

# A Survey on the Prevalence of Dental Caries Among Elementary School Girls of Multan, Pakistan: A Cross-Sectional Study

Prevalence of  
Dental Caries  
Among School  
Children

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## ABSTRACT

**Objective:** To assess the prevalence of dental caries among elementary school girls.

**Study Design:** cross-sectional study

**Place and Duration of Study:** This study was conducted at the Oral Biology Department, Tertiary Care Dental Hospital of Multan, Pakistan from January 2023 till June 2023.

**Materials and Methods:** The study was conducted at an elementary school for the purpose to assess dental caries in girls after the provision of the certificate from the ethical review board. A total of 270 girls were selected by utilizing a random sampling technique and Rao soft calculator was used. The age of the participants was 8-16 years. Informed consent was obtained from each participant accordingly after translating into Urdu language. All the data were collected from questionnaires and intra-oral checkups as well. The data was analyzed by using the latest version of SPSS 24.

**Results:** A total of 270 girls were selected in the current study with their ages ranging from 8-16 years. 93 (34.44%) of them were from 11-13 years of age and 111(41.11%) were from 14-16 years of age. The mean age of the participants was  $12.13 \pm 2.32$  years. The overall frequency of dental caries was 166 (61.48%). 188 (96.62%) were decayed, 77 (26.66%) were missing teeth and 11 (4%) had filled teeth. 48.79% of them were from 11-13 years, 28.31% were from 8-10 years and 22.89% of them were from 14-16 years. 80.72% of them had 1-2 teeth affected, while 53.61% had 3-4 teeth affected and 42.77% of them had 5-6 teeth affected among the various age groups respectively. 34.44% had good oral hygiene. Furthermore, 56.29% had bacterial plaque bio-film.

**Conclusion:** The current study concluded that the overall prevalence of dental caries among elementary school girls was more than half (61.48%), therefore, proper management and awareness programs need to be arranged for the school girls, parents, and the teachers so as to maintain a good oral health and minimize the prevalence of dental caries among these subjects.

**Key Words:** Dental caries, Cumulative DMFT, Elementary school girls, Oral Hygiene.

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## INTRODUCTION

The Worldwide Cost of Disease research carried out between the years 1990 and 2017 estimated that

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approximately 3.5 billion individuals around the world suffered from dental conditions, and 532 million of them had dental caries that went untreated in their primary dentition as well as 2.3 billion of their permanent set of teeth<sup>[1]</sup>. Damage to tooth enamel is the root cause of dental caries, a complex and ever-changing illness. A child with this disorder may have issues with their social and emotional development, as well as their ability to communicate, eat, learn, and enjoy leisure time<sup>[2]</sup>. According to a global study on children conducted in 2020, the highest rates of dental caries were found in the African continent, subsequently followed by the Asian continent<sup>[3]</sup>. Countries that are developing face a very difficult challenge in finding a cost-effective solution to this issue of dental illness, specifically tooth decay<sup>[4]</sup>. Mineral depletion from the intact dental tissues is a consequence of tooth decay, which is particularly a frequent disease that is not transmissible in children.

Factors like biology, habits, as well as socioeconomic standing have been linked to caries' lesion formation<sup>[5, 6]</sup>. Bad eating habits along with poor oral hygiene maintenance and the virulent activity of a bacteria known as *Streptococcus mutans* constitutes a few of the main causes for dental caries<sup>[7]</sup>. Caries disease, if ignored, can cause discomfort, illness, missed school days, delays in language along with speech growth retardation, and various other negative long-term effects<sup>[8-9]</sup>. Furthermore, racial as well as ethnic minorities and those with lower incomes are disproportionately more affected by dental caries<sup>[5]</sup>. Globally, there has been a rise in both the personal and population-wide efforts to improve people's oral health, regardless of their socioeconomic background<sup>[10]</sup>. Approximately 10% of the general population in rich nations and 12% in nations with low or middle incomes are affected by a cognitive or physiological handicap, according to the WHO<sup>[11]</sup>. 60-90%<sup>[12]</sup> of the kids in elementary schools in developed nations have got dental decay, having the prevalence even higher among children who have disabilities (88.8%)<sup>[13]</sup>. More than 80% of the world's 1 billion disabled persons live in nations with low or middle incomes<sup>[12, 13]</sup> while 97.1% of the world's population has dental caries<sup>[14]</sup>. As compared to Pakistan's overall yearly development rate of about 2.03%, the frequency with which the percentage of children across Pakistan who are mentally or physically disabled increases by is 2.65% every year<sup>[15]</sup>. Moreover, there are few studies regarding the prevalence of dental caries among elementary school girls. So, the current study was designed to identify this lag in the domain of dental caries population statistics.

## MATERIALS AND METHODS

the girls after the provision of the certificate from the ethical review board. A total of 270 girls were selected by utilizing a random sampling technique and Rao soft calculator was used as well. The age of the participants was 8-16 years. Informed consent was obtained from each participant accordingly after translating it into Urdu language. The questionnaire was translated into Urdu language as well and then was got filled by obtaining information from each individual properly. Consequently, the global DMFT index was applied in diagnostics check up for caries in the teeth. Since measuring tooth plaque as well as cleaning with a standardized measure hadn't been central to the study's aims, researchers instead relied on visual inspections. 1 tooth (very mild), 2-3 teeth (mild), 4-5 teeth (moderate), as well as 6 or more (severe) caries, was the criteria defined using DMFT index. One dental doctor having a minimum of 2 years of clinical experience evaluated the children's nutrition and cleanliness by conducting a comprehensive interview as well as a physical checkup which was cross checked by

a senior professional to maintain the validity and reliability of the data collection. All the data were analyzed by using the latest version of Statistical Package for Social Sciences (SPSS Version 24).

## RESULTS

A total of 270 girls were selected in the current study age ranging from 8-16 years. 93 (34.44%) of them were from 11-13 years of age and 111(41.11%) were from 14-16 years of age. The mean age of the participants was  $12.13 \pm 2.32$  years.

**Table No. 1: Demographic Characteristic of the Participants**

Age (years)	Number (n)	Percentage
8-10	66	24.44 %
11-13	93	34.44 %
14-16	111	41.11 %

**Table No. 2: Frequency of Dental Caries and Cumulative DMFT**

Dental Caries	Number (n)	Percentage
Yes	166	61.48 %
No	104	38.51 %
Cumulative DMFT	166	61.48 %
Decayed	188	96.62 %
Missing	77	26.66 %
Filled	11	4 %

**Table No. 3: Frequency of Dental Caries in accordance with Age**

Age (years)	Number (n)	Percentage
8-10	47	28.31 %
11-13	81	48.79 %
14-16	38	22.89 %

**Table No. 4: Intensity of tooth decay and oral health of the participants**

Teeth involved	Number (n)	Percentage
1 1-2 teeth	134	80.72 %
2 3-4 teeth	89	53.61 %
3 5-6 teeth	71	42.77 %
4 7 & more	33	19.87 %
<b>Oral hygiene habits</b>		
Yes	93	34.44 %
No	177	65.55 %
<b>Bacterial biofilm plaque</b>		
Yes	152	56.29 %
No	118	43.70 %

Table # 01 depicts the demographic details of the study participants. Table # 02 highlights that the overall frequency of dental caries was 166 (61.48 %). 188 (96.62%) were decayed, 77 (26.66%) were missing teeth and 11 (4%) had filled teeth. Table # 03 indicates the frequency of dental caries in accordance with age, 48.79% of them were from 11-13 years, 28.31% were

from 8-10 years and 22.89% of them were from 14-16 years of age. Table # 04 summarized the intensity of dental caries and the oral health of the participants. 80.72% of them had 1-2 teeth affected, while 53.61% had 3-4 teeth affected and 42.77% of them had 5-6 teeth affected. 34.44% had good oral hygiene. Furthermore, 56.29% had bacterial plaque biofilm.

## DISCUSSION

Dental caries is a common problem of teeth in children globally. Caries is a particularly common disease that is not transmissible worldwide. WHO's "Global Burden of Diseases Survey" published in 2015 confirmed its exceptionally high frequency, placing it "first" (among more than 2.3 billion individuals) in permanent teeth while 12<sup>th</sup> (among 560 million adolescents) with deciduous dental decay<sup>[16]</sup>. Although it comprises of a multi-factorial lineage of various social interactions, moreover, behavioral, cultural, nutritional and physiological factors are also related to its origin along with its progression. Dental caries impacts people of any age in every region of the globe<sup>[17]</sup>. Caries is nevertheless can be easily avoided with easy and reasonable measures, particularly in nations where treatment is expensive or unreachable. The results of the current study indicates that 93 (34.44%) of the study subjects were from 11-13 years of age whereas 111 (41.11%) were from 14-16 years of age. The mean age of the participants was  $12.13 \pm 2.32$  years. The overall frequency of dental caries was 166 (61.48%). 188 (96.62%) were decayed, 77 (26.66 %) were missing teeth and 11 (4%) had filled teeth. According to the previous studies, the overall incidence of tooth decay in young people's primary as well as permanent teeth globally as recorded between the years 1995 to 2019 remained at 46.2% and 53.8% respectively as reported by a meta-analysis and a systemic review<sup>[18]</sup>. High percentages from the current study matched those from the research (96.7%)<sup>19</sup>. These are the two examples of total caries frequency based study results. The present study reported the intensity of dental caries and the oral health of the participants as well. 80.72% of them had 1-2 teeth affected, while 53.61% had 3-4 teeth affected and 42.77% of them had 5-6 teeth affected. 34.44 % had good oral hygiene and furthermore, 56.29% had bacterial biofilm 'plaque'. A comparable study concluded that out of the 50.4% of youngsters with clinically deteriorated teeth, 10.8% had a single tooth affected (very mild), 16.8% had two to three teeth affected (mild), and 9.8% had four to five teeth affected (moderate), while only 13% of the youngsters with over six decaying teeth (severe) were recorded. In addition, 54% were the kids who had plaque in their teeth that was physically evident, as well as 20% of these kids in the investigation's sample had inadequate dental hygiene<sup>[20]</sup>. In total, there were 80.73% dental cases, having an average DMFT score of 3.9-4.4. Dental

caries was prevalent in 93.05% of the public educational institutions while they were prevalent in 68.39% of the private educational institutions. According to the findings, dental caries existed in 87.5%, 92.6%, as well as 99.4% of the female students in grades I, VII, and X at public institutions of learning. In private institutions, dental caries was reported in 62.3% of first-graders, 70.27% of seventh-graders, and 72.62% of eighth-graders<sup>[21]</sup>.

## CONCLUSION

The current study concluded the overall prevalence of dental caries among elementary school girls to be more than half (61.48%). This renders the urge of proper management and awareness programs' initiation for the school girls, parents, and the teachers so as to maintain good oral health and minimize the prevalence of dental caries among these subjects.

### Author's Contribution:

Concept & Design of Study:	Hafiz Muhammad Abu Bakar Siddique
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

- Bernabe E, Marcenes W, Hernandez CR, Bailey J, Abreu LG, Alipour V, et al. GBD 2017 Oral Disorders Collaborators. Global, regional, and national levels and trends in burden of oral conditions from 1990 to 2017: a systematic analysis for the global burden of disease 2017 study. *J Dental Res* 2020;99(4):362-73.
- Guarnizo-Herreño CC, Wehby GL. Children's dental health, school performance, and psychosocial well-being. *J Pediatr* 2012;161(6): 1153-9.
- Kazemina M, Abdi A, Shohaimi S, Jalali R, Vaisi-Raygani A, Salari N, et al. Dental caries in primary and permanent teeth in children's worldwide, 1995 to 2019: a systematic review and meta-analysis. *Head Face Med* 2020;16(1):1-21.
- Peres MA, Macpherson LM, Weyant RJ, Daly B, Venturelli R, Mathur MR, et al. Oral diseases: a

- global public health challenge. *The Lancet* 2019; 394(10194):249-60.
5. Machiulskiene V, Campus G, Carvalho JC, Dige I, Ekstrand KR, Jablonski-Momeni A, et al. Terminology of dental caries and dental caries management: consensus report of a workshop organized by ORCA and Cariology Research Group of IADR. *Caries Res* 2020;54(1):7-14.
  6. Pitts NB, Twetman S, Fisher J, Marsh PD. Understanding dental caries as a non-communicable disease. *Br Dent J* 2021;231(12): 749-53.
  7. Alraqiq H, Eddali A, Boufis R. Prevalence of dental caries and associated factors among school-aged children in Tripoli, Libya: a cross-sectional study. *BMC Oral Health* 2021;21(1):224.
  8. Çolak H, Dülgergil ÇT, Dalli M, Hamidi MM. Early childhood caries update: A review of causes, diagnoses, and treatments. *J Nat Sci Biol Med* 2013;4(1):29–38.
  9. Karki S, Päckilä J, Laitala ML, Humagain M, Anttonen V. Influence of dental caries on oral health-related quality of life, school absenteeism and school performance among Nepalese schoolchildren. *Comm Dentistry Oral Epidemiol* 2019;47(6):461-9.
  10. Cooper AM, O'Malley LA, Elison SN, Armstrong R, Burnside G, Adair P, Dugdill L, Pine C. Primary school-based behavioural interventions for preventing caries. *Cochrane Database Systematic Reviews* 2013(5).
  11. Bakry NS, Alaki SM. Risk factors associated with caries experience in children and adolescents with intellectual disabilities. *J Clin Pediatr Dentistry* 2012;36(3):319-24.
  12. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. *Bulletin World Health Organization* 2005;83:661-9.
  13. Shyama M, Al-Mutawa SA, Morris RE, Sugathan T. Dental caries experience of disabled children and young adults. *Comm Dent Health* 2001; 18(3):181-6.
  14. Hassan MU, Mumtaz N. AI in Assisting the Elderly and People with Disabilities. *Int J Res Eng* 2016;3(8):35-9.
  15. Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. *Am J Dent* 2009;22(1):3-8.
  16. World Health Organization. Sugars and dental caries Technical information note. World Health Organization (WHO) 2017.
  17. Albino J, Tiwari T. Preventing childhood caries: a review of recent behavioral research. *J Dent Res* 2016;95(1):35-42.
  18. Kazeminia M, Abdi A, Shohaimi S, Jalali R, Vaisi-Raygani A, Salari N, et al. Dental caries in primary and permanent teeth in children's worldwide, 1995 to 2019: a systematic review and meta-analysis. *Head Face Med* 2020;16(1):1-21.
  19. Vinh DQ, Quang DV, Hoa NT, Thanh NP, Nhung NT. Dental Caries and Oral Hygiene Status among Students at Vo Truong Toan Elementary School, Ninh Kieu District, Can Tho City in 2021. *Tap chí Y Dược học Cần Thơ* 2023;30(5):98-104.
  20. Dawani N, Nisar N, Khan N, Syed S, Tanweer N. Prevalence and factors related to dental caries among pre-school children of Saddar town, Karachi, Pakistan: a cross-sectional study. *BMC Oral Health* 2012;12(1):1-9.
  21. Alkhunaizi YM, Alshahrani SM, Elshewahy KM, Moaf AI, Wyne AH. Prevalence, severity and pattern of dental caries among female schoolchildren in eastern province. *Pak Oral Dent J* 2018;38(2):222-6.