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Original Article

Evaluation of Oral Health Status and Dietary Habits in School Children among age 12-14 years; A Cross-Sectional Study

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ABSTRACT

The prevalence of dental caries among Pakistani schoolchildren is rising. Current epidemiological statistics are required to determine treatment needs. These numbers are not presently accessible for elementary school students. **Objectives:** To assess the Oral health status of secondary school children 12 – 14 years through DMFT index and to determine the relationship between dietary habits and Dental caries of secondary school children aged 12 – 14 years via questionnaire. **Methods**: A cross-sectional study was conducted through interviews and clinical examinations in three Secondary schools of children based in Lahore. Number of participants were 398 children aged 12 to 14 years, encompassing both males and females. Oral health status and Dietary habits were evaluated through DMFT Index and Self-administered WHO Approved Questionnaire. Correlation of Demographic variables and Dietary habits of participants with High DMFT was observed. **Results:** The DMFT percentage was found to be 76% among 398 participants, indicating a significant burden of dental carries in our population. The Correlation between poor dietary habits and Dental caries was established through Chi square test. A statistically significant correlation ($p<0.05$) was noted among Dental caries and high sugary intake. No significant relation was observed among other variables and Dental Caries. **Conclusions:** Unsatisfactory Oral health status and poor food habits among school- aged youngsters. It calls for urgent action to improve oral health status and promote healthier dietary choices, seeking to minimize tooth decay frequency while improving general dental hygiene.

INTRODUCTION

Wellbeing is the most important predictor of a nation's prosperity, especially in this age of globalization, when wellness for the population is the key to improved efficiency and output. Dental wellness is essential for good health and personal fulfilment [1]. It is the absence of oral cancer, cavity formation and blisters, gingival (gum) illnesses, decaying, missing teeth, and various other medical conditions that impair gnawing, chewing, smiling, conversing, and emotional well-being. Dental cavities are a condition which impacts practically every adult's tooth during their adult life, with a median of five to ten teeth each arch of people. Cavities in the teeth is a worldwide sign of poor oral hygiene [2], and it has a significant impact on how one lives life [3]. Cavitation of the teeth is caused by this disease's tendency to weaken and damage the teeth [4]. Dental decay is very common in youngsters. Caries in the teeth can grow into tooth tissue, and if left untreated, an infection in the mouth will end in the decay of teeth. It may interfere with food patterns in severe cases, impacting dietary habits in addition to rest, tasks at hand, and academic performance [5]. Dental caries might induce feeding difficulties and stench under extreme situations [6]. In addition, an abscess may propagate to the tooth's adjacent soft pulp, causing pain and, in extreme cases, the loss of the tooth. Despite medical progress, dental issues throughout individuals in numerous countries are present

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[7]. These issues were identified among poor socioeconomic strata throughout developed and emerging countries. Dental well-being is associated with dental health, healthy tissues, and mouth delicate tissues. Education holds significant importance as a platform for learning, not only in terms of knowledge acquisition but also for overall health and associated with health habits [8]. To improve opportunities for increasing dental hygiene, the ideas of a healthy educational environment and an overall wellness promoting institution have evolved throughout Europe [9]. The World Health Organization (WHO) has introduced the "educational institutions health lessons program" to support for the establishment of "health-promoting schools" and has provided strategies to encourage oral hygiene practices within educational institutions [10]. Integration of oral health and dental camps into the school syllabus has become essential. Study focusing on the success of numerous styles of Dental hygiene lectures and their effectiveness in enhancing oral hygiene among kids has increased significantly during the last few years [11].

The aim of present study was to determine the oral health status and dietary habits in school children among age 12-14 years.

METHODS

This cross-sectional study was carried out on 398 individuals, with ages ranging from 12 to 14 years, from three private schools in Lahore for 6 months between June 2023 to Dec 2023. Since no data on dietary habits was available, we assume prevalence 50% and using WHO calculator sample size was 385 and we increase to 398 for generalizability of results. Convenient sampling was performed. Ethical permission was taken from AFPGMI Rawalpindi and granted ethical consideration. Inclusion criteria included children with age group 12-14 years old, having mixed as well as permanent dentition. Exclusion criteria comprised of handicapped children, having congenital syndromes. WHO modified questionnaire was used. Questions included Dietary habits of children focused on dietary habits, including sugar consumption, eating frequency per day, and snack consumption. oral health-related behaviors. These behaviors questions included cleaning teeth, oral cleaning, the accumulation of dental calculus, pain in the teeth, visiting the dentist, and grinding. In addition, the third section of the questionnaire sought information on the prevalence of dental caries. The DMFT measure, which stands for Decayed, Missing, or Filled Teeth, was used to assess tooth decay. This index offered an in-depth count of the number of teeth that were decayed, missing, or had received dental care. The researcher gained insight into the number of cavities within the study group by calculating the DMFT score, providing essential data on the subjects' general dental condition (table 1). Ethical permission was taken from Armed Forces Post Graduate Medical Institute, Rawalpindi. The dental examination conducted in this study followed the guidelines provided by the American Dental Association (ADA), specifically Type III examination protocols. disposable mouth mirrors, dental explorers, and torchlights. The patients sat properly on conventional chairs with backrests, while the examiner sat in front of each youngster. The emphasis of the oral exam was on assessing tooth decay in all teeth.

Table 1: DMFT Index Classification

DMFT Index	
0.0 – 1.1	Very low
1.2 – 2.6	Low
2.7 – 4.4	Moderate
4.5 – 6.5	High
6.6 >	Very High

Pilot research was previously carried out on 30 participants to check the validity and reliability of the questionnaire. Using kappa statistics, 0.84 was discovered. Data was collected entered and analyzed using SPSS version 26.0 Descriptive analysis, mean and percentage calculations, and statistical analysis were performed using SPSS version 26.0, and chi square test was applied between groups.

RESULTS

The study consisted of a total of 208 male participants and 190 female participants. Among them, the 12-year age group comprised 84 males and 56 females, the 13-year age group included 70 males and 65 females, and the 14-year age group consisted of 54 males and 69 females. In terms of geographical distribution, there were 106 males and 89 females from rural areas, while 102 males and 101 females were from urban areas (table 2).

Table 2: Demographic Characteristics of School Children (N=398)

Demographic Variables		Gender of Respondent	
		Male (N)	Female (N)
Age of Respondent	12	84	56
	13	70	65
	14	54	69
Father Education	Higher Secondary	82	85
	Secondary	103	89
	Graduation	23	16
Mother Education	Higher Secondary	98	85
	Secondary	102	101
	Graduation	8	4
Location	Rural	106	89
	Urban	102	101

Table 3 shows the outcomes of the chi-square test, which revealed that subgroups within variables demonstrated significant differences within different groups of the DMFT

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index, while other subgroups did not exhibit any significant differences. Patients in the 12-year cohort were identified to have a substantial DMFT score in the DMFT index high range, and had a notably higher prevalence rate (46%) compared to other age groups. Furthermore, males exhibited a higher prevalence rate (38%) in comparison to females. Similarly, participants with parents who had a low educational status, both fathers (54%) and mothers (62%), demonstrated higher prevalence rates. Additionally, individuals who did not maintain regular tooth brushing habits (69%) and those who initiated tooth brushing at a later age (38%) also showed higher prevalence rates within this group. These findings suggest that age, gender, parental education, and oral hygiene practices are key variables influencing the rising frequency of issues with teeth within the high DMFT index group.

Table 3: The Correlation between Dietary Habits Variables and DMFT (Chi Square Test)

Variables	Range	NumberofParticipants with Decayed,Missingand Filled Teeth (%)					p-value
		0.0-1.1 (Very Low)	1.2-2.6 (Low)	2.7-4.4 (Moderate)	4.5-6.5 (High)	> 6.5 (Very High)	
Age of respondent (Years)	12	38%	32%	36%	14%	46%	0.533
	13	38%	32%	32%	50%	31%	
	14	24%	35%	32%	36%	23%	
Gender of respondent	Male	57%	54%	50%	50%	38%	0.656
	Female	43%	46%	50%	50%	62%	
Father education	High	41%	42%	42%	36%	54%	0.190
	Secondary	47%	47%	52%	36%	31%	
	Graduation	12%	11%	6%	29%	15%	
Mother education	High	52%	44%	44%	36%	62%	0.666
	Secondary	45%	51%	54%	64%	38%	
	Graduation	3%	5%	2%	0%	0%	
Location	Rural	46%	48%	50%	57%	54%	0.916
	Urban	54%	52%	50%	43%	46%	
Eating frequency per day	1-2	58%	45%	52%	50%	69%	0.227
	2-3	42%	55%	46%	50%	31%	
	3-4	0%	0%	2%	0%	0%	
Sugar usage per day	Low	39%	41%	32%	0%	0%	0.001
	Medium	40%	50%	26%	0%	0%	
	High	21%	10%	42%	100%	100%	
Snacks per day	Once	54%	41%	44%	36%	54%	0.339
	Twice	46%	59%	56%	64%	46%	
At what age do you start brushing teeth?	3-4	38%	32%	38%	21%	23%	0.488
	4-5	37%	29%	33%	43%	38%	
	5-6	25%	39%	29%	36%	38%	
How often do you brush your teeth?	Once/twice A day	54%	52%	56%	50%	31%	0.461
	After 2 days	46%	48%	42%	50%	69%	
	After 3 days	0%	0%	2%	0%	0%	
How long do you brush teeth?	3-5 min	39%	30%	33%	21%	23%	0.333
	4-5 min	28%	36%	28%	0%	54%	
	>5 min	33%	33%	39%	29%	23%	
Which toolyou use for cleaning of teeth?	Tooth brush	97%	100%	99%	100%	100%	0.204
	Floss	3%	0%	0%	0%	0%	
	Gauze	0%	0%	1%	0%	0%	
Do you ever experience pain in tooth?	Yes	41%	52%	49%	64%	46%	0.261
	No	57%	48%	51%	36%	54%	
When was your last visit to dentist?	1 month ago	51%	40%	53%	43%	54%	0.284
	2 months ago	49%	60%	47%	57%	46%	

The lowest range, from 0 to 1.1, accounted for approximately 24% of the participants, indicating a relatively low severity of dental caries in this subgroup. Moving up to the next range, which spanned from 1.2 to 2.6, approximately 26% of the participants had slightly higher DMFT scores, suggesting a moderate level of dental caries prevalence. The range of 2.6 to 4.4 encompassed the largest proportion of participants, approximately 43%, who had higher DMFT scores. This suggests a

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greater percentage of decaying, missing, or filled teeth and a heavier load of tooth decay in this group of people. Inside the limits of 4.5 to 6.5, a smaller percentage (approximately 3.5%) of participants exhibited even higher DMFT scores, indicating a significant dental caries had a greater frequency and greater quantity of tooth decayed. This range represents a higher severity of oral health problems among these individuals. Finally, the category of >6.5 included another 3.5% of participants who had the highest DMFT scores, indicating the most severe cases of dental caries and the greatest number of affected teeth. The average DMFT value computed for the total sample size of 398 students was 2.36. The mean figure gives a snapshot of the participant population's general incidence and extent of tooth decay. Nevertheless, it is vital to highlight that examining the variation of DMFT values across various categories offers a broader overview of the individuals' different degrees of decay intensity in their teeth.

DISCUSSION

This research aimed to investigate children's perceptions of oral hygiene practices and attitudes, particularly focusing on their age when they started tooth brushing and their regular visits to the dentist. Despite this, since the research we conducted exclusively addressed youngsters between 12-14 years, our conclusions on the frequency of tooth decay might vary significantly from those findings. This research discovered that a considerable 76% of youngsters aged from twelve to fourteen had cavities in their teeth, representing roughly three-fourths of the examined population. These were not in accordance to a study carried out by Habib *et al.*, where 59.7% were healthy between age 13-17 years, this may be due to difference in population being studied and sample size [12]. These findings did not align with the goals set forth by the World Health Organization and the International Federation of Dentists [13], which sought to achieve a caries-free rate of 60% among children aged 12 to 14, along with a global average DMFT score of 3 or lower by the age of 12. The mean DMFT of the present study was 2.36 which shows the emergency treatment needs. Present study was in accordance to a study between 6-12 years carried out by Habib *et al.*, where mean DMFT index was 2.28+0.907, where more than 2/3 of children age between 6-12 years needs urgent dental care [14]. Still, in terms of education, the findings revealed an opposite relationship between level of education and DMFT. The aforementioned findings support the findings. In this investigation, we looked at the relationship amongst gender, years of age, parents' education, and place of residence, in addition to their effect on DMFT [15]. Surprisingly, no significant correlations were found between these variables and high DMFT scores. However, we did observe a high incidence of dental caries associated with the consumption of sugars and snacks. This finding is in line with previous studies that have consistently demonstrated a strong correlation between sugar consumption and caries incidence in both children and adults [16]. The results of this study emphasize the necessity for boosting dental awareness and implementing prevention techniques that involve frequent teeth cleansing and mouthwash use, to improve oral health outcomes. Because dental health is inextricably related to entire physical well-being, and oral disorders are common globally. The frequency of dental illnesses is increasing, especially between kids in school. Implementing strict brushing and flossing behaviors is critical in avoiding the development from these disorders [17]. Regular application of toothpaste that contains fluoride is suggested, and brushing regularity is important for preserving good oral health. Brushing multiple times, a day is more efficient than brushing less often in eradicating tooth bacteria [18]. These factors can significantly impact the prevalence of dental issues among individuals [19]. Contrary to other studies, our findings revealed that there existed little variation in dental health condition among males and females (74% vs. 79%) [20].

CONCLUSIONS

In conclusion, the research highlighted high prevalence of tooth decay among specific sample population of school children aged 12 – 14 years. Males exhibited a higher prevalence rate (38%) in comparison to females. Similarly, participants with parents who had a low educational status, both fathers (54%) and mothers (62%), demonstrated higher prevalence rates. Additionally, individuals who did not maintain regular tooth brushing habits (69%) and those who initiated tooth brushing at a later age (38%) also showed higher prevalence rates within this group. Overall, this research contributes to the existing knowledge on dental caries and provides insights for improving oral health outcomes among children.

Authors Contribution

Conceptualization: FS, FP
Methodology: FS
Formal analysis: FS, FP, MM,
Writing-review and editing: FS, AN, MFH, HM

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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