Prevalence of Dental Caries and Dental Calculus in 6-13 Years Old School Children in Rural Primary School in Sakipur Village Greater Noida, Uttar Pradesh.

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ABSTRACT

Background: National Programme for Nutrition Support for Primary Education was initiated with an idea of universalisation of primary education and improving the nutritional status of primary school children. Oral health is an integral part of overall health. Aim: The aim of this study is to assess the dental caries status and treatment needs of children in rural government primary school having mid-day meal in Uttar Pradesh. **Methods:** This cross-sectional, descriptive study was conducted on 150 children aged 6–13 year old (Class I to V grade) government primary school children who were examined for face to face interview followed by oral examination by trained dental experts using the WHO survey methodology 1997 . Descriptive statistics was calculated and t-test, chi square test and ANOVA was used for group comparisons. **Results:** The mean D and DMFT was significantly more among boys and the mean m and dmft was significantly more among girls. Mean dmft value was 0.73 for boys (S.D. =1.291) and 1.04 for girls (SD= 1.45) and mean DMFT value was 0.29(S.D. =0.61) for boys and 0.13 (S.D. 0.39) for girls. **Conclusion:** Dental caries needed significant attention. The provision of oral health education and school-based preventive programs seem to be a viable alternative to tackle overwhelming the burden of dental caries and other oral diseases.

Keywords: DMFT index, DMFT index, Dental caries.

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INTRODUCTION

In rural areas oral health care awareness is limited due to shortage of dental manpower, financial constraints and the lack of perceived need for dental care among rural masses.[1] On 15th August 1995 the National Programme for Nutrition Support for Primary Education was initiated with two major objectives of universalisation of primary education and improving the nutritional status of primary school children.[2]

Growing period in children needs emphasis for proper guidance, healthy growth, preservation and hygiene of teeth.[3] Only sporadic data on the oral health status in different states of India is available. The prevalence of dental caries, missing teeth and other oral health morbidities in school children are high in the lower socio-economic background because of their poor oral hygiene practice, lack of awareness, improper food intake and family status. Globally approximately 80% of children attend lower secondary school.4 Schools can provide a healthy environment not only for promoting comphrehensive oral health but can also be extremely helpful in spreading right message to rural community.[4] In developing countries children have a higher prevalence of dental caries affecting primary dentition than permanent dentition. The localized prevalence data is essential not only to understand the disease, but also plays a pivotal role in dental caries prevention and treatment planning.[5]

MATERIALS & METHODS

A descriptive cross sectional study on 150 children (54 boys and 96 girls) aged 6 to 13 years studying in a rural primary school were screened at sakipur village, Greater Noida for dmft, DMFT index and calculus grading. Children without history of systemic diseases or respiratory illness and chronic users of antibiotic syrup were excluded from the study. The children belonged to low socioeconomic background who were provided midday meal at school. The consent process was approved from the principal. Clinical examination was carried out in the field setting to assess caries experience, which was diagnosed visually and recorded using World Health

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Organization (WHO) criteria, with an additional code for noncavitated lesions. The clinical examination process was visual (i.e. no examination explorer) and appropriate infection control by use of new gloves for each subject, new barrier sleeves for mouth mirror handles for each participant, new mouth mirror heads for each participant, ice cream sticks and hand disinfectant. The dental caries status was assessed by Decayed/missed filled tooth (DMFT)/deft index using WHO criteria 1997 .All the recordings were done in the daylight and the child was made to sit in ordinary chair facing away from a direct sunlight.

Dental caries status of primary teeth was recorded as the following criteria: sound, caries, filled, missing due to caries, or exfoliation. Permanent teeth were recorded as follows: sound, dental caries, filled, or not erupted. According to the WHO criteria, only the cavitation is inspected and recorded as a carious lesion and noncavitation carious lesions are not included.

All responses were tabulated using Microsoft-Excel 2007 Software for data analysis. Data was analysed by using SPSS software version 25.0. Statistical tools like mean, median, t test, ANOVA and chi-square used as appropriate. A brief questionnaire about oral health behaviour was framed where each child was asked about past dental history and brushing instructions provided by any dentist in past and scored as yes and no.

RESULTS

Table 1:

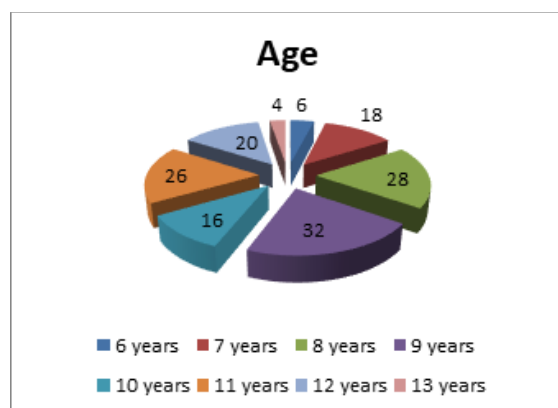| Gender	Frequency	Percent
Boys	54	36.0
Girls	96	64.0
Total	150	100.0

Figure 1: Age Distribution

The prevalence of dental caries in boys is 36% (n=54) and girls (n=96) is 64% [Table 1]. Dental caries was more among 9 years(32 %) old children in the mixed dentition stage and less in 13 years (4 %) old children because the permanent dentition has replaced the primary teeth [Figure 1]. 93.3 % of the children were aged between 7 to 12 years .A value of P < 0.05 was considered as statistically significant

Dental calculus showed grade 1 in 81.3 % of the sample of boys and girls and 8% girls showed Grade 2 calculus covering less than 2/3rd of the tooth surface. 18.5 % boys and 10.4% girls showed grade 3 calculus [Table 2]. Grade 2+ was significantly more among boys whereas Grade 3+ was significantly more among girls.

Table 2:

Dental calculus	BOYS	GIRLS	Total
GRADE 1	44	78	122
	81.5%	81.3%	81.3%
GRADE 2	0	8	8
	0.0%	8.3%	5.3%
GRADE 3	10	10	20
	18.5%	10.4%	13.3%
Total	54	96	150
	100.0%	100.0%	100.0%
Chi-square value = 6.202, p-value = 0.045*			

The distribution of brushing been ever demonstrated by dentist was compared between boys and girls using the chi-square test. There was no significant difference in distribution of brushing been ever demonstrated by dentist between boys and girls [Table 3].

Table 3 Chi-square test

Has brushing been ever demonstrated by dentist	Boys	Girls	Total
No	44	88	132
	81.5%	91.7%	88.0%
Yes	10	8	18
	18.5%	8.3%	12.0%
Total	54	96	150
	100.0%	100.0%	100.0%
Chi-square value = 3.395, p-value = 0.065			

Non-significant difference

The distribution of brushing been ever demonstrated by dentist was compared between 6-7, 8-9, 10-11 and 12-13 years age groups using the chi-square test. Brushing has been ever demonstrated by dentist was significantly more among12-13 years age group [Figure 2].
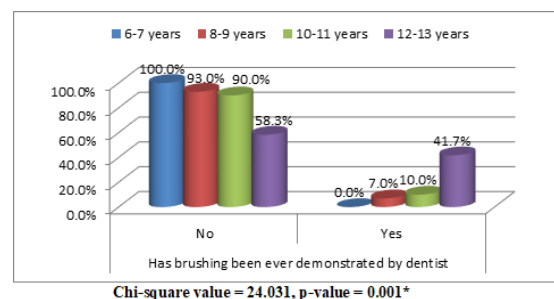

Chi-square value = 24.031, p-value = 0.001*

Figure 2: Chi-square test

* Significant difference

The distribution of dental calculus seen been ever demonstrated by dentist was compared between girls and boys using the chi-square test. Grade 2+ calculus was significantly more among males whereas Grade 3+ was significantly more among females [Figure 3].
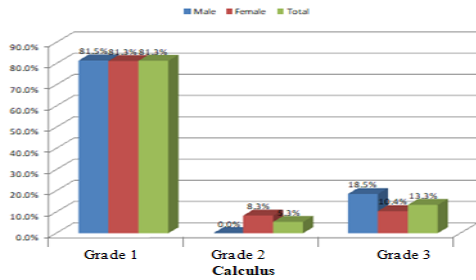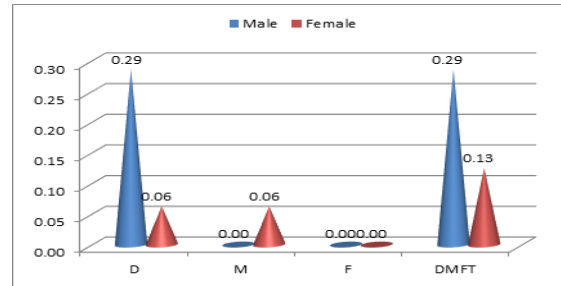
Figure 3: Grade of Calculus.

Figure 4: Gender Distribution

Table 4: Unpaired t-test

	Boys		Girls				
	Mean	Std. Deviation	Mean	Std. Deviation	Mean Difference	t-test value	p-value
d	0.53	0.79	0.54	0.87	-0.01	-0.075	0.941
m	0.20	0.64	0.50	0.85	-0.30	-2.149	0.033*
f	0.04	0.20	0.00	0.00	0.04	2.007	0.047*
dmft	0.73	1.29	1.04	1.45	-0.31	-2.251	0.043*

* Significant difference

Table 5   Unpaired t-test

	Boys		Girls				
	Mean	Std. Deviation	Mean	Std. Deviation	Mean Difference	t-test value	p-value
D	0.29	0.61	0.06	0.24	0.22	3.128	0.002*
M	0.00	0.00	0.06	0.32	-0.06	-1.372	0.172
F	0.00	0.00	0.00	0.00	0.00	0.000	1.000
DMFT	0.29	0.61	0.13	0.39	0.16	2.092	0.047*

* Significant difference

The mean d, m, f and dmft was compared between boys and girls using the unpaired t-test. The mean m and dmft was significantly more among girls. The mean f was significantly more among boys [Figure 4]. Mean dmft value was seen to be 0.73 for boys (S.D. =1.291) and 1.04 for girls (SD= 1.45) [Table 4].

The mean D, M, F and DMFT was compared between boys and girls using the unpaired t-test. The mean D and DMFT was significantly more among boys [Table 5 & Figure 3]. The mean DMFT value was 0.29 (S.D. =0.61) for boys and 0.13 (S.D. 0.39) for girls. The mean f was significantly more among 6-7 years age group compared to 8-9, 10-11 and 12-13 years age groups. The mean d, m, f and dmft was compared between 6-7, 8-9, 10-11 and 12-13 years age groups using the one-way ANOVA test with post-hoc bonferroni test for inter-group comparisons [Figure 5]
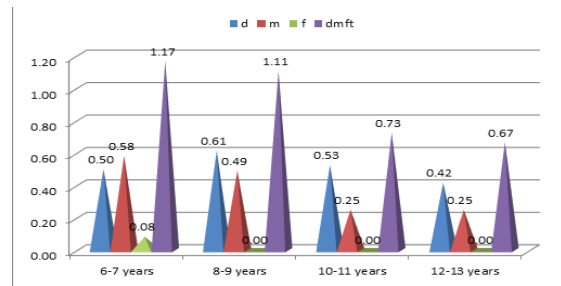

Figure 5: DMFT Value

Similarly mean D, M, F and DMFT was compared between 6-7, 8-9, 10-11 and 12-13 years age groups using the one-way ANOVA test with post-hoc bonferroni test for inter-group comparisons. The mean D was significantly more among 10-11 and 12-13 years age groups compared to 6-7 and 8-9 years age groups [Table 6].

Table 6: One-way ANOVA test

		Mean	Std. Deviation	F-value	p-value	Post-hoc comparisons
D	6-7 years (1)	0.08	0.28	3.490	0.017*	4, 3 > 1, 2
	8-9 years (2)	0.04	0.19			
	10-11 years (3)	0.20	0.52			
	12-13 years (4)	0.33	0.64			
M	6-7 years (1)	0.00	0.00	0.647	0.586	N/A
	8-9 years (2)	0.07	0.37			
	10-11 years (3)	0.05	0.22			
	12-13 years (4)	0.00	0.00			
F	6-7 years (1)	0.00	0.00	0.000	1.000	N/A
	8-9 years (2)	0.00	0.00			
	10-11 years (3)	0.00	0.00			
	12-13 years (4)	0.00	0.00			
DMFT	6-7 years (1)	0.08	0.28	1.911	0.130	N/A
	8-9 years (2)	0.11	0.41			
	10-11 years (3)	0.25	0.54			
	12-13 years (4)	0.33	0.64			

Post-hoc bonferroni test # Non-significant difference.

DISCUSSION

All age group people are affected by dental caries irrespective of the gender and socioeconomic status. Dental caries is found in approximately 90% of school children worldwide and most commonly in Asian and Latin American countries.[6] According to an extensive National Health Survey carried out in 2004 in India dental caries was seen to be in 51.9% of 5 year old children and 53.8% of 12 year-old children.[7]

The factors like diet (sweets and junk foods), low socioeconomic status and high rate of urbanization contribute to the increase in prevalence of dental caries.[8] The higher prevalence of dental caries among females might be due to early eruption of teeth among girls thereby teeth being exposed for a longer time to the oral environment when compared to boys.[9] However in our study no significant association between boys and girls was seen.

The decayed, missing and filled primary or secondary teeth (dmft or DMFT, respectively) index was used to report the dental caries .For this analysis the definition of caries included all lesions from the initial white spot disease presentation to cavitation, as this captures the progressive nature of the disease. The "d/D" component is used to describe decayed teeth which include carious teeth, filled teeth with recurrent caries and instances in which only the root is present. The "M" component is used to describe missing teeth due to dental caries. We did consider the "m" component for the missing teeth due to caries in the deciduous dentition but not the tooth missing due exfoliation according to age of the child. The "f/F" component is used to describe filled teeth due to caries when one or more permanent restorations are present and there is no recurrent caries or any part of the tooth with primary caries.

Out of the three components {decayed (D), missing (M) and filled (F)}; the decayed(D) in the boys is the major part of DMFT index depicting lack of knowledge and awareness among the masses about the importance of oral health care, less motivation, pessimistic approach and attitude of parents toward dental treatment of their children, financial difficulties due to low monthly household income and other shortfalls within the health care delivery system leading to less access to dental services and oral hygiene products.

Being a multi-factorial disease the specific risk factor for dental caries is very difficult but the socioeconomic status has been identified as a significant factor associated with occurrence of dental caries in population.[10]

Rao et al reported prevalence of dental caries to be 76.9% among 5-12 year old and Sudha P et al in Manglore noted dental caries in 82.5% of children.[11,12] Many industrialized countries have experienced a decline in dental caries due to improved socio-economic conditions, changing lifestyles, self-care practices, use of fluorides, and effective use of preventive oral health services.[13] So a number of developing countries have introduced school-based oral health education and preventive programs which aim at improving oral health behavior and status of the child population. The initial evaluations was conducted in Indonesia, Brazil, Madagascar, and China have shown positive results.[14] One goal of the WHO is to reduce the DMFT index in 2020, and in particular, the D component, in high-risk groups.[15]

CONCLUSION

There is an urgent need for evidence- based and sustainable primary prevention strategies to reduce the burden of caries in this highly vulnerable population. Inculcating good oral hygiene habits like regular brushing twice a day, less sugar intake, mouth rinsing after meals, fluoride applications, and atraumatic restorative treatment, regular dental health examination in school through active involvement of parents and teachers can go a long way in reducing dental caries by school-based community-oriented oral healthcare services.

Limitations: The initial, advanced, cavitated and non-cavitated dental caries were not classified which could have given a detailed information. The use of visual only (no examination explorer) examination for dental caries resulted in an increased false-negative rate and an underestimation of the true population caries estimate.

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