

# Dental Care use and Self-Reported Dental Problems in Children in Lahore, Pakistan

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## ABSTRACT

**Objectives:** Oral diseases affect a probable 90% of school children worldwide. Understanding the behaviours among children would give us the information required to create better health programmes. This cross-sectional research aims to assess oral health behaviours among school children.

**Methods:** Data was collected using a WHO oral health questionnaire for children and 527 students participated from four schools in Lahore.

**Results:** The research shows that in schools in Lahore, there are still 29.5% of students who are irregular in their brushing habits. The use of toothpaste was widespread although information on fluoride in toothpaste was limited. Students regularly took milk and tea with added sugar (43.9% and 49.2%). Fresh fruit consumption was 22%. According to regression analysis, females were 1.96 times more likely to be made fun of their teeth when compared to males. Higher parental education brought about significantly better brushing habits but also significantly higher odds for eating candies and sweets (1.29) and lower odds (0.57) for eating fresh fruits. High consumption of sugary foods was related to more dental visits.

**Practical implication & Conclusion:** Self-assessed dental health is positive amongst the students in Lahore. However, this research indicates a significant portion of the students have irregular oral hygiene practices and sporadic dental visitation. Oral health education should be incorporated into the school environment with the support of teachers and parents so that it becomes a lifetime practice.

**Keywords:** Child oral health, WHO oral health questionnaire, Fresh fruit consumption.

## INTRODUCTION

Oral health is a significant component of public health concerns with the highest prevalence of oral diseases in Asian and Latin American Countries<sup>1</sup>. The centers for disease control & prevention refers to oral health as "The health of the teeth, gums, and the entire oral-facial system that allows us to smile, speak, and chew"<sup>2</sup>. According to 2018 report by the FDI World Dental Federation, around 90% of the world's population would have been afflicted by an oral health issue at least once in their lifetime<sup>3</sup>. Tooth decay is an extremely common oral disease that can be prevented with adequate oral hygiene measures and a low cariogenic diet intake.

Oral health promotion programmes and use of fluoride in toothpastes and drinking water has brought about a decrease in dental caries level worldwide<sup>4, 5</sup>. This decrease supports the view that dental caries can be prevented by controlling risk factors<sup>6</sup>. Evidence suggests that better oral care habits are developed only after gaining adequate knowledge of oral health<sup>7</sup>. Similarly, individuals with a positive approach towards oral health benefit more from knowledge of oral health. Studies show that appropriate oral health education helps in cultivating beneficial oral health habits<sup>8</sup>. To impart appropriate oral health education, it is first essential to assess oral health practices<sup>7</sup>.

Dental caries can result in early loss of teeth, which predisposes children to various types of malocclusions. A study conducted by Krooks et al depicted malocclusion in 39.5% of children<sup>9</sup>. Besides caries, children are also affected by periodontal diseases. Gingivitis in 34.7% of children and periodontal disease in < 10 % of children and adolescents were reported by Botero et al in a study<sup>10</sup>. Oral health problems in children are not only limited to caries and periodontal disease and its sequelae but also encompass temporomandibular joint disorders (TMDs). TMDs comprise pain associated with temporomandibular joint and/or

masticatory muscles, joint noise, and alteration in the range of mandibular motion. According to Sena et al, its prevalence in children and adolescents varied from 16-68%<sup>11</sup>. Thus, these affect not only oral health but also the social and psychological well-being of children. Among the oral health conditions, as defined by World Health Organization, dental caries being nontransmissible, is still the topmost widespread disease. Its incidence among children and adolescents aged 5 to 17 years is more than 50%, being 5 times more common than fever and 14 times more common than chronic bronchitis<sup>12</sup>. According to a meta-analysis conducted in Pakistan, the frequency of dental caries has been found to be 56.62%<sup>13</sup>. With this data, early preventive measures at a young age are critical to avoiding invasive dental treatments later in life.

There has been improvement in oral health care seeking and provision in many countries, but oral diseases are still prevalent in many underprivileged populations of developed and developing countries<sup>14</sup>. The health of the oral cavity is important for eating and speaking and comprises a major component of facial aesthetics. Thus any form of oral disease has a huge impact on quality of life<sup>14, 15</sup>. Oral Health education is considered a cost-effective approach towards promoting oral health in schools as all school children can be reached regardless of their socioeconomic status<sup>16</sup>. WHO recommends that clinical oral health surveys for the same community or setting should be conducted every 5-6 years. This continuous surveillance provides renewed and opportune data for health agencies implementing public health programmes<sup>17</sup>. This study was conducted with the aim to assess general health behaviours or lifestyles in adolescents and their associations with socio-behavioural risk factors so that oral health care education programmes can be formulated based on the findings of this study. Understanding the dental care utilization patterns and self-reported

dental problems in children, healthcare providers can identify and address oral health issues early, before they become more severe.

**METHODOLOGY**

**Study design:** Cross-sectional study

**Population:** Children at four schools in Lahore

**Sampling:** Non-probability convenience sampling technique was employed, and the sample was increased to 527 students to cover any bias.

**Sample size:** A sample size of 470 was calculated based on a previous study done by Leghari et al, using a standard error of 5, a confidence interval of 95%, and an expected prevalence of good oral hygiene to be 50%<sup>18</sup>

**Development of Instrument:** The WHO oral health questionnaire for children was used<sup>17</sup>. The questionnaire comprises basic demographic data, along with the oral habits and eating habits of the child.

**Reliability and validity:** The questionnaire comprises basic demographic data, along with the oral habits and eating habits of the child. It also included variables of self-assessment for dental health and gum health. It includes self-reported oral health behaviours and family education levels. The questionnaire focuses on socio-environmental determinants and controllable risk factors towards oral health. In addition, data on oral hygiene practices, the use of oral health services and fluoride exposure is also gathered.

**Data collection procedure:** Data was collected online through a questionnaire, over a period of two months in October and November of 2021. The "Ethical Review Committee" of Rashid Latif Dental College approved the study via letter number "RLDC/002176/21". An informed consent was signed by parent or guardian of the school children. Voluntary participation information was given at the beginning of the online questionnaire. The questionnaire has been pilot tested in many countries. The students filled out the self-completion questionnaire at their respective schools. The age group had three categories of 10-12yrs, 13-15yrs, and 16-18yr old students. Parental education was split into, no formal education, basic schooling, and college or university level. For the purpose of statistical evaluation, variables were dichotomised for understanding. Tooth brushing was dichotomised to once or more times a day and less than once a day. Similarly, self-reported tooth and gum health was bifurcated into poor and above average. The use of different foods and drinks was divided into several times a week and once a week or less.

**Statistical analysis:** The collected data was entered into STATA-14 statistical software package (STATA Corp, College Station Texas, USA) and analysed using logistic and ordinal regression. P values below 0.05 were counted as significant.

**RESULTS**

527 students participated in the study which include 37.7% males. Mean age for the students was 14.95 (95% CI 14.75-15.15) with most participants being from the 13-15 years age group (46.7%). The parents of the participants had high education levels with 47.1% fathers and 52.2% mothers having a college degree (Table 1). The oral hygiene habits of the participants. Around 70.44% brushed once or more times a day, while 29.5% brushed less than once a day. More than 90% used toothpaste and only 38.6% were knowledgeable about the fluoride content of their toothpaste. 40.3% of participants had some form of toothache experience in the last 12 months but 69.7% have visited the dentist and the highest cause for the visit was pain in tooth (50.6%). Table 2 shows that 7.8% of the participants considered their teeth to be in poor condition while 8.2% of participants considered their gum health to be poor. 19.6% had difficulty biting and 33.0% reported problems chewing. 28.3% were not satisfied with the appearance of their teeth, but 38.4% avoided smiling and laughing because of their teeth. Only 14.9% reported other children making fun of their teeth. For nutritional habits, we can see that consumption of fresh

fruits was fairly low, While the consumption of soft drinks, tea with sugar and biscuit/cakes was relatively high (Table 3).

Table 1: Basic demographics, family education, oral habits and dental visitation (n=527)

Variable		N	%
Age	10-12	181	34.4%
	13-15	246	46.7%
	16-18	100	18.9%
Gender	Male	199	37.7%
	Female	328	62.24%
Fathers Education	No formal schooling	105	19.9%
	Basic	177	33.5%
	College, University	245	47.1%
Mothers Education	No formal schooling	98	18.6%
	Basic	154	29.2%
	College, University	275	52.2%
Brushing	Once and more	367	70.44
	Less than once	154	29.56
Toothpaste	Yes	469	90.2
	No	51	9.8
Fluoridated Toothpaste	Yes	203	38.6
	No	47	8.9
	Don't know	277	52.5
Toothache in the past 12 months	Yes	211	40.3
	No	312	59.6
Dental Visit in the last 12 months	Yes	366	69.7
	No	159	30.3
Reason For Last Dental Visit	Pain	267	50.6
	Treatment	88	16.8
	Routine check-up	68	12.9
	I don't know	104	19.7

Table 2: Self-perceived oral health (n=527)

Variable		N	%
Teeth Health	Above Average	486	92.2%
	Poor	41	7.8%
Gum Health	Above Average	484	91.8%
	Poor	43	8.2%
Because of the state of your teeth and mouth; problems experienced in the past year	• Not satisfied with appearance of teeth	144	28.3%
	• Avoid laughing and smiling	193	38.4%
	• Other children make fun of my teeth	74	14.9%
	• Missed school from toothache or discomfort	148	29.6%
	• Difficulty biting hard food	98	19.6%
	• Difficulty chewing	163	33.0%

Table 3: Nutritional habits (n=527)

Variable	Several times a week or more		Once a week or less	
	N	%	N	%
Fresh fruit	117	22.6%	400	77.4%
Biscuits, cakes, sweet pies, buns	138	27.5%	364	72.5%
Lemonade, coca cola, or other soft drinks	195	39.2%	302	60.8%
Jam, honey	236	47.5%	261	52.5%
Chewing gum containing sugar	203	40.9%	293	59.1%
Sweets, candy	187	38.3%	301	61.7%
Milk with sugar	216	43.9%	276	56.1%
Tea with sugar	178	35.7%	320	64.3%
Coffee with sugar	241	49.2%	248	50.7%

Table 4: Regression analysis of association for Gender and Age (n=527)

Variable	Gender (Logistic)		Age (Ordinal)	
	Odds Ratio (95% CI)	P-Val	Odds Ratio (95% CI)	P-Val
Tooth-health	2.00 (1.05-3.81)	0.03	0.77 (0.49-1.23)	0.28
Gum-health	1.14 (0.63-2.09)	0.65	0.85 (0.56-1.29)	0.45
Tooth Ache	0.72 (0.50-1.04)	0.08	0.89 (0.70-1.14)	0.38
Dental Visit	1.42 (0.95-2.10)	0.08	1.19 (0.91-1.54)	0.19
Satisfied with appearance of teeth	0.93 (0.62-1.39)	0.75	1.06 (0.81-1.39)	0.64
Avoid laughing and smiling	1.31 (0.90-1.90)	0.14	1.20 (0.93-1.55)	0.14
Other children make fun of my teeth	1.96 (1.19-3.2)	0.00	0.92 (0.65-1.31)	0.65
Miss school from toothache	1.51 (1.02-2.2)	0.03	1.27 (0.97-1.66)	0.07
Difficulty biting	1.30 (0.83-2.03)	0.25	0.94 (0.69-1.29)	0.74
Difficulty chewing	1.23 (0.84-1.82)	0.27	1.40 (1.07-1.83)	0.01

According to logistic regression analysis, females when compared to males significantly considered their tooth-health to be two times better than males. Similarly, females had 1.96 times higher chance to be affected by other children's comments and 1.51 times more likely to miss school due to toothache when compared to males. According to ordinal regression analysis, younger age participants were 1.40 times more likely to have difficulty chewing when compared to older participants as shown in table 4.

According to ordinal regression analysis, participants whose fathers were higher educated were 2.17 times significant for brushing once or more a day and significant for using fluoridated

toothpaste. Also, those participants whose fathers were higher educated had significantly higher consumption of sweets and candy. Higher educated mothers were significantly associated with fresh fruits and biscuits, along with better brushing and fluoridated toothpaste use. (Table 5) Further logistic regression analysis shows that students who brush less than once a day were 1.13 times more likely to have toothache when compared to students brushing more than once a day. Similarly, students using fluoridated toothpaste were 0.92 times less likely to have toothache. The use of fresh fruits was not significantly related to having toothache while higher consumption of all other sugar-containing food items was significant for having toothache.

Table 5: Regression Analysis for Oral hygiene and nutritional Habits (n=527)

Variable	Fathers Education		Mothers Education		Toothache		Dental Visit	
	Odds Ratio (CI)	P-Val	Odds Ratio (CI)	P-Val	Odds Ratio (CI)	P-Val	Odds Ratio (CI)	P-Val
Brushing	2.17 (1.69-2.78)	0.00	2.48 (1.92-3.20)	0.00	1.13 (1.02-1.25)	0.01	0.84 (0.75-0.94)	0.00
Tooth paste Use	0.71 (0.49-1.03)	0.07	0.71 (0.49-1.02)	0.06	1.40 (0.76-2.59)	0.27	0.53 (0.26-1.10)	0.09
Fluoride toothpaste	0.68 (0.54-0.83)	0.001	0.65 (0.52-0.82)	0.00	0.92 (0.88-0.96)	0.00	1.05 (1.00-1.10)	0.02
Fresh Fruit	0.57 (0.44-0.75)	0.00	0.63 (0.49-0.82)	0.001	1.44 (0.93-2.23)	0.09	1.66 (1.08-2.56)	0.02
Biscuits	0.80 (0.63-1.04)	0.09	0.75 (0.58-0.97)	0.03	0.47 (0.31-0.70)	0.00	2.59 (1.71-3.92)	0.00
Coke and fizzy	1.15 (0.91-1.46)	0.23	1.08 (0.86-1.38)	0.47	0.43 (0.30-0.63)	0.00	2.81 (1.89-4.17)	0.00
Jam Honey	1.17 (0.93-1.47)	0.17	1.04 (0.82-1.32)	0.68	0.29 (0.20-0.42)	0.00	6.03 (3.87-9.38)	0.00
Chewing Gum	0.97 (0.77-1.22)	0.80	0.83 (0.65-1.05)	0.13	0.65 (0.45-0.94)	0.02	4.07 (2.71-6.12)	0.00
Sweets and Candy	1.29 (1.01-1.64)	0.04	1.10 (0.86-1.41)	0.43	0.29 (0.20-0.43)	0.00	3.72 (2.48-5.58)	0.00
Milk with Sugar	1.17 (0.93-1.48)	0.17	1.17 (0.92-1.49)	0.18	0.54 (0.37-0.77)	0.00	2.74 (1.84-4.08)	0.00
Tea with Sugar	0.99 (0.78-1.26)	0.92	0.94 (0.73-1.20)	0.63	0.48 (0.33-0.69)	0.00	3.50 (2.34-5.23)	0.00
Coffee with sugar	1.15 (0.92-1.45)	0.21	1.08 (0.86-1.38)	0.47	0.31 (0.21-0.46)	0.00	5.03 (3.27-7.82)	0.00

## DISCUSSION

The research shows that in schools in Lahore, there are still 29.5% of students who are irregular in their brushing habits. The use of toothpaste was widespread, although information on fluoride in toothpaste was limited. Students regularly took milk and tea with added sugar (43.9% and 49.2%). All sugary food ingestion was above 35% while fresh fruits eating was 22%. According to regression analysis, females were 1.96 times more likely to be made fun of their teeth when compared to males. Higher parental education brought about significantly better brushing habits and the use of fluoridated toothpaste. Higher education levels of parents also brought significantly higher odds for eating candies and sweets (1.29) and lower odds (0.57) for eating fresh fruits. All sugar-containing foods and drinks were significantly related to having toothache in the past year except fresh fruits. Higher consumption of sugary foods was related to higher dental visits.

Research shows oral health to be an integral part of overall health with common risk factors<sup>19-21</sup>. The international research of "Youth People's Health in Context 2004" outlines how daily life and a variety of cultural, social and environmental influences affect the health of children and adolescents<sup>22</sup>. It also points out the necessity for systematic health information dissemination for improving health, which will in turn reduce social inequality in youth<sup>22, 23</sup>. Young people are usually more concerned about their appearance than their health issues<sup>24</sup>. Ostberg et al. estimated 90% of youngsters regarded their personal oral health as good, whereas 37% were displeased with the appearance of their teeth<sup>25</sup>. Similarly in this study, vast majority of participants declared that their dental health was good, and 28.3% were displeased with the appearance of their teeth. Ostberg et al, also observed higher dissatisfaction with appearance among girls. In this study, girls had higher frequency of dental symptoms and the multivariate analysis established that gender is an important factor in perceived dental health<sup>25</sup>. Similar results were obtained for this study where females considered their tooth health to be significantly better than males

and were more likely to miss school due to dental pain compared to males.

Other Chinese studies on children and adolescents show that nearly all participants brushed their teeth regularly everyday<sup>26,27</sup>. The usage of toothpaste containing fluoride was relatively low in children and adolescents in China and only a quarter of the participants visited dental clinics in the past 12 months<sup>26,27</sup>. Similarly, for this study, we can see that only 70% of students brushed regularly. The presence of fluoride in toothpaste was more of a lack of information concern where only 38% used fluoridated toothpaste and 52% were not sure about it. There was a 70% dental visitation rate among students in Pakistan. Students requiring dental services within the preceding 12 months was due to pain. Routine dental check-ups were only 12.9%. Similarly, high intake of sugary containing foods and drinks was significant for higher odds of dentist visit. These findings correspond to the Chinese inferences that dental visitation among adolescents is mostly symptom oriented and regular intake of sugar containing foods and drinks are mediators for development of caries<sup>26, 28</sup>.

Once a day brushing was the most consistent habit among adolescents but there was still a high percentage of students brushing less than once a day. In another research Peterson found only 22% of children brushed twice a day<sup>29</sup>. Many children were not aware of the presence of fluoride in the toothpaste they used. Regular brushing was significant for fewer visits to the dentist. The ingestion of sugar added juices and pastries was very high. Children usually enjoy such sweet items and in a study by Abdullah, sugar-sweetened tea, candies, and bread were associated with carious teeth in Pakistani children<sup>30</sup>. In a study by Baginska, 42.8% of children had never visited a dental clinic, while in this study 30% of the participants had not visited a dentist<sup>31</sup>. The lower visitation rates are usually dependant on factors such as parental education level, high costs of dental treatments and limited access to dental healthcare facilities<sup>32</sup>.

## CONCLUSION

The present study described the behaviours and dietary habits of school children in Lahore, Pakistan. The results from this study will help in establishing primary prevention campaigns against oral diseases in the future. In conclusion, self-assessment for dental health among adolescents in Lahore is positive. This study shows a significant portion of students have erratic oral hygiene practices and sporadic dental visitation. Although the best information related to oral hygiene practices would be provided by a dentist, dental hygienist should also be involved in mass media campaigns to deliver oral health information.

**Limitations:** The survey does not represent a national sample in statistical terms but can be related to most adolescent oral hygiene habits especially in metropolitan areas of Pakistan.

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**Conflict of Interest:** Authors declare no conflict of interest

**Consent for publication:** Not applicable

**Availability of data and materials:** Data is available on request from corresponding author

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