Original Article

PREVALENCE OF DENTAL CARIES AMONG THE PRIMARY SCHOOL CHILDREN OF URBAN PESHAWAR

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ABSTRACT

Objectives: *To investigate the prevalence of dental caries among school children of Hayatabad from class one to class fifth, the dft and DMFT score and some factors causing dental caries.*

Materials and method: *A cross sectional observational questionnaire based study was carried out in ten primary schools in Hayatabad, from class one to class fifth among 500 school children with main objective to investigate the prevalence of caries and calculate dft and DMFT score among these school children of Hayatabad, Peshawar. A questionnaire was designed to ask the students about their diets, tooth brushing habits and were examined for caries.*

Results: *Among 500 children examined, 72.4 % were detected with caries. The mean dft score was found to be 0.7983, mean DMFT score to be 2.163 and prevalence per 100 children was 20.11. The study revealed that tooth brushing habits played a very significant role in caries, where brushing habits were unsatisfactory, caries level was high and brushing habits were normal, then caries level was reduced.*

Conclusion: *In this study 72.4% children were caries positive with peak group affected was 9 years. High in take of sugar and chocolate resulted in high caries index. Normal or above normal tooth brushing habits resulted in low caries index.*

Key Words: *Dental Caries, School children, Hayatabad.*

INTRODUCTION

Dental caries is the single most common chronic childhood disease. Dental caries is fourteen times more common than chronic bronchitis, five times more common than asthma and seven times more common than hay fever.[1] Considering sugar as causative agent for caries, it is important to take into consideration the amount, consistency and frequency of sugar.[2,3] Sticky foods are more harmful as they remain on tooth surface for longer time. Carbohydrates taken in an adherent solid form are more cariogenic than those consumed in a soluble state.[4] Approximately 70% of the countries in the world have succeeded in achieving WHO goal of decayed, missing and filled teeth (DMFT) index 3 for 12 year olds.[5,6] WHO global data has shown an increase in DMFT of 12 years old Pakistani children from 0.9 to 1.38.[7]

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Caries can be controlled by many ways; the most important of which is to educate children. In this respect school based dental care programs were found to be effective in reducing the incidence of caries.[8] Relatively little information is available about prevalence of caries in Pakistan and especially in Khyber Pukhtunkhwa. Therefore study was carried out in ten primary level schools in Hayatabad, Peshawar. The aims of this study among school children of Hayatabad from class one to class fifth, were to:

1- Investigate the prevalence of dental caries among school children of Hayatabad.

2- Investigate dft and DMFT score among school children of Hayatabad.

3- Find out some factors causing dental caries among school children.

MATERIALS AND METHOD

A cross sectional observational questionnaire based study was carried out in ten primary schools of Hayatabad among 500 students. Hayatabad is mostly

an urban population. There are 11 Government primary schools (5 girl's and 6 boy's schools) and 31 Private primary schools. A random sampling was done by the Executive District officer (E.D.O) Schools and Literacy programme Peshawar, 6 Government (4 female and 2 male schools) and 4 private Schools (all co-education schools) were chosen for purpose of this survey. After formal permission from the school authority, days were chosen for interviews of students. First a pilot testing was performed at a school to overcome deficiencies in the actual study. In this trial a total number of 30 students were interviewed and examined according to the actual survey. The sampling technique used was multi-stage stratified random sampling. The study included school children from class 1 to class 5th who were willing to participate. Exclusion criteria comprised those children who had congenital anodontia or had systemic diseases.

At every school, the concerned Headmaster/ Headmistress performed random sampling using random numbers table. From each school 50 students were surveyed. The students were interviewed using a specially designed questionnaire and then examined for caries. There were 16 questions altogether, 5 related to demographic information like age, sex, parent's occupation and nationality. Questions were asked pertaining to oral hygiene practices, dietary intake and preventive awareness like time, frequency and regularity in tooth brushing, use of any other oral hygiene aid like dental floss, maswak, mouth wash, tooth powder or fluoride tablets and benefits of fluoride. Dietary questions included frequency of eating sweets like candy, chocolate and daily intake of tea cups. For clinical examination, gloves, disposable mirrors and probe were used for every student. Natural light was used for examination. Dental caries status was recorded using dft and DMFT score. Each questionnaire was completed in about twenty minutes followed by examination for dental caries using the FDI tooth-numbering system. A tooth was diagnosed as "Sound" if there was no evidence of treated caries (filling) or untreated caries (decay), evidence of white chalky spots (incipient enamel lesion), staining, calculus or rough spots, a deep pit or fissure (stained or unstained) that catches the probe but has no detectably softened dentin floor, undermined enamel or softened walls, fluorosis or any questionable lesion which cannot reliably be diagnosed as caries. The status of permanent teeth was scored according to the DMFT index. Confidentiality of the collected data was assured to the students, teachers and principals. At the end of survey in every school, a lecture was delivered, using dental models, to students about oral hygiene, caries, healthy snacking, tooth brushing and dental visits. Ten percent of children examined were re-examined by another survey member to check inter-examiner reliability and it was found to be excellent (Kappa Value 0.75). Data collected was checked for completeness of responses and was analyzed using Epi Info 6.0. The level of significance for all tests was set at $p<0.1$.

RESULTS

In this study, 500 students from class 1 to class 5 of Hayatabad schools were recruited. Amongst these, 205 students (41%) were male and 295 students (59%) were female as shown in Table-1. This table also shows that 27.6% of children were caries free while in 72.4% of the sample caries were noted irrespective of the gender. Mean value came out to be 0.7240, with variance of 0.2002 and standard deviation of 0.4475.

The age distribution of 362 caries positive children is given in Figure-1. Peak group was of 9 years old followed by 10 years, 7 years and 8 years in descending order of frequency.

Table 1: Gender wise distribution

Gender	Caries					
	Yes		No		Total	
	n	%	n	%	n	%
Female	200	40	95	19	295	59
Male	162	32.4	43	8.6	205	41
Total	362	72.4	138	27.6	500	100

Responses about chocolate intake by the investigated children were evaluated in Figure 2. The use of chocolate is taken as an indicator of sticky or retentive sugar. Moderate and too much intake of choco-

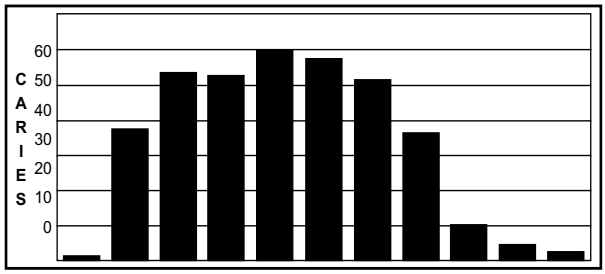

Fig. 1: Age distribution of caries positive children

late were grouped as high intake of chocolate. Out of 362 children who were found to have caries, 178 children (49.2%) were those who had high intake of chocolate. Among those whose chocolate intake was either nil or little, 90 children (33.7%) were noted to have caries.

Caries were cross tabulated against the sugar level in tea, as shown in Table-2. It was observed that out of 72.4% children with caries, 5.6% were found to have nil intake of sugar in tea, while 10% were taking too much sugar.

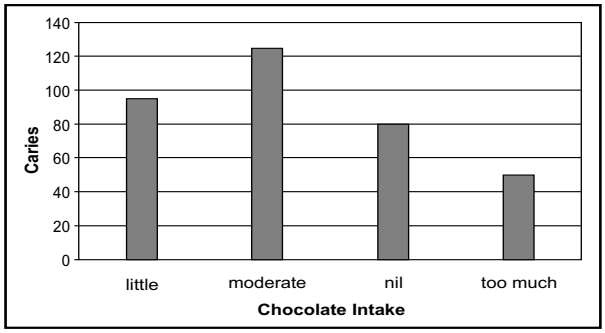

Fig. 2: Chocolate intake versus frequency of caries positive children.

Table-3 depicts tea intake versus caries. Tea intake was measured and considered as representing frequency of sugar intake. It was observed that the percentage of children who had dental caries increased as the tea cups taken daily increased from little, normal and more than normal, i.e. 66.4%, 83.9%, and 78.6% respectively.

Table-2 Caries versus level of intake of sugar

Sugar in tea	Caries					
	Yes		No		Total	
	n	%	n	%	n	%
Little	208	41.6	89	17.8	297	59.4
Nil	28	5.6	11	2.2	39	7.8
Normal	76	15.2	31	6.2	107	21.4
Too much	50	10	7	1.4	57	11.4
Total	362	72.4	138	27.6	500	100

The brushing habits were classified and their association with dental caries status was investigated as shown in Figure-3. The categories of tooth brushing i.e. below normal, on and off and nil were collectively termed as unsatisfactory brushing habits. It was observed that 75.98% of the sample belonged to the group whose tooth brushing was unsatisfactory and were found to have a high incidence of caries. The percentage of caries declined to 19.61% as brushing habits reached to normal level.

Table 3: Cups of tea taken daily versus caries

Daily intake of tea cups	Caries					
	Yes		No		Total	
	n	%	n	%	n	%
Little	178	66.4	90	33.6	268	100
> Normal	22	78.6	6	21.4	28	100
Nil	28	65.1	15	34.9	43	100
Normal	130	83.9	25	16.1	155	100
Too much	4	66.7	2	33.3	6	100
Total	362	72.4	138	27.6	500	100

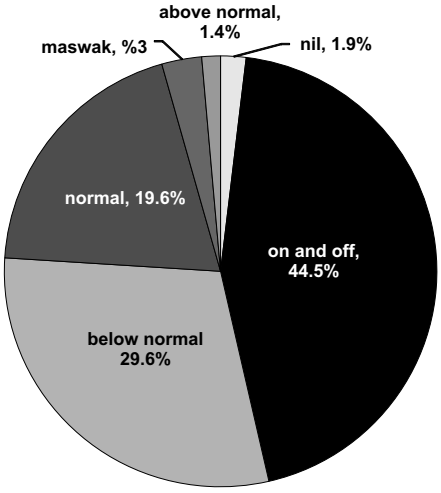

Fig. 3: Caries versus tooth brushing habits

Table-4 shows how the chocolate intake and tooth brushing habits jointly affects the dental caries. When 'Too much' chocolate intake was coupled with 'Unsatisfactory' brushing habits, the caries were noted amongst 36.08% of the children. In this 'High' intake group, when brushing habits were 'Normal and above normal', then caries was noted amongst 11.3% of the children. When chocolate intake was 'Nil' and brushing habits were 'Unsatisfactory', the caries was noted among 18% of the children. In this 'Nil' intake group with 'Normal and above normal' brushing habits, caries was noted only among 5.2% of the children.

Table 4: Chocolate intake versus tooth brushing habits and caries positive

Chocolate Intake Daily	Tooth Brush Habits													
	Above Normal		Below Normal		Maswak		Nil		Normal		On and Off		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Little	1	0.28	34	9.39	3	0.83	1	0.28	15	4.14	40	11.05	94	25.97
Moderate	0	0	35	9.67	2	0.55	3	0.83	24	6.63	60	16.57	124	34.25
Nil	1	0.28	23	6.35	6	1.66	1	0.28	18	4.97	41	11.33	90	24.87
Too much	3	0.83	15	4.14	0	0	2	0.55	14	3.87	20	5.52	54	14.91
Total	5	1.39	107	29.55	11	3.04	7	1.94	71	19.61	161	44.47	362	100

Statistical calculations

Prevalence: Persons with a given health indicator at a given time period / Population during same time period x 100.

Prevalence: 362/1800 X 100 = 20.11

dft: Mean dft = 0.7983 Variance = 1.4031
SD = 1.1845

DMFT: Mean DMFT = 2.163. Variance = 1.976.
SD = 1.405

DISCUSSION

In this present study 45% males versus 55% females were found to have caries. A study by Saravanan[3] reported almost opposit findings where 52.2% boys and 47.8% girls were caries positive.

Chocolate is included in category of those foods considered as containing retentive sugars. Sticky foods are more harmful than non sticky foods because they are retained on surface of tooth for longer period of time than non-sticky food, thus there is more time for interaction between tooth and carbohydrates. Bibby[8] carried out extensive research about food retentive potential and decalcification. Bibby[8] postulated that sugar in liquid state should less often cause caries than sugar eaten in solid state or in combination with adhesive substances. Decker[4] reported that Carbohydrate containing foods that are rapidly cleared from mouth have less chance to initiate caries than those foods which are slowly cleared. Chocolate is slowly cleared from oral cavity, so it has more chance to cause caries. Similarly in this present study, it was found that when chocolate intake was high, more children were found to be caries positive and when chocolate intake was nil, less children were caries positive.

There is convincing evidence between amount of sugar intake and caries. WHO[9] reported sugar consumption in different countries and found that when sugar intake exceeded 44 kg per person per year, those countries had a higher caries index. Pakistan had 26.6 kg per person intake in 2005, and is therefore in low intake countries. In present study when amount and consistency were grouped together to tabulate against caries, the caries level was high. When both were nil, the caries was low. Taking frequency as a factor, Zita[10] et al found a higher correlation between sugar utilization between meals and dental caries. Gustafsson[11] et al proved that more frequent consumption of sugar between meals had greater tendency for caries.

Oral hygiene practices were amongst the 120 variables observed during the National Health Survey of Pakistan[12]. The survey showed that 90% of population clean their teeth irrespective of the method used. The people in Pakistan use a variety of devices for maintenance of oral hygiene, like toothpaste and tooth brush, local salt mixtures, tooth powder, barks of different trees (Dandassa) and chewing stick or maswak. According to National Health Survey of Pakistan, more than 50% of community utilize maswak for oral cleanliness, which is also a religious ritual before each prayer. Berenie[13] et al studied the frequency of tooth brushing and its effect on caries. It was noted that children performing daily regular brushing had lower comparable level of DMFT and DMFS. Beal[14] et al reported that children having good oral hygiene had lower caries increment. In the present

study when tooth brushing habits were normal or above normal, the caries incidence was low but when brushing habits were unsatisfactory, then the caries index was high. Mack[15] found that when candy intake is high in diet, but if brushing habits are regularly maintained, so there is no significant increase in caries. This study supported these findings because regardless of nil or high intake of chocolate, when oral hygiene habits were satisfactory, the caries level was found to be low.

In the present study, the reported prevalence is 20.11 per 100 persons, dft is 0.7983 and DMFT calculated is 2.163. According to WHO survey, Pakistan was classified as low caries prevalent country. While 50% of children aged 12-15 years were caries free but on the negative side, 97% of all carious lesions were found to be untreated.[12.16.17] Haleem[18] et al carried out a study on caries prevalence in the urban regions of Pakistan and reported that the ratio of caries has been static for more than a decade in children. The caries status of two hundred and eighteen 12 year old school children from four schools of Karachi and Lahore was investigated. A mean DMFT of 1.82 for decayed and filled teeth was noted and 42% children were caries free.[19] In similar studies[20, 21] caries free children were reported to be 60% and 70% respectively. The present study showed 27.6 % children were caries free. Variations in different figures, compared to previous study, may be due to difference in age group, in which study is done, or target population.

CONCLUSIONS

From this study it is concluded that

1- Irrespective of the gender 27.6% of children were caries free while in 72.4% of the studied children caries was noted.

2- Peak group affected by caries was 9 year followed by 10 year.

3- When chocolate and sugar intake was high, the caries index was also high.

4- When tooth brushing habits were normal or above normal, the caries index was low. When brushing habits were unsatisfactory, the caries index was high.

Recommendation:

Community-based oral health education at school level is recommended for prevention of caries in children.

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