, and 6 (3.0 %) had Gestational diabetes mellitus GDM. **Conclusions:** There was considerable knowledge about diabetes in known diabetic patients but still there is a dire need to increase knowledge and awareness regarding disease understandings, causes, complications, management, and its preventive measures.

INTRODUCTION

Diabetes mellitus is widely considered to be the most common and fatal chronic disease. It has afflicted humans for thousands of years and is still doing so at an exponential rate. It has now spread around the world, wreaking havoc on humanitarian, social, and economic systems [1]. Diabetes Mellitus (DM) is a chronic metabolic disease, and it can lead to increased morbidity and mortality globally [2]. Diabetes is characterized by high blood glucose levels and a disruption in fat and protein metabolism. Because blood glucose cannot be metabolized in the cells due to a lack of insulin production by the pancreas or the cells' inability to properly use the insulin that is produced, blood glucose rises. Diabetes are of three types: type 1 diabetes, type 2 diabetes, and gestational diabetes. Type 1, in which the pancreas does not produce insulin; type 2, in which the body cells become resistant to the action of insulin, and

DOI: https://doi.org/10.54393/pjhs.v3i05.243

insulin production gradually decreases over time; and Gestational diabetes is a type of diabetes that develops during pregnancy and can lead to complications during labor and delivery, as well as an increased risk of type 2 diabetes in the mother and obesity in the infants [3]. Every 24 hours, 3,600 new cases diagnosed with diabetes round the world. 580 people die because of diabetes complications [4]. According to projections, Diabetes is expected to increase from 451 million people in 2017 to 693 million by 2045 worldwide. In addition, it is estimated that 49.7% of people with type 2 diabetes go undiagnosed. Diabetes will increase by 69 % in the adult population in developing countries between 2010 and 2030, compared to 20% in developed countries [5]. According to the World Health Organization (WHO), 12.9 million people in Pakistan (10 % of the population) have diabetes, 9.4 million have been diagnosed, and 3.5 million are undiagnosed [6]. Type 1 diabetes is most common in children, adolescents, and young adults. The exact cause or causes are unknown. Type 1 diabetes is thought to be caused by a combination of genetic susceptibility and environmental factors. Type 2 diabetes risk factors are better understood. Although there is a significant genetic component, most cases occur in the presence of risk factors such as age, overweight and obesity, and physical inactivity. Although smoking has been shown to increase the risk of diabetes, increased body fat is by far the most significant risk factor. A high sugar and fat intake, for example, has also been linked to an increased risk of type 2 diabetes. Gestational diabetes risk factors include not only family history, age, overweight and obesity, physical inactivity, but also excessive weight gain during pregnancy [3]. Uncontrolled diabetes causes complications in a variety of organs. Small and large blood vessel and nerve damage causes loss of vision and kidney function, strokes as well as heart attacks, and lower limb amputations. Diabetes causes disability and reduces life expectancy [3,7]. Prevention and treatment of diabetes mellitus involve a healthy diet, Physical exercise, not using tobacco and being a normal body weight. Regular routine checkup / examination & keeping positive attitudes [8]. Although the importance of educational programs in the prevention and control of diabetes is widely acknowledged [9]. Diabetes risk factors, management, and care are poorly understood in Pakistan. Nationally targeted public education programs should be implemented to increase understanding of diabetes prevention and treatment [10]. There is still a lack of awareness among the public and diabetics about existing interventions for the prevention and control of diabetes and its complications. So, keeping in view the significance of awareness of diabetes among patients with diabetes. This study was carried out to assess diabetic patients' knowledge regarding diabetes mellitus.

METHODS

The current descriptive cross-sectional study was conducted to assess the knowledge about various aspects of diabetes among known diabetic patients attending diabetic clinic at Pakistan Institute of Medical Sciences Hospital, Islamabad. During this cross-sectional study data was collected from 200 patients. According to the inclusion criteria, these patients were selected through a convenient sampling method. As per the sampling technique, selected participants were asked for the informed consent. The patients were referred to the Diabetic Clinic Outpatient Department (OPD) by the Endocrinology OPD at PIMS Hospital in Islamabad. Patients were chosen who were known to be diabetics due to their established diagnosis. Informed written consent was obtained from those patients who verbally agreed to become our study subjects on a voluntary basis, followed by written consent with their signature and date. As a data collection tool, a detailed self-structured questionnaire was used. After receiving the informed consent, the adopted survey questionnaire was distributed to the patients. The patient was questioned about their demographic information as well as their personal and diabetes-related history. Participants were asked to respond to each question in the questionnaire using their knowledge and understanding. The data were analyzed using SPSS software after the questionnaires have been collected. Data were obtained in frequency and percentage to examine sociodemographic variables.

RESULTS

In the current study, more females, 108 (54 %) contributed in the study as opposed to males, 92 (46 %) as shown in table 1. Diabetic patients aged 30 and up, i.e. 192 (96 %), presented in the Diabetic Clinic OPD, while only 8 (4 percent) of the patients younger than 30 were present. Results showed that 170 (85%) of diabetic patients had type 2 diabetes, 24 (12.0 %) were suffering from type 1 diabetes, and 6 (3.0 %) had Gestational diabetes mellitus GDM. According to the findings, patients with a family history of diabetes were more likely to have a parent with diabetes 87 (43.5 %), followed by siblings 47 (23.5 %), husband / wife 32 (16.0 %), relatives 24 (12.0 %), and children's 10 (5.0 %)

Demographic characteristics of study participants	Variable	Frequencies (n)(%)
Gender	Male	92(46%)
	Female	108(54%)
Age of the Study Participants	10-30 years	8(4.0%)
	30-50 years	95(47.5%)
	51 years & above	97(48.5%)
Type of Diabetes	Type 1	24(12.0%)
	Type 2	170(85.0%)
	GDM	6(3.0%)

DOI: https://doi.org/10.54393/pjhs.v3i05.243

Family History of Diabetes	Parents	87(43.5%)
	Siblings	47(23.5%)
	Husband / Wife	32(16.0%)
	Children	10(5.0%)
	Relatives	24(12.0%)

Table 1: Demographic Characteristics of the study participants

According to figure 1, 71 out of 92 (77.17 %) of the males had more knowledge about diabetes than females i.e., 75 out of 108 (69.44 %).

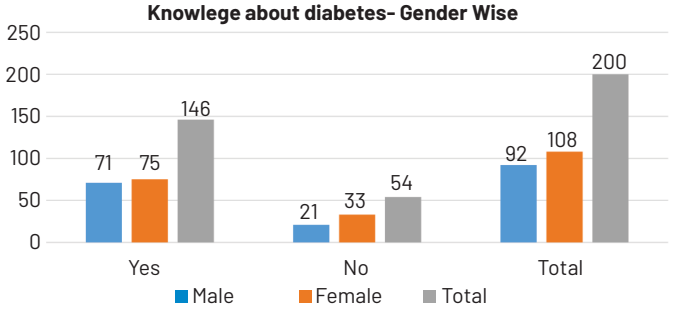

Figure 1: Knowledge about diabetes- Gender Wise

Figure 2 shows that both genders 74 (37.0%) reported increased thirst as the major sign and symptom of diabetes, followed by frequent urination (19.5%) in males and increased hunger (17.0%) in females. In diabetic patients, increased sweating was found to be the least frequent sign and symptom in 19 (9.5%) cases, trailing only slow healing in 34 (17.0%).

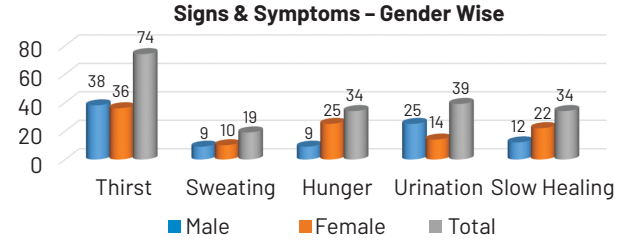

Figure 2: Sign and symptoms of diabetes- Gender Wise

Table 2 shows that both genders of our study participants identified high sugar intake 61 (30.5%) as the primary cause of their diabetes, followed by family history 36 (18.0%), a lack of insulin 29 (14.5%), and failure to use insulin 8 (4.0 %).

Gender	Cause of Diabetes Reported					Total
	Family History	High Sugar Intake	Lack of Insulin	Failure to use Insulin	Others	
Male	12	33	15	4	28	92
Female	24	28	14	4	38	108
Total	36	61	29	8	66	200

Table 2: Cause of Diabetes – Gender Wise

Figure 3 shows that the most successful diabetes management strategy was found to be Diet and Medication 99 (49.5%), which was followed by only Medication 40 (20.0%). Then Diet, Medication & Exercise 24 (12.0%), Diet and exercise 20 (10%).

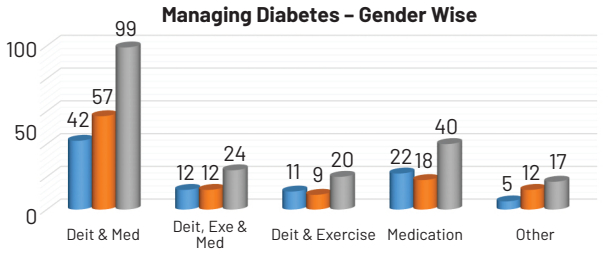

Figure 3: Managing diabetes- Gender Wise

According to table 3, the most common complication reported by the participants is kidney failure 67 (33.5 %), followed by loss of vision 61 (30.5 %), heart failure 38 (19.0 %), amputation 18 (9.0 %), and poor wound healing 16 (8.0). Loss of vision was reported by males, the leading diabetes complication, accounting for 35 out of 92 (38.04 %), while females reported kidney failure as the leading complication i.e., 35 out of 108 (32.40%).

Gender	Complications Reported					Total
	Vision Loss	Poor Healing	Amputation	Kidneys Failure	Heart Failure	
Male	35	6	8	32	11	92
Female	26	10	10	35	27	108
Total	61	16	18	67	38	200

Table 3: Complications of Diabetes – Gender Wise

According to table 4, eating less sugar was found to be the most efficient diabetes prevention measure by both genders, at 95 (47.5 %) followed by a healthy diet at 73 (36.5 %), physical exercise at 22 (11.0 %), and weight loss at 6 (3.0 %).

Gender	Preventive Measures					Total
	Healthy Diet	Eat Less Sugar	Physical Activity	Weight Loss	I don't know	
Male	37	41	10	2	2	92
Female	36	54	12	4	2	108
Total	73	95	22	6	4	200

Table 4: Preventing Diabetes – Gender Wise

DISCUSSION

The current study was a descriptive cross-sectional study to investigate the diabetes knowledge of known diabetic patients attending the diabetic clinic at PIMS Islamabad. The review of patients' diabetes knowledge in the hospital setting was an important aspect of this study. Pakistan is taking steps to raise awareness about the prevention and management of diabetes. In this study, we discovered that more females visited diabetic clinic OPD, so more females, 108 (54 %), became study participants as opposed to males, 92 (46 %). It was discovered that diabetic patients aged 30 and up, i.e. 192 (96 %), presented in the Diabetic Clinic OPD, while only 8 (4%) of the patients were younger than 30. We discovered 170 (85%) of these patients had type 2 diabetes, 24 (12.0 %) had type 1 diabetes, and 6 had GDM (3.0 %). According to prior global study estimates as well as Pakistani studies, type-2 diabetes was the most common form of diabetes in both males and females [11,12]. It was

DOI: https://doi.org/10.54393/pjhs.v3i05.243

discovered that patients with a family history of diabetes were more likely to have a parent with diabetes 87 (43.5 %), followed by siblings 47 (23.5 %), husband / wife 32 (16.0 %), relatives 24 (12.0 %), and children's 10 (5.0 %). According to a US study, family history is a major and important risk factor that should be included in public health approaches to diabetes prevention in the future [13]. A study conducted in Peshawar found that known diabetic patients had significant / satisfactory knowledge about their parents' diabetes history [14]. The good finding is that 146 (73.0 %) of the study participants understood what diabetes was. Only 54 people (27.0 %) had no idea about diabetes. Several studies in Pakistan, however, show that diabetic patients frequently lack diabetes knowledge [15]. A comparative study of the Indian and African populations revealed that Indians knew more about diabetes, its risks, and potential complications [16]. We also discovered that males, 71 out of 92 (77.17 %), knew more about diabetes than females, 75 out of 108 (69.44 %). A similar statement was made by a study conducted on British Pakistani Muslims, which discovered that women have comparatively less knowledge about diabetes [17]. We discovered that increased thirst 74 (37.0%) was reported as the main sign and symptom of diabetes by both genders, followed by excessive urination (19.5%) in males and increased hunger (17.0 %) in females. Increased Sweating was discovered to be the least common sign and symptom in diabetic patients 19 (9.5%), trailing only Slow Healing i–e 34 (17.0 %). We discovered that high sugar intake 66 (33.0%) is the leading cause of diabetes as reported by both genders of our study participants, followed by other causes 61 (30.5%), family history 36 (18.0%), lack of insulin 29 (14.5%) and failure to use insulin 8 (4.0 %). According to a study conducted in India, the most common diabetic complication reported by patients is vision loss [18]. We discovered that kidney failure was the most common complication reported by study participants, accounting for 67 (33.5 %), followed by loss of vision 61 (30.5 %), heart failure 38 (19.0 %), amputation 18 (9.0 %), and poor wound healing 16 (8.0). Males reported loss of vision as the leading diabetes complication, accounting for 35 out of 92 (38.04 %), while females reported kidney failure as the leading complication, accounting for 35 out of 108 (32.40%). Diet and Medication was found to be the most effective diabetes management method 99 (49.5%), followed by Only Medication 40 (20.0 %), Diet, Medication & Exercise 24 (12.0 %), and Only Diet as reported by 17 (8.5 %) of both genders. In this study, eating less sugar was found to be the most effective diabetes prevention measure among both genders, at 95 (47.5 %) followed by a healthy diet at 73 (36.5 %), physical exercise at 22 (11.0 %), and weight loss at 6 (3.0 %). According to an Indian study, one of the most popular assumptions about preventing diabetes is to eat less sugar [19]. One of the best method to increase knowledge and understanding among diabetic patients is through education and counseling [20]. As a result, greater emphasis should be made on increasing the patient's knowledge of diabetes.

CONCLUSIONS

There was considerable knowledge about diabetes in known diabetic patients but still there is a dire need to increase knowledge and awareness regarding disease understandings, causes, complications, management, and its preventive measures. Diabetes being a complicated disease is easy to diagnose but difficult to treat while public health approaches can play an important role in the prevention and control of this life-threatening disease. Education is the key towards self-management of this life-threatening disease.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Saadia Z, Rushdi S, Alsheha M, Saeed H, Rajab M. A study of knowledge attitude and practices of Saudi women towards diabetes mellitus. A (KAP) study in Al-Qassim region. The Internet Journal of Health. 2010; 11(2):1-7.

[2] Zowgar AM, Siddiqui MI, Alattas KM. Level of diabetes knowledge among adult patients with diabetes using diabetes knowledge test. Saudi medical journal. 2018 Feb; 39(2):161.

[3] Upadhyay DK, Palaian S, Shankar PR, Mishra P, Pokhara N. Knowledge, attitude and practice about diabetes among diabetes patients in Western Nepal. Rawal Medical Journal. 2008 Jan; 33(1):8-11.

[4] World Health Organization. Global burden of diabetes. Global report on diabetes. World Health Organization 2016.

[5] Brignac TA. A Diabetic Self-Management Education (DSME) Program for Adults with Diabetes Type 2 in a Rural Health Clinic: A Doctor of Nursing Practice Project. Southeastern Louisiana University; 2018.

[6] Akhtar S, Nasir JA, Abbas T, Sarwar A. Diabetes in Pakistan: A systematic review and meta-analysis. Pakistan journal of medical sciences quarterly. 2019 Aug; 35(4):1173-1178. doi: 10.12669/pjms.35.4.194

[7] Akhtar S, Khan Z, Rafiq M, Khan A. Prevalence of Type II diabetes in District Dir Lower in Pakistan. Pakistan journal of medical sciences quarterly. 2016 Jun;

DOI: https://doi.org/10.54393/pjhs.v3i05.243

32(3):622-5. doi: 10.12669/pjms.323.9795.

[8] Papatheodorou K, Papanas N, Banach M, Papazoglou D, Edmonds M. Complications of Diabetes 2016. Journal of diabetes research. 2016; 6989453. doi: 10.1155/2016/6989453.

[9] Foma MA, Saidu Y, Omoleke SA, Jafali J. Awareness of diabetes mellitus among diabetic patients in the Gambia: a strong case for health education and promotion. BMC Public Health. 2013 Dec; 13:1124. doi: 10.1186/1471-2458-13-1124.

[10] Gillani AH, Amirul Islam FM, Hayat K, Atif N, Yang C, Chang J, et al. Knowledge, Attitudes and Practices Regarding Diabetes in the General Population: A Cross-Sectional Study from Pakistan. International journal of environmental health research. 2018 Sep; 15(9):1906. doi: 10.3390/ijerph15091906.

[11] Shaw JE, Sicree RA, Zimmet PZ. Global estimates of the prevalence of diabetes for 2010 and 2030. Journal of diabetes research. 2010 Jan; 87(1):4-14. doi: 10.1016/j.diabres.2009.10.007.

[12] 12.Shera AS, Jawad F, Maqsood A. Prevalence of diabetes in Pakistan. Journal of Diabetes Research. 2007 May;76(2):219-22. doi: 10.1016/j.diabres.2006.08.011.

[13] Valdez R, Yoon PW, Liu T, Khoury MJ. Family history and prevalence of diabetes in the U.S. population: the 6-year results from the National Health and Nutrition Examination Survey (1999-2004). Diabetes Care. 2007 Oct; 30(10):2517-22. doi: 10.2337/dc07-0720.

[14] Zuhaid M, Zahir KK, Diju IU. Knowledge and perceptions of diabetes in urban and semi urban population of Peshawar, Pakistan. Journal of Ayub Medical College Abbottabad. 2012 Mar; 24(1):105-8.

[15] Moodley LM and Rambiritch V. An assessment of the level of knowledge of diabetic patients, in a primary health care setting, on diabetes mellitus. South African Family Practice. 2007;49(10).

[16] Sabri AA, Qayyum MA, Saigol NU, Zafar K, Aslam F. Comparing knowledge of diabetes mellitus among rural and urban diabetics. The McGill Journal of Medicine. 2007 Jul; 10(2):87-9.

[17] Hawthorne K and Tomlinson S. Pakistani moslems with Type 2 diabetes mellitus: effect of sex, literacy skills, known diabetic complications and place of care on diabetic knowledge, reported self-monitoring management and glycaemic control. Diabetes & Metabolism Journal. 1999 Jul;16(7):591-7. doi: 10.1046/j.1464-5491.1999.00102.x.

[18] Gulabani M, John M, Isaac R. Knowledge of diabetes, its treatment and complications amongst diabetic patients in a tertiary care hospital. The Indian Journal of Community Medicine (IJCM). 2008 Jul; 33(3):204-6. doi: 10.4103/0970-0218.42068.

[19] Muninarayana C, Balachandra G, Hiremath SG, Iyengar K, Anil NS. Prevalence and awareness regarding diabetes mellitus in rural Tamaka, Kolar. International Journal of Diabetes in Developing Countries. 2010 Jan; 30(1):18-21. doi: 10.4103/0973-3930.60005.

[20] Cooper HC, Booth K, Gill G. Patients' perspectives on diabetes health care education. Health Education Research. 2003 Apr;18(2):191-206. doi: 10.1093/her/18.2.191.

DOI: https://doi.org/10.54393/pjhs.v3i05.156

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

The Comparative Efficacy of Imipenem and Meropenem On Different Bacterial Strains Obtained from Clinical Samples

Nouman Ahmed Hunjra[1], Aqeela Ashraf[1] and Humaira Niamat[1*]

[1]Department of Biology, Lahore Garrison University, Lahore, Pakistan

ARTICLE INFO

Key Words:

Antibiotic Resistance, Carbapenem, Imipenem, Meropenem, P. aerugionosa

How to Cite:

Ahmed Hunjra, N. ., Ashraf, A. ., & Niamat, H. . (2022). The Comparative Efficacy of Imipenem and Meropenem On Different Bacterial Strains Obtained from Clinical Samples: Imipenem and Meropenem On Different Bacterial Strains. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.156

***Corresponding Author:**

Humaira Niamat

Department of Biology, Lahore Garrison University, Lahore, Pakistan

humairaniamat@lgu.edu.pk

Received Date: 24th September, 2022

Acceptance Date: 6th October, 2022

Published Date: 31st October, 2022

ABSTRACT

The most serious threat to patient's and the public's health is the resistance of clinically relevant microorganisms to antimicrobials. **Objective:** This study's primary objective was to compare the susceptibility profiles of imipenem and meropenem on various bacterial strains. **Methods:** 101 distinct patients' positive samples of blood and pus were collected and sent to a pathology lab in Lahore (Mughal Diagnostic and Research laboratory Lahore). On Macconkey, CLED, and Blood Agar media, five bacterial strains; *E. coli*, *P. aeruginosa*, *Enterococcus species*, *Klebsiella* species and *S. typhi* were isolated and resurrected. Following microscopical (gram staining) and biochemical tests to identify these bacterial strains, the antibiotic sensitivity of these bacterial strains was assessed. **Results:** The findings of this investigation clearly demonstrated that imipenem is more sensitive than meropenem. Imipenem demonstrated improved sensitivity to all of the bacterial strains included in the study, especially *E. coli*, *P. aeruginosa*, various *Enterococcus*, *Klebsiella*, and *S. typhi*, imipenem showed a sensitivity of 84.15%, while meropenem showed a sensitivity of 40.59%. **Conclusions:** The current investigation came to the conclusion that antibiotics (imipenem and meropenem) are becoming more resistant to bacteria as a result of their growing and frequent use. Physicians started to worry about the developing antibiotic resistance due to the indiscriminate use of these treatments after more than a decade of increased antibiotic consumption in the era.

INTRODUCTION

One of the primary methods of contemporary medicine for treating infections is antibiotic treatment. Many antibiotics were developed during the "golden era" of antibiotics, which lasted from the 1930s to the 1960s [1]. Antimicrobial resistance (AMR) is a growing global threat to human, animal, and environmental health. This is a result of multidrug-resistant (MDR) bacteria, also known as "superbugs," emerging, spreading, and remaining persistent [2]. The effectiveness of an antimicrobial agent is severely compromised by the possibility of tolerance or resistance developing from the first time this compound is used. This is true for antimicrobial agents used to treat infections caused by bacteria, viruses, fungi, and parasites. Several physiological and biochemical mechanisms may influence the development of this resistance. Various institutes and agencies around the world have recognized this serious global public health issue. Many recommendations and resolutions have been proposed, as well as several reports, but little progress has been made thus far. Unfortunately, the rise in antibiotic resistance is a continuing problem [3]. Drug-resistant infections affect one-third of ICU patients globally, which significantly raises patient mortality and medical expenses [4-6]. In >70% of non-complex cases, both outpatients and inpatients, UTI is caused by Escherichia coli bookkeeping [7]. Other Gram negative microbes include Klebsiella spp., Enterobacter spp., Pseudomonas aeruginosa, and Proteus spp. Gram positive microscopic organisms include Enterococcus spp., Staphylococci, and Streptococci [8]. Uropathogenic E. coli has been linked to 70-95% of urinary

DOI: https://doi.org/10.54393/pjhs.v3i05.156

tract infections (UTI) worldwide. This bacterium is capable of developing resistance to nearly every antibacterial therapy that has been discovered. Unfortunately, antibiotic resistance is significantly higher among UTI patients with UPEC infections [9]. Carbapenems are critical components of our antibiotic arsenal. Carbapenems have the broadest spectrum of activity and the greatest potency against Gram-positive and Gram-negative bacteria of any of the hundreds of different -lactams. As a result, when patients with infections become critically ill or are suspected of harbouring resistant bacteria, they are frequently used as "last-line agents" or "antibiotics of last resort" [10]. The peculiar structure of carbapenems, which is defined by a carbapenem attached to a -lactam ring, gives protection against the majority of -lactamases, including metallo—lactamase (MBL) and extended spectrum -lactamases. Carbapenems exhibit broad spectrum antibacterial action [11]. Along with imipenem, meropenem is a broad-spectrum antibacterial drug that belongs to the carbapenem family. It is typically used to treat patients who are moderately to seriously unwell and have polymicrobial or nosocomial infections [12]. Meropenem is recommended for use as empirical therapy in both adults and children with a wide range of dangerous illnesses before the identification of the causative organisms or for sickness caused by one or more susceptible bacteria [13].

METHODS

Isolation of Bacterial Strains:

101 distinct patients' positive samples of blood and pus were collected and sent to a pathology lab in Lahore (Mughal Diagnostic and Research laboratory Lahore). On Macconkey, CLED, and Blood Agar media, five bacterial strains; *E. coli*, *P. aeruginosa*, *Enterococcus species*, *Klebsiella* species and *S. typhi* were isolated and resurrected. Following microscopical (gram staining) and biochemical tests to identify these bacterial strains, the antibiotic sensitivity of these bacterial strains was assessed.

Antibiotic Assay (Kirby–Bauer method)

The prepared Muller-Hinton Agar medium was individually inoculated with each recovered bacterial strain. We used Oxoid Company's commercially available antibiotic discs (imipenem and meropenem). Using a sterile disc dispenser, the antibiotic discs were evenly distributed across the surface of the agar plate. To ensure that these had a direct connection with agar, discs were only lightly pressed. The plates were then kept at 37°C for a further 24 hours. After incubation, the data were interpreted as being sensitive, resistant, or intermediate [14].

RESULTS

To evaluate the bacteria associated with wounds their colony morphological features such as color, colony shape and consistency of colonies were observed as shown in table 1.

Sr. No.	Bacterial Isolates	Number of Samples	Morphological Characteristics			
			Colony Shape	Color	Margin	Consistency
1.	E. coli	42	Circular	Pink	Entire	Smooth
2.	P. aeruginosa	19	Circular	Colorless	Irregular	Mucoid
3.	Enterococcus Species	13	Circular	Red	Entire	Smooth
4.	Klebsiella Species	16	Large Circular	Pinkish red	Entire	Mucoid
5.	S. typhi	11	Circular	Colourless	Irregular	Smooth

Table 1: Morphological Characterization of bacterial isolates

13 bacterial isolates were identified as gram negative out of 101 studied samples, while 88 were identified as gram positive as shown in figure 1. These isolates were then put through biochemical and antimicrobial susceptibility tests.

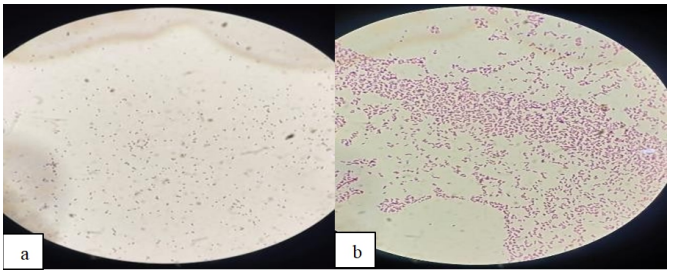

Figure 1: Microscopic identification of bacterial isolates (a) indicating Enterococcus species (b) indicating P. aeruginosa in light microscope.

Biochemical Characterization:

Bacterial isolates were subjected to various biochemical tests, yielding the following results as tabulated in table 2.

Sr. No.	Bacterial Isolates	Number	Biochemical Test				
			SIM Test	Citrate Test	TSI Test	Catalase Test	Urease Test
1.	E. coli	42	Positive	Negative	Positive	Positive	Negative
2.	P. aeruginosa	19	Negative	Positive	Positive	Positive	Negative
3.	Enterococcus Species	13	Negative	Negative	Negative	Negative	Negative
4.	Klebsiella Species	16	Negative	Positive	Negative	Positive	Positive
5.	S. typhi	11	Negative	Negative	Negative	Positive	Negative

Table 2: Biochemical Characterization of Bacterial Isolates

Evaluation of Antibiotic Activity:

The pathogens in the samples were already resistant to other antibiotics when they were treated with imipenem and meropenem antibiotics, which are commonly used to treat severe bacterial infections. Imipenem is more sensitive than meropenem, with 85 sensitive cases, 11 resistant cases, and 5 intermediate cases. Meropenem has 41 sensitive cases, 51 resistant cases, and 9 intermediate cases, represented in figure 2.

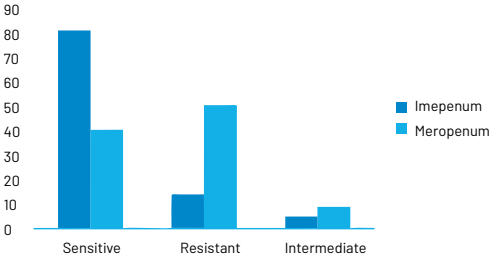

Figure 2: Imipenem and meropenem activity as sensitive,

DOI: https://doi.org/10.54393/pjhs.v3i05.156

resistant, and intermediate in patients with bacterial infections

The observed results clearly show that imipenem is more sensitive than meropenem. Imipenem demonstrated increased sensitivity against all of the bacterial strains, including E. coli, P. aeruginosa, Enterococcus species, Klebsiella species, and S. aureus, S. typhi, imipenem demonstrated 84.15% sensitivity, while meropenem demonstrated 40.59% sensitivity. Following the Kirby-Bauer methodology, we found that Imipenem is 35.7% sensitive in male patients and 48.5% sensitive in female patients. Meropenem, on the other hand, was 17.8% sensitive in males and 22.8% sensitive in females. In terms of resistance patterns, imipenem is less resistant in males (7.9%) and females (2.9%) than meropenem, which is resistant in males 22.8% and females 27.8% against bacterial strains. Comparison of Imipenem and Meropenem Sensitivity against Bacterial Species isolated from clinical samples table 3.

Sr. No.	Specimen	Imipenem		Meropenem
		Sensitive	Resistant	Sensitive
1.	Blood	16 (15.84%)	01 (0.1%)	13 (12.87%)
2.	Urine	40 (39.60%)	05 (4.9%)	12 (11.9%)
3.	Pus Swab	29 (28.71%)	05 (4.9%)	16 (15.84%)

Table 3: Susceptibility patterns of imipenem and meropenem among specimens

Susceptibility pattern of meropenem and imipenem against pathogens table 4.

Sr. No.	Pathogens	Imipenem		Meropenem
		Sensitive	Resistant	Sensitive
1.	E. coli	38(37.62%)	04(3.96%)	15(14.85%)
2.	P. aeruginosa	11(10.9%)	06(5.94%)	07(6.93%)
3.	Enterococcus species	13(12.87%)	00(0%)	04(3.96%)
4.	Klebsiella species	12(11.88%)	01(0.1%)	05(4.95%)
5.	S. typhi	11(10.89%)	00(0%)	10(9.90%)

Table 4: Activity of meropenem and imipenem against pathogens

DISCUSSION

Hellinger WC et al., Imipenem and meropenem are carbapenem-class - β-Lactam antibiotics that are among the most widely used antimicrobial drugs available for systematic use in humans. Streptococci, methicillin-sensitive Staphylococci, Neisseria, Haemophilus, anaerobes, and aerobic gram-negative nosocomial pathogens, including Pseudomonas, are all susceptible. Tolerance to imipenem and meropenem can occur during P. aeruginosa treatment, as it has with other -lactam agents; Stenotrophomonas maltophilia is usually resistant to both imipenem and meropenem. Carbapenem is protective against Enterococci, similar to penicillin. In general, it is said that imipenem has stronger in vitro activity against aerobic gram-positive cocci than meropenem, while meropenem has somewhat higher in vitro activity against aerobic gram-negative bacilli [15]. Current study was designed by Ullah F et al., to emphasize on antibiotic adaptability patterns of pathogenic bacteria E. coli, P. aeruginosa, Enterococcus species, Klebsiella species and S. typhi against imipenem and meropenem drugs. Previous research found that E. coli was resistant to imipenem at 3.96% and meropenem at 21.78%. It demonstrates that meropenem is less effective in cases of E. coli. [16] claim that he separated 116 E. coli from patient's urine and used imipenem and meropenem drugs, which showed 98% and 97% susceptibility, respectively. Current research results show that imipenem and meropenem have susceptibility rates of 37.62% and 21.78%, respectively, for the same experiments. P. aeruginosa was more prevalent among the 150 bacteria isolated from surgical sites of patients in a study by Khorvash F et al., [17]. Their resistance to imipenem was 6.4% and to meropenem was 13%, whereas our research work showed the same frequency pattern with results showing an increased resistivity rate against meropenem (11.88%) as compared to resistivity against imipenem [18]. Farhat U et al., studied antimicrobial adaptability patterns and ESBL prevalence in K. pneumoniae from UTI in the North-West of Pakistan, and their findings show that UTI is the most common infection in both male and female patients worldwide. Their findings show that K. pneumoniae (the most common pathogen causing UTIs) has a high susceptibility to antibiotics, particularly imipenem (93.28%) and meropenem (86.96%). Following the same methodology, our current research experiments revealed a sensitivity pattern of 11.88% and 4.95% against Klebsiella spp. respectively for imipenem and meropenem. [19] Mohammed MA et al., demonstrated the prevalence and antimicrobial tolerance pattern of bacterial strains obtained from patients with UTI. He examined 1153 samples, 160 of which were positive. He isolated E. coli as the most common (55.6%) bacteria, followed by P. aeruginosa and Klebsiella at 5.6% and 2.5%, respectively, with increased levels of resistance to imipenem (0.6%) and meropenem (2.5%). Following the methodology described by [19], our results revealed an increase in P. aeruginosa susceptibility patterns to imipenem and meropenem. The observed resistance pattern against imipenem was 5.94% and 11.88% for meropenem, respectively. The changing epidemiology of P. aeruginosa, as well as the impact of carbapenem mechanism, is critical for optimizing antimicrobial therapy in order to prevent and combat infections caused by multidrug resistant P. aeruginosa. Elena Riare and her colleagues studied the carbapenem resistance mechanism in P. aeruginosa and its impact on the activity of imipenem, meropenem, and doripenem in 2011. The study included vy Riera E et al., 175 P. aeruginosa isolates (39%) of the total samples. Only 6.9% of them were less susceptible to imipenem and meropenem. In the current study, imipenem showed (9.5%) resistance against P.

DOI: https://doi.org/10.54393/pjhs.v3i05.156

aeruginosa, which appears to be increasing from the previous study, and meropenem showed slightly more resistance (11.88%). The study raised two points: first, resistance patterns were increasing, and second, imipenem had slightly higher efficacy than meropenem [20].

CONCLUSIONS

Antibiotics (imipenem and meropenem) are becoming more resistant to microbes as they are used more frequently. Because of the increased use of these drugs, imipenem and meropenem are becoming more resistant to E. coli, P. aeruginosa, Enterococcus species, Klebsiella species and S. typhi. Many commonly used antibiotics were ineffective against E. coli. Very little resistance was detected toward imipenem in patients with pneumonia caused by E coli. Patients with typhoid fever brought on by typhi are developing an increased resistance to imipenem and meropenem. Typhi strains that have developed resistance pose a serious threat to the global population, so antibiotics must be prescribed according to the patient's culture and sensitivity. Although meropenem and imipenem are clear, they are equally effective (both bacteriologically and clinically) to treat crucial diseases. Continuous monitoring of susceptibility of clinical pathogenic strains is important.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Nathan C and Cars O. Antibiotic resistance—problems, progress, and prospects. The New England journal of medicine. 2014 Nov; 371(19):1761-3. doi: 10.1056/NEJMp1408040.

[2] Davies J and Davies D. Origins and evolution of antibiotic resistance. Microbiology and Molecular Biology Reviews. 2010 Sep;74(3):417-33. doi: 10.1128/MMBR.00016-10

[3] Roca I, Akova M, Baquero F, Carlet J, Cavaleri M, Coenen S, Cohen J, et al. The global threat of antimicrobial resistance: science for intervention. New Microbs and New Infections. 2015 Apr; 6:22-9. doi: 10.1016/j.nmni.2015.02.007.

[4] Erbay H, Yalcin AN, Serin S, Turgut H, Tomatir E, Cetin B, et al. Nosocomial infections in intensive care unit in a Turkish university hospital: a 2-year survey. Intensive Care Medicine. 2003 Sep; 29(9):1482-8. doi: 10.1007/s00134-003-1788-x.

[5] Aly NY, Al-Mousa HH, Al Asar el SM. Nosocomial infections in a medical-surgical intensive care unit. Medical Principles and Practice. 2008;17(5):373-7. doi: 10.1159/000141500.

[6] Neidell MJ, Cohen B, Furuya Y, Hill J, Jeon CY, Glied S, et al. Costs of healthcare- and community-associated infections with antimicrobial-resistant versus antimicrobial-susceptible organisms. Clinical Infectious Diseases. 2012 Sep; 55(6):807-15. doi: 10.1093/cid/cis552.

[7] Gupta K, Hooton TM, Stamm WE. Increasing antimicrobial resistance and the management of uncomplicated community-acquired urinary tract infections. Annals of internal medicine. 2001 Jul; 135(1):41-50. doi: 10.7326/0003-4819-135-1-200107030-00012.

[8] Akram HM, Abdullahi NH, Dya EM. Extended spectrum beta lactamases among multi drug resistant Escherichia coli and Klebsiella species causing urinary tract infections in Khartoum. African Journal of Bacteriology Research. 2010 Aug; 2(3):18-21.

[9] Mero WM. Phenotypic and Molecular Study of Extended-Spectrum β-lactamases Producing Enterobacteriaceae from Urinary Tract Infection in Zakho city, Kurdistan Region/Iraq. Academic Journal of Nawroz University. 2022 Aug; 11(3):305-13. doi.10.25007/ajnu.v11n3a1447

[10] Torres JA, Villegas MV, Quinn JP. Current concepts in antibiotic-resistant gram-negative bacteria. Expert Review of Anti-infective Therapy.2007 Oct; 5(5):833-43. doi: 10.1586/14787210.5.5.833.

[11] Buckingham SC, McCullers JA, Luján-Zilbermann J, Knapp KM, Orman KL, English BK. Pneumococcal meningitis in children: relationship of antibiotic resistance to clinical characteristics and outcomes. Journal of pediatric infectious diseases. 2001 Sep; 20(9):837-43. doi: 10.1097/00006454-200109000-00003.

[12] Zhanel GG, Wiebe R, Dilay L, Thomson K, et al. Comparative review of the carbapenems. Drugs. 2007; 67(7):1027-52. doi: 10.2165/00003495-200767070-00006.

[13] Angkasekwinai N, Werarak P, Tongsai S, Thamlikitkul V. Effectiveness and safety of generic formulation of meropenem (Penem) for treatment of infections at Siriraj Hospital. Journal of the Medical Association of Thailand = Chotmaihet thangphaet. 2012 Feb; 95(Suppl 2): S34-41.

[14] Wayne PA. Clinical and laboratory standards institute. Performance standards for antimicrobial susceptibility testing 2011.

[15] Hellinger WC and Brewer NS. Carbapenems and

DOI: https://doi.org/10.54393/pjhs.v3i05.156

monobactams: imipenem, meropenem, and aztreonam. Mayo Clinic Proceedings. 1999 Apr; 74(4): 420-34. doi: 10.4065/74.4.420.

[16] Ali N, Hameed A, Siddiqui M, Ghumro PB, Ahmed S. Application of Aspergillus niger SA1 for the enhanced bioremoval of azo dyes in simulated textile effluent. African Journal of Biotechnology. 2009; 8(16).

[17] Khorvash F, Mostafavizadeh K, Mobasherizadeh S. Frequency of mecA gene and borderline oxacillin resistant Staphylococcus aureus in nosocomial acquired methicillin resistance Staphylococcus aureus infections. Pakistan Journal of Biological Sciences. 2008 May; 11(9):1282-5. doi: 10.3923/pjbs.2008.1282.1285.

[18] Farhat U, Salman AM, Jawad A. Antimicrobial susceptibility pattern and ESBL prevalence in Klebsiella pneumoniae from urinary tract infections in the North-West of Pakistan. African journal of microbiology research. 2009 Nov; 3(11):676-80.

[19] Mohammed MA, Alnour TM, Shakurfo OM, Aburass MM. Prevalence and antimicrobial resistance pattern of bacterial strains isolated from patients with urinary tract infection in Messalata Central Hospital, Libya. Asian Pacific journal of tropical medicine. 2016 Aug; 9(8):771-6. doi: 10.1016/j.apjtm.2016.06.011.

[20] Riera E, Cabot G, Mulet X, García-Castillo M, del Campo R, Juan C, et al. Pseudomonas aeruginosa carbapenem resistance mechanisms in Spain: impact on the activity of imipenem, meropenem and doripenem. Journal of Antimicrobial Chemotherapy. 2011 Sep; 66(9):2022-7. doi: 10.1093/jac/dkr232.

DOI: https://doi.org/10.54393/pjhs.v3i05.225

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Impact of Diabetes on the Clinical outcome of COVID 19 Patients admitted in Tertiary Care Hospital of Khyber Pakhtunkhwa, Pakistan

Muhammad Salman Aamir[1], Huma Liaqat[2], Muhammad Ali[1], Sabina Afzal[1], Alvina Karam[1], Hamza Nazir[1] and Mashal Aamir[3]

[1]Department of Diabetes, Endocrinology and Metabolic Diseases, Hayatabad Medical Complex Peshawar, Pakistan
[2]Department of Rheumatology, Fauji Foundation Hospital, Rawalpindi, Pakistan
[3]Department of Periodontics and Implantology, Rahman Medical Institute, Peshawar, Pakistan

ARTICLE INFO

Key Words:
Diabetes Mellitus, COVID-19

How to Cite:
Salman Aamir, M. ., Liaqat, H. ., Ali, M. ., Afzal, S. ., Karam, A. ., Nazir, H. ., & Aamir, M. . (2022). Impact of Diabetes on the Clinical outcome of COVID 19 Patients admitted in Tertiary Care Hospital of Khyber Pakhtunkhwa, Pakistan: Impact of Diabetes on the Clinical outcome of COVID 19 Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.225

***Corresponding Author:**
Huma Liaqat
Department of Rheumatology, Fauji Foundation Hospital, Rawalpindi, Pakistan
humakmcite@gmail.com

Received Date: 11th October, 2022
Acceptance Date: 22nd October, 2022
Published Date: 31st October, 2022

ABSTRACT

In November 2019, a virus emerged in Wuhan City of China, named as novel coronavirus. **Objective:** To evaluate the impact of Diabetes on the clinical outcome of COVID 19 patients admitted in Isolation Units at Hayatabad Medical Complex Peshawar. **Methods:** This was a 6 months' prospective longitudinal observational study. Diagnosis was made on the basis of positive PCR nasal and / or pharyngeal swabs, following the provisional guidelines of the World Health Organization. Diagnoses of diabetes was confirmed by medical history of the patient. Data regarding socio demographic aspects, comorbidities, hematological and biochemical findings, chest radiographic images, complications, length of stay, treatments and outcomes were collected from the hospital charts. All known Type 2 Diabetics above 40 years of age with positive PCR for COVID 19 infections were included regardless of gender. Type 1 diabetics and those with prior complications were excluded from the study. **Results:** The ANOVA table *showed the overall model was statistically significant predictor* ((Duration of diabetes, gender, education and age) *of the outcome variable* (length of stay in COVID isolation unit) with P value 0.004 reflecting that diabetes has significant impact on the outcome of COVID 19 patients. There was also significant association (chi-square P value .005) between complications developed and *HbA1C* levels of the admitted patients. **Conclusions:** Diabetes has significant impact on clinical outcome of Covid 19 patients in terms of complications, length of stay and mortality. The complex nature of both the diseases leaves the patient with high risk of developing complications and mortality.

INTRODUCTION

In November 2019, a virus emerged in Wuhan City of China, named as novel coronavirus. Later on the disease was labelled as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) [1-3]. It was so contagious that in split of time, it spread to Asia and rest of the world. Therefore, the World Health Organization announced Covid 19 as a pandemic in March 11, 2020. The current statistics showed that cases exceeded 100 million and among them, more than two million died [4-5]. COVID-19, infection has variable disease symptomology, that can prove fatal. The COVID 19 symptoms are fever, dyspnea, cough, fatigue, headache, myalgia and loss of smell and taste. Even though majority of the patients experience mild symptoms, and do not require hospitalization although few patients develop serious complications. These complications include ARDS, Septic shock, Multiorgan failure and Hyper coagulation, which if not managed in time could lead to death [6]. However, the disease manifestation and disease progression to such extreme complications and the exact outcome is not fully understood yet. The disease progression, prevalence and extreme illness is seen in older males, whereas very mild symptoms and prevalence is reported in pediatric age group [7]. Latest researches about the COVID 19 infections showed that immunocompromised patients and those with chronic diseases including cardiovascular disease, hypertension,

DOI: https://doi.org/10.54393/pjhs.v3i05.225

chronic obstructive pulmonary disease, chronic kidney disease and melanomas are among those with poor outcomes in terms of treatment [8]. Diabetes (DM) has been emerged as a twenty first century pandemic and the estimated figure is expected to increase to 640 million patients by 2040 [9]. Between 2010 and 2030, there will be a 69% rise in patients with diabetes in developing and 20% in developed nation [10, 11]. According to Pakistan's national statistics, the prevalence of diabetes is estimated to be 26.3%, among which 28.3% are in urban and 25.3% resides in rural areas [12]. Previous articles confirmed that uncontrolled diabetes is associated with poor clinical outcome of COVID 19 infection and the extreme complications are major indications for ICU admissions in the hospital [13]. Some researchers also showed that uncontrolled diabetes was the only associated factor to cause death among COVID-19 patients [14]. It has been observed that patient with hyperglycemia combined with chronic inflammation leads to deranged inflammatory markers in COVID patients [15, 16]. Keeping in view the back ground of these two pandemic diseases, it is of immense importance to evaluate the impact of diabetes on the Clinical outcome of patients admitted in COVID isolation units. The current study elaborates the average length of stay and mortality of diabetic patients admitted in COVID isolation units which will provide baseline evidence for better planning and administration of these patients in a hospital setup.

METHODS

This was a 6 months' prospective longitudinal observational study of diabetic patients admitted with COVID-19 infection between June 2021 and December 2021 in COVID Isolation Unit at the Hayatabad Medical Complex Peshawar. Ethical approval was obtained from Ethical Committee of the hospital. The data was collected from charts of confirmed COVID 19 cases admitted in HMC Peshawar. As per provisional Guidelines of the World Health Organization, samples were taken from nasal/pharynx of patient through swabs and the diagnosis of the COVID-19 was confirmed through a positive PCR assay. Already diagnosed cases of diabetes were included in the study as per their medical history. The Berlin definition was used for acute respiratory distress syndrome (ARDs) [17]. Acute kidney injury (AKI) was assessed following the definition kidney disease [18]. The cardiac injury was determined based on blood biomarkers, Echocardiography and ECG. All known Type 2 Diabetics above 40 years of age with positive PCR for COVID 19 infections were included regardless of gender. Type 1 diabetics and those patients who were having prior complications were excluded from the study. Data regarding socio demographic aspects, comorbidities, hematological and biochemical findings, chest radiographic images, complications, length of stay, treatments and outcomes were collected from the hospital charts. Statistical analyses were done through SPSS version 21.0 statistical software. The Chi Square test was used for association of categorical variables, such as HbA1C levels and complications developed.

RESULTS

The results of the study showed that there is positive association of impact of diabetes on the Clinical outcome of the patients admitted in COVID Isolation units at Hayatabad Medical Complex. Table 1 shows demographics and characteristics of the Diabetic patients admitted in COVID Isolation Unit. Total Population under study was N=145 where mean age was 54.3 and Male to female ratio was 2:1. Body Mass Index (BMI) calculated was within normal range 21.6. Patients were admitted in isolation unit in second week since positive PCR with mean of 8.3 days and stayed in hospital for mean duration of 9.8 days. Diabetes profile in terms of mean HbA1C and RBS was 9.3% and 245.4 mg/dl respectively.

Variables	Minimum	Maximum	Mean ± SD
Age	41	73	54.3 ± 2.72
Height (Feet)	5.2	5.8	5.4 ± 0.84
Weight (Kg)	62	78	74.6 ± 2.38
BMI	18	24	21.6 ± 1.47
Duration Since Positive PCR	4	14	8.3 ± 4.76
Length of Stay in Isolation Unit (days)	6	21	9.8 ± 2.1
Duration of Diabetes (Years)	6	24	12.4 ± 2.87
HbA1C Levels (%)	6	24	9.3 ± 2.12
Random Blood Glucose (mg/dl)	128	382	245.4 ± 22.78

Table 1: Demographics and Characteristics of Population under study N 145

The ANOVA table showed the overall model was statistically significant predictor ((Duration of diabetes, gender, education and age) of the outcome variable (length of stay in COVID isolation unit) with P value 0.004. This reflects the statistical significance of the duration of diabetes and other independent variables on the duration of length of stay of the COVID patients admitted in Isolation unit in Hayatabad medical complex Peshawar. Hence, the hypothesis of no effect is rejected (Table 2).

Model	Sum of Squares	Df	Mean Square	F	P-Value
Regression	297.434	4	74.359	2.141	.040
Residual	4272.784	123	34.738		
Total	4570.219	127			

Table 2: Impact of diabetes, Gender, Education and Age on Average Length of Stay

Among the individual effects of each independent variable on dependent variable (average length of stay), the effect of gender, age and education was insignificant having p-value of 0.094, .183 and 0.136 respectively. However, the p-value for the duration of diabetes was 0.049 which was significant. Thus, concluding that the duration of diabetes

DOI: https://doi.org/10.54393/pjhs.v3i05.225

had a significant effect on the length of stay of COVID patients(Table 3).

Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Gender	1.772	1.049	.148	1.690	.094
Age	-.091	.068	-.156	-1.339	.183
Education	1.927	1.285	.132	1.500	.136
Duration of diabetes	.224	.113	.231	1.986	.049

Table 3: Individual effect of independent variables (duration of diabetes, Gender, Education and Age) on Dependent variable (average length of stay)

The Chi-square significance is 0.005 reflecting statistical significance between the complication developed and HbA1c among COVID admitted in isolation. Therefore, we reject the null hypothesis with 95% confidence that determine that there is evidence of an association between complication developed during admission and HbA1c of COVID patients admitted in Isolation unit (Table 4).

Complication development during Admission	HbA1c Control			Total	p-value
	Excellent	Good	Poor		
AKI	1	9	9	19	0.005
MI	0	2	8	10	
Stroke	0	1	1	2	
Diabetic Foot Ulcer	2	15	10	27	
Bed sores	0	5	20	25	
Other	14	22	26	62	

Table 4: Complication developed vs HbA1c

DISCUSSION

COVID-19 shows variation in symptomology which could prove fatal. Several factors influence disease consequences including gender and age. Severe chronic conditions such as Diabetes and Hypertension have been associated with the COVID 19 infection. In current study we determined the impact of diabetes on the outcome of COVID-19 patients admitted in Isolation units at Hayatabad Medical Complex Peshawar. Normally we found that a patient having diabetes with COVID-19 positivity shows severe outcomes in terms of length of stay and complications which ultimately puts greater burden on hospital administration in terms of work load. Our study results confirmed and agreed to findings of studies carried out at China where diabetic patients had 7.3 times higher risk of complications, that prolonged the average length of stay at hospital and fatality of 2.3 times higher [19]. According to another British cohort study, COVID-19 patient with uncontrolled diabetes and their complications showed higher risk of death as compared to other non-diabetic patients. These findings endorsed our study findings, where we calculated P value of 0.005 of HbA1c level and complications developed among COVID patients [20]. Hyperglycemia was considered as an indicator of poor outcome in diabetics during COVID 19 [21]. It has been found that poor outcome is associated with hyperglycemia due to interleukin-6 (IL-6) that causes lung injury [22]. Hence, researchers showed that patients who received IV insulin during hospitalization has displayed positive outcome as compared to those who were on oral medications. However, Chen et al., stated that COVID-19 patients who were diabetics already on insulin showed aggressive inflammatory response ending up with complications. However, it remains statistically insignificant in terms of severity of complications for those who were on oral anti-diabetic medications [23]. Complex nature of diabetes is associated with variation in severity of COVID 19 patients. In our study, we found that diabetic patients had a higher number of complications, which increased the length of stay at hospital as compare to those who were non diabetic. Our study results agreed to studies carried out at Wuhan, China [24]. Studies also suggested that a Hypertensive patient with COVID-19 positivity had adverse prognosis as far as clinical outcome is concerned in terms of complications like MI and stroke [23]. To conclude, those diabetic patients who were admitted in COVID isolation units were prone to develop complications due to complex inflammatory response of both the diseases that affected the ultimate clinical outcome in terms of average length of stay at hospital and mortality.

CONLCUSIONS

The complex nature of COVID-19 and diabetes leave the patient with higher risk of developing complications. Special care and management is required for diabetic patients in COVID isolation units with the view to manage the complications and thus minimizing mortality and average length of stay.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 Feb; 395(10223):497-506. doi: 10.1016/S0140-6736(20)30183-5

[2] Al-Mulla F, Mohammad A, Al Madhoun A, Haddad D, Ali H, Eaaswarkhanth M, et al. ACE2 and FURIN variants are potential predictors of SARS-CoV-2 outcome: A time to implement precision medicine against COVID-19. Heliyon. 2021 Feb; 7(2): e06133. doi: 10.1016/j.heliyon.2021.e06133.

DOI: https://doi.org/10.54393/pjhs.v3i05.225

[3] Haddad D, John SE, Mohammad A, Hammad MM, Hebbar P, Channanath A, et al. SARS-CoV-2: Proof of recombination between strains and emergence of possibly more virulent ones. MedRxiv. 2020 Jan. doi: 10.1101/2020.11.11.20229765

[4] Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis. 2020 May; 20(5):533-534. doi: 10.1016/S1473-3099(20)30120-1

[5] Al-Shammari AA, Ali H, Al-Ahmad B, Al-Refaei FH, Al-Sabah S, Jamal MH, et al. Real-time tracking and forecasting of the COVID-19 outbreak in Kuwait: A mathematical modeling study. MedRxiv. 2020; 2020. doi: 10.1101/2020.05.03.20089771

[6] Bai Y, Yao L, Wei T, Tian F, Jin DY, Chen L, et al. Presumed Asymptomatic Carrier Transmission of COVID-19. JAMA. 2020 Apr; 323(14):1406-1407. doi: 10.1001/jama.2020.2565

[7] Lu X, Zhang L, Du H, Zhang J, Li YY, Qu J, et al. SARS-CoV-2 infection in children. New England Journal of Medicine. 2020 Apr; 382(17):1663-5. doi: 10.1056/NEJMc2005073

[8] Williamson E, Walker AJ, Bhaskaran K, Bacon S, Bates C, Morton CE, et al. OpenSAFELY: factors associated with COVID-19-related hospital death in the linked electronic health records of 17 million adult NHS patients. MedRxiv. 2020 Jan. doi: 10.1101/2020.05.06.20092999

[9] Williams R, Karuranga S, Malanda B, Saeedi P, Basit A, Besançon S, et al. Global and regional estimates and projections of diabetes-related health expenditure: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. Diabetes Research and Clinical Practice. 2020 Apr; 162:108072. doi: 10.1016/j.diabres.2020.108072

[10] Shaw JE, Sicree RA, Zimmet PZ. Global estimates of the prevalence of diabetes for 2010 and 2030. Diabetes Research and Clinical Practice. 2010 Jan; 87(1):4-14. doi: 10.1016/j.diabres.2009.10.007

[11] Basit A, Fawwad A, Qureshi H, Shera AS; NDSP Members. Prevalence of diabetes, pre-diabetes and associated risk factors: second National Diabetes Survey of Pakistan (NDSP), 2016-2017. BMJ Open. 2018 Aug; 8(8):e020961. doi: 10.1136/bmjopen-2017-020961

[12] Alahmad B, Al-Shammari AA, Bennakhi A, Al-Mulla F, Ali H. Fasting Blood Glucose and COVID-19 Severity: Nonlinearity Matters. Diabetes Care. 2020 Dec; 43(12):3113-3116. doi: 10.2337/dc20-1941

[13] Yang JK, Feng Y, Yuan MY, Yuan SY, Fu HJ, Wu BY, et al. Plasma glucose levels and diabetes are independent predictors for mortality and morbidity in patients with SARS. Diabetic Medicine. 2006 Jun; 23(6):623-8. doi: 10.1111/j.1464-5491.2006.01861.x

[14] Iacobellis G. COVID-19 and diabetes: Can DPP4 inhibition play a role? Diabetes Research and Clinical Practice. 2020 Apr; 162:108125. doi: 10.1016/j.diabres.2020.108125

[15] de Lucena TMC, da Silva Santos AF, de Lima BR, de Albuquerque Borborema ME, de Azevêdo Silva J. Mechanism of inflammatory response in associated comorbidities in COVID-19. Diabetes and Metabolic Syndrome. 2020 Aug; 14(4):597-600. doi: 10.1016/j.dsx.2020.05.025

[16] ARDS Definition Task Force, Ranieri VM, Rubenfeld GD, Thompson BT, Ferguson ND, Caldwell E, et al. Acute respiratory distress syndrome: the Berlin Definition. JAMA. 2012 Jun; 307(23):2526-33. doi: 10.1001/jama.2012.5669

[17] Levey AS, Eckardt KU, Tsukamoto Y, Levin A, Coresh J, Rossert J, et al. Definition and classification of chronic kidney disease: a position statement from Kidney Disease: Improving Global Outcomes (KDIGO). Kidney International. 2005 Jun; 67(6):2089-100. doi: 10.1111/j.1523-1755.2005.00365.x

[18] Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA. 2020 Mar; 323(11):1061-1069. doi: 10.1001/jama.2020.1585

[19] Williamson EJ, Walker AJ, Bhaskaran K, Bacon S, Bates C, Morton CE, et al. OpenSAFELY: factors associated with COVID-19 death in 17 million patients. Nature. 2020 Aug; 584(7821):430. doi: 10.1038%2Fs41586-020-2521-4

[20] Zhu L, She ZG, Cheng X, Qin JJ, Zhang XJ, Cai J, et al. Association of Blood Glucose Control and Outcomes in Patients with COVID-19 and Pre-existing Type 2 Diabetes. Cell Metabolism. 2020 Jun; 31(6):1068-1077.e3. doi: 10.1016/j.cmet.2020.04.021

[21] Marfella R, Paolisso P, Sardu C, Bergamaschi L, D'Angelo EC, Barbieri M, et al. Negative impact of hyperglycaemia on tocilizumab therapy in Covid-19 patients. Diabetes and Metabolism. 2020 Oct; 46(5):403-405. doi: 10.1016/j.diabet.2020.05.005

[22] Chen X, Hu W, Ling J, Mo P, Zhang Y, Jiang Q, et al. Hypertension and diabetes delay the viral clearance in COVID-19 patients. MedRxiv. 2020 Jan. doi: 10.1101/2020.03.22.20040774

[23] Shi Q, Zhang X, Jiang F, Zhang X, Hu N, Bimu C, et al. Clinical Characteristics and Risk Factors for Mortality of COVID-19 Patients With Diabetes in Wuhan, China: A Two-Center, Retrospective Study. Diabetes Care. 2020 Jul; 43(7):1382-1391. doi: 10.2337/dc20-0598.

DOI: https://doi.org/10.54393/pjhs.v3i05.225

[24] Donath MY and Shoelson SE. Type 2 diabetes as an inflammatory disease. Nature reviews immunology. 2011 Feb; 11(2):98-107. doi: https://doi.org/10.1038/nri2925

DOI: https://doi.org/10.54393/pjhs.v3i05.218

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Determination of Parental Concerns about Seizures among Children with Epilepsy

Rukhsana Kousar[1*], Rehana Samreen[2], Tahira Yasmeen[2], Tabeeta Ayub[2], Shakila Naz[2] and Musarrat Yasmin[2]

[1]Lahore School of Nursing, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan
[2]School of Nursing, University of Health Sciences, Lahore, Pakistan

ARTICLE INFO

Key Words:
Epilepsy, Fear, Parental Concern

How to Cite:
Kousar, R. ., Samreen, R., Yasmeen, T., Ayub, T., Naz, S., & Yasmin, M. (2022). Determination of Parental Concerns about Seizures among Children with Epilepsy: Parental Concerns about Seizures . Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.218

***Corresponding Author:**
Rukhsana Kousar
Lahore School of Nursing, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan
rukhsanakusar9909@gmail.com

Received Date: 10th October, 2022
Acceptance Date: 21st October, 2022
Published Date: 31st October, 2022

ABSTRACT

Epilepsy is often misunderstood and not taken seriously as compared to other diseases the reason behind it is a lack of health-related knowledge, poor economic condition, and shortness of health facilities in remote areas. **Objective:** To determine the parental concerns about seizures among children with epilepsy. **Methods:** A cross-sectional study was carried out in the Neurology division of a public hospital. After receiving informed consent, the current study involved 36 parents of epileptic patients. The parents of children with epilepsy who visited the neurology clinic (OPD) were included. The parent's concerns about seizures scale was used to measure parental worry about seizures in children with epilepsy. **Results:** 36 parents of epileptic patients were enrolled in the current study. There were 33.3% male and 66.7% female participants. The majority of the participants dealt with children having generalized seizure types. Parents were more concerned about seizures can lead to underlying disease 23(63.9), they are often concerned that their child's epilepsy has unknown cause 14(38.9), brain damage 13(36.1), loss of intelligence 17(47.2), and child developing emotional problems 13(36.1). They also show concern sometimes when a seizure may be triggered due to if they do or don't do something 22(61.1) and they also think that their child may have learning issues 11(30.6). **Conclusions:** The current study shows that parents play a vital role in improving the family functioning of epileptic families. Parents played an important role in helping children with epilepsy cope with their differences from other children.

INTRODUCTION

Epilepsy is the most serious and common neurological problem which was spread worldwide [1]. Epilepsy is an old common neurological condition. It occurs due to unprovoked spontaneous seizures [2]. Epilepsy has two or more unprovoked seizures happen more than 24 hours. Epilepsy is the chief neurological illness among children that affect approximately 50,000,000 individuals around the globe [3]. A population-based study was conducted in 1987, result of the study showed that the prevalence of active epilepsy in Pakistan was 0.98% with a 98.1% epilepsy treatment gap in the rural area. Moreover, 72.5% presence of stigma in the urban population [4]. Children having epilepsy with and other diseases face great difficulty in their social lives. Epilepsy influenced patients' family lives from different ways and creates multiple issues [5]. This disease not only changes the patient's behavior but also disturb the life of whole family. Moreover, the parents' of the epileptic patients some time diver their perception about religious and cultural beliefs due to this disease [6]. A study was conducted on parent's perspective had shown that the combination of fever and seizure in children, develop severe anxiety in their parents as the time of despair sometimes they proclaimed that their children are dying [7]. Many parents worried during the first epileptic seizure of their children, because they have continuous complain of seizure, so that it is a reason for their worries; however, what the parents think, fortunately, this disease easily curable, and rarely causes of cerebral injuries [8]. Parents need sufficient knowledge and awareness regarding epileptic seizure that is a preventive step to lessen their

DOI: https://doi.org/10.54393/pjhs.v3i05.218

anxiety. A study conducted on 154 parents whose children were suffering from epileptic seizure; 54.3% of them were trained individuals. They had ample knowledge about the disease. It was observed that there was a direct relation between parents' knowledge and their practice [9, 10]. Parental consciousness about epilepsy is significant factor in improving their child's health. However, related issues connected to febrile fever and seizure makes more disturbances for the parents. Moreover, kids' mental health progress is parental satisfaction in life. Due to a lack of understanding, parents of epileptic patients are unable to actively participate in decision-making, role and relationship development, or effective communication [11]. They cannot manage actively epileptic seizure at home because they have no training and knowledge regarding epilepsy. Parents played an important role in helping children with epilepsy cope with their differences from other children. Due to feelings of rejection, self-blame, and humiliation, parents often avoided telling friends and relatives about their child's epilepsy, as this increased their stress levels. Therefore, this study was conducted to determine the parental concerns about seizures among children with epilepsy.

METHODS

A cross-sectional study was carried out in the Neurology division of a public hospital. After receiving informed consent, the current study involved 36 parents of epileptic patients. The parents of children with epilepsy who visited the neurology clinic (OPD) were included, while the parents of those children who had not had seizures in the previous year were excluded. The parent's concerns about seizures scale was used to measure parental worry about seizures in children with epilepsy. The Statistical Package for Social Sciences (SPSS) version 26.0 was used for the statistical analysis.

RESULTS

Table 1 showed that 36.1% were less than 35 years, whereas majority were above 35 years of age. There were 33.3% male and 66.7% female participants. The majority of the participants dealt with children having generalized seizure types.

Age (Years)	Frequency (%)
< 35 years	13 (36.1%)
> 35 years	23 (63.9%)
Gender	
Male	12 (33.3%)
Female	24 (66.7%)
Residential area	
Urban	21 (58.3%)
Rural	15 (41.7%)
Type of Epilepsy	
Generalized	24 (66.7%)
Focal	12 (33.3%)

Table 1: Demographic Characteristics of Participants (N=36)

Parents were more concerned about seizures can lead to underlying disease 23 (63.9), they often concern about that their child epilepsy has unknown cause 14 (38.9), brain damage 13 (36.1), loss of intelligence 17 (47.2) and child developing emotional problems 13 (36.1). They also show concern sometimes when seizure may be trigged due to if they do or don't do something 22 (61.1) and they also think that their child may have learning issues 11 (30.6). The overall effect of parents concern about seizure scale shows highest concern about their child (Table 2).

DOI: https://doi.org/10.54393/pjhs.v3i05.218

Sr. No.	Statements	All the Time n (%)	Often n (%)	Sometimes n (%)	Hardly Ever n (%)	Never n (%)
1	I worry that my child's seizures might be caused by an underlying problem such as a brain tumo	23 (63.9)	7 (19.4)	5 (13.9)	1 (2.8)	0 (0)
2	I worry that there might not be a known cause for my child's seizures	8 (22.2)	14 (38.9)	12 (33.3)	1 (2.8)	1 (2.8)
3	I worry that my child's seizures might be caused by something I did or did not do	3 (8.3)	7 (19.4)	22 (61.1)	3 (8.3)	1 (2.8)
4	I worry that my child might have brain damage from the seizures	9 (25.0)	13 (36.1)	10 (27.8)	3 (8.3)	1 (2.8)
5	I worry that my child might have a loss of intelligence from the seizures	11 (30.6)	17 (47.2)	3 (8.3)	5 (13.9)	0 (0)
6	I worry that my child might die from the seizures	9 (25.0)	17 (47.2)	6 (16.7)	2 (5.6)	2 (5.6)
7	I worry that my child might develop learning problems from the seizures	6 (16.7)	10 (27.8)	11 (30.6)	7 (19.4)	2 (5.6)
8	I worry about the side-effects of anti-seizure medicine on my child	6 (16.7)	9 (25.0)	16 (44.4)	2 (5.6)	3 (8.3)
9	I worry about my child developing emotional problems because of the seizures	11 (30.6)	9 (25.0)	13 (36.1)	1(2.8)	2(5.6)

Table 2: Parent Concerns about Seizures Scale (Pre-Intervention)

DISCUSSION

Most parents were impacted when their child was diagnosed with epilepsy because it came with a number of negative effects for the family, including "the loss of a perfect child" and the knowledge that the child might always be different from other kids due to their disease [12]. Growing up with epilepsy meant coping with a lot of uncertainty, fear, and the necessity for continuous monitoring. Parents must develop coping mechanisms for a variety of issues, including special diets, medication, academic difficulties, frequent hospital stays, behavioral issues, and more [13]. In current study 36.1% were less than 35 years, whereas majority were above 35 years of age. There were 33.3% male and 66.7% female participants. The majority of the participants dealt with children having generalized seizure types. In a study conducted in an Arab experience shows that if the caregiver was female, less educated, and parent of epilepsy patients had significant effect on their QOL. Females have to face more social, emotional and physical problems [14]. In this study majority of the participants belong to rural area. This would be the reason behind poor management and family functioning as they have not much knowledge about epilepsy, medications, nutrition, access to medical services and treatment methods. These findings were supported by different studies which showed that majority of participants were from rural area [13, 15]. According to study, people who are close to someone who has epilepsy may get uneasy around them and fear being left alone with the person's child because they are unsure of how to deal with a seizure that might occur. These are the fear of parents which lead them their concern about parents and their self-esteem get down around socialism [16]. According to studies, people who experience seizures particularly early in life and who are usually quiet and resistant to treatment are more likely to experience cognitive deficits. These deficits could also depend on other characteristics like the number, duration, nature, and antiepileptic drug therapy [17, 18]. The majority of parents were worried about how epilepsy, if it persisted into adulthood, might affect their child's future. One of their worries was that the seizures would cause their child to experience emotional issues. According to previous research, the majority of parents of children with chronic seizures worried about their children getting married, particularly in regards to their ability to become pregnant, their ability to disclose their epilepsy before getting married, and the potential repercussions of doing so. They believed that people would react negatively to them, and this perception was influenced by how the general population treated those who had epilepsy [19, 20].

CONCLUSIONS

Parents played an important role in helping children with epilepsy cope with their differences from other child. Proper and correct support from family is essential for patient care and management.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Thijs RD, Surges R, O'Brien TJ, Sander JW. Epilepsy in adults. Lancet. 2019 Feb; 393(10172):689-701. doi: 10.1016/S0140-6736(18)32596-0

[2] Ullah S, Ali N, Ali S, Khan A, Ahmad S, Uddin Z. Distribution of Different Genotypes MTHFR and GABRG2 Genes in Epileptic Population of Khyber Pakhtunkhwa Pakistan. Clinical Schizophrenia & Related Psychoses. 2020 Oct; 14(2):34-8.

[3] Fraser RT, Johnson EK, Lashley S, Barber J, Chaytor N, Miller JW, et al. PACES in epilepsy: Results of a self-management randomized controlled trial. Epilepsia. 2015 Aug; 56(8):1264-74. doi: 10.1111/epi.13052

[4] Asare RO. Knowledge, Attitude and Practice Regarding Epilepsy among Nurses in Asutifi North District (Doctoral Dissertation). 2019

[5] Jain P, Subendran J, Smith ML, Widjaja E; PEPSQOL

DOI: https://doi.org/10.54393/pjhs.v3i05.218

Study Team. Care-related quality of life in caregivers of children with drug-resistant epilepsy. Journal of Neurology. 2018 Oct; 265(10):2221-2230. doi: 10.1007/s00415-018-8979-4

[6] Mogal Z and Aziz H. Epilepsy treatment gap and stigma reduction in Pakistan: A tested public awareness model. Epilepsy and Behavior. 2020 Jan; 102:106637. doi: 10.1016/j.yebeh.2019.106637

[7] O'Toole S, Lambert V, Gallagher P, Shahwan A, Austin JK. Talking about epilepsy: Challenges parents face when communicating with their child about epilepsy and epilepsy-related issues. Epilepsy Behavior. 2016 Apr; 57(Pt A):9-15. doi: 10.1016/j.yebeh.2016.01.013

[8] Zakirova-Engstrand R, Hirvikoski T, Westling Allodi M, Roll-Pettersson L. Culturally diverse families of young children with ASD in Sweden: Parental explanatory models. PLoS One. 2020 Jul; 15(7):e0236329. doi: 10.1371/journal.pone.0236329

[9] Hughes JR. Did all those famous people really have epilepsy? Epilepsy Behavior. 2005 Mar; 6(2):115-39. doi: 10.1016/j.yebeh.2004.11.011

[10] Watila MM, Balarabe SA, Ojo O, Keezer MR, Sander JW. Overall and cause-specific premature mortality in epilepsy: A systematic review. Epilepsy Behavior. 2018 Oct; 87:213-225. doi: 10.1016/j.yebeh.2018.07.017

[11] Yang H, Chi Y, Zhu Z, Huang K, Xiang L, Xiao B, et al. Attitudes Toward Epilepsy Among Parents of Children With Epilepsy in Southern China. Frontiers in Neurology. 2021 Feb; 11:602000. doi: 10.3389/fneur.2020.602000

[12] Amudhan S, Gururaj G, Satishchandra P. Epilepsy in India II: Impact, burden, and need for a multisectoral public health response. Annals of Indian Academy of Neurology. 2015 Dec; 18(4):369-81. doi: 10.4103/0972-2327.165483

[13] Baca CB, Vickrey BG, Hays RD, Vassar SD, Berg AT. Differences in child versus parent reports of the child's health-related quality of life in children with epilepsy and healthy siblings. Value Health. 2010 Oct; 13(6):778-86. doi: 10.1111/j.1524-4733.2010.00732.x

[14] Ohaeri JU, Awadalla AW, Farah AA. Quality of life in people with epilepsy and their family caregivers. An Arab experience using the short version of the World Health Organization quality of life instrument. Saudi Medical Journal. 2009 Oct; 30(10):1328-35

[15] Baca CB, Vickrey BG, Vassar SD, Berg AT. Seizure recency and quality of life in adolescents with childhood-onset epilepsy. Epilepsy Behavior. 2012 Jan; 23(1):47-51. doi: 10.1016/j.yebeh.2011.10.010

[16] Jacoby A and Austin JK. Social stigma for adults and children with epilepsy. Epilepsia. 2007; 48 Suppl 9:6-9. doi: 10.1111/j.1528-1167.2007.01391.x

[17] Helmstaedter C. The impact of epilepsy on cognitive function. Journal of Neurology, Neurosurgery & Psychiatry. 2013 Sep; 84(9):e1-. doi: 10.1136/jnnp-2013-306103.14

[18] Lee YJ, Park HJ, Recchia SL. Embracing each other and growing together: redefining the meaning of caregiving a child with disabilities. Journal of Child and Family Studies. 2015 Dec; 24(12):3662-75. doi: 10.1007/s10826-015-0175-x

[19] Mu PF. Transition experience of parents caring of children with epilepsy: a phenomenological study. International Journal of Nursing Studies. 2008 Apr; 45(4):543-51. doi: 10.1016/j.ijnurstu.2006.10.009

[20] Holmes GL. Effect of Seizures on the Developing Brain and Cognition. Seminars in Pediatric Neurology. 2016 May; 23(2):120-6. doi: 10.1016/j.spen.2016.05.001.

DOI: https://doi.org/10.54393/pjhs.v3i05.214

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Psychosocial Stressors in Patients Presenting with Depression Episodes

Naeem Ullah Leghari [1], Bushra Akram [2] and Ahmad Bilal [2]

[1]Department of Psychiatry & Behavioral Sciences, Nishtar Medical University, Multan

[2]Department of Applied Psychology, The Islamia University of Bahawalpur

ARTICLE INFO

Key Words:

Depression, Ssubsequent Depressive Episodes, Psycho-social stressors, Life events

How to Cite:

Leghari , N. U. ., Akram , B. ., & Bilal, A. (2022). Psychosocial Stressors in Patients Presenting with Depression Episodes: Psychosocial Stressors in Patients. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.214

***Corresponding Author:**

Ahmad Bilal

Department of Applied Psychology, The Islamia University of Bahawalpur

ahmadbilal4@gmail.com

Received Date: 8th October, 2022

Acceptance Date: 17th October, 2022

Published Date: 31st October, 2022

ABSTRACT

Depression is a mood disorder characterized by aversion to activities that affects a person's thoughts, behaviour, feelings, and sense of well-being. **Objective:** To explore the psychosocial stressors / life events and demographic variables in patients with major depression in 1st and subsequent episodes with related sociodemographic factors in each. **Methods:** The sample of this study was 50 consecutive in-patients with Major Depression. Detailed open-ended interview was conducted and also administered The Presumptive Stressful Life Events Scale (PSLES) to elicit psychosocial stressors and major life events in 1st episode and in the subsequent episodes. **Results:** showed that of the 50 subjects, majority of subjects 32(64%) were female, 13 (26%) were 26-30 years' age group, 33(66%) belonged to urban area, 23(46%) were suffering from 3rd and more depressive episodes, 21(42%) reported positive family history, 28(56%) were suffering for 3 months. In psychosocial stressors / life events, 26% had Death of spouse, in Marital and Sexual factors 16% patients reported relationship effect with spouse in 1st, 22% in 2nd and 30% in 3rd Depressive episode and in financial difficulties 12% patients in 1st episode, 20% and 28% in subsequent episodes. **Conclusions:** Study concluded that there was difference of psychosocial stressors in 1st and subsequent episodes of depression.

INTRODUCTION

Depression is a mood disorder characterized by aversion to activities that affects a person's thoughts, behavior, feelings, and sense of well-being [1]. Sadness, nervousness, emptiness, hopelessness, frightened, powerless, worthless, guilty, irritated, hurt, or restless feelings are common in depressed persons. They may lose interest in formerly pleasurable activities, lose their appetite or overeat, have difficulty concentrating, remembering information, or making decisions, and consider or attempt suicide. Insomnia, excessive sleeping, weariness, a lack of energy, or aches, pains, or digestive issues that do not respond to treatment are all possible symptoms [2]. Major depression is one of the most common mental illnesses, with a complex aetiology. Depression affects people of all genders, ages, and backgrounds. Childhood traumatic traumas and current stressful life events have been determined to be important risk factors for major depression, in addition to hereditary variables [3]. There is a well-established link between life stress and major Depression. Unemployment, chronic social difficulties and persistent financial strains, health-related difficulties and loss of (close) social contacts, death of a loved one / family member or friend, job problems / the loss of a job, relationship problems, separation, childbirth, menopause, and natural disasters such as earthquakes, hurricanes, tornadoes, and other natural disasters have all been found to be risk factors for depression in several studies [4]. In a positive event, such as going to marriage, moving to a new home, place / city, or starting a new business or new job, can also cause stress. It's not unusual

DOI: https://doi.org/10.54393/pjhs.v3i05.214

for either happy or bad occurrences to turn into a crisis that leads to clinical depression [5]. Researchers have created a theory termed "learned helplessness" to explain how stressful events might lead to depression. According to this idea, people learn to feel helpless as a result of chronic or recurrent stressful occurrences. When a person believes he or she has no control over a difficult circumstance, this sense of helplessness is heightened. Depressed people frequently hold negative attitudes about their abilities to handle many elements of their lives, based on perceived failures in the past [6]. Recurrence has been linked to demographic (gender, married status, or economic position), clinical (age of onset, severity of episode index, comorbidity, or a familial history of affective disorders), and psychosocial characteristics (cognitions, personality, social support, or stressful life events) [7]. The contrast between early and subsequent episodes, as well as their relationship to stressors, is important for conceptual and practical reasons [4]. Kessler is one of many who has pointed out that most depression researches focus on recurrence because only a small percentage of depressed patients will suffer their first episode, and the predictors of first and subsequent episodes are likely to differ [8]. It is said that compared with subsequent episodes of depression, the 1st episode of depression is more likely to be preceded by major psychological stressors [9]. According to Nuggerud-Galeas et al. (2020), those who have previously had a major depressive episode may have a high recurrence rate, which is defined as the occurrence of a new major depressive episode after a previous one has completely resolved. The initial episode has an average recurrence time of about 3 years, while the subsequent episodes have an average recurrence time of between 1 and 1.5 years. During the first few months of recovery, the chance of recurrence is higher [7]. The aim of the present study was to explore the psychosocial stressors / life events and demographic variables in patients with major depression in 1st and subsequent episodes with related sociodemographic factors in each, reporting to Department of Psychiatry & Behavioral Sciences, Nishtar Medical University & Hospital, Multan.

METHODS

A Descriptive study was conducted in the Department of Psychiatry & Behavioural Sciences, Nishtar Medica University & Hospital, Multan from October, 2021 to December, 2021. The sample size was 50 consecutive in-patients of Depression. They were admitted in Department of Psychiatry & Behavioural Sciences. All the patients included in the study who fulfilled the criteria and patients excluded from the study who did not fulfil the criteria and with any organic brain syndromes, other psychiatric morbidity and alcohol or any other drug abuse. Diagnostic and Statistical Manual (DSM-V) criteria was for Depression used to diagnosed the patients [10]. All the information according to proforma and data collected after written informed consent and ensured confidentially. Detailed open-ended interview was conducted and also administered The Presumptive Stressful Life Events Scale (PSLES) [11] to elicit psychosocial stressors and major life events in 1st episode and in the subsequent episodes. Statistical Package for Social Sciences (SPSS) version 23.0 was using to analysed the data and to find out percentages and frequencies. Tables were used to showed findings and study results such as gender, age groups, marital status, locality, educational status, income, depressive episode, duration of index episode, family history of depression and psychosocial stressors & life events in all Depressive episodes.

RESULTS

Table 1 shows Demographic Characteristics of subjects. Out of 50 subjects, majority of patients 32(64%) were female, 13 (26%) were 26-30 years' age group, 33(66%) belonged to urban area, 23(46%) were single, 13(26%) were students and 16(32%) were housewives (n=50).

Characteristics	Frequency (%)
GENDER	
Females	32 (64%)
Males	18 (36%)
AGE GROUPS	
16-20	9 (18%)
21-25	12 (24%)
26-30	13 (26%)
31-35	4 (8%)
36-40	8 (16%)
41-45	4 (8%)
MARITAL STATUS	
Single	23 (46%)
Married	21 (42%)
Divorced	6 (12%)
LOCALITY	
Rural	17 (34%)
Urban	33 (66%)
EDUCATION	
Uneducated	9 (18%)
Primary	6 (12%)
Middle	5 (10%)
Matric	7 (14%)
F.A	4 (8%)
B.A	12 (24%)
M.A	7 (14%)
OCCUPATION	
Unemployed	5 (10%)
Student	13 (26%)
House wife	16 (32%)

DOI: https://doi.org/10.54393/pjhs.v3i05.214

Employed	11(22%)
Farmer	5(10%)
MONTHLY INCOME	
6000-10000	3(6%)
11000-15000	2(4%)
16000-20000	6(12%)
21000-25000	6(12%)

Table 1: Demographic Detail

Table 2 shows Episodes of Depression. Out of 50 patients 23(46%) were suffering from 3rd and more depressive episodes and it also shows the Duration of Index Episode. Out of 50 patients 28(56%) were suffering for 3 months and 11(22%) for 4 to 6 months.

NO OF EPISODES	FREQUENCY (%)	DURATION OF INDEX EPISODE	FREQUENCY (%)
1st Episode	17(34%)	0-3 Months	28(56%)
2nd Episode	10(20%)	4-6 Months	11(22%)
3rd and More Episodes	23(46%)	7-9 Months	3(6%)
		10-12 Months	8(16%)

Table 2: Episode and Duration of Depression

Table 3 shows Family History of Depression. Out of 50 patients, 29(58%) reported No family history & 21(42%) reported family history of Depression.

FAMILY HISTORY	FREQUENCY (%)
No Family History	29(58%)
Mother	13(26%)
Father	6(12%)
Sibling	2(4%)

Table 3: Family History of Depression

Table 4 shows list of major life events and psychosocial stressors of The Presumptive Stressful Life Events Scale (PSLES). In each subject, more than one stressor was found. In psychosocial stressors / life events, 26% had Death of spouse, in Marital and Sexual factors 16% patients reported relationship effect with spouse in 1st, 22% in 2nd and 30% in 3rd Depressive episode and in financial difficulties 12% patients in 1st episode, 20% and 28% in subsequent episodes. And 6% patients were facing lack of child or infertility in 1st Depressive episode and with time it increased 12% in 2nd episode and 16% in 3rd Depressive episode. Same 12% patients reported financial difficulties in 1st, 20% in 2nd and 28% in 3rd Depressive episode.

STRESSORS	1ST EPISODE (%)	2ND EPISODE (%)	3RD & MORE EPISODES (%)
FAMILY AND SOCIAL			
Conflict with In-laws	14%	6%	-
Disturbed relationship with family	22%	18%	2%
WORK			
Fired from work	4%	-	-
FINANCIAL			
Financial Difficulties	12%	20%	28%
Property issues	8%	4%	-
Business loss	6%	4%	2%
MARITAL AND SEXUAL			
Disturbed Relationship with spouse	16%	22%	30%
Marriage against will	8%	-	-
Divorced	6%	10%	15%
Sexual Problems	4%	6%	10%
Sexual Abused	4%	-	-
Lack of child	6%	12%	16%
HEALTH			
Physical illness	8%	6%	4%
BEREAVEMENT			
Death of spouse	26%	-	-
Death of close Family Member	15%	8%	4%
EDUCATION			
Ending School / Study	6%	4%	2%
Failure in Examination	16%	4%	6%
COURTSHIP AND COHABITATION			
Break-up of Engagement/ Love Affair	14%	2%	2%
Getting Married	4%	-	-

Table 4: Psychosocial Stressors / Stressful Life Events

DISCUSSION

In this research, 64% were females & 36% were males presenting with Depression. This was in concordance with another research by Lewinsohn, et al., where the 52% were females and 26% were male [12], however other researchers reported female and male ratio respectively 74%-26% [5], 64%-36% [13] and 83.2%-16.8% [14]. In the present study, majority of the subjects 26% were presented with Depression at 26-30 years & 24% were from 21-25 years' age group. This is in accordance with observation of other studies in which all subjects of 18-58 years [5] and 32.4% subjects were from 20-30 years [14], 44% were from 25-29 years [15], 100% were from 35-50 years of age group presented with Depression [16]. In this research, 66% belonged to urban area, 46% were single, 26% were students, 32% housewives & 11% employed but the socio-economic status was low. This is in accordance with various other researchers reported. According to other studies 58% [5], 53% patients were single [13], 31% were from urban area [13] and People who met the poverty level criteria had a higher rate of major depression than those who did not [6]. In this study, 34% of the patients were suffering from 1st episode, 20% 2nd episode and 46% suffering from 3rd and more episodes. Amongst them 56% of the patients were suffering from Depression for 3 months & 22% for 4 to 6 months. This is in keeping with various other researches. According to Roca, et al., each episode of depression increases the chances of subsequent episodes: up to 60% of all patients who suffer one episode will undergo at least one recurrence in their

DOI: https://doi.org/10.54393/pjhs.v3i05.214

lifetime [17]. According to study, 70% patients were of first onset and 43% were from recurrent episodes [12], Nandrino et al., 2004 explained in his study, 46% were suffering from 1st episode and 54% were recurrent episode and a total of 50% to 85% of patients who experience a depressive episode will have at least one more episode [18]. In present study, 58% of the patients suffering from Depression had no family history and 42% had positive family history of Depression. People with a family history of depression have long been known to be at a high risk to develop the mental illness [19]. Present research revealed that majority of subjects reported more than one stress. In present study, 26% had Death of spouse in first episode, and death of close family member 15% in 1st episode, 8% in 2nd episode and 4% in 3rd episode. This is in accordance with other researches. One study by Slavich, 16.3% patients reported death of spouse / close family member in 1st episode [5]. Depression is more common among the bereaved, particularly among those who have lost a spouse or child. When compared to married women and men, widows and widowers have a higher risk of getting major depression. Clayton et al, found that 35% of widows had enough symptoms to meet criteria for major depression 1 month after the death of a husband in their study of widowhood [20]. According to study by Chouinard et al, most people become depressed as a result of significant adversity, such as the death of a loved one or divorce, researchers discovered that roughly 30% of people with first-time depression and 60% of people with a history of depression develop the disorder as a result of relatively minor misfortunes [21]. In present study, 14% patients reported conflict with In-laws in 1st and 6% in 2nd Depressive episode, 22% reported disturbed relationship with family in 1st and 18% in 2nd Depressive episode, 16% patients reported relationship effect with spouse in 1st, 22% in 2nd and 30% in 3rd Depressive episode, 8% reported marriage against will in 1st Depressive episode, 6% divorced in 1st, 10% in 2nd and 15% in 3rd Depressive episode and 14% had breakup issue in 1st episode, 2% in 2nd and 3rd Depressive episode. It is in accordance with other studies reported. According to these studies, 68% [22] and 34.9% [23] patients reported with dysfunctional families, 40.5% were not satisfied with family situation and 22.4% were not satisfied with housing situation [14]. In a study by Rounsaville et al., Results showed 76 moderately depressed married patients who received outpatient maintenance treatment for depression, around 25% of those with marital disagreements or disputes and after treatment had a significant improvement in their marriage during course of treatment [24]. In our Pakistani culture, disturbed relationship with spouse or in-laws and marriage against will always lead to divorce. According to a survey by Gallup & Gilani, 2019 in Pakistan, 02 out of 05 Pakistanis believed that in-laws are responsible for most of divorce cases and 58% at the time also believed that divorce rates have increased in Pakistan [25]. In this study, 12% patients reported financial difficulties in 1st, 20% in 2nd and 28% in 3rd Depressive episode, 6% reported business loss in 1st, 4% in 2nd and 2% in 3rd Depressive episode, 8% reported property issues and 4% fired from word / trouble with boss in 1st Depressive episode. In other studies, on depression recurrence, for example, life stress has almost exclusively referred to severe and major negative life events, such as the loss of stable job, and so on, are common [26]. According to other studies, 7.1% job stress [27], 33.3% not satisfied with working situation, 32.9% poor finance in 1st depressive episodes [14]. One study result on nurses in Pakistan showed 27.1% poor environment, 21.4% heavy work load, 12.9% occupational hazards [15]. In this study widows also reported financial difficulties after death of spouse. Other studied found prevalence of depression was 19.2% [28] and explained that in Asian culture sexually, emotionally and economically exploitation or abuse of widows is very common [29]. In Pakistan one study by Gopang et al., 2017 at Karachi widows that facing depression, its results sowed 7% widows earning 3000 to 4000rs per month and faced financial difficulties & 53.85% widows facing bad attitude of family and society [30]. In this study, 26% patients were students, in which 16% reported exam failure in 1st, 4% in 2nd and 6% in 3rd depressive episode and 6% reported ending school / study in 1st, 4% in 2nd and 2% in 3rd Depressive episode. Examination stress among children and teenagers is unquestionably higher than it has ever been. Smith reported one student killed himself with his father's shotgun because he had failed his physics paper and one more student hanged himself from a tree because he believed he would not pass his math [31].In this study, 6% patients were facing lack of child or infertility in 1st Depressive episode and with time it increased 12% in 2nd episode and 16% in 3rd Depressive episode. In Pakistani culture female suffer socially, emotionally and psychological due to family pressure for lack of child or infertility and it's a major stress for a married woman that lead to depression. According to Pakistani studies 20% were mild depression, 11% moderate to severe depression and 49% suffering from Moderate Depression and 10% Severe Depression due to infertility [32-33]. In some other stressors of present study, 8% patients were reported physical illness in 1st, 6% in 2nd and 4% in 3rd Depressive episode. People suffering from any physical disease experience more psychological and emotionally distress than the healthy people. Risk of depression also increased due to poor physical health, especially it is very common in

DOI: https://doi.org/10.54393/pjhs.v3i05.214

chronically ill patients[34].

CONCLUSIONS

Study concluded that there was difference of psychosocial stressors in 1st and subsequent episodes of depression.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Jager KJ, Kovesdy C, Langham R, Rosenberg M, Jha V, Zoccali C. A single number for advocacy and communication—worldwide more than 850 million individuals have kidney diseases. Nephrology Dialysis Transplantation. 2019 Nov; 34(11):1803-5.

[2] Trappey AJ, Lin AP, Hsu KY, Trappey CV, Tu KL. Development of an Empathy-Centric Counseling Chatbot System Capable of Sentimental Dialogue Analysis. Processes. 2022 May;10(5):930.

[3] Assari S and Lankarani MM. Stressful Life Events and Risk of Depression 25 Years Later: Race and Gender Differences. Public Health Frontier. 2016 Mar; 4:49. doi: 10.3389/fpubh.2016.00049.

[4] Kendler KS and Gardner CO. Depressive vulnerability, stressful life events and episode onset of major depression: a longitudinal model. Psychological Medicine. 2016 Jul; 46(9):1865-74. doi: 10.1017/S0033291716000349.

[5] Slavich GM, Monroe SM, Gotlib IH. Early parental loss and depression history: associations with recent life stress in major depressive disorder. Journal of psychiatric research. 2011 Sep; 45(9):1146-52. doi: 10.1016/j.jpsychires.2011.03.004.

[6] Song X and Vilares I. Assessing the relationship between the human learned helplessness depression model and anhedonia. PLoS One. 2021 Mar;16(3): e0249056. doi: 10.1371/journal.pone.0249056.

[7] Nuggerud-Galeas S, Sáez-Benito Suescun L, Berenguer Torrijo N, Sáez-Benito Suescun A, Aguilar-Latorre A, et al. Analysis of depressive episodes, their recurrence and pharmacologic treatment in primary care patients: A retrospective descriptive study. PLoS One. 2020 May; 15(5): e0233454. doi: 10.1371/journal.pone.0233454.

[8] Kessler RC, Berglund P, Demler O, Jin R, Koretz D, *et al.* National Comorbidity Survey Replication. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). Journal of the American Medical Association. 2003 Jun; 289(23):3095-105. doi: 10.1001/jama.289.23.3095.

[9] Mitchell PB, Parker GB, Gladstone GL, Wilhelm K, Austin MP. Severity of stressful life events in first and subsequent episodes of depression: the relevance of depressive subtype. Journal of Affective Disorders. 2003 Feb; 73(3):245-52. doi: 10.1016/s0165-0327(01)00479-7.

[10] American Psychiatric Association, American Psychiatric Association. DSM-5 Task Force Diagnostic and statistical manual of mental disorders: DSM-5. Washington. DC: American Psychiatric Association 2013.

[11] Singh G, Kaur D, Kaur H. Presumptive stressful life events scale (PSLES)—a new stressful life events scale for use in India. Indian journal of psychiatry. 1984 Apr; 26(2):107.

[12] Lewinsohn PM, Allen NB, Seeley JR, Gotlib IH. First onset versus recurrence of depression: differential processes of psychosocial risk. Journal of Abnormal Psychology. 1999 Aug; 108(3):483-9. doi: 10.1037//0021-843x.108.3.483.

[13] Steunenberg B, Beekman AT, Deeg DJ, Kerkhof AJ. Personality predicts recurrence of late-life depression. Journal of Affective Disorders. 2010 Jun; 123(1-3):164-72. doi: 10.1016/j.jad.2009.08.002.

[14] Strömberg R, Backlund LG, Löfvander M. Psychosocial stressors and depression at a Swedish primary health care centre. A gender perspective study. BMC Family Practice. 2011 Nov; 12:120. doi: 10.1186/1471-2296-12-120.

[15] Irfan U, Sheikh S, Faisal M. Frequency of depression due to stress in female nurses. Khyber Medical University Journal. 2010; 2(1):10-4.

[16] Brilman EI and Ormel J. Life events, difficulties and onset of depressive episodes in later life. Psychological Medicine. 2001 Jul; 31(5):859-69. doi: 10.1017/s0033291701004019.

[17] Roca M, Gili M, Garcia-Campayo J, Armengol S, Bauza N, García-Toro M. Stressful life events severity in patients with first and recurrent depressive episodes. Social Psychiatry and Psychiatric Epidemiology. 2013 Dec; 48(12):1963-9. doi: 10.1007/s00127-013-0691-1.

[18] Nandrino JL, Dodin V, Martin P, Henniaux M. Emotional information processing in first and recurrent major depressive episodes. Journal of psychiatric research. 2004 Oct; 38(5):475-84. doi: 10.1016/j.jpsychires.2004.03.002.

[19] Shadrina M, Bondarenko EA, Slominsky PA. Genetics Factors in Major Depression Disease. Frontiers in psychiatry. 2018 Jul; 9:334. doi: 10.3389/ fpsyt.

DOI: https://doi.org/10.54393/pjhs.v3i05.214

2018.00334.
[20] Clayton PJ, Halikas JA, Maurice WL. The depression of widowhood. The British Journal of Psychiatry. 1972 Jan; 120(554):71-7. doi: 10.1192/bjp.120.554.71.
[21] Chouinard G, Chouinard VA, Corruble E. Beyond DSM-IV bereavement exclusion criterion E for major depressive disorder. Psychotherapy and Psychosomatics. 2011; 80(1):4-9. doi: 10.1159/000316966.
[22] Ebrahim EM. The relationship of expressed emption with mental health in the families of bipolar patients. Revista Publicando. 2018;5(17):52-7.
[23] Reinares M, Bonnín CM, Hidalgo-Mazzei D, Sánchez-Moreno J, Colom F, Vieta E. The role of family interventions in bipolar disorder: A systematic review. Clinical psychology review. 2016 Feb; 43:47-57. doi: 10.1016/j.cpr.2015.11.010.
[24] Rounsaville BJ, Weissman MM, Crits-Christoph K, Wilber C, Kleber H. Diagnosis and symptoms of depression in opiate addicts. Course and relationship to treatment outcome. archives of general psychiatry. 1982 Feb; 39(2):151-6. doi: 10.1001/archpsyc.1982.04290020021004.
[25] Jha V. Current status of end-stage renal disease care in India and Pakistan. Kidney International Supplements. 2013 May; 3(2):157-60.
[26] Monroe SM and Harkness KL. Life stress, the "kindling" hypothesis, and the recurrence of depression: considerations from a life stress perspective. Psychological review. 2005 Apr;112(2):417-45. doi: 10.1037/0033-295X.112.2.417.
[27] Wang J. Work stress as a risk factor for major depressive episode(s). Psychological medicine. 2005 Jun;35(6):865-71. doi: 10.1017/s0033291704003241.
[28] Blanner Kristiansen C, Kjær JN, Hjorth P, Andersen K, Prina AM. Prevalence of common mental disorders in widowhood: A systematic review and meta-analysis. Journal of Affective Disorders. 2019 Feb; 245:1016-1023. doi: 10.1016/j.jad.2018.11.088
[29] Trivedi JK, Sareen H, Dhyani M. Psychological aspects of widowhood and divorce. Mens Sana Monographs. 2009 Jan; 7(1):37-49. doi: 10.4103/0973-1229.40648.
[30] Gopang N, Khushik AG, Begum S, Saeed S. An Analysis of Socio-Economic Conditions of Widows Living in Sindh University Colony Jamshoro, Sindh. The Women-Annual Research Journal of Gender Studies. 2012 Mar;4.
[31] O'Connor RC, Rasmussen S, Hawton K. Predicting depression, anxiety and self-harm in adolescents: The role of perfectionism and acute life stress. Behaviour research and therapy. 2010 Jan; 48(1):52-9.
[32] Abbasi S, Kousar R, Sadiq SS. Depression and anxiety in Pakistani infertile women. Journal of surgery Pakistan. 2016 Jan; 21(1):13-7.
[33] Yusuf L. Depression, anxiety and stress among female patients of infertility; A case control study. Pakistan Journal of Medical Sciences. 2016 Dec; 32(6):1340-1343. doi: 10.12669/pjms.326.10828.
[34] Ohrnberger J, Fichera E, Sutton M. The relationship between physical and mental health: A mediation analysis. Social Science and Medicine. 2017 Dec; 195:42-49. doi: 10.1016/j.socscimed.2017.11.008.

DOI: https://doi.org/10.54393/pjhs.v3i05.253

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Assessment of Aerobic Fitness Associated with Moderate Intensity Exercise

Afnan Khan[1], Asad Hussain Shaikh[2], Muhammad Zafar Iqbal Butt[3], Muhammad Jamil[4], Alamgir Khan[3], Javad Ali Soomro[4], Manzoor Khan[5], Zeliha Selamoglu[6], Betul Ozdemir[6] and Abdul Manan Khan[7]

[1]Department of Physical Education, E&SE Khyber Pakhtunkhwa, Pakistan
[2]Sukkur IBA University, Sukkur, Pakistan`
[3]Department of Sports Sciences and Physical Education, University of the Punjab, Lahore, Pakistan
[4]Center of Physical Education, Health and Sports Sciences, University of Sindh, Jamshoro, Pakistan
[5]Department of Sport Sciences and Physical Education, Gomal University, Dera Ismail Khan, Pakistan
[6]Department of Medical Cardiology, Faculty of Medicine, Nigde Omer Halisdemir University, Nigde, Turkey
[7]Department of Economics, Gomal University, Dera Ismail Khan, Pakistan

ARTICLE INFO

Key Words:
Exercise, Intensity, Volume, Aerobic Fitness

How to Cite:
Khan, A. ., Hussain Shaikh, A. ., Iqbal Butt, M. Z., Jamil, M. ., Khan, A. ., Soomro, J. A. ., Khan, M. ., Selamoglu, Z. ., Ozdemir, B. ., & Khan, A. M. . (2022). Assessment of Aerobic Fitness Associated with Moderate Intensity Exercise: Aerobic Fitness Associated with Moderate Intensity Exercise. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.253

***Corresponding Author:**
Muhammad Jamil
Center of Physical Education, Health and Sports Sciences, University of Sindh, Jamshoro, Pakistan
meharjamil88@gmail.com

Received Date: 16th October, 2022
Acceptance Date: 25th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Sound health is considered a basic need of every individual. It allows a person to enjoy routine activities. **Objective:** To examine the impact of moderate intensity exercise on aerobic fitness. **Methods:** Participants of the study were voluntarily selected from the department of sports science and Physical Education, Gomal University, Dera Ismail Khan, KPK, Pakistan. In addition, the participants of the study were categorized as; control group (CG =20) and experimental groups (EG-20). A self-made exercise protocol of twelve weeks was applied on the selected subjects and thus for the assessment of aerobic fitness, Harvard Step Test, developed by Brouha *et al.*, (1943) was used. The collected data were tabulated and were analyzed by using appropriate statistical tools *i.e.* Percentage, Means, Standard Deviation, Paired Sample t-Test and ANOVA. **Results:** The study found significant difference were found between pre & post cardiovascular fitness of male subject i.e. $t(9) = -21.433$, sig. = .000 < α= .05. Similarly, significant difference was found between pre & post cardiovascular fitness of female subject i.e. $t(9) = -25.249$, sig = .000 < α= .05. According to the results of this research study, it may be recommended that the Physical education and exercise must be a necessary subject for all college, school and university level students or the student is necessary to take the subject of physical education and exercise for each year so that their cardiovascular fitness is maintained. **Conclusions:** The study concluded that moderate intensity exercise has significant impact on aerobic fitness of respondents.

INTRODUCTION

Sound health is considered a basic need of every individual. It allows a person to enjoy routine activities [1, 2]. Cardiovascular health plays an important role in promoting and staying healthy. Exercise with moderate volume and intensity promote and maintain the functional capacity of cardiovascular system (CVS) [3]. Cardiovascular health refers to the state of all the allied organs of heart which function properly without any problem. Sometime the term aerobic fitness also used for cardiovascular health. Aerobic activities play an important role in overall development of cardiovascular health [4]. More oxygen is required for aerobic exercise [5, 6]. Regular exercise promotes cardiovascular health. A person with regular exercise having more strong heart. Different studies indicate active individual with regular exercise has little chances of heart problems [7, 8]. Various allied organs of cardiovascular system and respiratory system collectively called cardiovascular system. Blood receive oxygen from lungs resultant to air that we breathe. Muscles need oxygen to stay healthy. In addition, blood removes all the waste

DOI: https://doi.org/10.54393/pjhs.v3i05.253

products given off by active muscles cells. This blood is returned back to heart by veins for further purification [8, 9]. Resting heart in ranged from 70 to 80 beats per minutes. Findings of previous research studies indicate that a person with sound fitness level usually having RHR of 50 which is considered million times better than a person with poor fitness level [10-12]. Exercise promote immune system that enable a person to stay healthy and to avoid health complications. Healthy heart easily purifies blood and provide oxygen to all organs of the body. Poor heart function may cause different health problems; therefore, regular exercise may help us to strengthen the functional capacity of heart [13]. Both CVS and respiratory system helps in provision of oxygen and nutrients and also helps to relives the carbon dioxide (CO2) and wastes products of metabolic system. In addition, it also helps in temperature preservation and acid-base balance, and carrying of hormones from the endocrine glands to their target organs [12-15]. The authors further suggested that 4 to 5 kilometers daily walk can improve the function of CVS or aerobic system. Even if aerobic exercise remains the preferred exercise for elderly because it is safer and it conditions directly the cardiovascular component, while strength exercise is more dangerous, because it causes sudden changes in the system that are hard to be held by an inefficient heart but the improvement in muscle mass can also benefit the cardio circulatory component to greater efficiency of the muscular pump function [13]. As a result of critical analysis of the above discussion now it is well defined that exercise and cardiovascular health or aerobic fitness are interrelated to each other. How much exercise play its role in the development and maintenance of cardiovascular health? To discover the fact, the researcher decided to carry a research study under the title "Assessment of aerobic fitness associated with moderate intensity exercise.

METHODS

The researcher adopted the following procedures for reaching at certain findings and conclusion. Male and female students from the Department of Sports Science and Physical Education, Gomal University were included as the population of the study. Participants were randomly categorized into two groups i.e. control group (CG) and experimental group (EG). Each group was comprised of 20 subjects. A self-made exercise protocol of twelve weeks was applied on the selected subjects and thus for the assessment of aerobic fitness, Harvard Step Test, developed by Brouha et al., (1943) was used. Ethical approval was taken from the ethical research and review board of Gomal University, Dera Ismail Khan, KPK, Pakistan. Consent was taken from all the participants before participation in the study. Risks and benefits of participation in the study were also ensured. The placid data were administered through statistical package of social sciences (SPSS, version-26) and thus apt statistical tools were applied for the analysis of data.

RESULTS

The results of paired sample t-test among the sampled male respondents in cardiovascular fitness. Before the exercise the cardiovascular mean was 24.331, Standard deviation was 6.164 and after the exercise the cardiovascular fitness of male respondents was increased and reached at mean 87.054, standard deviation 9.921. The relationship between pre and post cardiovascular fitness was positively 42%. The table 1 indicates that there is significant difference between pre cardiovascular fitness of male and post cardiovascular of male t(9)= -21.433, sig.= .000 < a= .05. Hence according to the hypothesis there is significant difference between the cardiovascular fitness of the male before and after the applying aerobic exercise protocol is hereby accepted.

Testing Variable	Mean±SD	N	R (Pre & Post)	T	Df	Sig.
Cardiovascular Fitness of Male pre Training	24.3310± 6.16462	10	.415	-21.43	9	.000
Cardiovascular Fitness of Male post Training	87.0540± 9.92101	10				

Table 1: showing the comparison of male pre and male post training cardiovascular fitness

The results of paired sample t-test among the sampled female respondents in cardiovascular fitness. Before the exercise the cardiovascular mean was 20.45, Standard deviation was 3.15 and after the exercise the cardiovascular fitness of female respondents was increased and reached at mean 85.69, standard deviation 9.20. The relationship between pre and post cardiovascular fitness was positively 48%. The above table indicates that there is significant difference between pre cardiovascular fitness of female and post cardiovascular of female t(9)= -25.249, sig.= .000 < a= .05. Hence the hypothesis there is significant difference between the cardiovascular fitness of the female before and after the applying aerobic exercise protocol is hereby accepted.

Testing Variable	Mean±SD	N	R (Pre & Post)	T	Df	Sig.
Cardiovascular Fitness of Female pre Training	20.4570± 3.15124	10	.415	-21.43	9	.000
Cardiovascular Fitness of Female post Training	85.6900± 9.20962	10				

Table 2: showing the comparison of female pre and female post training cardiovascular fitness

The result of one factor ANOVA regarding deference of cardiovascular fitness with reference to the body types (ectomorph, mesomorphs, endomorphs) of male and female students in the department of sports sciences and

DOI: https://doi.org/10.54393/pjhs.v3i05.253

Physical Education of Gomal University D.I. Khan. The above figures in the table depicts that Ectomorphs (M=22.848, SD=6.145, n= 7), Mesomorphs (M=21.940, SD= 4.802, n=11) Endomorphs (M=23.300. SD=6.618, n=02), F (2,17)=.091, sig=.914> .05. The data indicates that there is no significant difference in pre training of cardiovascular fitness in respect of body types.

Body Types	N	Mean±SD	Df	F	Sig.
Ectomorphs	7	22.848±6.145	(2,17)	.091	.914
Mesomorphs	11	21.940±4.802			
Endomorphs	2	23.300±6.618			

Table 3: showing the pre training difference of cardiovascular fitness of respondents in respect of their body types

The result of one factor ANOVA regarding deference of cardiovascular fitness with reference to the body types (Ectomorph, Mesomorphs, and Endomorphs) of respondents. The Table also indicate that ectomorphs (M=22.848, SD=6.145, n= 7), Mesomorphs (M=21.940, SD=4.802, n=11) Endomorphs (M=23.300. SD=6.618, n=02), F (2,17)=.091, sig=.914>.05. The data indicates that there is no significant difference in pre training of cardiovascular fitness in respect of body types (Ectomorph, Mesomorphs, and Endomorphs) of respondents.

Body Types	N	Mean±SD	Df	F	Sig.
Ectomorphs	7	22.8486±6.14529	(2,17)	.091	.914
Mesomorphs	11	21.9400±4.80299			
Endomorphs	2	23.3000±6.61852			

Table 4: showing post training difference of cardiovascular fitness of respondents in respect of their body types

DISCUSSION

After careful analysis, the researcher found that the percentage of ectomorphs were (35%), mesomorphs were (55%) and endomorphs were recorded (10%). Therefore, majority of subjects were found in good physical status by having BMI ranged from 18 to 24. This finding is supported by that the physical activity or exercise in the youth bring positive change in BMI [16, 17, 19]. In 1958 British birth cohort, BMI increased gradually throughout adulthood. In this study the researcher investigated that proper exercise can brings positive change in body, mass, index (BMI). Exercise helps in maintenance body weight. The author further stated that exercise and body mass index is closely related with exercise. This finding is looked like the finding of the present study. The study concluded that majority of the both male and female subjects during pre-test were found in poor category in term of cardiovascular fitness. The study indicated that majority of the male subjects during post-test were found in average category in term of cardiovascular fitness. This emerging concept is supported [19-21] by concluding that increased level of physical activity level led to rise directly measured highest aerobic fitness in moderate obese subjects participating in the 6-week exercise. The study found significant difference were found between pre & post cardiovascular fitness of male subject i.e. t (9) = -21.433, sig. = .000 < a= .05. Similarly, significant difference was found between pre & post cardiovascular fitness of female subject i.e. t (9) = -25.249, sig = .000 < a= .05. According to the results of this research study, it may be recommended that the Physical education and exercise must be a necessary subject for all college, school and university level students or the student is necessary to take the subject of physical education and exercise for each year so that their cardiovascular fitness is maintained. The study conducted by [22, 23] found that students of urban have lower levels of cardiovascular fitness as compared with students of rural. Cardiovascular fitness is familiar as a significant component of health and it may be essential for the performance of functional activities. Therefore, this finding is also seemed inline of the present study findings. Demographic perspective of respondents also effects by the exercise adaptation of the subjects. Similarly, body status means body types is very positive influenced by the exercise [20,23].

CONCLUSIONS

On the bases of analysis and findings the researcher arrived at conclusion that cardiovascular fitness of both male and female students were poor during pre-test and during post-test and found at average category. The body mass index of both male and female may change as a result of exercise and similarly as result of exercise, many of the subjects' changed its body category from endomorph to mesomorph. In addition, the researcher also concluded that exercise effect the heart rate of a person and similarly during pre-test and post-tests of both gender's (male and female) pulse rate were found significantly change, it means that exercise effects the pulse rate of a person.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Patil NT, Shinde VS, Gajula B. A one-pot catalysis: the strategic classification with some recent examples. Organic & Biomolecular Chemistry (OBC). 2012 Jan; 10(2):211-24. doi: 10.1039/c1ob06432k.

[2] Amusa TO. Effects of three pre-treatment techniques on dormancy and germination of seeds of Afzelia africana (Sm. Ex pers). Journal of Horticulture and forestry. 2011 Apr; 3(4):96-103.

DOI: https://doi.org/10.54393/pjhs.v3i05.253

[3] Selamoglu Z, Duranni MR, Jamil M, Khan S, Tanweer AM, Tanweer AJ, et al. Exercise as an Emerging Factor Effecting Cardiovascular Health (An Experimental Approach). Journal of Pharmaceutical Research International. 2021 Dec; 193-205.
[4] Bassett DR Jr and Howley ET. Limiting factors for maximum oxygen uptake and determinants of endurance performance. Medicine & Science in Sports & Exercise (MSSE). 2000 Jan; 32(1):70-84. doi: 10.1097/00005768-200001000-00012.
[5] Vlachopoulos C, O'Rourke M, Nichols WW. McDonald's blood flow in arteries: theoretical, experimental and clinical principles. CRC press; 2011 Jul.
[6] Khan A, Khan S, Khan S, Khan D, Bharti S, Zain Z. Exercise is more important than Medicines: A Clinical Approach. International Journal of Medical Research & Health Sciences. 2019; 8(6):75-9.
[7] Kenney WL, Wilmore JH, Costill DL. Physiology of sport and exercise. Human kinetics; 2021 Oct.
[8] Peláez JR and Yndurain FJ. Pion-pion scattering amplitude. Physical Review D. 2005 Apr; 71(7):074016.
[9] Tanaka H, Monahan KD, Seals DR. Age-predicted maximal heart rate revisited. Journal of the American College of Cardiology. 2001 Jan; 37(1):153-6. doi: 10.1016/s0735-1097(00)01054-8.
[10] Hillig T, Krustrup P, Fleming I, Osada T, Saltin B, Hellsten Y. Cytochrome P450 2C9 plays an important role in the regulation of exercise-induced skeletal muscle blood flow and oxygen uptake in humans. Physiology journal 2003 Jan; 546(1):307-14. doi: 10.1113/jphysiol.2002.030833.
[11] Åstrand PO, Rodahl K, Dahl H, StrÃ SB. Textbook of work physiology: physiological bases of exercise. Human kinetics; 2003.
[12] Hoffman J. Physiological aspects of sport training and performance. Human Kinetics; 2014 Mar.
[13] Beashel P, Sibson A, Taylor J. The world of sport examined. Nelson Thornes; 2001.
[14] Moroz V and Van Schaftingen J. Groundstates of nonlinear Choquard equations: existence, qualitative properties and decay asymptotics. Journal of Functional Analysis. 2013 Jul; 265(2):153-84.
[15] Graham I, Atar D, Borch-Johnsen K, Boysen G, Burell G, Cifkova R, et al. European Society of Cardiology (ESC) Committee for Practice Guidelines (CPG). European guidelines on cardiovascular disease prevention in clinical practice: executive summary: Fourth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (Constituted by representatives of nine societies and by invited experts). European heart journal. 2007 Oct; 28(19):2375-414. doi: 10.1093/eurheartj/ehm316.
[16] Yin RK. Applications of case study research. sage; 2011 Jun.
[17] Chambers D, Huang C, Matthews G. Basic physiology for anaesthetists. Cambridge University Press; 2019 Jul.
[18] Lethbridge TC, Sim SE, Singer J. Studying software engineers: Data collection techniques for software field studies. Empirical software engineering. 2005 Jul; 10(3):311-41.
[19] Brouha L. The step test: A simple method of measuring physical fitness for muscular work in young men. Research Quarterly. American Association for Health, Physical Education and Recreation. 1943 Mar; 14(1):31-7.
[20] Gaskins RB, LaGasse LL, Liu J, Shankaran S, Lester BM, Bada HS, et al. Small for gestational age and higher birth weight predict childhood obesity in preterm infants. American journal of perinatology. 2010 Oct; 27(09):721-30.
[21] Bize R, Johnson JA, Plotnikoff RC. Physical activity level and health-related quality of life in the general adult population: a systematic review. Preventive medicine. 2007 Dec; 45(6):401-15. doi: 10.1016/j.ypmed.2007.07.017.
[22] Muhammad N, Khan A, Butt MZ, Khan S, Nazir S, Asghar E, K et al. Effect of Moderate Intensity Exercise on Lungs Functions (IRV & ERV) in Young Athletes. kidney. 2021; 8(9):10.
[23] Khan A, Khan A, Butt MZ, Khan S, Khan S, Selamoglu Z, et al. Analysis of Blood Serum Bilirubin Concentration among Moderate Intensity Exercise Performers; A Randomized Control Trails 2021.

DOI: https://doi.org/10.54393/pjhs.v3i05.207

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Establishing Pediatric Cardiac Surgery Unit in Underprivileged Area. An Audit of First 100 Cases & Challenges Faced

Iqbal Hussain Pathan[1*], Jai Parkash[2], Naresh Kumar[3], Muhammad Farhan Khan[1], Naveed Nek[1]

[1]Department of Cardiac Surgery, Gambat Institute of Medical Sciences (GIMS), Sindh, Pakistan
[2]Department of Anesthesia, Gambat Institute of Medical Sciences (GIMS), Sindh, Pakistan
[3]Department of Pediatric Cardiac Surgery, Gambat Institute of Medical Sciences (GIMS), Sindh, Pakistan

ARTICLE INFO

Key Words:

Cardiac Surgery, Pediatric, Congenital, Heart Defects, Underprivileged

How to Cite:

Hussain Pathan, I., Parkash, J. ., Kumar, N. ., Farhan Khan, M. ., & Nek, N. . (2022). Establishing Pediatric Cardiac Surgery Unit in Underprivileged Area an Audit of First 100 Cases & Challenges Faced: Pediatric Cardiac Surgery Unit in Underprivileged Area. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.207

***Corresponding Author:**

Iqbal Hussain Pathan
Department of Cardiac Surgery, Gambat Institute of Medical Sciences (GIMS), Sindh, Pakistan
driqbalnicvd@gmail.com

Received Date: 5th October, 2022
Acceptance Date: 14th October, 2022
Published Date: 31st October, 2022

ABSTRACT

There is significant global improvement has been observed in declining of under 5-year mortality from 93 deaths per 1,000 births in 1990 to 39 in 2017 (58%). Nevertheless, congenital anomalies predominantly cardiac are still leading cause of under five-year-old mortality**. Objective:** The aim of this audit was to present our experiences of first hundred cases of congenital heart defects surgeries along with the challenges faced during the establishment of new pediatric cardiac surgery center in underprivileged area. **Methods:** This was an audit of the first 100 cardiac surgeries performed for congenital heart defects at Gambat Institute of Medical Science from 15- 3- 2021 to1-10-2022. During the period challenges other then related with surgical interventions; more than an investment of money but political, cultural, and social faced. **Results:** The mean age was 9+/-6.5 years, with female predominance of 57. Sever pulmonary hypertension was present in 6 patients. The majority of our patients were from RACHS1 score category 1. Out of 100 patient open heart surgeries were 89(89%) and close heart were 11(11%). We have single mortality of patient underwent Tetralogy of Fallot correction developed massive stroke and expired at 5th postoperative day. Three patients were re explored for bleeding while one required emergency reopening in PICU for cardiac arrest. Post clamp removal arrhythmias were observed in 7(7%) patients. We received three patients in emergency from Pediatric cardiology post intervention including device embolization, device malposition and acute Mitral regurgitation post intervention. **Conclusions:** Providing Pediatric cardiac surgery services to the children of remote and socioeconomically deprived area is a greatly rewarding. It has many challenges other than providing direct patient care.

INTRODUCTION

There is significant global improvement has been observed in declining of under 5-year mortality from 93 deaths per 1,000 births in 1990 to 39 in 2017 (58%) [1,2]. This was the result of significant improvement in control and prevention of communicable diseases and over all maternal and child care. Nevertheless, after infection third most common reason of the less than five years' age mortality is congenital anomalies with predominant congenital cardiac defects with significant socioeconomic impact on the community [3]. It is estimated the prevalence of congenital heart defects are 8 to 12 children per thousand live birth [4].

There is extreme unequal access for definite health care for children with congenital heart defects with less than 100000 compare to over 1.3 million born every year with congenital heart defects [5]. Resulting improve survival in high income countries with already low birth rate leaving low income countries where burden is heaviest and disabilities continue to raise [6,7]. Regrettably this desired care is mostly provided to a small fortunate number of children residing in North America, Western Europe. There are sporadic centers with excellent care are also available in major metropolitan areas of many other countries

DOI: https://doi.org/10.54393/pjhs.v3i05.207

throughout world thanks to the individuals with commitment. There are multi factorial reasons for such unequal distribution of care. Required allotment of resources, clinical care, and development of cost-effective treatment strategies requires assessment of the burden of congenital heart diseases problem in community, that is often lacking in underdeveloped countries due to prevalence of home deliveries and non-availability of experienced pediatricians in primary and secondary care maternity setups for early detection. In Pakistan 60000 children born with congenital heart defects every year with 11% mortality during first month of life [8,9]. In the state of Sind second largest populated state of Pakistan with estimated population of more 48 million, there is only one government supported institute NICVD providing all type of cardiovascular management. The PAQSJ institute of medical sciences a multidisciplinary institute located in tinny city of Gambat in the state of Sind planned to start the setup for pediatric cardiac services. Our team was approached for this challenging position. In spite of all challenges, our commitment and promised economic potential enable us to anticipate positive developments, including rapid growth of pediatric cardiac services. To overcome these challenges a "Pediatric Cardiac Team" was then established including pediatric cardiac surgeon, pediatric cardiologist, cardiac anesthetic and pediatric ICU manager and a part time pediatric cardiac perfusionist. Further recruitment of staff was carried out from local population including three staffs and two technicians for PICU. While rest of staff was involved from preexisting adult cardiac surgery team as per requirements.

METHODS

The first Open heart surgery was done at 20-03-2021 that was a7 year old child with Atrial Septal Defect LI. Clinical assessment and appropriate investigations were done as per standard including PCR for COVID 19 at the time of admission (no more perquisite until suspicious) and before surgery if time period between admission and surgery was more than five days. Transthoracic echocardiography was repeated in the presence of surgeon in all cases for diagnosis after admission in surgical ward. All open heart surgeries were done under tepid(30 to 32c)to moderate(28 c) cardiopulmonary bypass with aortic and bicaval cannulation. Myocardial protection was with cold blood Delnido(self constituted by percussionist in Ringer Lactate solution)cardioplegia in all cases transfused via Aortic root at pressure of 100mmgh and visual assessment of aortic distension and topical cooling with frequent cold saline irrigation. Patients were weaned off from bypass with selected ionotropic support with adenaline add-on milrinon add on noradrenaline in order of our preference. we use Wernovsky IS for calculation of ionotropic score of patients [10]. Following surgery, the patients were transferred to the Intensive Care unit with Propofol infusion and planned for fast tract exultation. Nevertheless, if patient planned for prolong intubation then our choice was intermittent or infusion of Attracurium with Nalbuphine. Patients remained in PICU till discharge. The patients were usually seen 2 weeks afterwards in the cardiothoracic department. Demographic and clinical data were collected from medical notes and mobile software of surgilog(mobile application)from surgeon's personal data base. These data included patient age, diagnosis, surgical procedure, preoperative use of inotropic and vasoactive medications, and duration of CPB and aortic cross clamp and outcome on excel sheet. In addition, patients were categorized by the Risk adjusted congenital heart surgery (RACHS-1) method as described by Jenkins [11]. Data were recorded on excel sheet. All continuous variables were expressed as Mean with standard deviation, and qualitative variables were expressed as numbers with percentages.

RESULTS

A total of 100 surgeries involving congenital heart defects were carried out from 20/03/2021 to 1/10/2022. The demographic characters of patients are shown in table 1. consisting of 89(89%) open heart surgeries and 11 close heart surgeries. The patients had a mean age of 9.1=/-6.5 years with the youngest of 2years. With female 57 and male 43. The patients in all had a mean weight of 23 +/- 13.5 kg with minimum weight of 10 kg and maximum of 61 kg.

Female : Male	57:43
Age	9.1 +/- 6.542016 (years)
Weight	23.09 +/- 13.606 kg
On pump :off pump	89:11
Pump time	112.7586 +/- 58.5 minutes
Cross clamp time	54.67816 +/- 38.6 minutes

Table 1: Demographic and Operative variables of patients

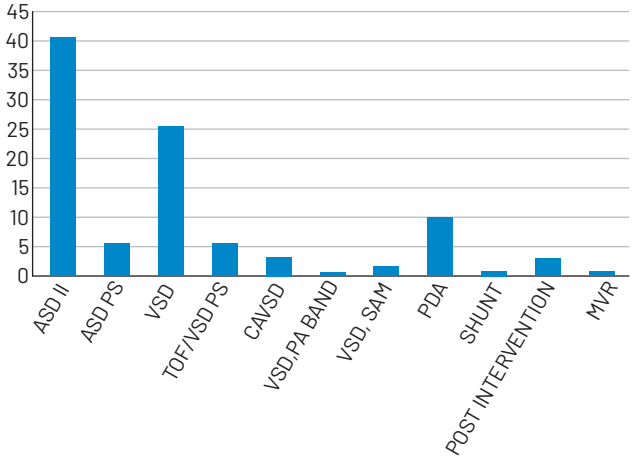

Figure 1: Anatomical Diagnosis of patient population

DOI: https://doi.org/10.54393/pjhs.v3i05.207

The diagnosis of patients is shown in chart 1 with the Risk Adjusted classification for Congenital Heart Surgery (RACHS-1) was used to classify the patient's population for surgical risks shown in table 2.

RACHS1 Category	Patients
1	51
2	42
3	4

Table 2: RACHS 1 risk category of patient population

Group	Ionotrope score
1	<10
2	10 to 14
3	15 to 19
4	20 to 24
5	>25

Table 3: Groups with ionotrope score10

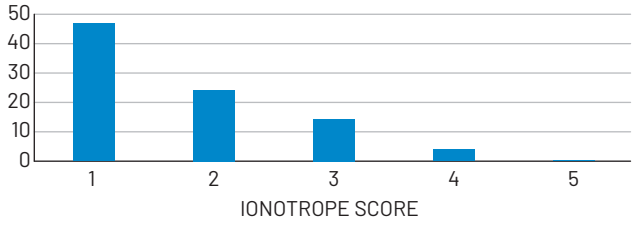

Figure 2: Ionotropic Score of patients at the PICU receiving

DISCUSSION

Pediatric cardiology department established in NICVD, Karachi in 1984 [13]. It is the first government supported institute looking after the children with congenital or acquired heart defects; children are brought from all over the Sind, southern Punjab and Baluchistan travel to Karachi for their treatment till our team accepted the challenge to establish second government supported unit of pediatric cardiac services in Sind. Importance of new unit can be well understandable from the observation of Kowalsky and others [14]. for each 100 km of distance traveled by patient to reach health care facility he or she will be delayed for 1.4 times of median age ideally desired for their respective intervention for cardiac problem this difference was even becomes twice if family belongs to rural locations. There were echoes of concerns from inside and outside about all obstacles when planning for establishing a new set up. Most of the colleagues have opposite of opinion of leaving a well established institute considering it a downhill course. Rao and others elaborate the challenges to establish cardiovascular care like limited financial support, deficient health care infrastructure, competing priorities, and unavailability of well trained pediatric cardiac care specialists [15]. Working in under privilege area is rewarding if we look at statics with 85 to 90% of the world's children are born in regions where cardiac surgery is not available [16,17]. That suggest about millions of Children as 28% children born with congenital defects have cardiac involvement who remain alive worldwide with heart problems, waiting for surgery, and new babies are born every day with congenital heart defects [18]. It is always should be taken in consideration prior to intervene and help to develop any type of project, its problems and resistances. Out, together with the local staff, exactly what is needed and how it can be addressed. Though financial resources are a major concern, supposition that it is the only or even the predominant problem is a common misconception instead always be ready for some difference of opinions are the real concerns for establishing a new project. The commonly faced resistances are to accept a new program or team includes: political obstacles problems, mostly local (institutional) and national levels, cultural differences such as skills (acceptance of others abilities and qualities), individual priorities, lifestyles and the "brain drain (unavailability of local expertise) [19]. Many of the time political will is very encouraging and enthusiastic for establishing the new unit till ribbon cut and few photographs. Furthermore, a more drastic effect is change of political will is diversion of assigned logistic and equipment to other new priority. Similarly, local politics may be the result of significant competition between individual providers for the scare of their existing position or sharing of the financial or logistics. There may be certain attitudes or acts from local staff considered unprofessional or against work ethics for a new appointee needed to be tactfully address to avoid any unwanted confrontation. Establishing a successful and sustainable program require a team of highly committed trained members who work in coordinate fashion with tolerance and commitment. The unavailability of local train staff is a major reason of failure. Locally trained staffs working in big cities most of the time not willing to back to native places. Adequate salary offer is crucial for reverse brain drain of experienced staff. Even the hiring a highly trained person has its own limitations and concerns due to non availability of advance instruments and professional support. Another major reason preventing reverse brain drain is desire of achieving higher position considering more growth potential compare to under developed regions. Furthermore, social life style, opportunities and concern for education of children are other major concerns. Nevertheless, despite of all challenges and resistances we have to understand the problems and then look forward for solution. Especially when we look at the statics about 15 million children are died or crippled from cardiac conditions waiting or searching for treatment almost all belong to underprivileged areas [20]. Most of the time planning is made sitting remotely or by quick visit well impressed from the enthusiasm from local bosses and

DOI: https://doi.org/10.54393/pjhs.v3i05.207

colleagues and subordinates with warm welcoming gesture. Therefore, there shall be few visits and predefined strategy to determine the rules of proceeding. Furthermore, to proceed ahead needs frequent involvements of administration to maintain their attention towards us rather than after ribbon cut all interests diverted to other desires. This needs frequent communication. Our target shall be to achieve the aim rather indulging and arguing with how it will be achieved. There shall be willingness to accept their thought. It is imperative to identify, "fertile land", where people are doing good work, and sorting out their help through the concept of a twinning program. Our struggle is still in infancy where more problems listed still awaiting the solution. Many of the times we have to accept palliations despite of having definitive cure of our problems.

CONCLUSIONS

Providing pediatric cardiac surgery services to the children of remote and socioeconomically deprived area is a greatly rewarding. It has many challenges other than providing direct patient care. To achieve a sustainable program tolerance, commitment and adaption with the system is prerequisite.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Murala JS, Karl TR, Pezzella AT. Pediatric cardiac surgery in low-and middle-income countries: present status and need for a paradigm shift. Frontiers in pediatrics. 2019 Jun; 7:214. doi: 10.3389/fped.2019.00214.

[2] Gray ER, Turbé V, Lawson VE, Page RH, Cook ZC, Ferns RB, et al. Ultra-rapid, sensitive and specific digital diagnosis of HIV with a dual-channel SAW biosensor in a pilot clinical study. NPJ digital medicine.2018 Aug; 1(1):1-8.

[3] Nguyen N and Pezzella AT. Pediatric cardiac surgery in low- and middle-income countries or emerging economies: a continuing challenge. Journal of the World Society for Pediatric and Congenital Heart Surgery (WSPCHS). 2015 Apr; 6(2):274-83. doi: 10.1177/2150135115574312.

[4] Hoffman JIe. The global burden of congenital heart disease. Cardiovascular journal of Africa. 2013 May; 24(4):141-5. doi: 10.5830/CVJA-2013-028.

[5] Polivenok I, Gelatt M, Cardarelli M. Cardiac surgical missions: what works, what does not, where we need to go from here. Current Opinion in Cardiology. 2020 Jan; 35(1):76-79. doi: 10.1097/HCO.0000000000000691.

[6] Musa NL, Hjortdal V, Zheleva B, Murni IK, Sano S, Schwartz S, et al. The global burden of paediatric heart disease. International journal of cardiology. 2017 Dec; 27(S6): S3-S8. doi: 10.1017/S1047951117002530.

[7] Van Der Linde D, Konings EE, Slager MA, Witsenburg M, Helbing WA, Takkenberg JJ, et al. Birth prevalence of congenital heart disease worldwide: a systematic review and meta-analysis. Journal of the American College of Cardiology. 2011 Nov; 58(21):2241-7.

[8] Khokhar RA, Gowa MA, Bangash SK, Tahir A. The Spectrum of Pediatric Cardiac Procedures and Their Outcomes: A Six-month Report from the Largest Cardiac Facility in Sindh, Pakistan. Cureus. 2019 Aug;11(8): e5339. doi: 10.7759/cureus.5339.

[9] Pathan IH, Bangash SK, Khawaja AM. Spectrum of heart defects in children presenting for paediaric cardiac surgery. Pakistan Heart Journal. 2016; 49(1).

[10] Wernovsky G, Wypij D, Jonas RA, Mayer JE Jr, Hanley FL, Hickey PR, et al. Postoperative course and hemodynamic profile after the arterial switch operation in neonates and infants. A comparison of low-flow cardiopulmonary bypass and circulatory arrest. Circulation. 1995 Oct; 92(8):2226-35. doi: 10.1161/01.cir.92.8.2226.

[11] Jenkins KJ, Gauvreau K, Newburger JW, Spray TL, Moller JH, Iezzoni LI. Consensus-based method for risk adjustment for surgery for congenital heart disease. The Journal of Thoracic and Cardiovascular Surgery. 2002 Jan; 123(1):110-8. doi: 10.1067/mtc.2002.119064.

[12] Gaies MG, Gurney JG, Yen AH, Napoli ML, Gajarski RJ, Ohye RG, et al. Vasoactive-inotropic score as a predictor of morbidity and mortality in infants after cardiopulmonary bypass. Journal of pediatric critical care. 2010 Mar; 11(2):234-8. doi: 10.1097/PCC.0b013e3181b806fc.

[13] Javed S, Bajwa TH, Bajwa MS, Shah SS. Current status of paediatric cardiac surgery in Pakistan. Annals of King Edward Medical University. 2021 Jul; 27(2).

[14] Kowalsky RH, Newburger JW, Rand WM, Castañeda AR. Factors determining access to surgery for children with congenital cardiac disease in Guatemala, Central America. Cardiology in the Young. 2006 Aug; 16(4):385-91. doi: 10.1017/S1047951106000412.

[15] Rao SG. Pediatric cardiac surgery in developing countries. Pediatric cardiology. 2007 Apr; 28(2):144-

DOI: https://doi.org/10.54393/pjhs.v3i05.207

8. doi: 10.1007/s00246-006-1452-7.
[16] Mock C and Cherian MN. The global burden of musculoskeletal injuries: challenges and solutions. Clinical Orthopaedics and Related Research. 2008 Oct; 466(10):2306-16. doi: 10.1007/s11999-008-0416-z.
[17] Pezzella AT. International cardiac surgery: a global perspective. Seminars in Thoracic and Cardiovascular Surgery. 2002 Oct;14(4):298-320. doi: 10.1053/stcs.2002.0140298.
[18] Dolk H, Loane M, Garne E; European Surveillance of Congenital Anomalies (EUROCAT) Working Group. Congenital heart defects in Europe: prevalence and perinatal mortality, 2000 to 2005. Circulation. 2011 Mar; 123(8):841-9. doi: 10.1161/Circulationaha.110.958405.
[19] Novick WM, Molloy F, Bowtell K, Forsberg B, Pavanić M, Polivenok I, et al. Pediatric cardiac service development programs for low-and middle-income countries in need of improving or initiating local services. Frontiers in pediatrics. 2019 Sep; 7:359.
[20] Yacoub MH. Establishing pediatric cardiovascular services in the developing world: a wake-up call. Circulation. 2007 Oct; 116(17):1876-8. doi: 10.1161/Circulationaha.107.726265.

DOI: https://doi.org/10.54393/pjhs.v3i05.272

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 3, Issue 5 (October 2022)

Original Article

Age versus HBA1c: Which is a better predictor of Acute Kidney Injury in Diabetics after CABG?

Wardah Saleem[1], Fayaz Iqbal[2] and Fatima Saleem[3]

[1]Department of Cardiac Surgery, National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan
[2]Department of Surgery, Lady Reading Hospital, Peshawar, Pakistan
[3]Rehman Medical Institute, Peshawar, Pakistan

ARTICLE INFO

Key Words:
Acute kidney injury, diabetes, CABG, age, HBA1c, KDIGO

How to Cite:
Saleem, W. ., Iqbal, F., & Saleem, F. . (2022). Age Versus HBA1c: Which Is a Better Predictor of Acute Kidney Injury in Diabetics After CABG? Age versus HBA1c: Which is a better predictor of Acute Kidney Injury in Diabetics after CABG?. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.272

***Corresponding Author:**
Wardah Saleem
Department of Cardiac Surgery, National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan
wardah.saleem@ymail.com

Received Date: 16th October, 2022
Acceptance Date: 24th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Diabetes is a proven risk factor for the development of Acute Kidney Injury after CABG. Other multiple factors that are involved in causing AKI after CABG like pre-operative renal dysfunction, long CPB time, and low cardiac output syndrome. We controlled all the variables, to study the difference between age and HBA1c levels in predicting acute kidney injury after CABG. **Objective:** The purpose of the study is to take the diabetic population and control other variables involved in the causation of AKI after CABG and study the role of age versus HBA1c levels in predicting AKI after elective CABG. **Methods:** A total of 200 diabetic patients who underwent elective CABG were selected from May 2021 to May 2022 at NICVD Karachi. The KDIGO criteria for AKI was applied. **Results:** The incidence of AKI in our study was 36.5%. 52.7% patients developed AKI with HBA1c of 6.5 – 7.4%; 40% developed AKI with HBA1c levels of 7.5 – 8.4%, 16% AKI with HBA1c of 8.5 to 8.9%, 12% AKI in patients with HBA1c of 9 – 9.4%, 18% AKI with HBA1c of 9.5 – 9.9%, 20% for HBA1c of 10.01 – 10.04% and 83.3% for HBA1c > 10.04%. There was a 4.35% frequency of AKI for ages between 40 – 49 years; 26.8% frequency for ages between 50 – 59 years; 50.7% AKI for 60 -69 years and 84% for the population between 70 to 80 years. **Conclusions:** Increasing age is a better predictor of acute kidney injury following CABG than increasing HBA1c levels till the HBA1c level of 10.04% after which it becomes equivalent to the risk as present in diabetics above 70 years old.

INTRODUCTION

Acute kidney injury (AKI) is a common complication after cardiac surgery occurring in about 30 % of patients [1]. Diabetes Mellitus possess an increased risk of AKI after CABG. AKI not only impairs kidney function but also puts a strain on the function of lungs, brain, and gut and adds a 5-fold increase in the risk of death with AKI [2]. Acute coronary syndrome is one of the dominant causes of AKI [3]. Renal ischemia, hemolysis, inflammation, hemolysis, cholesterol emboli, toxins, and oxidative stress contribute to the causation and progression of AKI. Preventive strategies are currently limited, but evidence supports the maintenance of adequate renal perfusion by raising the mean pressures on CPB, intravascular volume resuscitation, and maintenance of postoperative renal perfusion by maintaining mean pressures and avoidance of nephrotoxic drugs [4]. AKI requiring renal replacement therapy has a frequency of about 2–5 % and is associated with a mortality of 50% [5,6,7]. Diabetes Mellitus is associated with an increased risk of AKI [8,9]. A higher HBA1c level is a better predictor of postoperative outcomes like reintubation, post-operative wound infection, and bleeding [10]. The incidence of AKI was found to be 13% higher in patients with HBA1c levels of > 5.6% [11]. Age plays a major role in causing acute kidney injury after open heart surgery. It has been regarded as an independent risk factor in predicting acute kidney injury after cardiac surgery [12]. CABG is defined as "coronary artery bypass graft surgery". The operation is done to bypass a blocked coronary artery

DOI: https://doi.org/10.54393/pjhs.v3i05.272

to alleviate the symptoms caused by a blocked artery like chest pain and shortness of breath. It is one of the common operations performed in cardiac surgery units with a mortality of less than 1 % [13]. The purpose of the study is to take the diabetic population and control other variables involved in the causation of AKI after CABG and study the role of age versus HBA1c levels in predicting AKI after elective CABG.

METHODS

A sample of 200 patients was taken from the cardiac surgery department. All diabetics were selected based on the standard definition of diabetes [14]. Age was confirmed from the computerized national identity cards. Only male population was selected as there was more age discrepancy issues with the female gender in our region. The KDIGO criteria for acute kidney injury was applied for the diagnosis [15]. Study inclusion criteria: Diabetics (having more than one month since diagnosis of diabetes) undergoing CABG, age 40 to 80 years, male gender, patients on oral anti-hyperglycemic or insulin/ controlled or uncontrolled blood sugar levels, patients undergoing elective CABG and type 2 diabetics. Our exclusion criteria included deranged pre-operative renal function with a serum creatinine level of > 1.2 mg/dl, diagnosed renal failure patients, patients on dialysis before operation, patients who have received renal transplantation (recipients), patients undergoing valvular surgeries, patients undergoing emergency CABG, patients suffering from other endocrine disorders along with diabetes, type 1 diabetic, LVEF < 40%; preoperative, per-operative or post-operative usage of IABP, long pump runs of more than 4 hours, CABG with concomitant valvular operation; and those who refuse to cooperate in the questionnaire or not willing to participate in my research and those left without medical advice. Informed verbal consent for participation was taken from all our patients in the study. HBA1c levels and renal function status was noted before CABG. The recent laboratory values for HBA1c levels and serum creatinine which were less than 7 days old were only considered. Post-operative renal function tests and urine output was measured according to the KDIGO criteria. Patients having post-operative low cardiac output syndrome or long pump runs were then excluded from our sample. All the sample is taken from the cardiac surgery department of our institute. All the operations were performed by senior cardiac surgeons having more than 5 years of post-fellowship experience in the field. Patient confidentiality was strictly maintained. The total study duration was 1 year from May 2021 to May 2022. The data was collected and analyzed via SPSS version 23 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp). Frequency calculated by standard methods. Mean ± standard deviation was obtained for quantitative variables like age (years), height (cm), weight (kg), and body mass index (kg/m2). Frequencies and percentages were calculated for categorical variables like gender and comorbidities. A non-parametric chi-square test is applied to the data. Statistical significance is kept at p<-0.05. Data is presented in graphical form through bar charts.

RESULTS

The data from 200 diabetic patients was analyzed to produce the results. The mean age was 55.9 ± 8.0 years and BMI was 26.4 ± 4.3 kg/m2. Our sample consisted of only the male population. Only patients with an LVEF > 40% were included in the study. There were 34% of patients with an LVEF of 40 – 50% and 66% of patients with an LVEF of 50% as shown in Figure 1. All patients with moderate to severe LVEF dysfunction were excluded from our sample to minimize the effect of reduced LV function on kidney function. All patients with pre-operative normal kidney functioning were included in the study. The KDIGO criteria for acute kidney injury was applied to detect AKI. A total of 73 (36.5%) patients developed AKI. All the data was stratified into smaller sets to increase the accuracy level to find the variable which was playing a dominant role in causing AKI in post-CABG patients. There was a 4.35% frequency of AKI in ages between 40 – 49 years; 26.8% for ages between 50 – 59 years; 50.7% AKI for 60 -69 years set and 84% for the population between 70 to 80 years as shown in Table 1 and figure 1.

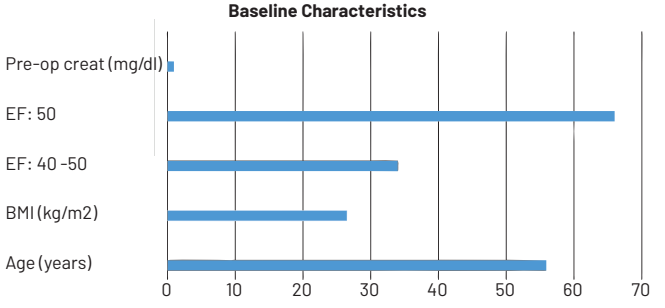

Figure 1: Baseline Characteristics

AGE (years)	NUMBER OF PATIENTS	AKI	PERCENTAGE OF AKI
40 -49	46	2	4. 35%
50- 59	66	18	26. 8%
60- 69	63	32	50. 7%
70- 80	25	21	84 %
TOTAL	200	73	

Table 1: Percentage of AKI

DOI: https://doi.org/10.54393/pjhs.v3i05.272

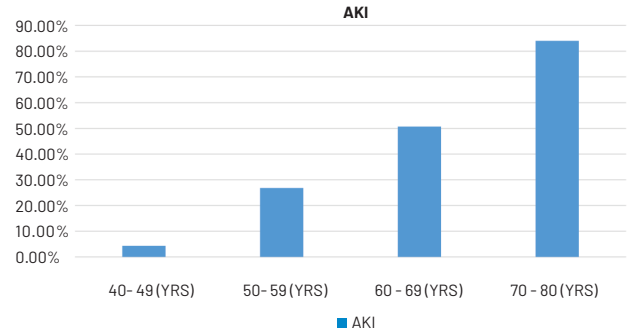

Figure2: Age in Percentage

A similar stratification was applied for HBA1c levels. The values for HBA1c were divided into short sets and % of AKI for each set was calculated. 52.7% of patients developed AKI with HBA1c of 6.5 – 7.4%; 40% AKI with HBA1c levels of 7.5 – 8.4%, 16% AKI with HBA1c of 8.5 to 8.9%, 12% AKI in patients with HBA1c of 9 – 9.4%, 18% AKI with HBA1c of 9.5 – 9.9%, 20% for HBA1c of 18% and 20% for HBA1c > 10.04% as shown in Table 2 and figure 2.

HBA1c (%)	NUMBER OF PATIENTS	AKI (%)
6.5 7.4	55	29(52.7%)
7.5 – 8.4	35	14 (40%)
8.5 – 8.9	25	4 (16%)
9 – 9.4	25	3(12%)
9.5 – 9.9	22	4 (18%)
10.01 – 10. 04	20	4(20%)
Above 10.04	18	15 (83.3%)

Table 2: Stratification for HBA1c

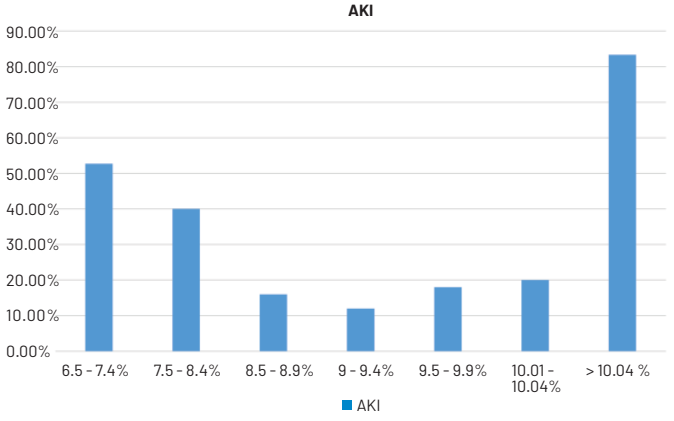

Figure 3: Percentage of HBA1c with AKI patients

After these results, we made one of our one variable constant to check for significance levels. All patients of age 60 were selected, there were a total of 18 patients aged 60. 15 patients developed AKI and their HBA1c levels were divided into short groups. The Chi-square test was applied to find the significance level as shown in Table 3.

HBA1c	AKI (%)	p-value
6.5 -7.4 (6)	5(83%)	0.7
7.5 – 8.4 (5)	3(60%)	
8.5 – 10.0 4 (4)	3(75%)	
>10.04 (3)	3(100%)	

Table 3: Significance level

After this, we made our HBA1c levels constant at 7% and divided our patient's ages into different sets. There were 25 diabetics with an HBA1c level of 7% and 16 patients developed AKI. Chi-square test was applied to find the significance level as shown in Table 4. Thus, the data concludes that increasing age is a better predictor of AKI after CABG than increasing HBA1c levels. (p = 0.02).

Age (years)	AKI (%)	p-value
40 -49 (5)	1(1%)	0.02
50- 59 (8)	5 (2.8%)	
60- 69 (7)	5 (3%)	
70- 80 (5)	5 (5%)	

Table 4: Significance level

DISCUSSION

Acute Kidney injury is a common complication after CABG [16]. Our majority population consists of diabetics [17]. Our common approach is to assess the HBA1c levels and if the HBA1c levels are lower, we ignore the risks of AKI. This study serves the purpose to invalidate the belief that lower HBA1c cannot cause AKI. According to this study, any patient of age 65 years with a low HBA1c will have almost a 50% risk of developing AKI. This study will change our perspective on how we see the risk population of AKI. Once the high-risk patients are identified, it is easy to control the per-operative and post-operative factors to prevent renal impairment [18]. Cevedet et al., analyzed the role of HBA1c levels in non-diabetics to find the incidence of AKI. Their cut-off value for HBA1c was 5.6%. It was concluded that there was a 13% increased incidence of AKI when HBA1c was more than 5.6% [19]. H Palomba et al., developed the prediction model for "Acute Kidney Injury After Cardiac Surgery (AKICS) score". The incidence of AKI predicted was 55% with age > 65 years and 35% incidence in diabetics [20]. If we compare our study with this prediction model, we have controlled all other factors i-e only CABG patients were selected with pre-operative serum creatinine < 1.2 mg/dl. Low cardiac output syndrome and use of IABP were excluded. Our incidence of AKI after CABG in population between 60 to 69 years was 50.7% which closely correlates with the Brazilian study Our incidence of AKI in diabetics was 36.5 % [21]. Joud et al., studied the difference in length of stay between patients with a cut-off HBA1c level of 7.0% and found no difference in length of hospital stay between diabetic patients who had HBA1c of less than 7% and those

DOI: https://doi.org/10.54393/pjhs.v3i05.272

with more than 7% [22]. Our study has already negated the role of levels of HBA1c in predicting AKI till 10. 04%. So, we can say that there will be no difference in length of stay. Yang Zu et al., performed a study on a Swedish Cohort. They studied the relationship between HBA1c levels and the incidence of AKI. They divided their cohort into 5 levels. HBA1c of less than 6%, 6 – 6.9%, 7 – 7.9%, 8 – 8.9% and ≥ 9 %. They found that HBA1C 9% was associated with a higher risk of AKI. 10. Age > 70 years has been quoted as an independent risk factor for AKI. Not only this, a meta-analysis further concluded that aged individuals have a poor recovery of renal function after AKI [23]. A research was performed by Gur K and co on 118 diabetic patients who underwent CABG. They divided their diabetics into HBA1c <7% and more than 7%. They concluded that Hemodialysis may be required after CABG in diabetics however, there was no relationship between post-operative hemodialysis and pre-operative HBA1c levels [24]. The literature review has helped in better understanding the variables in our subject. Our study has clarified the comparative difference between age and HBA1c levels in predicting acute kidney injury in diabetics after CABG.

CONCLUSIONS

Increasing age is a higher risk factor in diabetics even in the presence of lower HBA1c levels. On the other contrary, younger patients had a lower risk of AKI despite high HBA1c levels. Increasing age dominates in predicting acute kidney injury after CABG in diabetics. However, after a certain limit of HBA1c of more than 10.04%, this difference diminishes and the ratio of AKI becomes equivalent to the risk as present in above 70 years diabetic population.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Regner KR. Epidemiology of acute kidney injury after cardiac surgery: an update. Journal of Organ Dysfunction. 2007 Jan; 3(4):232-9.

[2] Coleman MD, Shaefi S, Sladen RN. Preventing acute kidney injury after cardiac surgery. Current Opinion in Anesthesiology. 2011 Feb; 24(1):70-6. doi: 10.1097/ACO.0b013e3283422ebc.

[3] Schrezenmeier EV, Barasch J, Budde K, Westhoff T, Schmidt-Ott KM. Biomarkers in acute kidney injury - pathophysiological basis and clinical performance. Acta physiologica Scandinavica. 2017 Mar; 219(3):554-572. doi: 10.1111/apha.12764.

[4] Shaw A. Update on acute kidney injury after cardiac surgery. The Journal of Thoracic and Cardiovascular Surgery. 2012 Mar;143(3):676-81. doi: 10.1016/j.jtcvs.2011.08.054.

[5] Gaffney AM and Sladen RN. Acute kidney injury in cardiac surgery. Current Opinion in Anesthesiology. 2015 Feb; 28(1):50-9. doi: 10.1097/ACO.0000000000000154.

[6] O'Neal JB, Shaw AD, Billings FT 4th. Acute kidney injury following cardiac surgery: current understanding and future directions. Critical Care. 2016 Jul; 20(1):187. doi: 10.1186/s13054-016-1352-z.

[7] Lagny MG, Jouret F, Koch JN, Blaffart F, Donneau AF, Albert A, et al. Incidence and outcomes of acute kidney injury after cardiac surgery using either criteria of the RIFLE classification. BMC Nephrology. 2015 May; 16:76. doi: 10.1186/s12882-015-0066-9.

[8] Amini S, Najafi MN, Karrari SP, Mashhadi ME, Mirzaei S, Tashnizi MA, et al. Risk Factors and Outcome of Acute Kidney Injury after Isolated CABG Surgery: A Prospective Cohort Study. Brazilian Journal of Cardiovascular Surgery. 2019 Feb;34(1):70-75. doi: 10.21470/1678-9741-2017-0209.

[9] Sherwani SI, Khan HA, Ekhzaimy A, Masood A, Sakharkar MK. Significance of HbA1c Test in Diagnosis and Prognosis of Diabetic Patients. Biomark Insights. 2016 Jul; 11:95-104. doi: 10.4137/BMI.S38440.

[10] Gomez-Perez FJ, Aguilar-Salinas CA, Almeda-Valdes P, Cuevas-Ramos D, Lerman Garber I, Rull JA. HbA1c for the diagnosis of diabetes mellitus in a developing country. A position articles. Archives of medical research. 2010 May; 41(4):302-8. doi: 10.1016/j.arcmed.2010.05.007.

[11] Faritous Z, Ardeshiri M, Yazdanian F, Jalali A, Totonchi Z, Azarfarin R. Hyperglycemia or high hemoglobin A1C: Which one is more associated with morbidity and mortality after coronary artery bypass graft surgery? Annals of cardiothoracic surgery. 2014; 20(3):223-8. doi: 10.5761/atcs.oa.13.02282

[12] Paez RP, Hossne NA, Santo JA, Berwanger O, Santos RH, Kalil RA, et al. Coronary artery bypass surgery in Brazil: analysis of the national reality through the BYPASS registry. Brazilian journal of Cardiovascular surgery. 2019 Mar; (34):142-8.

[13] Alexander JH and Smith PK. Coronary-artery bypass grafting. New England Journal of Medicine. 2016 May;374(20):1954-64.

[14] Kerner W and Brückel J; German Diabetes Association. Definition, classification and diagnosis of diabetes mellitus. Experimental and clinical endocrinology & diabetes. 2014 Jul;122(7):384-6. doi:

DOI: https://doi.org/10.54393/pjhs.v3i05.272

10.1055/s-0034-1366278.
[15] de Boer IH, Caramori ML, Chan JCN, Heerspink HJL, Hurst C, Khunti K, et al. Executive summary of the 2020 KDIGO Diabetes Management in CKD Guideline: evidence-based advances in monitoring and treatment. Kidney International. 2020 Oct; 98(4):839-848. doi: 10.1016/j.kint.2020.06.024.
[16] Axelsson TA, Adalsteinsson JA, Arnadottir LO, Helgason D, Johannesdottir H, Helgadottir S, et al. Long-term outcomes after coronary artery bypass surgery in patients with diabetes. Interactive Cardiovascular and Thoracic Surgery. 2020 May; 30(5):685-690. doi: 10.1093/icvts/ivaa009.
[17] Lehto HR, Pietilä A, Niiranen TJ, Lommi J, Salomaa V. Clinical practice patterns in revascularization of diabetic patients with coronary heart disease: nationwide register study. Annals of medicine. 2020 Aug; 52(5):225-232. doi: 10.1080/078 53890. 2020.1771757.
[18] Barodka V, Silvestry S, Zhao N, Jiao X, Whellan DJ, Diehl J, et al. Preoperative renin-angiotensin system inhibitors protect renal function in aging patients undergoing cardiac surgery. Journal of Surgical Research. 2011 May; 167(2): e63-9. doi: 10.1016/j.jss. 2009.11.702.
[19] Paez RP, Hossne NA, Santo JA, Berwanger O, Santos RH, Kalil RA, et al. Coronary artery bypass surgery in Brazil: analysis of the national reality through the BYPASS registry. Brazilian journal of Cardiovascular surgery. 2019 Mar; 34:142-8.
[20] Palomba H, de Castro I, Neto AL, Lage S, Yu L. Acute kidney injury prediction following elective cardiac surgery: AKICS Score. Kidney International. 2007 Sep;72(5):624-31. doi: 10.1038/sj.ki.5002419.
[21] Ramos KA and Dias CB. Acute Kidney Injury after Cardiac Surgery in Patients Without Chronic Kidney Disease. Brazilian Journal of Cardiovascular Surgery. 2018 Oct; 33(5):454-461. doi: 10.21470/1678-9741-2018-0084.
[22] Almogati JG and Ahmed EO. Glycated Hemoglobin as a Predictor of the Length of Hospital Stay in Patients Following Coronary Bypass Graft Surgery in the Saudi Population. Brazilian Journal of Cardiovascular Surgery. 2019 Feb;34(1):28-32. doi: 10.21470/1678-9741-2018-0202.
[23] Xu Y, Surapaneni A, Alkas J, Evans M, Shin JI, Selvin E, *et al.* Glycemic Control and the Risk of Acute Kidney Injury in Patients with Type 2 Diabetes and Chronic Kidney Disease: Parallel Population-Based Cohort Studies in U.S. and Swedish Routine Care. Diabetes Care. 2020 Dec; 43(12):2975-2982. doi: 10.2337/ dc20-1588.
[24] Huang Y, Zhu D, Lv Q, Porter AL, Robinson DK, Wang X. Early insights on the Emerging Sources Citation Index (ESCI): an overlay map-based bibliometric study. Scientometrics. 2017 Jun;111(3):2041-57.

DOI: https://doi.org/10.54393/pjhs.v3i05.204

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Frequency of Placental Abruption in Preterm Premature Rupture of Membranes (PPROM)

Nadia Rani[1], Nilofar Iqbal[2], Tasmia Waris[3], Sanila Gul[4] and Muhammad Izhar[5]

[1]Medical Teaching Institute (MTI) THQ Topi, Swabi, Pakistan
[2]Gajju Khan Medical College, Swabi, Pakistan
[3]Government Maternity Hospital, Hashtnagri, Peshawar, Pakistan
[4]Bacha Khan Medical Complex, Swabi, Pakistan
[5]Institute of Kidney Disease, Peshawar, Pakistan

ARTICLE INFO

Key Words:
Placenta, Trimester, Rapture, Gestation, Membrane

How to Cite:
Rani, N. ., Iqbal, N., Waris, T. ., Gul, S. ., & Izhar, M. . (2022). Frequency of Placental Abruption in Preterm Premature Rupture of Membranes (PPROM): Frequency of Placental Abruption in Preterm Premature Rupture of Membranes (PPROM). Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.204

***Corresponding Author:**
Muhammad Izhar
Institute of Kidney Disease, Peshawar
izhar.kmc888@gmail.com

Received Date: 5th October, 2022
Acceptance Date: 14th October, 2022
Published Date: 31st October, 2022

ABSTRACT

Placental abruption is the premature separation of normally placed placenta. Its incidence is 1% worldwide in all pregnancies and 7% in Pakistan. **Objective:** To determine frequency of placental abruption in preterm premature rupture of membranes. **Methods:** This study was conducted in Department of obstetrics and gynecology DHQ Hospital Topi Swabi from 1st March 2021 to 31st October 2022. Total of 276 patients were recruited. Routine clinical examination was done for the confirmation of preterm PROM. All the patients were followed till delivery and placental abruption was diagnosed. All the mentioned information obtained were noted on a pre designed proforma. **Results:** Mean age was 33 ±2.17 years. Primi para and multi para were 40% and 60% respectively. Forty-two % patients were primi gravida, 58% patients were multi gravida. 33% mothers had gestational period of age range from 28-32 weeks while 67% patients had POG range 33-37 weeks. More over the frequency of placental abruption in preterm premature rupture of membranes was 5%. **Conclusions:** On the basis of results, it was concluded that active expectant management strategy and strict follow up minimizes the risk of occurrence of perinatal asphyxia, and neonatal morbidity and mortality.

INTRODUCTION

Placental abruption is the premature separation of normally placed placenta. It is serious obstetrics complication for both mother and fetus [1]. Its incidence is 1% worldwide in all pregnancies and 7% in Pakistan [2]. Placental abruption patients usually have combination of bleeding per vagina, pain abdomen and tense and tender abdomen. Patient may present with massive bleeding resulting in fetal death and severe maternal morbidity. Perinatal mortality varies from 20-67% [3]. Among multiple risk factors, premature rupture of membranes (PROM) is an important risk factor for abruption of placenta [4]. It is the rupture of placental membranes before start of regular uterine contractions [5]. Incidence of preterm PROM is 2-3% and term PROM is 8%. Prolong premature rupture of membranes leads to intrauterine infections, chorioamnionitis and placental abruption [6]. Some studies show that prolong preterm PROM leads to neutrophillic infiltration into decided and placental abruption. Sudden uterine decompression after PROM cause placental abruption [7]. Preterm premature rupture of membranes (PPROM) usually occurs before 37 weeks of gestation and is greater risk for feto-maternal

DOI: https://doi.org/10.54393/pjhs.v3i05.204

complications. Preterm PROM results in one-third of all preterm babies and suffer from the complications of prematurity, including death [8,9]. Another study conducted in US and published in Acta Obstet Gynecol shows that incidence of placental abruption in preterm PROM was more than in total study population i.e. 11/1000 v/s 4.2/1000 [10]. Reptured membranes results in a rent that provide a pathway for bacteria to transmit and thus both the mother and fetus at high risk for serious manifestations. The Low levels of amniotic fluid surrounding the womb increases the risk of the compression of umbilical cord and interfere with development of lung [11]. As no research study had been conducted in our locality regarding PPROM that is why this study will provide us the latest and updated information. To determine frequency of placental abruption in preterm premature rupture of membranes.

METHODS

This study was conducted in department of obstetrics and gynecology DHQ Hospital Topi Swabi from 1st March 2021 to 31st October 2022. Patients fulfilling the inclusion criteria were recruited for the study. The purpose of the study was explained to the subjects and they were assured about the risks and benefits involved. Written informed consent was taken from each patient. Routine clinical examination was done for the confirmation of preterm PROM like visualization of amniotic fluid pooled in posterior fornix or draining from cervix on bivalve speculum examination. All the patients were followed till delivery and placental abruption was diagnosed by separation of normally sited placenta after 28 weeks of gestation (radiological evidence) and clinically with tense and tender abdomen on per abdominal examination with or without per vaginal bleeding (200-400ml) and those patients who have reteroplacental clots after delivery. All the information was noted on a proforma. Exclusion criteria was applied to strictly observed to control confounders and bias in the study.

RESULTS

Age distribution among 276 patients was analyzed and 116(42%) patients were in age range 18-26 years, 160(65%) patients were in age range 27-35 years, Mean age was 30 ±11.35 years as shown in table 1.

AGE	FREQUENCY(%)
18-26 years	116(42%)
27-35 years	160(58%)
Total	276(100%)

Table 1: Age Distribution (total patients =276)

Status of parity among 276 patients were analyzed. 110(40%) patients were primi para and 166(60%) patients were multi para. Status of gravida among 276 patients was analyzed as 116(42%) patients were primi gravida, 160(58%) patients were multi gravida. Gestational age among 276 patients was analyzed as 91(33%) patients had POG range 28-32 weeks while 185(67%) patients had POG range 33-37 weeks. Placental abruption among 276 patients was analyzed as 14(5%) patients had placental abruption while 262(95%) patients didn't have placental abruption as shown in table 2.

Placental Abruption	Frequency(%)
Yes	14(5%)
No	262(95%)
Total	276(100%)

Table 2: Frequency of Placental Abruption (n=276)

Stratification of placental abruption with respect to age and period of gestation as shown in table 3 and 4.

PLACENTAL ABRUPTION	18-25 years	26-35 years	Total
Yes	6	8	14
No	110	152	262
Total	116	160	276

Table 3: Placental Abruption Stratification in Terms of Age Distribution(n=276)

Applying Chi square test (P value =0.9486)

Stratification of placental abruption with respect to age and period of gestation as shown in table 3 and 4.

PLACENTAL ABRUPTION	28-32 weeks	33-37 weeks	Total
Yes	5	9	14
No	86	176	262
Total	91	185	276

Applying Chi square test (P value was 0.8226)

Table 4: Stratification of Placental Abruption in Terms of Period of Gestation(n=276)

DISCUSSION

The incidence of PROM worldwide is 1% in all pregnancies and 7% in Pakistan [2]. Placenta abruption in patients presents with vaginal Bleeding and pain abdomen. This results in a number of maternal and fetal complications. Furthermore, Patient may present with massive bleeding leading to fetal demise and severe maternal morbidity [3]. Among multiple risk factors premature rupture of membranes (PROM) is an important risk factor [4]. In this study mean age was 33 ±2.17 years. 40% patients were primi para while 60% patients included were multi para. Thirty three percent patients had POG range 28-32 weeks while 67% patients had POG range 33-37 weeks. 42% and 58% patients were primi gravida, and multi gravida respectively. Placental abruption frequency was 5% while similar incidence of 4.7% was noted in another study in patients with singleton pregnancy. In women following p-PROM the odds ratio of abruption of placenta was 6.50 (< 0. 0 5) [12]. 64 cases (67.4%) of placental abruption occurred among 95 cases with no p-PROM while 31 cases (32.6%)

DOI: https://doi.org/10.54393/pjhs.v3i05.204

occurred following p-PROM. However, the administration of corticosteroids such as dexamethasone or betamethasone causes reduction in incidence of neonatal morbidity and mortality. The incidence of respiratory distress syndrome as well as necrotizing Enterocolitis were reduced when either betamethasone IM or dexamethasone is administered [13,14]. In contrast, maternal and neonatal outcomes among mothers with and without p-PROM were not significantly different. Although preterm premature rapture of membrane is one of significant risk factors that exists for abruption of placenta related to chorioamnionitis and may not affect the perinatal outcomes. Another study conducted reported that placental abruption incidence in preterm PROM was significantly more than the incidence in total study population i.e. 11/1000 v/s 4.2/1000 [15]. In another study conducted had reported that the incidence of placental abruption in PROM was 11.0 per 1,000 (34 of 3 077) and higher than in comparison to the total study population [16]. The incidence of placental abruption was less in PPROM (11.0 /1,000) in comparison to births without PPROM (36.1 / 1 000; adjusted odds ratio 0.3). No significant association was observed in term births [17]. In the current study stratification of placental abruption with respect period of gestation shows that placental abruption occurs in decreased number of patients in comparison to full term pregnancy (Table no.4). Gestational age, maternal and fetal status are other factors considered when to do delivery of fetus. In patients having membrane rupture at 32–34 weeks, conservative management is often practiced in obstetrics, by waiting till spontaneous onset of uterine contractions.5% of patients suffered placental abruption in preterm pregnancies as shown in Table 2. Mothers having amnionitis are administered broad spectrum antibiotics and all mothers should receive appropriate antibiotics prophylaxis [18]. Obstetricians caring for gravid patients should be well equipped because early diagnosis and management could result in better outcome [19]. Strict bed rest at approximately 32-34 weeks' gestations is acceptable for mothers having no active complaint. They must be educated about their condition and to consult obstetrician in case of any emergency or preterm labor [20].

CONCLUSIONS

On the basis of results, it was concluded that active expectant management strategy and strict follow up minimizes the risk of occurrence of perinatal asphyxia, and neonatal morbidity and mortality.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Suzuki S. Clinical Significance of Preterm Singleton Pregnancies Complicated by Placental Abruption following Preterm Premature Rupture of Membranes Compared with Those without p-PROM. ISRN Obstetrics and Gynecology. 2012; 856971. doi: 10.5402/2012/856971.

[2] Dars S, Sultana F, Akhter N. Abruptio placentae: Risk factors and maternal outcomes at a tertiary care hospital. Journal of Liaquat University of Medical and Health Sciences (JLUMHS) 2013 Sep; 12(3):198-202.

[3] Ghaheh HS, Feizi A, Mousavi M, Sohrabi D, Mesghari L, Hosseini Z. Risk factors of placental abruption. Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences. 2013 May;18(5):422.

[4] Hossain N, Khan N, Sultana SS, Khan N. Abruptio placenta and adverse pregnancy outcome. Hypertension. 2010; 13:16.

[5] Patil S and Patil V. Maternal and foetal outcome in premature rupture of membranes. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2014; 13(12):56-81.

[6] Wojcieszek AM, Stock OM, Flenady V. Antibiotics for prelabour rupture of membranes at or near term. Cochrane Database of Systematic Reviews 2014.

[7] Suzuki S, Hiraizumi Y, Yamashita E, Yonezawa M, Shirokane M, Satomi M. Clinical significance of singleton pregnancies complicated by placental abruption associated with histological chorioamnionitis. Journal of Nippon Medical School. 2010 Aug; 77(4):204-8. doi: 10.1272/jnms.77.204.

[8] Dars S, Malik S, Samreen I, Kazi RA. Maternal morbidity and perinatal outcome in preterm premature rupture of membranes before 37 weeks' gestation. Pakistan journal of medical sciences quarterly. 2014 May; 30(3):626-9. doi: 10.12669/pjms.303.4853.

[9] Ananth CV, Oyelese Y, Srinivas N, Yeo L, Vintzileos AM. Preterm premature rupture of membranes, intrauterine infection, and oligohydramnios: risk factors for placental abruption. Journal of Obstetrics and Gynecology. 2004 Jul; 104(1):71-7. doi: 10.1097/01.AOG.0000128172. 71408.a0.

[10] Markhus VH, Rasmussen S, Lie SA, Irgens LM. Placental abruption and premature rupture of membranes. Acta Obstetricia et Gynecologica Scandinavica. 2011 Sep; 90(9):1024-9. doi: 10.1111/j.1600-0412.2011.01224. x.

[11] Ekin A, Gezer C, Kulhan G, Avcı ME, Taner CE. Can platelet count and mean platelet volume during the

DOI: https://doi.org/10.54393/pjhs.v3i05.204

first trimester of pregnancy predict preterm premature rupture of membranes? Indian Journal of Obstetrics and Gynecology Research. 2015 Jan; 41(1):23-8. doi: 10.1111/jog.12484.

[12] Kibel M, Asztalos E, Barrett J, Dunn MS, Tward C, Pittini A, et al. Outcomes of Pregnancies Complicated by Preterm Premature Rupture of Membranes Between 20 and 24 Weeks of Gestation. Obstetrics and Gynecology. 2016 Aug;128(2):313-320. doi: 10.1097/AOG.0000000000001530.

[13] D'Souza Z and D'Souza D. Urinary tract infection during pregnancy—dipstick urinalysis vs. culture and sensitivity. Journal of Obstetrics and Gynaecology. 2004 Jan; 24(1):22-4. doi: 10.1080/01443610310001620233.

[14] Mohammad M, Mahdy ZA, Omar J, Maan N, Jamil MA. Laboratory aspects of asymptomatic bacteriuria in pregnancy. Southeast Asian Journal of Tropical Medicine and Public Health. 2002 Sep; 33(3):575-80.

[15] Ananth CV, Oyelese Y, Srinivas N, Yeo L, Vintzileos AM. Preterm premature rupture of membranes, intrauterine infection, and oligohydramnios: risk factors for placental abruption. Obstetrics and gynecology. 2004 Jul;104(1):71-7. doi: 10.1097/01.AOG.0000128172.71408.a0.

[16] Markhus VH, Rasmussen S, Lie SA, Irgens LM. Placental abruption and premature rupture of membranes. Acta obstetricia et gynecologica Scandinavica. 2011 Sep; 90(9):1024-9.

[17] Stuart EL, Evans GS, Lin YS, Powers HJ. Reduced collagen and ascorbic acid concentrations and increased proteolytic susceptibility with prelabor fetal membrane rupture in women. Biology of reproduction. 2005 Jan; 72(1):230-5. doi: 10.1095/biolreprod.104.033381.

[18] Egarter C, Leitich H, Karas H, Wieser F, Husslein P, Kaider A, et al. Antibiotic treatment in preterm premature rupture of membranes and neonatal morbidity: a metaanalysis. American journal of obstetrics and gynecology. 1996 Feb; 174(2):589-97. doi: 10.1016/s0002-9378(96)70433-7.

[19] Naylor CS, Gregory K, Hobel C. Premature rupture of the membranes: an evidence-based approach to clinical care. American journal of perinatology. 2001 Nov; 18(7):397-413. doi: 10.1055/s-2001-18699.

[20] Schutte MF, Treffers PE, Kloosterman GJ, Soepatmi S. Management of premature rupture of membranes: the risk of vaginal examination to the infant. American Journal of Obstetrics and Gynecology. 1983 Jun; 146(4):395-400. doi: 10.1016/0002-9378(83)90819-0.

DOI: https://doi.org/10.54393/pjhs.v3i05.246

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Role of a Learning Management System in Medical Curriculum; Students' initial perception about the use of LMS-Moodle at Fazaia Ruth Pfau Medical College

Muhammad Faisal Rahim[1*], Masood Ahmed Shaikh[1], Sama ul Haque[1], Shahjabeen[1] and Tahir Ansari[1]

[1]Fazaia Ruth Pfau Medical College

ARTICLE INFO

Key Words:

E-learning, Learning management system, Moodle, Blended learning

How to Cite:

Faisal Rahim, M. ., Ahmed Skaikh, M. ., Ul Haque, S. ., Jabeen, S. ., & Ansari, T. . (2022). Role of a Learning Management System in Medical Curriculum: Role of a Learning Management System in Medical Curriculum. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.246

***Corresponding Author:**

Muhammad Faisal Rahim

Fazaia Ruth Pfau Medical College

faisal.rahim@frpmc.edu.pk

Received Date: 14th October, 2022

Acceptance Date: 23rd October, 2022

Published Date: 31st October, 2022

ABSTRACT

The modern medical curriculum has to deliver a great amount of educational content and knowledge to the learners as changes in content delivery are occurring at a very high speed. New technology and tools are introduced each day for this purpose. MS Moodle helps in students` learning mainly through tools which provides students` interactions like discussions forums, timed assignments, and use of computer-based testing as E-assessment tools. During implementation of e-learning platform LMS-Moodle, it was felt necessary to examine students' perception about Moodle. **Objectives:** To assess students initial perception of about the use of the learning management system Moodle in integrated modular systems at FRPMC. **Methods:** The study design was cross-sectional and observational in nature with a quantitative data collection method. The study was conducted at Fazaia Ruth Pfau Medical College, Karachi during 2021 to 2022. Total number of participants was 100. The instrument used in the research was a questionnaire consisted of 17 statements presented with 1-5-point Likert scale for responses. The Cronbach alpha test was employed for reliability test. The analysis was done by SPSS version 23. **Results**: By analyzing overall received feedbacks of participants, the cumulative mean on 5-point Likert scale was 3.3 where 1 considered as strongly disagree and 5 as strongly agree. **Conclusions:** It was concluded that majority of participants studying in Fazaia Ruth Pfau Medical College have positive perception and experience of using Learning Management System Moodle in medical curriculum.

INTRODUCTION

The modern medical curriculum has to deliver a great amount of educational content and knowledge to the learners whereas changes occurring in content delivery are taking place at a very high speed. New technology and tools are introduced each day for this purpose. To adapt these changes in health professions education, e-learning plays a vital role in providing learners with a flexible learning environment to disseminate knowledge online [1]. For many decades many universities have been trying to incorporate distance learning programs with their existing programs but able to do with partial success due to technological constraints and lack of awareness of implementation issues [2]. However, during the past few years, many universities including medical colleges have observed a decent response in the implementing e-learning in their curriculum [3]. In addition, the utility of e-Learning and Learning Management System (LMS) came into the limelight because of the prolonged closure of educational institutes due to the COVID-19 pandemic starting at the beginning of the year 2020 [4]. On an emergency basis, schools and colleges including medical colleges needed to adopt e-learning tools for the continuation of their ongoing classes [5]. Therefore, effective learning management was a need of the hour. Irrespective of COVID-19 status, it was never easy to start this program without a strong infrastructure and a team-based approach in order to make it successful [6]. There are many important factors which play role in the successful implementation of e-learning LMS, in which the foremost factor is LMS`s user-friendliness and its cost-effectiveness. Therefore, most of the universities around the world is now choosing Moodle a Learning management system which is very user-friendly and open source free software for their e-learning programs [7]. E-learning can

DOI: https://doi.org/10.54393/pjhs.v3i05.246

be related to many learning theories in which the most important theory, which usually linked with e-learning is social constructivism [8]. According to this theory, online learners conceive new or a shared knowledge or understanding and comprehend the meaning and merge it with their existing knowledge with their individual experiences [9]. Likewise, the theory of connectivism is also linked with e-learning where learners to learn from social interaction and team collaboration, and getting benefit from sharing their personal experiences and diverse opinions in the group of network [10]. Online teaching and learning is opening a new paradigm in education which cannot be ignored. New technology and advancements are emerging at lightning pace in medical education. Use of tablet, smart phone, smart TV are usually incorporated in these technologies. It is never too late for medical schools to align with this new technology and tools used in these technologies. The Learning Management System provides an online platform or software application that is used for tracking, reporting, assessment and delivery of educational content [11]. The concept of a Learning Management System directly comes from e-Learning. Moodle is a type of Learning Management System that is free (open source) software, which helps in curriculum planning, content delivery, e-Assessment, therefore is used by health professions educators in designing, conceptualizing, implementing online courses and other programs. Flipped classroom recently got attention which uses online learning material before the class and during class students` activities [12]. Moodle is the most widely used LMS in the world, it has been providing the most powerful tools for online learning which includes learning resources in a form of Lectures in ppt or PDF formats, online assignment, blogs, forums, lessons, quizzes, workshops, chat, wikis, live streaming, and recently getting attention are gaming tools example H5P tools which provides extra interactivity for students engagements during lesson delivery [13]. Many studies show that LMS Moodle helps in students` learning mainly through tools which provides students` interactions like discussions forums, timed assignments, and most importantly use of computer-based testing in e-assessment tools [14]. At Faizaia Ruth Pfau Medical College (FRPMC) Karachi, which was recently established in 2019, initiated the implementation of LMS in the academic programs. E-learning team was involved in the installation of LMS on a virtual server and also created profiles for each student and faculty members. Later many courses for medical education and modules in integrated modular system of curriculum were created. During Covid-19 pandemic during when schools and colleges were closed for two and half months' time, during this duration our college started using EDMODO Learning management system but later shifted to Moodle-Learning management system. Moodle continued as a main learning management system for both online delivery and to support face-to-face teaching on regular basis. For full implementation of the e-learning platform LMS-Moodle, it was felt necessary to examine students' initial perception about Moodle as a LMS that they were using in their curriculum. Our aim of the study is to know students` initial perception about the use of learning management system Moodle in integrated modular systems. Furthermore, we plan to use this research data for future improvement in teaching and learning strategies.

METHODS

The study design is cross-sectional, descriptive, and observational in nature with a quantitative data collection method [15]. A 5-point Likert scale questionnaire was devised to gather quantitative data from students. The questions were related to general perception about the use and utility of LMS-Moodle. Questions were mainly inquiring about issues related to login and registration process, students' interactive activities like discussion forums and assignments, accessing learning resources like lectures, online videos and also about use of online assessment methods and discussion forums for collaborative learning. Data was analyzed by the mean and standard deviation of all responses obtained through 1-5 point Likert scale. The overall consistency of the questionnaire was also calculated through Cronbach alpha value. The study took place at Fazaia Ruth Pfau Medical College during 2021 to 2022 for second year MBBS program. Participants were students of second years M.B.B.S program of FRPMC, total number of participants who took part in this study was 100. Sample size was calculated using W.H.O software for sample size calculation. The instrument used in the research was a questionnaire based on a 5-point Likert scale. The participants were asked to participate by indicating their agreement or disagreement with each statement on a 5-point Likert scale ranging from 1(strongly disagree) to 5 (strongly agree) research questions. The questionnaire consisted of 17 statements presented with 1-5-point Likert scale for responses [16]. This questionnaire was developed on Moodle and was filled out by students online. Consent was also taken online from students. For some students who were unable to fill out the questionnaire online due to technical difficulties, they were given hard copies of the questionnaire to fill. To test the reliability of the questionnaire, the Cronbach alpha test was employed. The Statistical Packages for Social Sciences (SPSS) version 23 was employed in the analysis. To determine the initial perception levels obtained from a questionnaire, data analysis was done based on mean,

DOI: https://doi.org/10.54393/pjhs.v3i05.246

standard deviation scores obtained from a 5-point Likert scale questionnaire. Frequency Tables were tabulated to depict results for results section. The comparison among different variables were analysed through appropriate tables, graphs, and their percentages. Mean and standard deviation were computed for each variable of 5-point Likert scale. Data of 4 participants were incomplete so it was not included in the study. The reliability of the Likert scale was estimated using Cronbach's alpha, which showed all variables to have reliability coefficient of 0.867 which is more than 0.75 which is in acceptable range (>0.75), indicating the high level of reliability or consistency [17] (See Table 3).

RESULTS

By analyzing overall received feedbacks of participants, the cumulative mean on 5-point Likert scale was 3.3 where 1 considered as strongly disagree and 5 as strongly agree. Thus, it can be inferred by cumulative mean which is 3.3 that overall trend received from students was positive for the use Moodle as a Learning Management system in medical curriculum (Table 1).

S. No.	Questions	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean ± SD
1	The login process is easy	16	25	11	19	29	2.8 ± 1.5
2	The registration process is easy	14	19	18	21	28	2.7 ± 1.4
3	The interface is user friendly	10	51	16	16	7	3.4 ± 1.1
4	Downloading reading materials and lectures is easy	24	53	9	7	7	3.8 ± 1.1
5	Use assignments routinely	7	50	21	12	10	3.3 ± 1.1
6	Use discussion forums routinely	0	25	46	17	12	2.8 ± 0.9
7	Provides Flexibility in learning (anytime, anywhere)	15	45	13	11	16	3.3 ± 1.3
8	Participation in discussion forums facilitates collaborative learning	11	19	16	27	27	2.6 ± 1.4
9	Sharing knowledge helps in becoming a good team player	19	49	8	12	12	3.5 ± 1.3
10	Sharing prior knowledge with peers helps in the development of new and practical knowledge	19	39	14	11	17	3.3 ± 1.4
11	Highly motivated to use LMS-Moodle	9	55	14	9	13	3.4 ± 1.2
12	Computer-based testing is a useful tool in the assessment	10	52	11	9	18	3.3 ± 1.3
13	Training given to the use of discussion forums, quizzes, and assignments enhances my skills	15	58	5	9	13	3.5 ± 1.2
14	Online interaction improves my communication skills	10	56	11	9	14	3.4 ± 1.2
15	The LMS-Moodle platform will help develop my e-learning programs	13	48	15	12	12	3.4 ± 1.2
16	Contributes positively to my learning experience	14	53	10	9	14	3.4 ± 1.2
17	Was overall a smooth and exciting experience to use LMS technology in medical education	16	53	10	7	14	3.5 ± 1.3
				Cumulative Mean ± SD			3.3 ± 1.2

Table 1: Response frequencies with Mean and Standard Deviation

Majority of participants on question where students were asked about downloading lectures, presentation and reading material was easy and helpful more than 75 percent of students responded in Strongly Agree or Agree in this category. While training given to students in regard for using Moodle as a learning management system, more 77 percent of participants Strongly Agree or Agree and were satisfied with the training provided in making the LMS accessible. However, some students were facing some difficulties in registration and login process initially as mean score in this category was lowest among all other variables. Moreover, more the 60 percent of participants suggest that LMS-Moodle was user friendly, provides flexibility in learning, improve their communication and collaborative team-based skills and create interest and motivate them to learn (Table 2). Based on cumulative score of 5-point Likert scale it can be concluded that overall experience and perception of using Moodle as learning management system was positive among all the participants and have positive impact on medical curriculum.

DOI: https://doi.org/10.54393/pjhs.v3i05.246

Questions	Strongly Agree & Agree	Percentage
Interface is user friendly	61	61.00%
Downloading of learning material	77	77.00%
I use assignments and discussion forums	57	57.00%
Provides Flexibility in learning (anytime, anywhere)	60	60.00%
Sharing knowledge with peers helps in development of new and practical knowledge and becoming a good team player	63	63.00%
Highly motivation to use LMS-Moodle	64	64.00%
Computer based testing is useful tools in assessment	62	62.00%
Training given to use of discussion forums, quizzes, and assignments enhances my skills	73	73.00%
Online interaction improves my communication skills	66	66.00%
The LMS-Moodle platform will be helpful in developing my own e-learning programs	61	61.00%
Contributes positively to my learning experience	67	67.00%
Was overall a smooth and exciting experience to use LMS technology in medical education	69	69.00%

Table 2: Cumulative scores and percentages of strongly and Agree Category of 5 point Likert scale Items

S.No.	Activity Name	Frequency
1	No. of students enrolled on LMS	300
2	No. of modules attended	18
3	No. of lectures downloaded	720
4	No. Of study guide downloaded	18
5	No. of online quizzes attended	7
6	No. of assignments submitted on LMS	5
7	No. of TBL resources downloaded	11

Table 3: FRPMC Students activity on LMS

The reliability of the Likert scale was estimated using Cronbach's alpha, which showed all variables to have a maximum score > 0.6 – 0.7 (0.87), indicating the high reliability of each item of questionnaire (Table 4).

Cronbach's Alpha	Mean ± SD	Variance	N of Items
0.867	3.265 ± 0.329	0.108	17

Table 4: Reliability & Summary Item Statistics

DISCUSSION

This study sketches our initial perception of integrating a learning management system in the medical curriculum. Our study showed that students found the LMS Moodle registration and login process very easy and convenient. They beheld the interface as handy, accessible and user friendly. Same experience was shared by Luo et al., in their study in 2002 [18]. The LMS Moodle is primarily an interactive tool for conceptual learning. We also availed the tool to provide reading material and lectures to the students and this parameter was received very enthusiastically. In our study 78% of the students found the lectures notes very easy to download and enjoyed the learning capacity of flexible nature thoroughly (60%). In line with previous studies, Seluakumaran et al.,(2011) and Subedi et al.,(2020) we also noted that students were highly motivated to use Moodle as their primary LMS [19, 20]. Prior reading material and lectures promoted active learning and help students to grasp the knowledge and concept better, facilitating in their understanding of subject for exam preparation. However, it was discerned that some of our lecturers uploaded their lectures after face to face interactions due to concerns of skipping the traditional lectures. Our observation was in line with other authors like Cader et al., and Devis et al., [21, 22]. Contrary to this De lange et al., in their study revealed that uploading of lecture notes in precedence to the class room lectures did not affect students attendance [23]. Accordingly, we also encouraged teachers to post in advance that definitely allowed the students to fathom the lectures more vividly. Besides prior skimming of the lectures will cognate them to ask the queries at the end of the lectures. Moreover, beforehand lectures lessen the burden of writing notes during lectures and enable them to concentrate more on the concepts being taught. It was pertinent from student's feedback of our study that only 30% were in consonance that participation in a discussion forum facilitates collaborative learning. We observed that a very small percentage of students utilized the discussion tool (25%) routinely. Similar observation was found out by Kumar et al., in their study that students though regularly visited and viewed discussion but remained reluctant to participate [24]. This may be due to the dearth of facilitation and encouragement from their tutors who lagged in the queries response and took part in the discussions less frequently. So it is highly recommended that tutors should post the comments and reply to discussion forums vehemently in order to impart analytical thinking and upgrade the student's cognitive learning. Li Q in his article also suggested that the facilitators should also be designated among the students who can lead the discussion forum more vigilantly [25]. Another solution to this is to grade the participants on their participation and posting of the content. This will influence the students to take full advantage of this forum, which is a very effective tool for engaging them in peers' oriented learning. This study also showed that more than half of the students resorted to assignment regularly. This is contrary to the study by Link et al., where this parameter very effectively complimented the learning process [26]. The unwillingness of the students for assignment submission might be due to lack of familiarity with web based online system. For grading of academic achievement, we also took formative and final summative assessment via Moodle. 62% of the students

DOI: https://doi.org/10.54393/pjhs.v3i05.246

agreed that this computer based testing proved to be a useful tool for them. In unison to this a study by Susilowati et al., also described the LMS role in improving students' performance based on assessment including average score improvement from 1.2 % to 3.8 % [27]. However, we observed that deficient resources, i.e., electricity failure, poor internet connection and students' nescience with computer based testing created a great hindrance for the optimum effectiveness of this tool [26]. This study indicates that Moodle can boost the students cognitive learning and enhance performance achievement. In harmony of this several other studies by Pinilla et al., and Dantas et al., also concluded the same findings [27-29]. Overall our study depicts that Moodle provides continuous positive learning exposure for self-learning and evaluation, strong peer sharing of knowledge and beneficial teachers' interaction in supplementing their learning capabilities and academic performance.

CONCLUSIONS

It was concluded that majority of participants studying in Fazaia Ruth Pfau Medical College have positive perception and experience of using Learning Management System Moodle in medical curriculum. It can also contribute in developing future e-learning program which would further facilitate students`learning.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article

REFERENCES

[1] Shikino K, Rosu CA, Yokokawa D, Suzuki S, Hirota Y, Nishiya K, et al. Flexible e-learning video approach to improve fundus examination skills for medical students: a mixed-methods study. BMC Medical Education. 2021 Aug; 21(1):428. doi: 10.1186/s12909-021-02857-8

[2] Tashkandi E. E-Learning for Undergraduate Medical Students. Advances in Medical Education and Practice. 2021 Jun; 12:665-674. doi: 10.2147/AMEP.S314509

[3] Huynh R. The Role of E-Learning in Medical Education. Academic Medicine. 2017 Apr; 92(4):430. doi: 10.1097/ACM.0000000000001596

[4] Almaiah MA, Al-Khasawneh A, Althunibat A. Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic. Education and Information Technologies. 2020; 25(6):5261-5280. doi: 10.1007/s10639-020-10219-y

[5] Hoq MZ. E-Learning during the period of pandemic (COVID-19) in the kingdom of Saudi Arabia: an empirical study. American Journal of Educational Research. 2020 Jul; 8(7):457-64. doi: 10.12691/education-8-7-2

[6] Bartley SJ and Golek JH. Evaluating the cost effectiveness of online and face-to-face instruction. Journal of Educational Technology & Society. 2004 Oct; 7(4):167-75.

[7] Gao X, Wong LM, Chow DY, Law XJ, Ching LY. Learning clinical procedures through Internet visual resources: a qualitative study amongst undergraduate students. European Journal of Dental Education. 2015 Feb; 19(1):38-43. doi: 10.1111/eje.12099

[8] Reddy E, Reddy P, Sharma B, Reddy K, Khan MG. Student readiness and perception to the use of smart phones for higher education in the Pacific. In2016 3rd Asia-Pacific World Congress on Computer Science and Engineering (APWC on CSE) 2016 Dec 5 (pp. 258-264). IEEE. doi: 10.1109/APWC-on-CSE.2016.049

[9] Koohang A, Riley L, Smith T, Schreurs J. E-learning and constructivism: From theory to application. Interdisciplinary Journal of E-Learning and Learning Objects. 2009 Jan; 5(1):91-109.

[10] Goldie JG. Connectivism: A knowledge learning theory for the digital age? Med Teach. 2016 Oct; 38(10):1064-1069. doi: 10.3109/0142159X.2016.1173661

[11] Fenu G, Marras M, Meles M. A learning analytics tool for usability assessment in Moodle environments. Journal of e-Learning and Knowledge Society. 2017 Sep; 13(3).

[12] Wagner M, Gegenfurtner A, Urhahne D. Effectiveness of the flipped classroom on student achievement in secondary education: A meta-analysis. Zeitschrift für Pädagogische Psychologie. 2020 Mar 17. doi:

[13] 10.1024/1010-0652/a000274
Muhsen ZF, Maaita A, Odah A, Nsour A. Moodle and e-learning Tools. International Journal of Modern Education and Computer Science. 2013 Jul; 5(6):1. doi: 10.5815/ijmecs.2013.06.01

[14] Antonoff MB, Verrier ED, Yang SC, Lin J, DeArmond DT, Allen MS, et al. Online learning in thoracic surgical training: promising results of multi-institutional pilot study. The Annals of Thoracic Surgery. 2014 Sep; 98(3):1057-63. doi: 10.1016/j.athoracsur.2014.04.062

[15] Diomidus M. Epidemiological study designs. Studies in Health Technology and Informatics. 2002; 65:126-35

[16] Fang J, Fleck MP, Green A, McVilly K, Hao Y, Tan W, et al. The response scale for the intellectual disability module of the WHOQOL: 5-point or 3-point? Journal

DOI: https://doi.org/10.54393/pjhs.v3i05.246

of Intellectual Disability Research. 2011 Jun; 55(6):537-49. doi: 10.1111/j.1365-2788.2011.01401.x

[17] Tavakol M and Dennick R. Making sense of Cronbach's alpha. International Journal of Medical Education. 2011 Jun; 2:53-55. doi: 10.5116/ijme.4dfb.8dfd

[18] Luo L, Cheng X, Wang S, Zhang J, Zhu W, Yang J, *et al.* Blended learning with Moodle in medical statistics: an assessment of knowledge, attitudes and practices relating to e-learning. BMC Medical Education. 2017 Sep; 17(1):170. doi: 10.1186/s12909-017-1009-x

[19] Seluakumaran K, Jusof FF, Ismail R, Husain R. Integrating an open-source course management system (Moodle) into the teaching of a first-year medical physiology course: a case study. Advances in Physiology Education. 2011 Dec; 35(4):369-77. doi: 10.1152/advan.00008.2011

[20] Subedi S, Nayaju S, Subedi S, Shah SK, Shah JM. Impact of E-learning during COVID-19 pandemic among nursing students and teachers of Nepal. International Journal of Science and Healthcare Research. 2020 Sep; 5(3):68-76.

[21] Cader R and McGovern M. Introducing Blackboard: an electronic learning platform. Nursing Times. 2003 Aug; 99(32):24-5

[22] Davis MJ, Wythe J, Rozum JS, Gore RW. Use of World Wide Web server and browser software to support a first-year medical physiology course. American Journal of Physiology. 1997 Jun; 272(6 Pt 3):S1-14. doi: 10.1152/advances.1997.272.6.S1

[23] De Lange P, Suwardy T, Mavondo F. Integrating a virtual learning environment into an introductory accounting course: determinants of student motivation. Accounting Education. 2003 Mar; 12(1):1-4. doi: 10.1080/0963928032000064567

[24] Li L, Tam CW, Wang N, Cheung F, Zhou Q, Zhang C, et al. Effectiveness of blending E-learning with field trip on Chinese herbal medicine education: quasi-experimental study. BMC Complementary Medicine and Therapies. 2020 Aug; 20(1):248. doi: 10.1186/s12906-020-03034-y

[25] Li Q. Knowledge building community: Keys for using online forums. TechTrends. 2004 Jul; 48(4):24-9. doi: 10.1007/BF02763441

[26] Link TM and Marz R. Computer literacy and attitudes towards e-learning among first year medical students. BMC Medical Education. 2006 Jun; 6:34. doi: 10.1186/1472-6920-6-34

[27] Susilowati S, Noor A, Rustono R, Samsudi S, Sudana I, Rifai MD. The College Students' Satisfaction for Using Edmodo-the Learning Technology Application as E-Learning Media and Learning Effectiveness Improvement in Economic Higher Institution Mahardika Surabaya. Turkish Journal of Computer and Mathematics Education. 2021; 12(6):2749-54.

[28] Pinilla S, Cantisani A, Klöppel S, Strik W, Nissen C, Huwendiek S. Curriculum Development with the Implementation of an Open-Source Learning Management System for Training Early Clinical Students: An Educational Design Research Study. Advances in Medical Education and Practice. 2021 Jan; 12:53-61. doi: 10.2147/AMEP.S284974

[29] Dantas AM and Kemm RE. A blended approach to active learning in a physiology laboratory-based subject facilitated by an e-learning component. Advances in Physiology Education. 2008 Mar; 32(1):65-75. doi: 10.1152/advan.00006.2007

DOI: https://doi.org/10.54393/pjhs.v3i05.119

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Frequency of Spinal Defects in Fetuses with Ventriculomegaly

Ameer Hamza Khan[1*], Noraiz Ali [1], Zain-ul-Hasan [1], Syed Muhammad Yousaf Farooq [1], Amna Akhtar[1], Saqib Zawar Zain[1], Ali Ahsan Javed [1], Adeel Yasir [1], Muhammad Hashim [1], Bibi Khatera [1], Arooba Fatima[1] and Nozaina Iram[1]

[1]University Institute of Radiological Sciences and Medical Imaging Technologies, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan

ARTICLE INFO

Key Words:

Ventriculomegaly (VM), Spinal defects (SD), Ultrasound

How to Cite:

Hamza Khan, A. . ., Ali, N. ., Ul-Hasan , Z., Yousaf Farooq , S. M., Akhtar, A. ., Zawar Zain, S. ., Ahsan Javed , A. ., Yasir , A. ., Hashim , M. ., Khatera, B. ., Fatima, A. ., & Iram, N. . (2022). Frequency Of Spinal Defects in Fetuses with Ventriculomegaly: Frequency of Spinal Defects in Fetuses with Ventriculomegaly. Pakistan Journal of Health Sciences,3(05).https://doi.org/10.54393/pjhs.v3i05.119

***Corresponding Author:**

Ameer Hamza Khan

University Institute of Radiological Sciences and Medical Imaging Technologies, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan

hkehtran2@gmail.com

Received Date: 14th October, 2022

Acceptance Date: 22nd October, 2022

Published Date: 31st October, 2022

ABSTRACT

Fetal ventriculomegaly (VM) is a dilation of the lateral ventricle. Different patients have different etiologies for fetal ventriculomegaly, which can be idiopathic, structural, or chromosomal. A measurement of 10–15 mm is commonly referred to as mild ventriculomegaly, while measurements of 15–20 and >20 mm and above are defined as moderate and severe ventriculomegaly. **Objective:** To find the frequency of spinal defects (SD) in fetuses with ventriculomegaly (VM). **Methods:** It was a cross-sectional analytical study which included 103 pregnant ladies who had evidence of ventriculomegaly visited multiple centers during research period. Convenient sampling method was used. The presence of ventriculomegaly was confirmed using transabdominal probe with frequency 3-5 MHz. Frequency was calculated and crosstabs were made using SPSS version 21.0. **Results:** Among 103 pregnant patients, frequency of fetal spinal defects was 25.2%. Frequency of ventriculomegaly was as follow: mild ventriculomegaly 43.7%, moderate ventriculomegaly 31.2%, and severe ventriculomegaly 25.2%. Among 103 patients, 25.2% patients had AFI greater than 21. Frequency of mother's H/O any fetal spinal defects in their previous pregnancies was 15.5%. **Conclusions:** The study concluded that frequency of spinal defects in fetuses with ventriculomegaly was 25.2% and spinal defects occur in those patients who had severe ventriculomegaly (>20mm) and had AFI greater than 25.

INTRODUCTION

Ventriculomegaly, a general sonographic sign that is present in a variety of clinical entities with various prognoses, is the dilatation of the fetal cerebral ventricles [1]. Different patients have different etiologies for fetal ventriculomegaly, which can be idiopathic, structural, or chromosomal. The three main causes of fetal ventriculomegaly are loss of cerebral tissue, ventricular system blockage, and excessive CSF production. Brain tissue is lost as a result of cerebral atrophy, giving the ventricles an expanded appearance. It typically causes imbalance between the two lateral ventricles and may originate from infections, metabolic problems, cerebral hypoxia, or infarction. Aqueductal stenosis (AS), or narrowing of the cerebral aqueduct, is a common cause of obstruction. It can be brought on by X-linked hydrocephalus, infection with subsequent aqueduct fibrosis, or intraventricular hemorrhage. Of patients with fetal ventriculomegaly, 22.5 % experience it. Cortical malformations, brain masses, or migrational anomalies are some additional reasons of prenatal ventriculomegaly. In some circumstances, the fetal ventricular itself may be used as a marker for severe brain defects, genetic abnormalities, infections, or CNS diseases [2]. CNS abnormalities are frequently linked to fetal

DOI: https://doi.org/10.54393/pjhs.v3i05.119

ventriculomegaly (agenesis of the corpus callosum, spina bifida). Severe ventriculomegaly is linked to non-CNS abnormalities in 30% of instances. When ventriculomegaly is accompanied by other fetal defects, chromosomal anomalies are found in more than 15% of instances [3]. Structural aberrations can be anywhere between 10% and 76 % in mild Ventriculomegaly. Malformations are discovered after birth in 13% of cases, even in ventriculomegaly that appears to be isolated. A high mortality rate is related with ventriculomegaly when it coexists with other brain malformations. Poor prognostic indicators are early ventriculomegaly detection and progression. 20 % of cases with isolated moderate ventriculomegaly have bad outcomes, and 1.4% of those cases result in neonatal death. Chromosome abnormalities are seen in 3% of cases with isolated mild ventriculomegaly [4]. According to a recent study, ACC and spina bifida were the most frequent related anomalies with severe ventriculomegaly (60%), although non-CNS malformations made up roughly one-third of all diagnosed anomalies [5]. Ventricles begin to form within the brain during the fifth week of embryonic life [6]. The alterations of the ventricular system diameters, or the distance between each ventricle's walls, had been theorized to be the cause of an increase in the fetal skull dimension [7]. In most cases of ventricular dilatation, an increase in the size of the anterior horn of the lateral ventricle occurs first in its anteroposterior portion. The ventricular hemisphere Ratio may still be normal at this stage of ventricular dilatation and be ineffective for making an early diagnosis of ventricular dilatation [8]. Early ventriculomegaly (occurring before 24 weeks) is significantly associated with high spinal defects and severe ventriculomegaly at the end of pregnancy [9]. Fetal ventriculomegaly can also be characterized as unilateral, bilateral, isolated, or non-isolated [10]. The probability of survival with normal neurodevelopment is greater than 90% in isolated ventriculomegaly measuring 10–12 mm. The possibility of normal neurodevelopment with moderate ventriculomegaly is 75-93% [11]. In terms of survival and neurodevelopmental outcome, fetuses with severe ventriculomegaly have a poor prognosis [12]. The ultrasound findings for the diagnosis of ventriculomegaly are: Anechoic visualization of the third and fourth ventricles with fluid, choroid-plexus to "dangle" with the ventricular trium, over-imposing ventricular boundary notices in the occipital horn and trigon areas [13]. Spina bifida is the most common central nervous system malformation. It is a vertebral median defect with external spinal cord exposure [14]. Open or closed congenital spinal abnormalities can be distinguished with certainty. Open spinal deformities make up the great majority of them. Prenatal diagnoses are typically made after routine scanning in low-risk patients [15]. Closed spina bifida accounts for about 15% of all cases and consist of a small defect that is entirely covered by normal skin. This condition is frequently asymptomatic and is diagnosed incidentally or after a radiological scan of the column. Instead, open spina bifida is the most common lesion, accounting for 85% of all cases. The spinal cord may be exposed, or the defect may be covered by the meningeal membranes [16]. When neural tube fails to close properly early in gestation, the caudal cell mass develops abnormally, resulting in a variety of congenital spinal deformities known as neural tube defects (NTD). Prenatal ultrasound (US) can detect spinal abnormalities, linked CNS and non-CNS defects (cardiac, skeletal), and can also gauge fetal growth and wellbeing [17]. There are over 140000 cases of neural tube defects reported annually worldwide [18]. While spina bifida affects roughly 0.5 out of every 1000 babies born worldwide [19]. In pregnancy there may be a lot of associated complications in fetus because of ventriculomegaly and spinal defects before and after birth such as central-nervous-system abnormalities, non-central-nervous-system structural abnormality, chromosomal abnormality, fetal infection, traumatic birth, difficult delivery of the baby and hydrocephalus. The purpose of this study was to assess the frequency of spinal defects in fetuses with ventriculomegaly while most of the ventriculomegaly is referred to legal abortion. In case of ventriculomegaly with spinal defects, legal abortion is necessary because fetus cannot be able to survive as pregnancy advances. In our study we had found that how many fetuses had ventriculomegaly with spinal defects.

METHODS

It was a cross sectional study performed to find out the frequency of spinal defects in fetuses with ventriculomegaly. We reviewed 103 such cases who had fetal ventriculomegaly and then we analyzed that how many fetuses had spinal defects also. Convenient sampling technique was used. The duration of data collection was 6 months and data was collected from Multiple Centers according to the variables such as gestational age, parity, AFI, fetal presentation and included all the patients with evidence of fetal spinal defects, ventriculomegaly and those patients were also included who had previous history of fetal spinal defects. Women in 1st trimester of pregnancy and with history of diabetes mellitus or hypertension were excluded. Sonographic evaluation was performed by using Transabdominal probe with frequency 3-5 MHz. Frequency was calculated and crosstabs were made using SPSS version 21.0.

RESULTS

In this study 103 patients came with evidence of

DOI: https://doi.org/10.54393/pjhs.v3i05.119

ventriculomegaly in the radiology department of Multiple Centers. Among 103 pregnant patients, frequency of fetal spinal defects was 25.2%. Frequency of ventriculomegaly was as follow: mild ventriculomegaly 43.7%, moderate ventriculomegaly 31.2%, and severe ventriculomegaly 25.2%. Among 103 patients, 25.2% patients had AFI greater than 21. Frequency of mother's H/O any fetal spinal defects in their previous pregnancies was 15.5%.

Variables	Categories	Frequency(%)
Parity	1.00	47(45.6%)
	2.00	37(35.9%)
	3.00	16(15.5%)
	4.00	3(2.9%)
Presentation	Breech	29(28.2%)
	Cephalic	74(71.8%)
Ventriculomegaly	Mild	45(43.7%)
	Moderate	32(31.1%)
	Severe	26(25.2%)
Spina Bifida	No	77(74.8%)
	Yes	26(25.2%)
Mother's H/O any fetal spinaldefect	No	87(84.5%)
	Yes\	16(15.5%)

Table 1: Shows variables and their frequencies

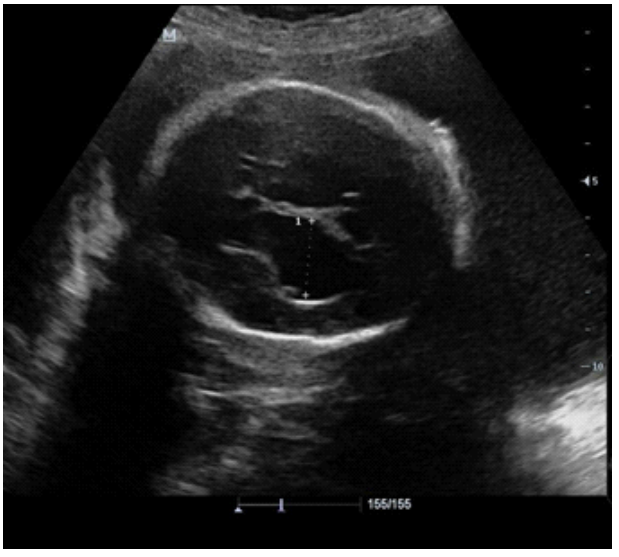

Figure 1: Ultrasound image showing fetal brain having bilateral and severe ventriculomegaly at 30 weeks and 4 days of gestation.

Table 2: Describes the cross tabulation of Fetal Presentation and Ventriculomegaly, It describes that 10 (34.4%) fetuses had mild, 10 (34.4%) had moderate and 9 (31.0%) had severe ventriculomegaly with breech presentation. While 35(47.2%) had mild, 22 (29.7%) had moderate and 17(22.9%) had severe ventriculomegaly with cephalic presentation.

Count					
		Ventriculomegaly			
		Mild	Moderate	Severe	Total
Presentation	Breech	10(34.4%)	10(34.4%)	9(31.0%)	29(100%)
	Cephalic	35(47.2%)	22(29.7%)	17(22.9%)	74(100%)
Total		45(43.6%)	32(31.0%)	26(25.2%)	103(100%)

Table 2: Presentation Ventriculomegaly Comparison

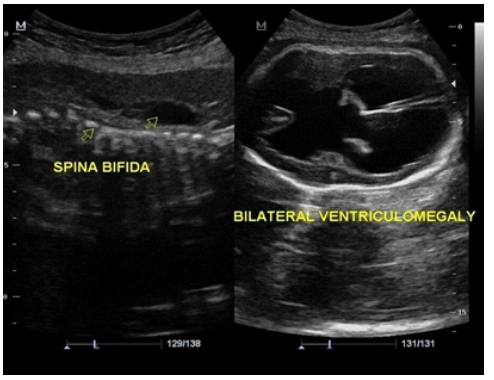

Figure 2: Ultrasound images of fetal spine and fetal head. Image on left side demonstrate spina bifida in fetus. Image on right side demonstrate severe bilateral ventriculomegaly.

Table 3: Describes the cross tabulation of Fetal Presentation and Spina Bifida, it describes that 9 (31.0%) fetuses had Spina Bifida with breech presentation. While 17 (22.9%) had Spina Bifida with cephalic presentation out of 103(100%)fetus

Count				
		Spina Bifida		
		No	Yes	Total
Presentation	Breech	20(68.9%)	9(31.0%)	29(100%)
	Cephalic	57(77.0%	17(22.9%)	74(100%)
Total		)77(74.7%)	26(25.2%)	103(100%)

Table 3: Presentation *Spina Bifida Comparison

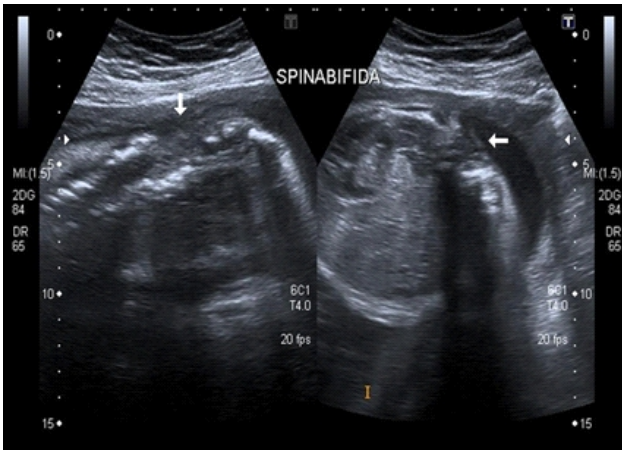

Figure 3: Ultrasound images of fetal spine shows spina bifida at 29 weeks of gestation

DOI: https://doi.org/10.54393/pjhs.v3i05.119

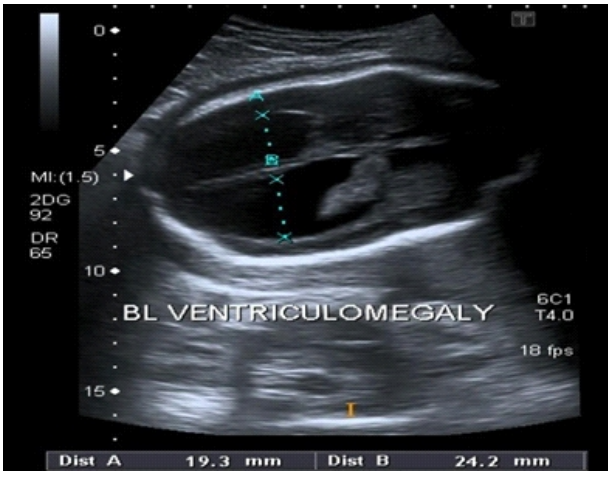

Figure 4: Ultrasound image of fetal head demonstrate bilateral ventriculomegaly measuring 19.3mm and 24.2mm

DISCUSSION

Our study was designed to find the frequency of spinal defects in fetuses with ventriculomegaly. In pregnancy there may be a lot of associated complications in fetus because of ventriculomegaly and spinal defects before and after birth such as central-nervous-system abnormalities, non-central-nervous-system structural abnormality, chromosomal abnormality, fetal infection, traumatic birth, difficult delivery of the baby and hydrocephalus. We reviewed 103 such cases who had fetal ventriculomegaly and then we analyzed that how many fetuses had spinal defects also. Table 1 of our study display variables and their frequencies. Our analysis displays the parity with a minimum of 1 and a maximum of 4. 103 patients were divided such as 47 patients were with parity 1, 37 patients were with parity 2, 16patients were with parity 3, and 3 patients were with parity 4. At the time of the scan, 74 of the 103 patient's fetuses were cephalic and 29 of them were breech. Fetal ventriculomegaly is a dilation of the lateral ventricle. One of the most frequent findings on second-trimester obstetrical ultrasound examinations is fetal ventriculomegaly, which is generally defined as a transtrigone measurement of more than or equal to 10 mm at any point in pregnancy. Ventriculomegaly can be caused by a variety of disorders which results in neurological, motor, and/or cognitive disorders impairment [20]. Mild ventriculomegaly is typically described as a measurement between 10 and 15 millimeters, whereas moderate and severe ventriculomegaly are characterized as measures between 15 and 20 millimeters and above [21]. One of the important strength of our study was that we analyzed the data of patients separately according to the degree of ventriculomegaly such as mild, moderate and severe. By analyzing of data separately we found that spinal defects were found in cases of severe ventriculomegaly (width of the atria of the lateral ventricles >20mm). Our study shows that out of 103 fetuses, 45 (43.7%) fetuses had mild ventriculomegaly, 32 (31.1%) had moderate ventriculomegaly and 26 (25.2%) had severe ventriculomegaly. Our investigation shows fetal spina bifida in patients who had severe ventriculomegaly and AFI greater than 25. It shows that out of 103 fetuses, 26 (25.2%) had Spinal defects of different types. Further, our research found that out of 103 Pregnant Women, 16 patients had history of fetal spinal defect in their previous pregnancies while 87 had not history of any fetal spinal defect. Moreover, our study describes that 35 (60.3%) fetuses had mild and 23 (39.6%) had moderate ventriculomegaly with AFI less than 15. Further describes that 10 (52.6%) had mild and 9 (47.3%) had moderate ventriculomegaly with AFI of 16 to 20. while 26 (100.0%) fetuses had severe ventriculomegaly with AFI greater than 21.

CONCLUSIONS

The research concluded that frequency of spinal defects in fetuses with ventriculomegaly was 25.2% and spinal defects occur in those patients who had severe ventriculomegaly (>20mm) and had AFI greater than 25.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] D'Addario V, Pinto V, Di Cagno L, Pintucci A. Sonographic diagnosis of fetal cerebral ventriculomegaly: an update. Journal of Maternal-Fetal and Neonatal Medicine. 2007 Jan; 20(1):7-14. doi: 10.1080/14767050601036188.

[2] El-Dib M, Massaro AN, Bulas D, Aly H. Neuroimaging and neurodevelopmental outcome of premature infants. American journal of perinatology. 2010 Nov; 27(10):803-18. doi: 10.1055/s-0030-1254550.

[3] Hiller L 4th, McGahan JP, Bijan B, Melendres G, Towner D. Sonographic detection of in utero isolated cerebellar hemorrhage. Journal of medical ultrasound. 2003 Jun; 22(6):649-52. doi: 10.7863/jum.2003.22.6.649.

[4] Yüksel A and Batukan C. Fetal cerebellar hemorrhage in a severely growth-restricted fetus: natural history and differential diagnosis from Dandy-Walker malformation. Ultrasound in Obstetrics & Gynecology. 2003 Aug; 22(2):178-81. doi: 10.1002/uog.180.

[5] Gaglioti P, Danelon D, Bontempo S, Mombrò M, Cardaropoli S, Todros T. Fetal cerebral

DOI: https://doi.org/10.54393/pjhs.v3i05.119

ventriculomegaly: outcome in 176 cases. Ultrasound in Obstetrics & Gynecology. 2005 Apr; 25(4):372-7. doi: 10.1002/uog.1857.

[6] Sadler TW. Embryology of neural tube development. In American Journal of Medical Genetics Part C: Seminars in Medical Genetics 2005 May;(135):1,2-8. Hoboken: Wiley Subscription Services, Inc., A Wiley Company.

[7] Garcia RF, Lederman HM, Brandão J. Sonographic evaluation of cerebral ventricular system in healthy, full term infants aged 1-6 months. Radiologia Brasileira. 2011; 44:349-54.

[8] Benacerraf BR, Shipp TD, Bromley B, Levine D. What does magnetic resonance imaging add to the prenatal sonographic diagnosis of ventriculomegaly? Journal of ultrasound in medicine. 2007 Nov; 26(11):1513-22.

[9] Giardini V, Verderio M, Cozzolino S, Vergani P. Isolated spina bifida aperta: prenatal ventriculomegaly as an ultrasound prognostic marker. Prenatal diagnosis. 2019 Oct; 39(11):1035-1037. doi: 10.1002/pd.5509.

[10] Hannon T, Tennant PW, Rankin J, Robson SC. Epidemiology, natural history, progression, and postnatal outcome of severe fetal ventriculomegaly. Obstetrics and Gynecology. 2012 Dec; 120(6):1345-53. doi: 10.1097/aog.0b013e3182732b53.

[11] Society for Maternal-Fetal Medicine (SMFM); Electronic address: pubs@smfm.org, Fox NS, Monteagudo A, Kuller JA, Craigo S, Norton ME. Mild fetal ventriculomegaly: diagnosis, evaluation, and management. American Journal of Obstetrics and Gynecology. 2018 Jul; 219(1):B2-B9. doi: 10.1016/j.ajog.2018.04.039.

[12] Kennelly MM, Cooley SM, McParland PJ. Natural history of apparently isolated severe fetal ventriculomegaly: perinatal survival and neurodevelopmental outcome. Prenatal diagnosis. 2009 Dec; 29(12):1135-40. doi: 10.1002/pd.2378.

[13] Afodun AM, Quadri KK, Masud MA, Sheu SO, Franck KS, Okeniran OS, et al. Fetal Ventricular Dilation; Prelude to Dandy-Walker Syndrome and Hydrocephalus: Synopsis of Two Case Reports. Nepal Journal of Neuroscience. 2022 Jan; 19(1).

[14] Main DM and Mennuti MT. Neural tube defects: issues in prenatal diagnosis and counselling. Obstetrics and gynecology. 1986 Jan; 67(1):1-6.

[15] Coleman BG, Langer JE, Horii SC. The diagnostic features of spina bifida: the role of ultrasound. Fetal Diagnosis and Therapy. 2015;37(3):179-96. doi: 10.1159/000364806.

[16] Cardwell MS. Late trimester hydranencephaly associated with maternal exposure to methamphetamine. Journal of Substance Use. 2014 Oct; 19(5):351-2.

[17] Morris JE, Rickard S, Paley MN, Griffiths PD, Rigby A, Whitby EH. The value of in-utero magnetic resonance imaging in ultrasound diagnosed foetal isolated cerebral ventriculomegaly. Clinical radiology. 2007 Feb; 62(2):140-4. doi: 10.1016/j.crad.2006.06.016.

[18] Copp AJ, Adzick NS, Chitty LS, Fletcher JM, Holmbeck GN, Shaw GM. Spina bifida. Nature reviews. Disease primers. 2015 Apr; 1:15007. doi: 10.1038/nrdp.2015.7.

[19] Mohd-Zin SW, Marwan AI, Abou Chaar MK, Ahmad-Annuar A, Abdul-Aziz NM. Spina Bifida: Pathogenesis, Mechanisms, and Genes in Mice and Humans. Scientifica (Cairo). 2017; 5364827. doi: 10.1155/2017/5364827.

[20] Almog B, Gamzu R, Achiron R, Fainaru O, Zalel Y. Fetal lateral ventricular width: what should be its upper limit? A prospective cohort study and reanalysis of the current and previous data. Journal of medical ultrasound. 2003 Jan; 22(1):39-43. doi: 10.7863/jum.2003.22.1.39.

[21] Sonographic examination of the fetal central nervous system: guidelines for performing the 'basic examination' and the 'fetal neurosonogram'. Ultrasound in Obstetrics & Gynecology. 2007 Jan; 29(1):109-116. doi: 10.1002/uog.3909.

DOI: https://doi.org/10.54393/pjhs.v3i05.209

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Original Article

Early Childhood School Leaders Knowledge, Attitude, Practices Schools Reopening Amidst Covid-19

Shelina Bhamani,[1*] Maliha Abbas,[1] Komal Rahim,[1] Areeba Syed,[1] Dawood Ahmad,[2] Ali Faisal Saleem[1]

[1]The Aga Khan University, Karachi, Pakistan
[2]Sarhad University of Information and Technology, Peshawar, Pakistan

ARTICLE INFO

Key Words:

Covid-19, pandemic, ECE, School reopening, KAP, School leaders, Karachi

How to Cite:

Bhamani , S. ., Abbas, M. ., Rahim, K. ., Syed, A., Ahmad, D. ., & Faisal Saleem, A. (2022). Early Childhood School Leaders Knowledge, Attitude, Practices Schools Reopening Amidst Covid-19: Practices Schools Reopening Amidst Covid-19. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.209

***Corresponding Author:**

Shelina Bhamani
The Aga Khan University, Karachi, Pakistan
Shelina.bhamani@aku.edu

Received Date: 6th October, 2022
Acceptance Date: 17th October, 2022
Published Date: 31st October, 2022

ABSTRACT

The COVID-19 pandemic has seriously disrupted the educational process in every educational institution worldwide. Like many other countries, Pakistan has had to close schools and educational facilities twice over the past year to stop the spread of the COVID-19 pandemic. **Objective:** To determine early childhood school leader's knowledge, attitude, practices schools reopening amidst Covid-19. **Methods:** This cross-sectional survey was conducted to examine Early Childhood School leaders' knowledge and practices related to COVID-19. The data were collected as part of an online survey of 154 school leaders from Karachi's Early Childhood Education (ECE) sector. **Results:** The knowledge constructs' overall mean score (right answers) was 6.8 with 1.3 standard deviations. Many respondents had misconceptions regarding the covid-19 virus's characteristics; only 70% of them are aware that the virus is not airborne. According to about 65% of the answers, the covid19 virus is not surface carried. On the other hand, more than 90% of the respondents stated that the covid-19 virus spreads through respiratory droplets; consequently, an overwhelming majority (95%) expressed their concern about the transmission of covid19 in school. Nearly 3 out of 4 responders thought the school should continue to be closed. **Conclusions:** The study concludes that some proper training for school leaders regarding knowledge and practices of Covid-19 would help prepare them for safe school reopening. In addition, the majority of the school leaders showed a positive attitude towards school reopening amidst Covid-19.

INTRODUCTION

The Covid-19 pandemic has severely impacted the world [1], and Pakistan has been no exception. The pandemic has affected just about every industry globally, from health care to education and has shaken global economies. Educational institutes were considered a potential hub for the spread of Covid-19. Therefore, at the beginning of the pandemic, all educational institutes were considered forced into sudden closure for many months [2]. Since March onwards Pakistan has seen several waves of COVID and there have been complete or partial school closures until 2022. Government has been constantly guiding schools on safe schools reopening [2-5]. Children have been impacted in many ways. The most significant impact has been on their school routine and learning methods which could further affect their psychosocial and emotional well-being [3]. Along with physical distancing measures in school rooms and during travel, good ventilation, education and awareness, and support to children and families, schools can help create new routines to help students adjust [6,7]. The aim is not to return to normal but acquire some normalcy in face of adversities [8]. However, not all schools and communities can manage such arrangements due to limited resources. Furthermore, many countries have reported a rise in cases coinciding with school reopening [4,8]. School leaders' confidence in the safe reopening of schools is also an important aspect [7]. Considering the above context, the investigators explored the knowledge, attitude and practices of ECE

DOI: https://doi.org/10.54393/pjhs.v3i05.209

leaders in Pakistan, with an aim to understand their readiness and fears regarding schools reopening during COVID-19. The students responded to the following questions: What are the fears of early childhood educational leaders pertinent to schools reopening amidst COVID-19 pandemic? What is the knowledge, attitude, and practices of early childhood educational leaders regarding COVID-19?

METHODS

This quantitative study was carried out to explore and describe school leaders' knowledge, attitude, practices and fears towards school reopening in Covid-19. A cross-sectional online survey was used to collect data from the ECE school leaders in Karachi – a metropolitan city of Pakistan. The data collection was undertaken from May 2020 to August 2020, where an online survey link was shared with schools in Karachi and globally to participate in this study. The participants of this webinar were also invited to this study, and 154 respondents completed the online survey questionnaire. As presented in table 1, altogether 154 ECE leaders based in Karachi participated in this study and their demographic details are provided. This survey questionnaire was adapted from a customized Knowledge, Attitude and Practices (KAP) developed by researchers from Wuhan, China [9]. The questionnaire was in English and included questions that were relevant to the purpose of the study. The questionnaire was comprised of four sections. 1) Study information along with the consent of participation; 2) demographic variables; 3) items related to knowledge of Covid-19 (9 items), practices as per covid-19 SOPs (5 items) and, attitude, fear, and confidence towards school reopening (9 items); 4) open-ended questions to capture the in-depth picture of respondents' attitudes and fears towards school reopening. The survey required approximately 20 minutes to be completed. Cronbach's alpha value was calculated and found in the acceptable range (Alpha=0.702). The data were analyzed through SPSS version 23 by employing descriptive and inferential statistics. The items were coded (No = 0, Yes=1), whereas negative items were re-coded by giving a 1 value to each correct response. Similarly, the overall scores for each construct were computed by adding all the correct responses. On the other hand, items related to fear, confidence and resources were coded (none=0, low=1, moderate=2, high=3).

RESULTS

Descriptive statistics were employed to compute frequencies and percentages for demographics, whereas mean and standard deviations were calculated for other constructs.

Demographic characteristics of Respondents	Variable	Frequency (%)
Gender	Male	22 (14%)
	Female	127 (82%)
Age in years	25-30	22 (14%)
	30-35	28 (18%)
	35-40	31 (20%)
	40-45	18 (12%)
	45 and above	10 (7%)
Academic qualification	Graduate	49 (32%)
	Post graduate	57 (37%)
Professional Qualification	B.Ed.	37 (23%)
	M.Ed.	33 (21%)
	No PQ/others	36 (23%)
School Type	Public	29 (19%)
	Private	101 (65%)
	Community	25 (16%)
School size based on enrolling students	Small (less than 500)	113 (72%)
	Medium (500 - 1000)	25 (16%)
	Large (above 1000)	14 (9%)
Available Teachers	Less than 20	81 (52%)
	20-50	44 (28%)
	Greater than 50	28 (18%)

Table 1: Shows demographics of respondents
*Total respondents were 154, frequencies based on exclusion of missing data

Results presented in Table 2 show the frequency and percentage of respondents' responses. The overall mean score of the knowledge constructs (correct responses) was 6.8, with 1.3 standard deviations. In other words, on average, the respondents responded to seven questions correctly out of nine questions, which shows that they have good knowledge of Covid-19. However, the minimum values reveal that a few respondents have limited knowledge about the Covid-19 infection. On the other side, almost 7% of the total respondents responded correctly to all the knowledge-based questions. Specifically, the item-wise analysis reveals that an overwhelming majority (i.e., 96%) of the total respondents know about 'clinical symptoms of Covid-19'. Further, 91% of the school leaders viewed that child can also be affected by covid-19, while 9% of the respondents think that children cannot be affected by covid-19. Moreover, a considerable percentage of the respondents (38%) reported availability of cure for covid-19; conversely, most (62%) respondents accepted the unavailability of treatment for Covid-19. Many respondents possess misconceptions about the nature of the covid-19 virus; for instance, 70% of them understand that covid19 is not airborne. Around 65% of the respondents considered that the covid19 virus is not surface borne. On the other hand, more than 90% of the respondents reported that the covid-19 virus spreads through respiratory droplets; therefore, mostly school leaders (90%) believed that all

DOI: https://doi.org/10.54393/pjhs.v3i05.209

children should wear a mask to be safe from covid-19 infection. It was quite encouraging that a vast majority (98%) of the respondents clearly understood the precautionary measures (i.e., hand washing and physical distancing) to keep safe from covid-19.

Knowledge about Covid-19	No	Yes
The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and shortness of breath	6 (4%)	148 (96%)
Children are not affected by COVID-19	141* (91%)	13 (9%)
There is currently no cure for COVID-19	59 (38%)	95* (62%)
Hand hygiene and physical distancing are the key preventions for COVID-19	3 (2%)	151* (98%)
COVID-19 is airborne	109 (70%)	45* (29%)
COVID-19 is surface borne	101 (65%)	53* (34%)
COVID-19 spreads via respiratory droplets	14 (9%)	140* (91%)
All children should wear masks	16 (10%)	138* (90%)
Isolation and quarantine is same	90* (58%)	64 (42%)

Table 2: Respondent's knowledge about covid-19
Overall score (M=6.8, S. D=1.3); Min score (2) – Max. score (9)
*Shows correct response

School leader's attitude towards school reopening amidst covid19: Results presented in table 3 revealed school leaders' attitude towards school reopening amidst the covid-19 pandemic and lockdown. Overall, the respondents showed a positive attitude towards school reopening, as the mean score for positive attitude was 4.5 with 0.79 standard deviations. The minimum and maximum scores lie between 2 and 6; around 60% of the respondents scored 4 and above for this construct. Further, an overwhelming majority (95%) exhibited their concern about the transmission of covid19 in school. Almost 3 out of 4 respondents reported that the school should remain closed. On the other hand, the school leaders felt confident about schools reopening, as 86% of the respondents viewed that they can confidently open their school with well-planned SOPs. Additionally, it was quite encouraging that a vast majority of the respondents (i.e., 97%) thought they would prepare their teachers for safe school reopening with covid-19 SOPs. Furthermore, 88% of the respondents were also confident to communicate and involve parents and community members for safe school reopening to help the school leaders effectively implement COVID-19 SOPs.

Attitude towards the school reopening	No	Yes
Schools can be a potential transmission zone for COVID-19	8 (5%)	146 (95%)
Do you agree that schools should remain closed?	47 (30%)	107 (70%)
Do you have confidence with well-planned SoPs you can open the schools?	22 (14%)	132 (86%)
Do you have assurance that you are ready as a school leader for school reopening?	32 (21%)	122 (79%)
Do you think you will be able to prepare teachers for school reopening?	5 (3%)	149 (97%)
Are you confident of communicating about parent community on school reopening and COVID-19 measures?	19 (12%)	135 (88%)
Overall score (M=4.5, S.D=0.79); Min score (2) – Max. score (6)		

Table 3: School leader's attitude towards school reopening amidst covid-19

School leaders' Practices towards Covid-19: Results presented in table 4 show descriptive statistics of the respondents' practices towards Covid-19. The majority reported positive practices towards COVID-19. The respondents mentioned that they are following almost four positive practices out of the five internationally agreed Covid-19 SOPs to keep them safe from the infection. The overall mean score of positive practices was 4.3, with a standard deviation of 0.96 revealed that the respondents were sensitive towards precautionary practices amidst Covid-19. Additionally, almost three out of the four respondents (77%) revealed that they had avoided crowded places during the covid-19 pandemic, while 23% of the respondents stated that they had visited a crowded place. That said, it was quite encouraging that all the respondents (98%) reported wearing a mask while going out. Furthermore, an overwhelming majority (91%) of the respondents washed their hands frequently for more than 20 seconds and practiced physical distancing in their routine activities (88%). Moreover, 76% of the respondents claimed that they are disinfecting key areas of contact, while 24% were not practicing this SOP to keep themselves safe from covid-19 infection.

Practices towards Covid19	No	Yes
In recent days have you gone to a crowded place?	118* (77%)	36 (23%)
Have you been wearing masks when going out?	3 (2%)	151* (98%)
Do you wash hands frequently for more than 20 seconds?	14 (9%)	140* (91%)
Are you practicing physical distancing of 2 meters or 6 feet?	18 (12%)	136* (88%)
Are you disinfecting your key areas of contact?	37 (24%)	117* (76%)
Overall score (M=4.3, S.D=0.96); Min score (1) – Max. score (5)		
*Represents positive practices towards covid19		

Table 4: Showing respondents' practices as per covid19 SOPs

DISCUSSION

The results from our study suggest that most of the school leaders have some preliminary knowledge related to the

DOI: https://doi.org/10.54393/pjhs.v3i05.209

COVID-19 virus and its spread. However, there were two things which showed that the school leaders need further understanding and information. As the finding suggested that the understanding about COVID-19 being an airborne, surface borne or a respiratory borne disease was This highlights a matter of concern as many of the school leaders perceived that COVID-19 is not transmitted through airborne and surface borne routes. Another contradictory view encountered in this research was that, at one point, the school leaders had mixed thoughts as to whether COVID-19 was a surface-borne virus. However, they did mention that they clean the surfaces as part of their SOPs practice [10]. This depicts that the school leaders follow the SOPs without enquiring about the rationale or knowing the reason for their actions. A similar study was conducted in the Jammu and Kashmir, India, which used the same KAP questionnaire to detect the knowledge, attitude, and practice of the general population [11]. Their questionnaire did not have this statement for "COVID-19 is an airborne virus"; thus, that study did not have any of the findings which might overlap to ours. While many of the school leaders believe that schools can be a potential source of the spread of COVID-19, the initiation of online learning was greatly encouraged and adopted by many schools in Pakistan. The initiation of Tele school has been a tremendous effort from the government in a concise period [12]. While the title school initiative is growing in popularity and viewership, it has its fair share of challenges such as, student engagement and retention, age-appropriateness of the content, and assessment for learning [13]. Distance learning is also a challenge for most families who may not have internet facilities and paraphernalia for online learning [14]. Managing children's routines at home is also a newfound challenge for most family's incapable of managing children's learning routines at home [15]. According to the government, school reopening is also not possible since the public has yet to understand the gravity of the situation and follow the standard operating procedures (SOPs) for their safety and that of others [16]. The responsible reopening of schools is deemed a Herculean task across Pakistan due to many reasons, primarily lack of professionalism, resources, commitment, and adherence of the law [14]. The government believes that schools could become nurseries for the contagion to spread quickly, weakening the mitigation strategies that are already not being followed effectively by the people [17]. Schools will be ineffective in implementing safety and prevention SOPs on their premises for children and staff. While many developed countries have reopened schools and are normalizing public life, Pakistan is not ready for a similar event [18]. The most critical question now is what could be done in this scenario. The situation described above sums up the incapable and ineffective infrastructures in the country and the impact cannot miss the majority of schools [19]. School leaders may not be able to conjure safety protocols for their teachers and students, given the many restrictions. With collective responsibility, we may curb the spread of the virus and hope for the situation to make school reopening possible with the new variants appearing every now and then. The knowledge and implementation have not been standardized in our country; hence, opening schools and resuming academic activity would be difficult to monitor, and managing the consequences might be an additional burden [20].

CONCLUSIONS

The study concludes that some proper training for school leaders regarding knowledge and practices of Covid-19 would help prepare them for safe school reopening. In addition, the majority of the school leaders showed a positive attitude towards school reopening amidst Covid-19. The contradictory responses from participants regarding the spread of the virus and implementation of SOPs leave little room for resumption of in-person teaching/learning practices in the wake of the remitting pattern of Covid-19 cases. This offers an excellent opportunity to Pakistan to work on remote-learning programs and ensure the availability of equipment to remote regions of the country.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] McKibbin W and Fernando R. The economic impact of COVID-19. Australian National University. Centre for Economic Policy Research (CEPR). Asian Economic Papers. 2020;1-55.

[2] Singh V and Thurman A. How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). American Journal of Distance Education. 2019 Oct; 33(4):289-306.

[3] D'angelo D, Sinopoli A, Napoletano A, Gianola S, Castellini G, Del Monaco A, et al. Strategies to exiting the COVID-19 lockdown for workplace and school: A scoping review. Safety Science. 2021 Feb; 134: 105067. doi: 10.1016/j.ssci.2020.105067.

[4] Di Domenico G, Tuan A, Visentin M. Linguistic drivers of misinformation diffusion on social media during the COVID-19 pandemic. Italian Journal of Marketing.

DOI: https://doi.org/10.54393/pjhs.v3i05.209

2021 Dec; 2021(4):351-69.
[5] Ilyas N, Azuine RE, Tamiz A. COVID-19 pandemic in Pakistan. International Journal of Translational Medical Research and Public Health. 2020 May; 4(1
[6] Duan H, Bao Q, Tian K, Wang S, Yang C, Cai Z. The hit of the novel coronavirus outbreak to China's economy. China Economic Review. 2021 Jun; 67:101606.
[7] Martin F, Sun T, Westine CD. A systematic review of research on online teaching and learning from 2009 to 2018. Computers & education. 2020 Dec; 159:104009.
[8] Griffin M, Sohrabi C, Alsafi Z, Nicola M, Kerwan A, Mathew G, et al. Preparing for COVID-19 exit strategies. Annals of Medicine and Surgery. 2020 Dec; 61:88-92. doi: 10.1016/j.amsu.2020.12.012.
[9] Villar-Rodríguez G, Souto-Rico M, Martín A. Virality, only the tip of the iceberg: ways of spread and interaction around COVID-19 misinformation in Twitter. Communication & Society. 2022 Apr: 239-56.
[10] Javaid S and Javaid MK. Survey on corona virus: a case study in Pakistan. International Journal of Medical Science in Clinical Research and Review. 2020 Apr; 3(02):223-7.
[11] Balayar BB and Langlais MR. Parental Support, Learning Performance, and Socioemotional Development of Children and Teenagers During the COVID-19 Pandemic. The Family Journal. 2022 Apr; 30(2):174-83.
[12] Leibowitz A. Home investments in children. Journal of Political Economy. 1974 Mar; 82(2, Part 2): S111-31.
[13] Gurdasani D, Bear L, Bogaert D, Burgess RA, Busse R, Cacciola R, et al. The UK needs a sustainable strategy for COVID-19. Lancet. 2020 Dec; 396(10265):1800-1801. doi: 10.1016/S0140-6736(20)32350-3.
[14] Zhou J, Li YS, Chien S. Shear stress-initiated signaling and its regulation of endothelial function. Arteriosclerosis, Thrombosis, and Vascular Biology (ATVB) 2014 Oct; 34(10):2191-8. doi: 10.1161/ATVBAHA.114.303422.
[15] Jan A, Khan I, Ahmad M, Rehman AU, Ali A. Challenges and Response: How Covid-19 effect the Educational Activities in Schools (A Case study of Lower Dir Khyber Pakhtunkhwa). Multicultural Education. 2021;7(2).
[16] Pradhan NA and Nanji K. Implications for Schools Reopening During the Second Wave of COVID-19 in Pakistan. Asia-Pacific Journal of Public Health. 2021 Apr; 33(2-3):322-323. doi: 10.1177/1010539521996629.
[17] Zacharia S. Pakistan: Tele School and Taleem Ghar (Educational TV at Home) 2022.
[18] Mansoor S and Afzal MT. Role of Tele School in Students' Engagement during COVID-19 Lockdown: A Phenomenological Perspective. Journal of Educational Research (1027-9776). 2021 Jan; 24(1).
[19] Yousafzai A. Low-cost private schools may not be able to survive COVID-19 crisis. The News International.s 2020.
[20] Segre G, Campi R, Scarpellini F, Clavenna A, Zanetti M, Cartabia M, et al. Interviewing children: the impact of the COVID-19 quarantine on children's perceived psychological distress and changes in routine. BMC Pediatrics. 2021 May; 21(1):231. doi: 10.1186/s12887-021-02704-1.

DOI: https://doi.org/10.54393/pjhs.v3i05.233

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 3, Issue 5 (October 2022)

Case Study

Effects of Bobath and Neurodevelopmental Treatment in A 3.5 Years Old Child with Lacunar Pure Motor Stroke Following Ventricular Septal Defect Repair

Nayab Khuram[1], Binash Afzal[1], Rida Nasir[1], Hafza Mushtaq[1]

[1]Department of Neuromuscular Physical Therapy, Riphah Collage of Rehabilitation and Allied Health Sciences

ARTICLE INFO

Key Words:

Lacunar stroke, lacunar infarct, bobath therapy, neurodevelopment therapy, motor stroke

How to Cite:

Khuram, N. ., Afzal, B. ., Nasir, R. ., & Mushtaq, H. . (2022). Effects of Bobath and Neurodevelopmental Treatment in A 3.5 Years Old Child with Lacunar Pure Motor Stroke Following Ventricular Septal Defect Repair: Bobath and Neurodevelopmental Treatment in A Child with Lacunar Pure Motor Stroke. Pakistan Journal of Health Sciences, 3(05). https://doi.org/10.54393/pjhs.v3i05.233

***Corresponding Author:**

Nayab Khuram

Department of Neuromuscular Physical Therapy, Riphah Collage of Rehabilitation and Allied Health Sciences

nayabkhuram8@gmail.com

Received Date: 11th October, 2022

Acceptance Date: 21st October, 2022

Published Date: 31st October, 2022

ABSTRACT

Lacunar pure motor stroke happens when an artery leading to the deep section of the brain, which contains the organs like the thalamus or basal ganglia is obstructed. Small and occurring outside of the cortex, lacunar strokes are a subtype of ischemic stroke. Lacunar strokes mostly affect patient's memory, judgmental skills and language. On the basis of symptoms, lacunar stroke is categorized as pure motor hemiparesis (45% cases), pure sensory stroke (7% cases) and ataxic hemiparesis (17-18% cases). We reported a case of 3.5 years old male patient with pure motor lacunar stroke following ventricular septal defect repair who was effectively treated with bobath therapy and neurodevelopmental therapy as bobath is a generally accepted theory in the rehabilitation of hemiparetic stroke victims worldwide. On examination, the patient had a total pure motor based right sided hemiparesis. The lower extremity movements were more compromised than upper extremity, strength of mainly antigravity or postural muscles was compromised and lower extremity muscles were scoring 1/5 on Manual Muscle Testing (MMT) and scored 1 on Modified Ashworth Scale (MAS). As such there was no spasticity factor in the upper or lower limb muscles but there was weakness (right sided hemiparesis), so the treatment plan was given and thoroughly explained to the patient's caretaker. There was no major cognitive and sensory deficit, as lacunar stroke has a better prognosis than other types of stroke, so, the recovery was good within 3 to 4 months by NDT and bobath therapy. Bobath therapy mainly improves the motor function with postural balance and stability.

INTRODUCTION

When an artery leading to the deep section of the brain, which contains organs like the thalamus or basal ganglia is obstructed, a lacunar stroke happens [1]. Small and occurring outside of the cortex, lacunar strokes are a subtype of ischemic stroke [2]. Small, deeply penetrating branches of the circle of Willis' cerebral vessels, such as those from the middle cerebral artery (MCA), anterior cerebral artery (ACA), posterior cerebral artery (PCA), or basilar artery, can get blocked and result in lacunar infarctions. Lacunar infarcts are typically asymptomatic because of their tiny size. Yet, the distribution and buildup of several lacunar infarctions can cause serious cognitive and physical impairments [3].One of the most prevalent diseases that results in functional impairment and disability is stroke. According to data from the American Stroke Association, hemorrhagic stroke makes up the remaining 13% whereas ischemic stroke causes 87% of all strokes [4]. The fifth most common cause of mortality in the US is stroke [5]. The majority of ischemic strokes, or 25% of all ischemic strokes are lacunar strokes [6]. In a society study, the incidence rate of lacunar infarct in a largely White community was 29 over 100,000 individuals, whereas the incidence rate was 52 over 100,000 persons in a community-based study with a predominantly Black population [7]. Lacunar stroke was differentially diagnosed by an international systematic guidelines of stroke

DOI: https://doi.org/10.54393/pjhs.v3i05.233

assessment including sensory, cognitive and motor deficit, diagnosis of lacunar stroke was made by CT scan for more accuracy. In Lacunar stroke mostly people had effect on memory, judgmental skills and language. On the basis of symptoms lacunar stroke is categorized like pure motor hemiparesis (45% cases), pure sensory stroke (7% cases) and ataxic hemiparesis (17-18% cases) etc [8]. Recovery widely depends on symptoms onset and treatment. Either patient presented within 4.5 hours takes 24 hours to manage effectively or patient presented within 6-24 hours roughly takes 21 days to manage. Previous research indicated that lacunar stroke has a better prognosis than other types of stroke [8]. It has a high rate of survival, a low rate of recurrence, and a largely positive functional recovery. The prognosis for lacunar infarcts is generally quite good [9]. The Bobath technique, commonly referred to as neurodevelopmental treatment (NDT), is a generally accepted theory in the rehabilitation of hemiparetic stroke victims worldwide. It has been acknowledged that the neurodevelopmental treatment (NDT)/Bobath approach can be used to treat stroke patients who have mobility disorders [10].

Clinical Presentation: M. Burahan, a 3.5 years old boy was admitted in the ICU of National hospital due to ventricular septal defect repair. Due to ventricular septal defect repair patient perceived lacunar stroke at 2nd post-operative day with complications of atelectasis and chest congestion. On examination, the patient had a totally pure motor based right sided hemiparesis. Lower extremity movement was more compromised than upper extremity, strength of mainly antigravity or postural muscles was compromised and lower extremity muscles was scoring 1/5 on Manual Muscle Testing (MMT) and scored 1 on Modified Ashworth Scale (MAS). As such there was no spasticity factor in muscles but there was weakness (right sided hemiparesis), so plan was given and thoroughly explained to patient's caretaker. As patient has mainly weakness factor, it was improved by strengthening exercises. There was no as such cognitive sensory deficit, so, the recovery was good within 3 to 4 months by NDT and bobath therapy. Bobath therapy mainly improves motor function with postural balance and stability. Patient was recovered in 3 to 4 months following the plan of care with follow ups and contact via WhatsApp for assessment of recovery of patient. Contact through WhatsApp was easily accessible approach by patient due to rural background.

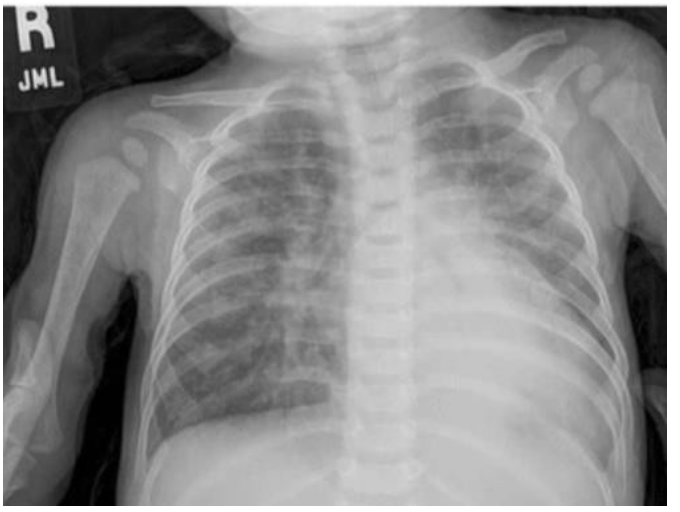

Figure 1: AP View of Right Sided Atelectasis of Upper and Middle Lower Lobe of Right Lung.

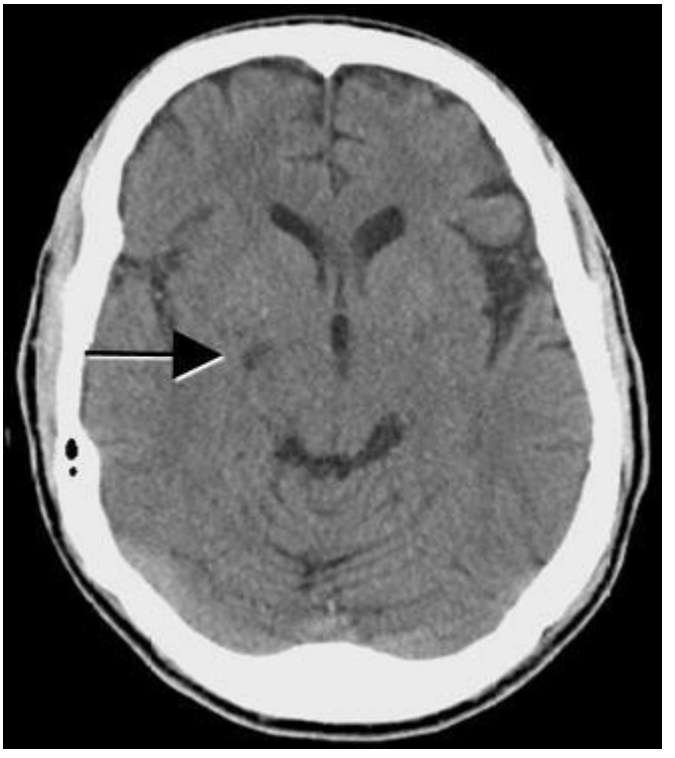

Figure 2: Axial CT scan of Brain without Contrast indicating Lacunar Infarct

DISCUSSION

As patient was suffering from ventricular septal defect, aged 3.5 years to treat ventricular septal defect he had cardiac surgery and at the second day of surgery he had right sided lacunar stroke due to ventricular septal repair with complication of atelectasis. On the basis of symptoms, 1/5 grade of antigravity or postural muscles indicates weakness of muscles. In coordination with consultant physiotherapist, our team planned plan of care involving strengthening exercise, neurodevelopmental

DOI: https://doi.org/10.54393/pjhs.v3i05.233

treatment (NDT) and Bobath. As ischemic stroke, subtype of lacunar stroke involves 20 types of syndromes varying due to symptoms presentation inpatients. On the basis of symptoms right sided mainly motor lacunar stroke was diagnosed and this type of symptoms are 45% prevalent. Lacunar stroke has various reasons, but in this case lacunar stroke was caused by ventricular septal defect in M.Burhan. While during management and diagnostic procedure, CT scan (Axial without contrast) and X- Ray (Anteroposterior AP-view) of chest was performed. The patient was thoroughly assessed by physiotherapist team using international guidelines for stroke that diagnosed pure motor right sided lacunar stroke following MAS scored 1, Babinski reflex positive, slightly raised spasticity in patient and mainly weakness in postural or antigravity muscles. As the patient did not have cognitive sensory deficit and diagnosed within hours, recovery was good and quick in patient. It took 3 months to recover. Patient was mainly supervised by surgeon and as per his recommendations due to complications that patient was facing, he was admitted for 3 weeks in hospital so comprehensive rehabilitation program (inpatient rehabilitation) was executed to him. In rehabilitation program, there were following international guidelines for stroke population management that includes strengthening exercises (weight bearing and repetition, etc.), positioning, balance training. Along with managing muscle weakness by physiotherapy, pharmacotherapy was provided. Mainly bobath therapy is used to improve movement function involving proprioceptive and exteroceptive environment. Along with all of these aspects tone was also affecting factor that was managed by using mobilization, stretching technique.

CONCLUSIONS

This case report described the male patient of 3.5 years diagnosed with pure motor right sided lacunar stroke due to the ventricular septal defect repair with the complication of Atelectasis and chest congestion. Pure motor lacunar stroke with lower extremity hemiparesis was effectively treated with bobath and neurodevelopment therapy.

Conflicts of Interest

The authors declare no conflict of interest

Source of Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Berberich A, Schneider C, Herweh C, Hielscher T, Reiff T, Bendszus M, et al. Risk factors associated with progressive lacunar strokes and benefit from dual antiplatelet therapy. European Journal of Neurology. 2020 May; 27(5):817-824. doi: 10.1111/ene.14159.

[2] Bashir S, Terceño M, Buxó M, Silva Y, Álvarez-Cienfuegos J, Vera-Monge V, et al. Progressive Lacunar Strokes: A Predictive Score. Journal of Stroke & Cerebrovascular Diseases. 2022 Aug; 31(8):106510. doi: 10.1016/j.jstrokecerebrovasdis.2022.106510.

[3] Guzik A and Bushnell C. Stroke Epidemiology and Risk Factor Management. Continuum (Minneap Minn). 2017 Feb; 23(1, Cerebrovascular Disease):15-39. doi: 10.1212/CON.0000000000000416.

[4] Gore M, Bansal K, Asuncion RM. Lacunar Stroke 2020.

[5] Gorelick PB. The global burden of stroke: persistent and disabling. Lancet Neurology. 2019 May; 18(5):417-418. doi: 10.1016/S1474-4422(19)30030-4.

[6] GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet. 2017 Sep; 390(10100):1211-1259. doi: 10.1016/S0140-6736(17)32154-2.

[7] Katan M and Luft A. Global Burden of Stroke. Seminars in Neurology. 2018 Apr;38(2):208-211. doi: 10.1055/s-0038-1649503.

[8] Nair R, Gandeti R, Chatterjee A, Chandran V, Gorthi SP, Puppala G, et al. Clinical, radiological and risk factor profiles of acute lacunar stroke in a developing country. Neurology Asia. 2021 Mar; 26(1).

[9] Clavier I, Hommel M, Besson G, Noèlle B, Perret JE. Long-term prognosis of symptomatic lacunar infarcts. A hospital-based study. Stroke. 1994 Oct; 25(10):2005-9. doi: 10.1161/01.str.25.10.2005.

[10] Pathak A, Gyanpuri V, Dev P, Dhiman NR. The Bobath Concept (NDT) as rehabilitation in stroke patients: A systematic review. Journal of Family Medicine and Primary Care. 2021 Nov; 10(11):3983-3990. doi: 10.4103/jfmpc.jfmpc_528_21.