10.5005/jp-journals-10051-0009

ORIGINAL RESEARCH

Evaluation of Caries Prevalence in Children of Rural Karad Area

[1]Savita Gopal Hadakar, [2]Amee M Poshiya, [3]Swapnil M Taur, [4]Debapriya Pradhan
[5]Sachin C Gugawad, [6]Namrata N Gaonkar

ABSTRACT

Background: Dental caries is a universal problem arising from many complex determinants, including limited access to dental services to children at high risk.

Aims:

- To evaluate caries prevalence (quantity) in the Karad rural area
- To evaluate the oral hygiene status of children in the Karad rural area.

Materials and methods: The study group comprised 400 students from Krishna School, Karad, in the age group 6 to 12 years studying in 1st to 6th standards. Out of these, 232 were boys and 168 were girls. The teeth of all children were examined in a systematic manner using the international FDI two-digit nomenclature to identify each primary tooth and standard dental terminology to identify each surface. The children were examined according to the dentition status and the WHO oral health assessment 1987.

Statistical analysis: The statistical analysis of the data was done using the Mann–Whitney test.

Results: Evaluation showed that caries prevalence was higher in the age group 6 to 8 years than in the 9 to 12 years group. Further, males also showed higher caries prevalence than females.

Conclusion: There are areas where people need to be educated about the modern methods of maintaining oral hygiene to reduce the prevalence of caries.

Keywords: Dental caries, Oral hygiene, Prevalence.

How to cite this article: Hadakar SG, Poshiya AM, Taur SM, Pradhan D, Gugawad SC, Gaonkar NN. Evaluation of Caries Prevalence in Children of Rural Karad Area. Int J Oral Care Res 2016;4(1):33-38.

[1,3,6]Senior Lecturer, [2]Student (Final Year) [4,5]Reader Staff

[1,3-6]Department of Paedodontics and Preventive Dentistry School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Satara, Maharashtra, India

[2]School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Satara, Maharashtra India

Corresponding Author: Savita Gopal Hadakar, Senior Lecturer, Department of Paedodontics and Preventive Dentistry School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Satara, Maharashtra India, Phone: 09623958066, e-mail: drsavita0485@yahoo.co.in

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Dental caries is the most prevalent oral disease. Its very high morbidity potential has brought this disease into the main focus of the dental health profession. There is practically no geographic area in the world whose inhabitants do not exhibit some evidence of dental caries. It affects both the sexes, all races, all socioeconomic status, and all age groups.[1] The seriousness and societal costs of dental caries in preschool children are enormous. National data shows that caries is highly prevalent in poor and near-poor Indian preschool children, yet this disease is infrequently treated. The etiology includes elevated colonization levels of *Streptococcus mutans*, frequent sugar consumption, and developmental defects in primary teeth. A necessary first step in preventing dental caries in preschool children is evaluating the child's caries risk factors that include socioeconomic status, previous caries experience, presence of white spot lesions, presence of visible plaque, perceived risk by dental professionals, and microbiologic testing for the presence or quantity of *S. mutans*. Based on this knowledge, different preventive strategies, as well as different intensities of preventive therapies, can be employed.

MATERIALS AND METHODS

This study was conducted among 6- to 12-year-old school children studying in Krishna School in Karad city, Maharashtra, India. A sample of 400 students was taken, out of which 232 were boys and 168 were girls. All the students were selected to screen the primary dentition, mixed dentition, and permanent dentition except the third molar. Before starting the study, an official permission was obtained from all the concerned authorities. Permission from the parents was in the form of an informed consent, after which the study proceeded. The school principal was well informed about the study and the procedure. Children with the consent to participate in the survey were examined within their school, usually in the school class rooms. All teeth were examined in a systematic manner using the international FDI two-digit nomenclature to

identify each primary tooth and standard dental terminology to identify each surface. An average number of 30 school children were examined per day. A survey form was prepared and the children were examined according to the dentition status and the WHO oral health assessment 1987.[2] All the examinations were carried out by the investigator in the subjects' own surroundings, i.e., the school. A recording clerk (trained dental surgeon) was involved to enter the codes on the survey form. The present and past health status of each tooth was recorded in terms of the presence or absence of disease or a dental restoration. Only definite cavitation of the tooth surface was recorded as dental caries to reduce confusion regarding the diagnosis and exclusion of intact demineralized (white spot) lesions. The school children were allowed to sit on a chair or stool, where sufficient natural daylight was available. The groups divided were according to age (6–8 years, 9–12 years) and sex (male and female).

Statistics

The statistical analysis of the data was done using the Mann–Whitney test.

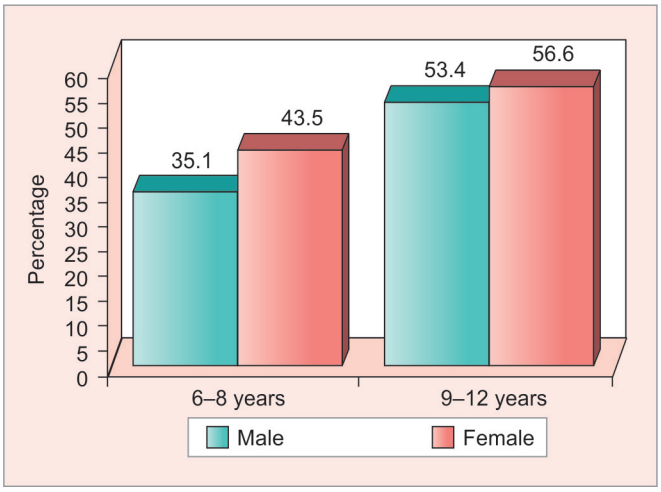
RESULTS

The study was carried out among 400 children aged 6 to 12 years from Krishna school, Karad. Children who were examined in the present study were divided into two groups (6–8 years, 9–12 years). The distributions of boys and girls in those age groups are shown in Table 1 and Graph 1.

In Tables 2 and 3 and Graphs 2 and 3, higher values of decayed missing filled surfaces (DMFS) and decayed missing filled teeth (DMFT) are shown in the age group 9 to 12 years with a significance value of 0.82 as compared to the 6 to 8 years group whose significance value was 0.83. Further, males had higher values than females.

Table 1: Distribution of males and females by age groups

Age group	*Male*	*%*	*Female*	*%*	*Total*
6–8 years	92	35.11	73	43.45	165
9–12 years	140	53.44	95	56.55	235
Total	232	88.55	168	100.00	400



Graph 1: Distribution of males and females by age groups

Tables 4 and 5 and Graphs 4 and 5 show a higher value of decayed extracted filled surfaces (DEFS) and decayed extracted filled teeth (DEFT) for the age group 6 to 8 years than in the age group 9 to 12 years. But here also males had a higher value of DEFS and DEFT than females.

Table 6 and Graph 6 depict that the mean score of Simplified Oral Hygiene Index was 1.18 in the 6 to 8 years group whereas it was 1.35 in the 9 to 12 years group with a statistical significance of 0.0038.

Table 7 and Graph 7 show a complete analysis of the prevalence of caries with respect to sex, age groups, the frequency of brushing, and the type of diet. Among all the males and females who were evaluated, 80.60 and 76.19% showed the prevalence of caries respectively whereas evaluation according to age groups showed

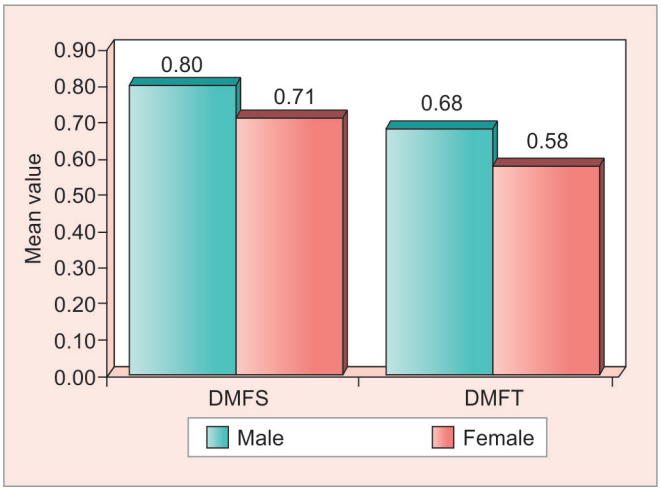
Table 2: Comparison between males and females in total, 6–8 and 9–12 years of age groups with respect to DMFS and DMFT using the Mann–Whitney U test

Sample	*Variable*	*Sex*	*Mean*	*SD*	*SE*	*Sum of ranks*	*U-value*	*Z-value*	*Sign*
Total	DMFS	Male	0.80	1.53	0.10	46,989.0			
		Female	0.71	1.46	0.11	33,211.0	19,015.0	–0.4145	0.6785
	DMFT	Male	0.68	1.26	0.08	47,010.0			
		Female	0.58	1.04	0.08	33,190.0	18,994.0	–0.4329	0.6651
6–8 years	DMFS	Male	0.40	1.02	0.11	7,702.0			
		Female	0.32	0.78	0.09	5,993.0	3,292.0	–0.2165	0.8286
	DMFT	Male	0.34	0.77	0.08	7,693.5			
		Female	0.32	0.78	0.09	6,001.5	3,300.5	–0.1886	0.8504
9–12 years	DMFS	Male	1.06	1.74	0.15	16,605.5			
		Female	1.02	1.77	0.18	11,124.5	6,564.5	–0.1672	0.8672
	DMFT	Male	0.91	1.46	0.12	16,651.0			
		Female	0.78	1.17	0.12	11,079.0	6,519.0	–0.2561	0.7978

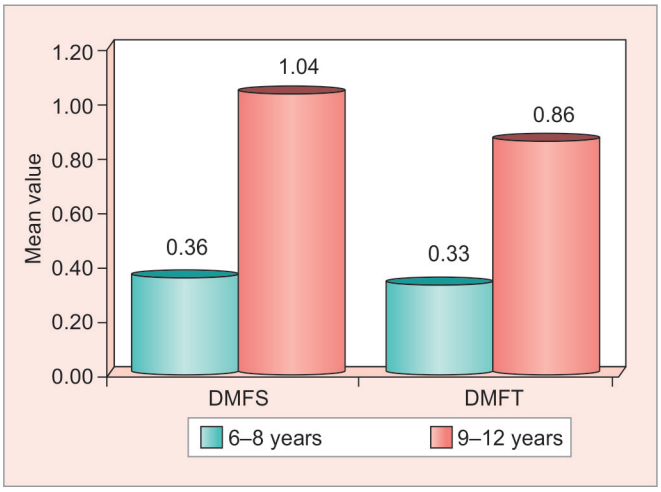
Table 3: Comparison between 6–8 and 9–12 years age groups in males and females with respect to DMFS and DMFT using the Mann–Whitney U test

Sample	*Variable*	*Age*	*Mean*	*SD*	*SE*	*Sum of ranks*	*U-value*	*Z-value*	*Sign*
Total	DMFS	6–8 years	0.36	0.92	0.07	29,001.0			
		9–12 years	1.04	1.75	0.11	51,199.0	15,306.0	–3.5856	0.0003*
	DMFT	6–8 years	0.33	0.77	0.06	29,078.0			
		9–12 years	0.86	1.35	0.09	51,122.0	15,383.0	–3.5180	0.0004*
Male	DMFS	6–8 years	0.40	1.02	0.11	9,386.5			
		9–12 years	1.06	1.74	0.15	17,641.5	5,108.5	–2.6625	0.0078*
	DMFT	6–8 years	0.34	0.77	0.08	9,387.0			
		9–12 years	0.91	1.46	0.12	17,641.0	5,109.0	–2.6615	0.0078*
Female	DMFS	6–8 years	0.32	0.78	0.09	5,424.0			
		9–12 years	1.02	1.77	0.18	8,772.0	2,723.0	–2.3823	0.0172*
	DMFT	6–8 years	0.32	0.78	0.09	5,456.5			
		9–12 years	0.78	1.17	0.12	8,739.5	2,755.5	–2.2783	0.0227*

*p<0.05



Graph 2: Comparison between males and females in the total sample with respect to DMFS and DMFT



Graph 3: Comparison between 6–8 and 9–12 years age groups in the total sample with respect to DMFS and DMFT

Table 4: Comparison between males and females in the 6–8 and 9–12 years groups with respect to DEFS and DEFT using the Mann–Whitney U test

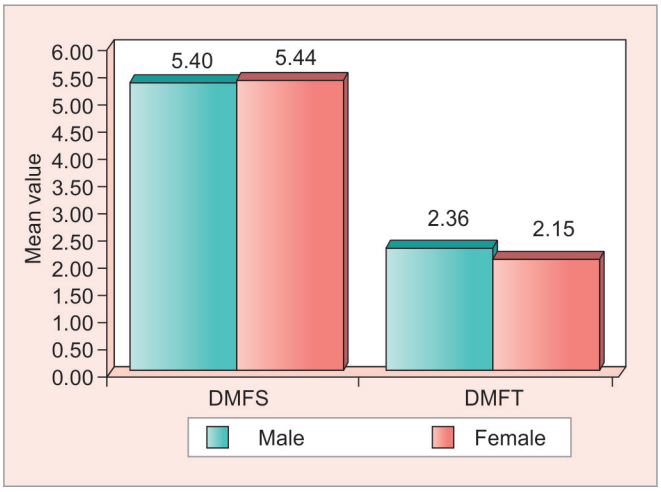
Sample	*Variable*	*Sex*	*Mean*	*SD*	*SE*	*Sum of ranks*	*U-value*	*Z-value*	*Sign*
Total	DEFS	Male	5.40	8.26	0.54	47,021.5			
		Female	5.44	9.19	0.71	33,178.5	18,982.5	–0.4429	0.6578
	DEFT	Male	2.36	2.68	0.18	47,384.0			
		Female	2.15	2.59	0.20	32,816.0	18,620.0	–0.7606	0.4469
6–8 years	DEFS	Male	6.98	8.68	0.90	8,062.0			
		Female	6.92	11.65	1.36	5,633.0	2,932.0	–1.3976	0.1622
	DEFT	Male	3.26	3.04	0.32	8,019.0			
		Female	2.88	3.22	0.38	5,676.0	2,975.0	–1.2566	0.2089
9–12 years	DEFS	Male	4.36	7.83	0.66	16,329.0			
		Female	4.31	6.56	0.67	11,401.0	6,459.0	–0.3735	0.7088
	DEFT	Male	1.76	2.24	0.19	16,554.5			
		Female	1.59	1.81	0.19	11,175.5	6,615.5	–0.0675	0.9462

that higher prevalence of caries was seen in age group 6 to 8 years (83.03%) than in 9 to 12 years (75.74%). And while comparing caries prevalence with the frequency of brushing, it was observed that children who brushed once had caries prevalence 80.65% whereas it was 76.37% in those who brushed two times a day. The association of diet with caries depicted that students who consumed nonvegetarian diet had 78.99% chances of caries prevalence compared to 78.23% chances in students who ate vegetarian food.

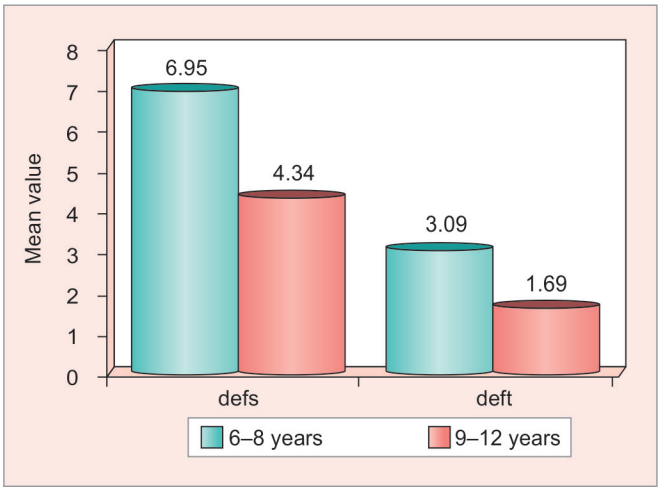
Table 5: Comparison between 6–8 and 9–12 years groups in males and females with respect to DEFS and DEFT using the Mann–Whitney U test

Sample	*Variable*	*Sex*	*Mean*	*SD*	*SE*	*Sum of ranks*	*U-value*	*Z-value*	*Sign*
Total	DEFS	6–8 years	6.95	10.07	0.78	37,544.5			
		9–12 years	4.34	7.33	0.48	42,655.5	14,925.5	–3.9199	0.0001*
	DEFT	6–8 years	3.09	3.12	0.24	38,474.0			
		9–12 years	1.69	2.07	0.14	41,726.0	13,996.0	–4.7364	0.00001*
Male	DEFS	6–8 years	6.98	8.68	0.90	12,647.0			
		9–12 years	4.36	7.83	0.66	14,381.0	4,511.0	–3.8573	0.0001*
	DEFT	6–8 years	3.26	3.04	0.32	12,829.0			
		9–12 years	1.76	2.24	0.19	14,199.0	4,329.0	–4.2213	0.00001*
Female	DEFS	6–8 years	6.92	11.65	1.36	6,659.0			
		9–12 years	4.31	6.56	0.67	7,537.0	2,977.0	–1.5695	0.1165
	DEFT	6–8 years	2.88	3.22	0.38	6,903.5			
		9–12 years	1.59	1.81	0.19	7,292.5	2,732.5	–2.3519	0.0187*

*p < 0.05



Graph 4: Comparison between males and females in the total sample with respect to DEFS and DEFT



Graph 5: Comparison between 6–8 and 9–12 years groups in the total sample with respect to DEFS and DEFT

Table 6: Comparison between 6–8 and 9–12 years groups in males and females with respect to Oral Hygiene Index Simplified (OHIS) using the Mann–Whitney U test

Variable	*Sex*	*Mean*	*SD*	*SE*	*Sum of ranks*	*U-value*	*Z-value*	*Sign*
Total	6–8 years	1.18	0.75	0.06	29,791.5			
	9–12 years	1.35	0.45	0.03	50,408.5	16,096.5	–2.8911	0.0038*
Male	6–8 years	1.14	0.78	0.08	8,990.0			
	9–12 years	1.36	0.46	0.04	18,038.0	4,712.0	–3.4554	0.0006*
Female	6–8 years	1.24	0.72	0.08	5,997.0			
	9–12 years	1.33	0.45	0.05	8,199.0	3,296.0	–0.5488	0.5832

*p < 0.05

DISCUSSION

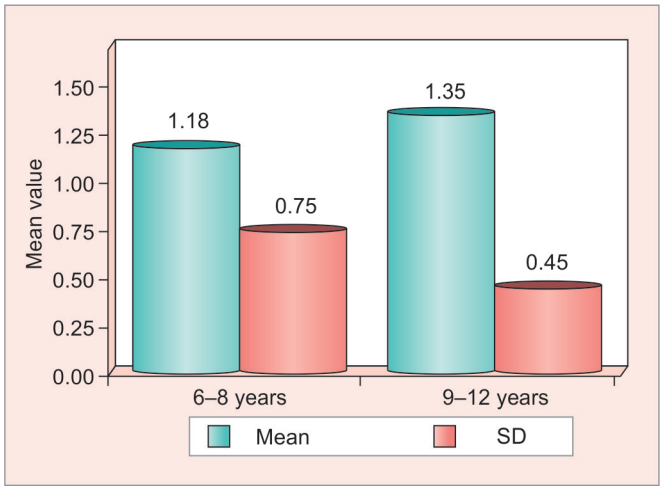
Dental caries is a multifactorial, microbial, infectious, transmissible disease of hard tissues of teeth characterized by the demineralization of inorganic structures and subsequent breakdown of organic moieties along with remineralization of the demineralized structures until there is cavitation. A plenty of influencing factors have been postulated by various authors regarding its etiology. Oral hygiene maintenance also has great influence over the causation of dental caries.

The present study was carried out among 400 school children aged 6 to 12 years and the overall caries prevalence in boys was found to be 80.60% and in girls it was 76.19% with the prevalence of caries being 83.03% in the age group 6 to 8 years and 75.74% in the age group 9 to 12 years. Preschool children with high colonization levels of Mutans Streptococci (MS) have been shown to have greater caries prevalence as well as a much greater risk for new lesions than those children with low levels of MS.[3] Additionally,

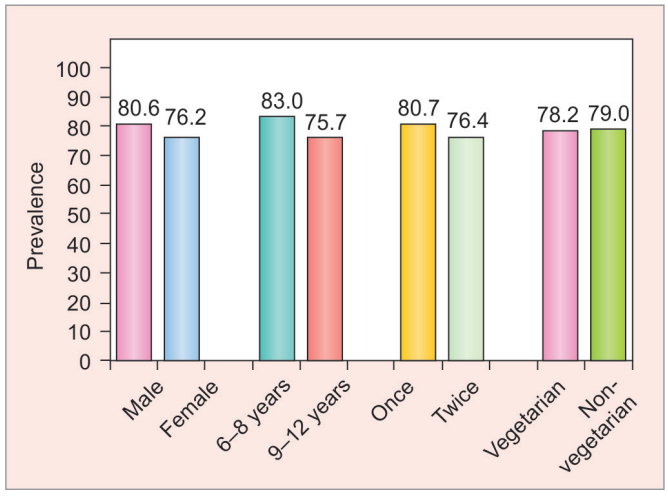
Table 7: Association between prevalence of caries with sex, age groups, frequency of brushing, and type of diet

Factor	*With caries*	*%*	*Without caries*	*%*	*Total*	*%*	*Chi-square*	*p-value*
Sex								
Male	187	80.60	45	19.40	232	58.00	1.1339	0.2869
Female	128	76.19	40	23.81	168	42.00		
Age group								
6–8 years	137	83.03	28	16.97	165	41.25	3.0748	0.0795
9–12 years	178	75.74	57	24.26	235	58.75		
Frequency of brushing								
Once	175	80.65	42	19.35	217	54.25	1.3498	0.5092
Twice	139	76.37	43	23.63	182	45.50		
Type of diet								
Vegetarian	97	78.23	27	21.77	124	31.00	0.0295	0.8636
Nonvegetarian	218	78.99	58	21.01	276	69.00		
Total	315	78.75	85	21.25	400	100.00		

$p < 0.05$



Graph 6: Comparison between 6–8 and 9–12 years groups in the total sample with respect to OHIS scores



Graph 7: Prevalence of caries by sex, age group, frequency of brushing, and type of diet

colonization with MS at an early age is an important factor for early caries initiation. Several studies have shown that the earlier MS is detected in children, the higher the caries experience.[4,5] As age advances, the prevalence of dental caries decreases. This finding corresponds with the study conducted by Misra (1979)[6] among 6- to 16-year-old children in an urban area of south Odisha. He observed an increase in caries level between 5 and 12 years (56–81%) and a decrease in caries level between 13 and 15 years (41.4%). Similar results were seen in studies conducted by Petersen et al (1991),[7] Retna Kumari (1999),[8] Dash et al (2002),[9] Saravanan et al (2003),[10] and Mahesh Kumar et al (2005).[11]

As per the present study, as the frequency of brushing increased, the prevalence of dental caries decreased. This finding is consistent with the findings of Christina et al,[12] Wei et al,[13] and Sethi et al.[14] The role of brushing teeth in the prevention of tooth decay has long been considered self-evident. Yet, there is little evidence to support the notion that tooth brushing per se reduces caries. The relationship between individual oral hygiene status and caries experience is weak and instructional programs designed to reduce caries incidence by promoting oral hygiene have failed.[15-17]

The result of this study is a pointer to the fact that there still exists a large segment of the population who continue to remain ignorant about the detrimental effects of poor oral health and the multiple benefits enjoyed from good oral health. One of the oral health goals advocated by WHO for the year 2000 was that 50% of 5- to 6-year-old should be free from dental caries. In the present study it was observed that 57.2% of children 6 years of age were affected by dental caries, indicating a high prevalence of the disease in children.

ACKNOWLEDGMENT

We solemnly thank Dr. Asha Pratinidhi, director of research, KIMSDU, for allowing us to conduct the study. We would also like to thank the principal of Krishna English Medium School, Mrs. Namrata Kulkarni, for allowing us to perform the study and, most importantly,

the students of Krishna School for being active participants in the research. We are thankful to Miss Rucha Patil, Miss Siddhi Pancholi, and Miss Rutuja Kand for their active role in our research.

REFERENCES

1. Moses J, Rangeeth BN, Gurunathan D. Prevalence of dental caries, socio-economic old school going children of Chidambaram status and treatment needs among 5 to 15 year old school. JCDR;2011 Feb;5(1):146-151.
2. World Health Organization. Oral health surveys basic method. 4th ed. Geneva: WHO; 1987. p. 760-871.
3. Thibodeau EA, O'Sullivan DM. Salivary *Streptococci mutans* and dental caries patterns in pre-school children. Community Dent Oral Epidemiol 1996 Jun:24(3):164-168.
4. Alaluusua S, Renkonen OV. Streptococcus mutans establishment and dental caries experience in children from 2 to 4 years old. Scand J Dent Res 1983 Dec;91(6):453-457.
5. Masuda N, Tsutsumi N, Sobue S, Hamada S. Longitudinal survey of the distribution of various serotypes of Streptococcus mutans in infants. J Clin Microbiol 1979 Oct;10(4):497-502.
6. Misra FM, Shee BK. Prevalence of dental caries in school going children in an urban area of South Orissa. J Ind Dent Assoc 1979 Sep;51(9): 267-270.
7. Petersen PE, Pulsen VJ, Ramalhaleo J, Ratsifaritara C. Dental caries and dental health behavior situation among 6 and 12 year urban school children in Madagascar. Afr Dent J 1991;5:1-7.
8. Retna Kumari N. Prevalence of dental caries and risk assessment among primary school children of 6–12 year old in the Varkala municipal area of Kerala. J Indian Soc Pedod Prev Dent 1999 Dec;17(4):135-142.
9. Dash JK, Sahoo PK, Bhuyan SK. Prevalence of dental caries and treatment needs among children of Cuttack (Orissa). J Indian Soc Pedod Prev Dent 2002 Dec;20(4):134-144.
10. Saravanan S, Anuradha KP, Bhaskar DJ. Prevalence of dental caries and treatment needs among school going children of Pondicherry. J Indian Soc Pedod Prev Dent 2003 Mar;21(1): 1-12.
11. Mahesh Kumar P, Joseph T, Varma RB, Jayanth M. Oral health status of 5 years and 12 years school going children in Chennai city: an epidemiological study. J Indian Soc Pedod Prev Dent 2005 Mar;23(1):17-22.
12. Christina SB, Anna KH. Dental caries in Swedish 4 year old children. Swed Dent J 1989;13:39-44.
13. Wei SH, Holm AK, Tong LS, Yuen SW. Dental caries prevalence and related factors in 5-year-old children in Hong Kong. Pediatr Dent 1993 Mar-Apr;15(2):116-119.
14. Sethi B, Tandon S. Caries pattern in preschool children. J Indian Dent Assoc 1996;67:141-145.
15. Andlaw RJ. Oral hygiene and dental caries: a review. Int Dent J 1978 Mar;28(1):1-6.
16. Bibby BG. Do we tell the truth about preventing caries? ASDC J Dent Child 1966 Sep;33(5):269-279.
17. Heifetz SB, Bagramian RA, Suomi JD, Segreto VA. Programs for the mass control of plaque: an appraisal. J Public Health Dent 1973;33(2):91-95.