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Original Article

Knowledge and Awareness Regarding Defining Components of Research Process Among Dental Graduates

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ABSTRACT

Modern breakthroughs significantly improve life span and quality. Conducting research should be viewed as crucial to medical education. Critical thinking and reasoning abilities must be developed if dental practitioners are to embrace a positive viewpoint of scientific study. Therefore, efforts are being made for graduate dentists to bridge gap between understanding research process and its components. **Objectives:** To determine how well dental graduates understood key elements of research process. Decisions and curriculum changes for bettering knowledge and conducting research could be made using study's findings. **Methods:** A cross-sectional descriptive study was designed and conducted among house officers of University Dental Hospital, University of Lahore. Self-administered questionnaire was designed and circulated among various dental schools in area. For data analysis, SPSS Version 25.0 was used. **Results:** Total of 161 participants took part in current study out of which majority (n=107, 66.4%) were females and minority (n=54, 44.6%) were males with the age group lying between 23-25 years. Bulk of study participants (n= 53, 32.9%) rarely had any experience in research. Participants indicated that they were knowledgeable about research and its components, scoring 48% fair, 16% good, and 6% excellent, although 30% of them showed inadequate understanding. **Conclusions:** The majority of dental graduates believed they had poor to fair knowledge of how to plan, carry out, and write a research project.

INTRODUCTION

Research is a movement from unknown to known and the evolution of the world from ancient to modern is a result of this movement. J. H. Shera defined research as "an intellectual process whereby a problem is perceived, divided into its constituent elements and analyzed in the light of certain basic assumptions" [1]. In simple words, research starts with a question in one's mind and ends with an answer to that question, which further helps other to solve problems or to identify other questions, that's how we are all evolving in a better place daily [2]. The word "research" is derived from French "recherché" meaning "to go about seeking" [3]. With the advent of internet over the turn of the millennium, an immense amount of information has become available for everyone across the globe leading to a "paradigm shift" toward research-oriented and self-directed learning [4]. According to Hudson Maxim, "All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry and inquiry leads to investigation" [5]. Quality of life and duration is highly increased by present day advances. Scientific research should be considered as an integral part in medical education. It is important to inculcate aptitude of critical thinking and reasoning in order to develop a positive attitude among undergraduate student towards scientific research [6]. There has been much discussion over the past 25 years regarding the serious decline in medical graduates choosing clinician scientist careers [7]. Other problems identified included lack of time, lack of statistical

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support and lack of interest in research. Apart from the student projects, since most of the faculty in the medical schools are not actively involved in conducting research that led to the failure of medical graduates to imbibe and understand the importance of research in medical science. Moreover, inadequate training, lack of funding, lack of motivation and no mentorship program are also major obstacles to carry out research [8, 9]. The worldwide alleluia of a 7-star doctor is comprised of attributes of 5-star doctor as determined by World Health Organization (WHO) i.e., care provider, decision maker, communicator, community leader, manager; plus, two other competencies deemed necessary in medical graduates are researcher and faith and piety [10]. At international level efforts are being made to encourage and incentivize students to get involved in research activities. To come in line with international standards Pakistan Medical and Dental Council (PMDC) has drafted the competences for fresh graduates which also included area of researcher and lifelong learner [11]. Unfortunately, till date this initiative could not bridge the gap between understanding the need of good research and knowledge of defining components of research process among medical and dental graduates. Therefore, current study was conducted to assess the knowledge and awareness of dental graduates in the area that was led to propose a possible solution to the problem.

METHODS

A cross-sectional descriptive study was conducted from March 2022 till September 2022, with probability purposive sampling technique. The study was conducted among house officers of four private and public dental colleges: University College of Dentistry (UOL), de' Montmorency College of Dentistry Lahore, Akhtar Saeed Medical and Dental College Lahore, CMH medical and dental college Lahore. A self-administered questionnaire was designed. Sample size of 161 was calculated with 90% confidence level, 6.5% margin of error and by taking percentage of awareness about research components as 48% {$X = Z^2 \times p(1-p)/ d^2$}. From a sample size of 161 the initial 70 responses were used to check the validity and reliability of the questionnaire which showed Cronbach's alpha value of 0.923. The questionnaire was holding a cover letter which explained the procedure and purpose of the study, informed the participants about the confidentiality and withdrawal options. Inclusion criteria was fresh dental graduates doing house-job. Consultants, Demonstrators and students were excluded from the study. Consent was obtained and confidentiality of the participants was ensured. The questionnaire was circulated among various dental schools in the area via Google forms as well as in the form of hard copies to be filled by house officers. It consisted of 3 sections with section 1 being related to demographics, section 2 about the basic defining components of research assessed on a 5-point Likert scale and the 3rd section consisted of 4 scenario-based questions each having 5 options with 1 correct answer. A score of 1 for correct answer and 0 for wrong was marked. The latter were included in order to asses a holistic knowledgeable approach of study participants towards various research manoeuvers. Data were analyzed using SPSS Version 25.0 for Windows. Descriptive statistical analysis was performed on the results of all questions whereas Chi-Square test was applied for gender association pertinent to study items.

RESULTS

Total of 161 participants took part in our study out of which majority (n=107, 66.4%) were females and minority (n=54, 44.6%) were males with the age group lying between 23 to 25 years. This gender distribution coincides well with the actual representation of female to male ratio present in the medical and dental colleges of Pakistan. A large proportion of the participants (n=60, 37.2%) were aware of the concept of plagiarism. Knowledge of the participants about journal categorization by Higher Education Commission (HEC) revealed alarming results with only 10% (n=18) being aware. Participants' knowledge of sampling methods and research design was adequate in 21.1% (n=34) and 6.2% (n=10) of responses, respectively. Maximum respondents (n= 77, 48%) were of the opinion that they have fair level of self-perceived competence in research skills while 31% (n= 50) marked poor level followed by only 5% (n=8) who indicated excellent response for aforementioned. Only 5% (n=8) of the participants perceived their research skills as of very poor level (Table 1).

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No.	Questions	Responses n (%)				
		Not aware at all	Slightly aware	Moderately aware	Very aware	Extremely aware
1	How much aware are you of the terms used in research writing?	32 (19.9%)	57 (35.4%)	44 (27.3%)	26 (16.1%)	2 (1.2%)
2	To what extent you know about the implication of "Conflict of Interest" in a research project?	35 (21.7%)	31 (19.3%)	49 (30.4%)	26 (16.1%)	20 (12.4%)
3	Do you know about the appropriate use of graphs and tables in a research paper?	19 (11.8%)	41 (25.4%)	43 (26.7%)	34 (21.2%)	24 (14.9%)
4	Are you aware about scope of journals?	23 (20.4%)	48 (29.8%)	46 (28.5%)	30 (18.6%)	14 (8.6%)
5	Do you know how to cite an article?	32 (19.8%)	53 (32.9%)	34 (21.1%)	18 (11.1%)	24 (14.9%)
6	Do you have any knowledge about funding resources for research?	56 (34.8%)	42 (26.1%)	45 (27.9%)	10 (6.2%)	8 (4.9%)
7	Do you have any knowledge about plagiarism and its implications?	21 (13.4%)	39 (24.2%)	41 (25.5%)	30 (18.6%)	30 (18.6%)
8	Do you have any knowledge about journals recognized by Higher Education commission (HEC)?	44 (27.3%)	57 (35.4%)	42 (26.1%)	6 (3.7%)	12 (7.4%)
9	Do you have any knowledge about various data analyzing tools available for research?	27 (16.8%)	62 (38.5%)	34 (21.2%)	0 (0%)	38 (23.6%)
		Not at all familiar	Slightly unfamiliar	Moderately familiar	Very familiar	Extremely familiar
10		44 (27.3%)	40 (24.8%)	67 (41.6%)	8 (4.9%)	2 (1.2%)
11	Do you think you have enough knowledge about various sampling techniques in a study?	33 (20.5%)	49 (30.4%)	45 (27.9%)	32 (19.8%)	2 (1.2%)
		Very poor	Poor	Fair	Good	Excellent
12	Can you perceive your level of competence in research skills?	8 (5%)	50 (31%)	77 (48%)	26 (16%)	8 (5%)

Table 1: Frequency & percentage distribution of study items assessing awareness regarding basic defining component of research

Regarding previous experience of research, most participants (n=53, 32.9%) had rarely participated in any research followed by those (n=40, 24.8%) who clicked sometimes while some (n=30, 18.6%) never had any experience. Only few (n=28, 17%) of participants had often participated in research activities (Figure 1).

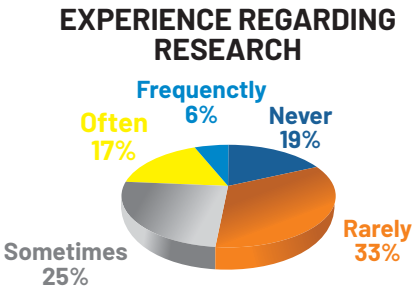

Figure 1: Responses regarding research experience

Many participants had a moderate comprehension of the words used in research, according to their answers to the questions designed to gauge their understanding of the various research components and their knowledge of research terminologies are shown in Figure 2.

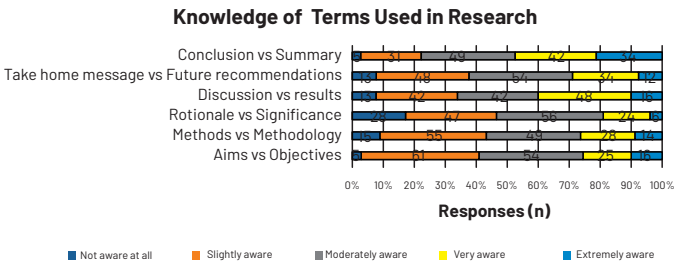

Figure 2: Responses regarding knowledge of terms used in research

The majority of research participants made wrong choices in the scenario-based questions that made up the third section of the survey (Table 2). Association between gender and questionnaire items using Chi-Square test revealed statistically significant results for the questions pertaining to difference between methods and methodology (p=0.000) with female preponderance while difference between aims and objectives (p=0.005) with male predominance. Furthermore, the association of gender with knowledge regarding study designs turned out as statistically significant (p=0.021) with female distinction. Likewise, male dominance was also reflected in response to self-perceived level of their research with p-value of 0.010.

Questions with Options	Correct Option n (%)	Incorrect Option n (%)
To assess the effect of consumption of sugar and development of carious lesions, which of the following study designs do you think would be appropriate? (a) Descriptive (b) Correlational* (c) Casual comparative (d) Experimental (e) Cohort/ follow up	36 (22.4%).	125 (77.6%)
If you want to collect data and you are supposed to ask your initial subjects to assist in identifying other potential subjects, which sampling technique do you think is this? (a) Snowball sampling* (b) Quota sampling (c) Exponential sampling (d) Bias sampling (e) Random sampling	47 (29.2%).	114 (70.8%)
If you want to publish your research in a peer review impact factor journal, which category of HEC recognized journal falls into this group? (a) W* (b) X (c) Y (d) Z (e) None	19 (11.8%)	142 (88.2%)
A person was supposed to get and write a text from an article to include it in his own, he didn't mention that text within quotation marks. Which of the following terms do you think is appropriate? (a) Copied text (b) Plain text (c) Plagiarized text*(d) Forged text (e) None	98 (60.9%)	63 (39.1%)

Table 2: Distribution of responses for individual Scenario-based Question among 161 Participants

* Correct option

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DISCUSSION

It is no longer unusual for undergraduate medical students to carry out research, present it at a conference and publish the results as an abstract or a full paper. The proponents of undergraduate research hold that knowing about research leads to better doctors who study literature and clinical research findings more critically. Exposure to research improves one's understanding of clinical medicine, fosters critical thinking and appraisal, increases one's chances of being accepted for postgraduate study, grants, and high-impact publications, nurtures the development of teamwork, and exposes one to more of the brightest clinical minds [12, 13]. Although there is debate about whether or not early exposure to research is important, the advantages are clear. The Bachelor of Dental Surgery (BDS) programme core curriculum in dental institutions must include research as a requirement [14]. However, lack of mentorship, facilities and infrastructure, lack of time and drive as well as lack of training in certain abilities can all prove to be significant obstacles [15]. In Germany, medical school graduates practice medicine but cannot assume the title 'Doctor' until they have submitted a thesis. As a result, around 90% of practicing German physicians have undertaken a period of research [16]. In relation to the aforementioned, the results of present study revealed that around half of the participants (n=83, 51.6%) did not have any experience in research, be a participant in a research related activity or conducting a research by themselves (Figure 1). Similar results were revealed by the study conducted in Malaysia by Ismail et al., that demonstrated only 50% students were involved in research activities while rest of the participants were not involved in any kind of research work [17]. About knowledge of terms used in research, majority (n=57, 35.4%) of the participating population were slightly aware of the components, which was followed by moderate level (n=44, 27.3%) of awareness. Most of the participants (n=49, 30.4%) marked the option of very aware concerning their understanding about conclusion vs summary and take home message vs future recommendations (n=54, 33.5%) while moderately aware for discussion vs results (n=48, 29.8%). A study conducted in Pakistan by Khan et al., revealed results similar to this study where 63% (n=138) of the participants were either slightly or moderately knowledgeable about the terms used in research (Table 1) [9]. In regards to question on the subject of knowledge about data processing and data analysis revealed awful outcome where majority opted a poor response (n=62, 38.5%). Likewise, results were shown by Murdoch-Eaton et al., where only a few (n= 279, 31%) were knowledgeable about data analyzing process (Table 1) [7]. A study conducted by Burgoyne et al., showed that their study participants had higher level of competence (98.1%) in research skills [10]. Similar findings were obtained from a Saudi Arabian study where individuals believed they had fair (n=108, 40.5%) to good (n=162, 60.4%) levels of competence as research has become a compulsory subject where students are obligated to complete a substantive research during final year at University College Cork [18]. Results of aforementioned studies coincides with the results of present research where majority of the respondents (n=77, 48%) were having fair level of perceived competence followed by those (n=50, 32%) who were falling in the poor level category. It was quite surprising that only 5% (n=8) were of the opinion that their perceived level of competence is excellent while 16% (n=26) ranked it as good (Table 1). About 60% (n=96) of the participants in current study had knowledge about plagiarism and its implications. Alzahrani et al., demonstrated in their study that majority (n=165, 82.6%) of the respondents were aware about plagiarism which is analogous to present study as every student was aware of plagiarism, since it is a common topic of discussion in the research field (Table 1) [19]. Despite the fact that a good majority of participants (n=111, 68.9%) said they were knowledgeable about the research components and skills, a significant portion of participants chose erroneous answers to scenario-based questions that demonstrated real lack of understanding of various research layouts (Table 2). A study conducted in Saudi-Arabia by Habib et al., revealed similar results (mean= 3.36±1.76) about the scenario based research items in which majority of the participants chose incorrect answers to the questions which coincided well with this study [20].

CONCLUSIONS

A greater proportion of dental graduates perceived that they have poor to fair knowledge regarding planning, conducting and writing a research project. This is contradictory to the facts that they might have heard of the terms but they do not have enough knowledge to practically implement them which calls for the need of fresh graduates to be trained properly for the research driven clinical skills. We recommend that research training should be an integral part of undergraduate curriculum in Pakistan so that we can have professionals who are also good researchers.

Conflicts of Interest

The authors declare no conflict of interest

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