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RESEARCH ARTICLE

PREVALENCE OF DENTAL CARIES IN PRIMARY AND PERMANENT TEETH AND ITS RELATION WITH TOOTH BRUSHING HABITS AMONG 6-12 YEAR OLD SCHOOL CHILDREN IN NANGAL RAYA VILLAGE, NEW DELHI: A CROSSECTIONAL STUDY

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ABSTRACT

Introduction: Oral health is a crucial component of general health, with dental caries affecting a person's ability to eat, speak or socialize. There is a high prevalence of dental caries worldwide involving the people of all region and society. Schools provide a platform for the promotion of health and oral health not only for the students, but also for the staff, families, and members of the community as a whole. **Aim:** To determine the prevalence of dental caries in the primary and permanent teeth, and evaluate the brushing habits of school children. **Material and Methods:** This is cross-sectional short study was carried out in Nangal Raya Village , New Delhi district to assess the prevalence of dental caries among Government and public school children in the age group of 6–12 years. We covered 11, Government and public schools and examined and selected 2350 children with random sampling. The examination of dental caries was assessed using DMFT index (Klein, Palmer, Knutson 1938). **Results:** The caries prevalence and mean dmf scores in children who brush once daily 66.2% (Mean dmf 2.5) was higher than in those children who brush twice a day 50.6% (Mean dmf 2.1). These results were very highly significant The caries prevalence and mean DMF scores in children who brush once, twice and after every meal were 15.3% (Mean DMF 0.20), 23.8% (Mean DMF 0.31) and 14.7% (Mean DMF 0) respectively. This showed that caries prevalence was maximum in the children who brush once daily compared to other frequencies of brushing. These results were highly significant.

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INTRODUCTION

Dental caries is an infectious microbial disease of multifactorial origin in which diet, host, and microbial flora interacts over a period of time in such a way so as to encourage demineralization of the tooth enamel with resultant caries formation. Dental caries, the product of man's progress toward civilization, has a very high morbidity potential and thus, is coming into focus of the mankind (Sudha *et al*., 2005). There is a high prevalence of dental caries worldwide involving the people of all region and society, voluminous literature exists about dental caries levels in Indian population. Available literature from 1940 to 1960, the prevalence of dental caries in India showed a varied picture (Bagramian *et al*., 2009). The objectives of this study was to know the prevalence of dental caries in children of 6-12 years studying in local government and public schools and also to suggest suitable preventive programs for the prevention of dental caries in this population

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MATERIALS AND METHODS

The present study on the prevalence of dental caries in school going children of 6-12 years in Nangal raya village of south west district, New Delhi

Source of Data: Sample populations of all primary school children of 6-12 years of Nangal raya village of south west district, New Delhi

Method of Collection of Data: Information and lists of government and unaided schools in Nangal Raya Village was obtained from the District education officer. Approval to conduct the study was obtained from the respective Principal for the government schools. In case of unaided schools,

consent for the examination was obtained from the respective heads of the institutions. Sample included all the primary school students in the 6-12 years age group of Nangal Raya Village.

Inclusion criteria: Primary school going children of 6 to 12 years of age of schools located in Nangal Raya .

Exclusion Criteria: Children below 6 and above 12 years of age.

The Survey Design: The study was undertaken in a total of 11 schools which included 9 government and 2 unaided schools. Total number of students examined was 2,350. The survey was carried out using a specific proforma which consists of two parts. First part consists of a questionnaire to collect information of the school children's demographic data, oral hygiene practices, dietary habits and source of drinking water at school. The second part consisted of the clinical examination.

Armamentarium

- C.P.I. Probes (WHO Probes)
- Mouth mirrors
- Shepherds crook probes
- Kidney trays
- Tweezers and cotton rolls
- Pans for cold sterilization
- Mouth masks and gloves
- 5% Glutaraldehyde solution (KORSOLEX).

Method of examination: Depending on the physical conditions of the school, exact arrangements for examination were made. Subjects were examined on an upright chair in adequate natural daylight. Subjects were not allowed to crowd around the examination chair, to allow for sufficient light and to prevent errors during examination and recording. Examination was undertaken by a single examiner to avoid inter examiner variability. A trained person who assisted throughout the study did recording. Chemical sterilization (5% glutaraldehyde) was used to sterilize the instruments. Clinical examination - Caries was recorded as per WHO criteria (2013).

RESULTS

In the present study to evaluate the prevalence of dental caries was conducted on a sample of 2350 children of 6-12 years of age IN NANGAL RAYA VILLAGE OF SOUTH WEST DISTRICT, NEW DELHI. The results of the present study were as follows: Table 1 shows that Out of the total of 2350 children as sample, it was observed that 1228 (52.25%) were males and 1122 (47.74%) were females. Table 2 shows that in the deciduous dentition, it was seen that 8 year old shows a highest prevalence of 87.1% (Mean dmft 4.10) and the lowest prevalence of 16.7% in the 12 year age group (Mean dmft 0.60). The relation of age with caries prevalence in the primary dentition was found to be highly significant. Table 3 shows an overall prevalence of 16.9% in the study population in the permanent dentition. Where 12 year old children showed a highest prevalence of 30.9% (Mean DMF 0.538) and the lowest prevalence of 4.5% in the 6 year age group (Mean DMF 0.051).

The relation of age with caries prevalence in the permanent dentition was found to be highly significant. The caries prevalence and mean dmf scores in children who brush once daily 66.2% (Mean dmf 2.5) was higher than in those children who brush twice a day 50.6% (Mean dmf 2.1). These results were very highly significant. The caries prevalence and mean DMF scores in children who brush once, twice and after every meal were 15.3% (Mean DMF 0.20), 23.8% (Mean DMF 0.31) and 14.7% (Mean DMF 0) respectively. This showed that caries prevalence was maximum in the children who brush once daily compared to other frequencies of brushing.
These results were highly significant.

DISCUSSION

Age: In the present study a universal sampling method was followed and total number of children examined was 2,350. The age group selected was 6-12 years and this was significant 5 years. Ideally children should be examined between their 5th and 6thbirthdays. We choose the age group of 6-12 years school going children. It can be justified on the basis that eruption of permanent dentition and exfoliation of primary dentition begins during the age of 6 years and both these processes usually complete by the age of 13 (except third molars). Moreover, the oral health of children 12‑year‑old is the object of several epidemiological studies conducted around the world.8 According to the World Health Organization (WHO, 2013)8,the importance given to this age group was because it is the age that children leave primary school in majority of the developed countries. As it is the last age at which data can be easily obtained through a reliable sample of the school system. Moreover, it is possible that at this age, all the permanent teeth except third molars have already erupted. Therefore, the age of 12 was determined as the age of global monitoring of caries for international comparisons and monitoring of disease trends. Hence, it is logical to do a comparative observation for dental caries experiencing both the deciduous and permanent dentitions, particularly among those between the ages of 6-12 years. Besides this, during mixed dentition period, the oral hygiene is poor due to frequent intake of refined sugar and sticky food.

We categorized total study sample into different age groups i.e age group 6, 7, 8, 9, 10, 11 and 12 and the observed sample size in each age group was 335, 324, 319, 282, 337, 369, 384 respectively. (TABLE 1). In the deciduous dentition, 8 year old shows a highest prevalence of 87.1% (Mean dmft 4.10) and the lowest prevalence of 16.7% in the 12 year age group (Mean dmft 0.60). In rest other age groups the prevalence of caries recorded was: 6 years (79.4%), 7 years (80.8%), 9 yrs (81.2%), 10 years (55.5), and 11 years (47.9%) (TABLE 2,). Our results prove that the relation of age with caries prevalence in the primary dentition was very highly significant. Another important finding was that the dmf scores declined progressively as age increased. This may be attributed to the loss of primary teeth as age advances as a result of normal exfoliative process. Mehta *et al*. (2018) reported similar reduction in dmf scores in their study. In the permanent dentition, an overall prevalence of 16.9% was observed. Further 12 year old children showed a highest prevalence of 30.9% (Mean DMF 0.538) and the lowest prevalence of 4.5% in the 6 year age group (Mean DMF 0.051). (TABLE 3). The relation of age with caries prevalence in the permanent dentition was very highly significant.

The DMF scores increased progressively from 6 years (0.051) to 12 years (0.538).This could be because of the irreversible nature of DMF index. Overall, Our results showed that deciduous dentition is more prevalence of caries than permanent dentition. This could be attributed to the fact permanent teeth have a lower susceptibility to dental caries. It may also be because children of 12 years of age had just finished to permanent dentition.

It could also be due to the lower calcium content of deciduous teeth and structural differences that may increase caries susceptibility in deciduous teeth

Brushing Frequency: In deciduous dentition, our results showed that the caries prevalence and mean dmf scores in children who brush once daily 66.2% (Mean dmf 2.5) was higher than in those children who brush twice a day 50.6% (Mean dmf 2.1).

Table 1. Distribution of study subjects according to age and gender

AGE	MALE		FEMALE		TOTAL	
	(N)	%	(N)	%	(N)	%
6	167	49.8	168	50.1	335	100
7	145	44.7	179	55.2	324	100
8	148	46.3	171	53.6	319	100
9	156	55.3	126	44.6	282	100
10	185	54.8	152	45.1	337	100
11	204	55.2	165	44.7	369	100
12	223	58.1	161	41.9	384	100
TOTAL	1228	52.25	1122	47.74	2350	100

Table 2. Prevalence of dental caries according to age in deciduous dentition

Age Wise Groups	No.of Children	Children Free of Caries		Children with Caries		DMFT	
		n	%	n	%	Mean	SD
6	335	79	23.5	266	79.4	3.52	3.49
7	324	62	19.1	262	80.8	4.24	3.22
8	319	49	15.3	278	87.1	4.10	3.10
9	282	51	18.1	229	81.2	3.33	2.55
10	337	126	37.4	186	55.2	1.82	2.38
11	369	193	52.3	177	47.9	1.26	2.56
12	384	298	77.6	94	16.7	0.60	1.21
TOTAL	2350	858	36.5	1492	63.5	2.69	2.64

Caries Prevalence x2= 521.282
p = 0.001 very highly significant

Table 3. Prevalence of dental caries according to age in permanent dentition

Age Wise Groups	No.of Children	Children free of caries		Children with caries		Dmft	
		n	%	n	%	Mean	SD
6	335	320	95.5	15	4.5	0.051	0.271
7	324	311	95.9	17	5.2	0.054	0.250
8	319	278	87.1	43	13.5	0.149	0.372
9	282	240	85.1	38	13.5	0.151	0.417
10	337	245	72.7	67	19.9	0.310	0.557
11	369	272	73.7	99	26.8	0.402	0.765
12	384	286	74.4	119	30.9	0.538	1.061
TOTAL	2350	1952	83.1	398	16.9	0.236	0.527

Caries Prevalence x2= 146.742
p = 0.001 very highly significant

Table 4. Comparison of dmf vs brushing frequency

		Children without caries		Children with caries		Total		MEAN	SD	Min.	Max.
Frequency of brushing		Count	%	Count	%	Count	%				
	Once daily	655	33.7	1285	66.2	1940	100	2.5	2.34	0.0	14
	Twice daily	201	49.6	204	50.6	405	100	2.1	2.56	0.0	16
	After every meal	2	40	3	60	5	100	2.2	3.54	0.0	6
Total		858	36.5	1492	63.5	2350	100				

p = 0.001 very highly significant

Table 5. Comparison of dmf vs brushing frequency

		Children without caries		Children with caries		Total		MEAN	SD	Min.	Max.
Frequency of brushing		Count	%	Count	%	Count	%				
	Once daily	1598	84.7	288	15.3	1886	100	0.20	0.55	0.0	3
	Twice daily	348	76.1	109	23.8	457	100	0.31	0.85	0.0	11
	After every meal	6	85.7	1	14.2	7	100	0.11	0.12	0.0	1
Total		1952	83.1	398	16.9	2350	100				

These results were very highly significant (Table 4). Where as in permanent dentition, the caries prevalence and mean DMF scores in children who brush once, twice and after every meal were 15.3% (Mean DMF 0.20), 23.8% (Mean DMF 0.31) and 14.7% (Mean DMF 0) respectively.

Table 6. Comparison of dmf/ dmf according to frequency of brushing

	F	P
Dmf	8.95	0.00
DMF	10.01	0.00

This revealed that caries prevalence was maximum in the children who brush once daily compared to more frequencies of brushing (TABLE 5). These results were highly significant. In support of our results, studies conducted by Datta *et al*. (2013) Dixit *et al.* (2013) and Rao and Bharambe (1993) presented with similar and positive relation of caries with frequency of brushing teeth. Oral health education was effective in establishing good oral health habits among school children and also in enhancing the knowledge of their parents about good oral health. Damle *et al*. (2014. Also those studies done by Ainamo and Parviainen and Shetty (1979) and Elidrissi SM1, Naidoo (2016) were unable to demonstrate a correlation between brushing frequency and caries prevalence.

Conclusion

Finally to conclude we can say that the data from the present study provides valuable information on the caries prevalence and association of specific risk factors in the above mentioned population. Dental caries is a major public health issue globally. The result of such descriptive cross-sectional epidemiological studies are of importance in the evaluation of the past and planning of future oral health prevention and treatment programs targeting young children in primary schools. A comprehensive community-focused oral health‑care intervention that includes oral health

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