



## Original Article



## Dental Caries Prevalence among Undergraduate Students Attending Medical and Dental College

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## ABSTRACT

Dental caries is a chronic and widespread infectious disease that affects billions of people worldwide. The most prevalent chronic illness is one that, if left untreated, becomes worse over time. **Objective:** To determine the prevalence of the dental caries in the undergraduate student in medical and dental college of Jamshoro. **Methods:** With permission from Liaquat University of Medical and Health Science's Ethical Committee vide number ERC-19/2024/11, this observational cross-sectional study was carried out between April 2024, and November 2024. All students of Medical and Dentistry who were willing to participate in the study were included with 17-25 age range. Epi Info Software was used to calculate the sample size. 500 of the students were included as per the sample size calculation. **Results:** 300 (60%) of the participants were day scholars. The first, second, third, and fourth/final years were represented by students 105 (21%), 90 (18%), 175 (35%) and 130 (26%) respectively. 97 students (19.4%) had no DMFT score, whereas 403 students (80.6%) had dental caries with a DMFT score (>1). The test-takers' DMFT scores were as follows: 97 (19.4%) for a score of 0 and 139 for a score of 1 (27.8%). The DMFT scores were 102 (20.4%) for a score of 2, 136 (27.2%) for a score of 3, and 26 (5.2%) for a score of 4. **Conclusion:** This study demonstrated that the population's prevalence of dental caries was relatively low.

## INTRODUCTION

Dental caries is a microbiological and infectious disease [1]. It is the result of tooth demineralization, which can lead to cavitation and pulp injury if treatment is not received. The combination of several problems, such as tooth demineralization, dental plaque bacteria, processed carbohydrates, and weak teeth from external sources [2]. Dental caries is a chronic and widespread infectious disease that affects billions of people worldwide. The most prevalent chronic illness is one that, if left untreated, becomes worse over time [3]. Because they make it

difficult to eat, chew, smile, and communicate, teeth that are broken, decayed, or missing have a major impact on day-to-day living. Dental caries is the third most prevalent oral health issue that affects people of all races, according to the World Health Organization (WHO). Dental caries affects around 100% of adults in most nations worldwide, particularly in developed nations [4]. In Pakistan, dental caries is seven times more common than hay fever and five times more common than asthma, which has concerning consequences for oral health in the nation. It is presently a



significant problem for community health in developing countries because of inadequate oral hygiene practices, excessive sugar consumption, and ignorance regarding fluoride additions [5, 6]. Thus, it is not unexpected that the WHO is urging pledges for ongoing oral and dental health improvement. The Decayed, Missing, Filled (DMF) index has been used for about 80 years and is well recognized as a significant indication of caries experience in dental epidemiology [7]. The DMFT index is used for teeth, and each person's score can be anywhere from 0 to 28 or 32. The DMFT results will be interpreted using the DMF scoring system. The traits that make women more susceptible to dental caries are a matter of debate, and some of these traits may differ among communities [8]. A study of medical and dentistry students in Taxila revealed a mean DMFT score of  $1.64 \pm 1.66$  among participants. This shows generally decent oral health, but it also emphasizes unmet treatment requirements for untreated cavities. The study highlighted the importance of education and preventative practices in treating dental caries [9]. Yadav K *et al.*, conducted another research in Nepal to analyze medical students' knowledge, attitudes, and practices about dental caries at Janaki Medical College Teaching Hospital. It stated that while these students have enough understanding of oral hygiene principles, greater attention should be made on practical applications [10]. Despite substantial studies [5, 9] on dental caries prevalence, there are still numerous gaps in the literature. Firstly, gender disparities in dental caries have been frequently reported, the underlying biological, behavioral, and environmental variables that contribute to this disparity in Pakistani medical student populations have received little attention. Furthermore, stress levels, academic burden, and psychological aspects influencing medical and dental students' dental hygiene practices have not been well investigated. The objective of the current study was to determine the prevalence of the dental caries in the undergraduate student in medical and dental college of Jamshoro.

Despite multiple international and regional studies on dental caries, there is still limited institution-specific evidence from Pakistani undergraduate medical and dental student populations, particularly from Jamshoro, regarding the current prevalence and DMFT patterns. Moreover, factors such as academic environment, behavioral practices, and preventive oral health awareness in this subgroup remain underexplored. Therefore, the aim of this study was to determine the prevalence of dental caries and assess DMFT scores among undergraduate medical and dental students at Liaquat University of Medical and Health Sciences, Jamshoro.

## METHODS

With permission from Liaquat University of Medical and Health Science's Ethical Committee vide number ERC-19/2024/11, this observational cross-sectional study was carried out at Liaquat University of Medical and Health Sciences Jamshoro between April 2024, and November 2024. All students of who were willing to participate in the study were included with 17-25 age range. While students who had history of orthodontic treatment or ongoing orthodontic treatment were excluded. To validate external generalizability, a Kolmogorov-Smirnov test was conducted, confirming that the age distribution of the sample did not significantly differ from the general student population ( $p = 0.076$ ). Epi Info Software was used to calculate the sample size. Population size was taken as 957 with an expected frequency of 50% and CI 95%. 500 of the students were included as per the sample size calculation. The students were selected randomly. The participant signed a written consent form. The students were told there were no risks or disadvantages. To record the oral health status for dental caries, three examiners from dental college filled out the DMFT performa and demographic data, making sure to check for any inaccuracies by looking at dental carries. (D) indicates decaying teeth, (M) indicates caries-related tooth loss, (F) indicates carious tooth filling, and (T) indicates teeth. The WHO-recommended procedure was followed i.e. (Examiners were trained and calibrated to minimize inter-examiner and intra-examiner variability. WHO-recommended tools, such as mouth mirrors, explorers, and periodontal probes (e.g., WHO probe), were used. Proper lighting (natural) was used. Infection control measures, including the use of Personal Protective Equipment (PPE) like gloves, masks, and eyewear, were followed, with instruments sterilized or disposable ones utilized. Patients were seated comfortably in a well-lit area, ensuring their head remains stable throughout the examination). Students who met the requirements for inclusion were evaluated in the classroom near the window under natural light. The SPSS version 26.0 was used to enter and analyze the data. The relationship between gender and dental caries prevalence was evaluated using the chi-square test. An independent t-test and chi square test were used to analyze the differences in average DMFT, dental caries or decaying, missing, and fillings among many groups. Both the 95% confidence level and the P-Value 0.05 criterion were used.

## RESULTS

Among the 500 subjects, 255 (51%) were males and 245 (49%) were females. Maximum of the students belong to the age group 22-23 years 167 (53.4%) followed by 24-25 years 103 (46.6%) (Table 1).

**Table 1:** Characteristics of the Subjects Involved in the Study

Age	Male Frequency (%)	Female Frequency (%)	Total Frequency (%)
<18	51(49.5%)	52 (50.5%)	103 (20.6%)
19-21	40(37.4%)	67(60.6%)	107(21.4%)
22-23	84(50.3%)	83(49.7%)	167(33.4%)
24-25	80(65%)	43(35%)	123(24.6%)
Total	255(51%)	245(49%)	500(100%)

Three hundred (60%) of the participants were day scholars. The first, second, third, and fourth/final years were represented by students 105 (21%), 90 (18%), 175 (35%) and 130 (26%) respectively. 97 students (19.4%) had no DMFT score, whereas 403 students (80.6%) had dental caries with a DMFT score (>1). The test-takers' DMFT scores were as follows: 97(19.4%) for a score of 0 and 139 for a score of 1 (27.8%). The DMFT scores were 102(20.4%) for a score of 2, 136 (27.2%) for a score of 3, and 26 (5.2%) for a score of 4. The differences between genders were statistically significant ( $p=0.003$ ). Logistic regression analysis revealed age and gender as significant predictors of caries presence ( $p<0.05$ )(Table 2).

**Table 2:** Characteristics of the Participants Involved in the Study

Variables	Category	Frequency (%)	p-value
Gender	Male	245 (49%)	0.003*
	Female	255 (51%)	

**Table 3:** Gender associated with the DMFT Index Score

Gender	Class (Year)	Mean of Decayed Teeth	Mean of Missed Teeth	Mean of Filled Teeth	DMFT Score
Male	1 <sup>st</sup>	1.40 ± 0.05	-	0.64 ± 0.63	2.04 ± 0.68
	2 <sup>nd</sup>	0.27 ± 1.01	-	1.59 ± 0.19	1.86 ± 1.20
	3 <sup>rd</sup>	0.13 ± 1.06	-	0.41 ± 0.13	0.54 ± 1.19
	4 <sup>th</sup> /Final	1.30 ± 1.06	-	0.01 ± 0.29	1.31 ± 1.35
Female	1 <sup>st</sup>	1.51 ± 0.59	0.03 ± 0.01	0.51 ± 0.43	2.05 ± 1.03
	2 <sup>nd</sup>	0.19 ± 1.16	-	0.21 ± 0.81	0.40 ± 1.97
	3 <sup>rd</sup>	1.01 ± 0.01	-	0.94 ± 0.71	1.95 ± 0.72
	4 <sup>th</sup> /Final	0.03 ± 0.19	0.01 ± 0.18	1.46 ± 0.35	1.50 ± 0.72
p-Value	-	0.003*	-	-	0.27

\*Statistically Significant

Effect size measures were calculated to clarify the clinical significance of group differences. The effect size for gender differences in DMFT scores was Cohen's ( $d = 0.42$ ), indicating a moderate effect size. Additionally, Cramér's V for the chi-square test between gender and caries presence was 0.28, suggesting a moderate association. The odds ratio (OR) for females having a DMFT > 0 compared to males was 1.34 (95% CI: 1.12 - 1.57,  $p = 0.002$ ), indicating that female students were 34% more likely to have dental caries than males (Table 4).

**Table 4:** Statistical Tests and Effect Sizes Evaluating the Clinical Significance of Group Differences

Variable Comparison	Test Used	Effect Size	p-value	Interpretation
Gender vs DMFT score	Independent t-test	Cohens $d=0.42$	0.003*	Moderate Effect
Gender vs Caries	Chi-square test	Cramér's $V=0.28$	<0.001*	Moderate Association

Class	1 <sup>st</sup> Year	105 (21%)	0.045*
	2 <sup>nd</sup> Year	90 (18%)	
	3 <sup>rd</sup> Year	175 (35%)	
	4 <sup>th</sup> /Final Year	130 (26%)	
Residence	Hostilities	200 (40.0%)	<0.001*
	Day Scholars	300 (60.0%)	
DMFT Categories	Low (0-1)	236 (47.2%)	<0.001*
	Moderate (2-3)	238 (47.6%)	
	High (4+)	26 (5.2%)	
Caries Presence	DMFT = 0	97 (19.4%)	<0.001*
	DMFT > 0	403 (80.6%)	

\*Statistically Significant

The correlation between the DMFT index score and gender over time is presented. This connection with the average number of students having decayed teeth among male and female students are statistically significant, with a p-value of 0.003. Furthermore, across students in different graduation years, the average number of missing teeth was 0.000.00 for male students and 0.0360.29 for female students. Female students exhibited slightly higher DMFT scores, and difference was statistically significant, with a p value of 0.003 (Table 3).

Female vs Male	Logistic Regression	OR= 1.34 (95% CI: 1.12 - 1.57)	0.002*	Female more likely to have caries by 34%
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\*Statistically Significant

## DISCUSSION

The research involved 500 students aged 17 to 25 from medical & dental college, revealing that approximately 80.6% of participants exhibited dental caries, as indicated

by a DMFT score. Interestingly, while female students showed a higher prevalence 255(51%) of caries compared to males 245 (49%). Given that the mean DMFT of 0.27, it was determined that the amount of caries suffered was extremely minimal. Since many parts of Sindh are classified as being in the fluorotic belt, using ground water for drinking, which may be higher in fluoride, might be one of the causes of the low DMFT. Regarding age and gender, the results of this survey were in line with those of another study conducted on Peshawar undergraduate dental students [11]. Female students 255 (51%) had a higher prevalence of caries than male students, according to other studies that used the same study design. The average total DMFT score for boys and girls did not differ statistically significantly, according to this study. With a p-value of 0.003, the quantity of dental caries, which affects the DMFT average, was statistically significant. According to the present study's findings, dental caries is prevalent in both men and women. Several studies conducted in Saudi Arabia, the United Kingdom, India, Pakistan and Saudi Arabia produced similar results[5, 6, 12-17]. Based on these findings, caries was found to be lower. Among the included studies, there were differences in the reported dental caries rates [18]. This supported the findings of Tsuchida S *et al.*, who discovered that the prevalence of dental caries varies greatly between studies because of things like (a) the age, socioeconomic status, and availability of examination of the subjects; (b) racial and cultural factors; and (c) diagnostic criteria [19]. It is hard to extrapolate findings from one ethnic group inside another due to the significant regional variations in dental caries prevalence. Current research findings in some ways support the World Health Organization's 2022 World Oral Health Report, which indicates that emerging nations have low Mean DMFTs (1.7) [20]. This analysis found that the frequency of dental cavities was trending increasing in developing nations and lower in industrialized ones. This is mostly since industrialized nations have better self-care habits, fluoride exposures, and preventative care programs, whereas underdeveloped nations lack those [21]. Qureshi A *et al.*, conducted another survey in underprivileged regions of Karachi, revealing variances in the mean DMFT, which is around 4 among rural populations[22]. The socioeconomic status of two distinct areas is the cause once more. Since Karachi is Pakistan's largest metropolis, there are more economic prospects there than in Jamshoro. Once more, the results showed that there were relatively few teeth filled because of caries. Reliability of the DMFT performance was enhanced through examiner calibration and adherence to standardized procedures. The natural light conditions and sterile instruments minimized variability in caries detection.

This study is limited by its cross-sectional design, which prevents causal inference between risk factors and dental caries. Being a single-center study with a student-only population also limits generalizability to broader

community groups. Additionally, self-reported behavioral factors and limited assessment of dietary and oral hygiene practices may introduce bias. Future research should include multicenter, longitudinal studies involving diverse populations and should incorporate detailed assessment of dietary habits, oral hygiene behaviors, and psychosocial determinants to better understand caries risk and prevention strategies.

## CONCLUSIONS

This study demonstrated that the population's prevalence of dental caries was relatively low. It demonstrated how oral hygiene education aided medical and dentistry students in maintaining and practicing good oral hygiene. Larger- longitudinal scale studies should be conducted, to explore caries determinants in diverse populations and evaluate the long-term effectiveness of preventive strategies

## Authors' Contribution

Conceptualization: AQM

Methodology: AQM, MFC

Formal analysis: SWB, YH, MZ

Writing and Drafting: AS, SWB, SAAZ, YH, MFC

Review and Editing: AS, SWB, SAAZ, YH, MFC

All authors approved the final manuscript and take responsibility for the integrity of the work

## Conflicts of Interest

All the authors declare no conflict of interest.

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