

Prevalence of Dental Caries in 5 – 6 Years and 12 – 13 Years Age Group of School Children of Kathmandu Valley

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ABSTRACT

Introduction: Dental caries is one of the most common conditions affecting the general health of children. The present study was carried out among school children of Kathmandu valley to determine the prevalence of dental caries in two age groups.

Methods: The study was conducted from December 2007 to May 2008. The age of the school children of the study was divided into two group: 5 - 6 years and 12 - 13 years. A stratified cluster sampling with proportional allocation was used while grouping the subjects. The dental status examination was done with the help of trained dentists. Decayed, missed and filled teeth index and decayed, missed and filled surfaces index (dmft for primary dentition and DMFT for permanent dentition) were used as the standard tools for the determination of prevalence.

Results: A total of 638 students (325 of age group 12 - 13 years and 313 of age group 5 - 6 years) from 30 different schools of the Kathmandu valley were included in the study. The caries status was found higher in the age group of 5 - 6 years than in the 12 - 13 years and it was found to be statistically significant ($p < 0.001$). The dmfs and caries percentage of the age group 5 - 6 years and the DMFS and caries percent of the 12 - 13 years was found to be 3.79, 69 % and 1.6, 53.23 % respectively. The dmft/dmfs value was found to be significant according to the districts in the 5 - 6 years age group whereas the DMFS was found statistically significant among the sexes of the 12 - 13 years age group.

Conclusion: The caries percentage was found to be above the recommended level of the World Health Organization. However, the DMFS and DMFT values were within the WHO level.

Keywords: Children, dental caries, DMF index

INTRODUCTION

Dental caries is a multifactorial oral disease developed by the localized dissolution of the tooth hard tissues, caused by bacteria.^{1,2} The frequently encountered bacteria in caries are the different species of Streptococci.³⁻⁷ Dental caries is a common disease with low mortality and high morbidity and has great impact in the general health of a population.^{8,9}

Nepal has a high morbidity of dental caries in all age groups of both genders. The disease is on different factors such as lifestyle, diet and lack of dental health care.⁸⁻¹⁰

WHO recommends DMFT/DMFS as the standard tool for evaluation of dental caries.⁸ Two critical index age

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groups of 5 - 6 years (for primary dentition) and of 12 - 13 years (for mixed dentition) have been included in this study.

METHODS

Ethical clearance and approval of the protocol to be followed was obtained from the Nepal Health Research Council (NHRC) before field visits. Schools under the sampling were officially informed and assured about the confidentiality of the research findings and of the report. Written consent was taken both from the schools under study and the students and their guardians after explaining the objectives of the study. A total of 30 different private and government schools of the Kathmandu valley were selected by using a stratified cluster random sampling on the basis of geographical region (Kathmandu, Lalitpur and Bhaktapur District) and socioeconomic status (community and private schools). Ten schools were drawn for the representation of the geographical regions and 20 were drawn on the basis of socio-economic status. The student's age group of 5 - 6 years and 12 – 13 years were included in the study, as recommended by WHO.⁸ Students were proportionately drawn according to the gender of the selected age groups. Students going through any dental medication were excluded from the study. A cross-sectional study design was followed and the study variables were age, sex, socio-economic status, and location.^{10,11}

For recording dental caries the WHO caries form was used.^{10,11} The examination of dental condition was done with the help of sixteen trained volunteer dentists provided by the Nepal Dental Association (NDA) and other required data were collected by the use of standard semi- structured questionnaires. Calibration/ cross check was done in one of five students examined. The DMF index, that is, dmft/dmfs for primary dentition and DMFT/DMFS for permanent dentition was used as the standard tool for the dental status examination of the children.^{10,11}

Data entry was done in the software scientific questionnaire analysis program. After completion of the data entry work, several logical and structural checks were done to ensure the quality of the data. Data tabulation and statistical analysis were carried out using SPSS 16.

RESULTS

A total of 638 students were included in the study. Among them 313 school children were of the age group of 5 - 6 years and 325 of 12 - 13 years were examined for the assessment of dental caries. The mean dmfs was found to be 3.79 in the 5 - 6 years age group and the mean DMFS of 1.6 in the 12 - 13 years group which was found significant at $p = 0.001$. The significant caries index (SiC)¹⁰⁻¹² was calculated as recommended by WHO and was found to be 6.4 dmft in the 5 - 6 years age group and DMFT of 3.1 in the 12 - 13 years age group.

The dental caries status of the girls was found higher than that of the boys in both the age groups but it was found statistically significant only in the 12 - 13 years age group (Table 2).

In the 5 - 6 and 12 - 13 years age groups the prevalence of dental caries (caries %) was found highest in Kathmandu district and lowest in Bhaktapur, and it was found significant $p = 0.001$ only in the 5 - 6 years age group (Table 3).

In both the age groups, the dmfs/DMFS and caries percent was found higher in the private schools than in the government schools but no significant difference was observed (Table 4).

Table 1. Prevalence of dental caries, mean DMFS and other measures of caries in the 5 - 6 years and 12 - 13 years age groups

5 - 6 years age group (n = 313) caries 69 %				
Mean (SE)	SiC	d	m	f
dmft = 3.79 (0.28)	6.4	3.73	0.03	0.03
dmfs = 2.78 (0.17)		2.74	0.01	0.03
12 - 13 years age group (n = 325) caries 53.23%				
Mean (SE)	SiC	D	M	F
DMFT = 1.6 (0.14)	3.1	1.4	0.1	0.11
DMFS = 1.25 (0.09)		1.17	0.4	1.67

Table 2. Dental caries status in the 5 - 6 years and 12 - 13 years age group by gender

5 - 6 years age group										
Gender	N (%)	% caries	ds	ms	fs	dmfs (SE)	dt	mt	ft	dmft (SE)
Male	163 (52.1)	67.48	3.66	0.01	0.04	3.69 (0.40)	2.69	0.01	0.02	2.72 (0.25)
Female	150 (47.9)	70.67	3.73	0.03	0.3	3.79 (0.28)	2.74	0.01	0.26	2.78 (0.17)
12 - 13 years age group										
Gender	N (%)	% caries	DS	MS	FS	DMFS (SE)	DT	MT	FT	DMFT(SE)
Male	170 (52.31)	47.06	1.24	0.00	.02	1.26 (0.15)	1.01	0.00	0.02	1.04 (0.12)
Female	155 (47.69)	60.00	1.57	0.19	0.21	1.97 (0.25)	1.34	0.04	0.10	1.48(0.14)

Table 3. Dental caries status in the 5 - 6 years and 12 - 13 years age group by type of school

5 - 6 years age group										
Type of schools	N (%)	% caries	ds	ms	fs	dmfs (SE)	dt	mt	ft	dmft (SE)
government	74 (23.6)	61.45	3.41	0.00	0.01	3.41 (0.57)	2.61	0.00	0.1	2.62 (0.39)
private	239 (76.4)	71.55	3.83	0.04	0.04	3.91 (0.32)	2.79	0.13	0.03	2.83 (0.19)
12 - 13 years age group										
Type of schools	N (%)	% caries	DS	MS	FS	DMFS (SE)	DT	MT	FT	DMFT (SE)
government	110 (33.8)	50.91	1.27	0.13	0.02	1.42 (0.26)	1.10	0.03	.02	1.163 (0.16)
private	215 (66.15)	54.42	1.46	0.07	0.16	1.69 (0.18)	1.20	0.01	.08	1.30 (0.11)

Table 4. Dental caries status in the 5 - 6 years and 12 -13 years age group by districts

5 - 6 years age group										
Districts	N (%)	% caries	ds	ms	fs	dmfs (SE)	dt	mt	ft	dmft (SE)
Bhaktapur	41 (13.1)	23.23	2.41	0.00	0.00	2.41 (0.70)	1.76	0.00	0.00	1.76 (0.40)
Lalitpur	88 (28.1)	63.64	2.72	0.09	0.03	2.84 (0.42)	2.20	0.02	0.03	2.26 (0.3)
Kathmandu	184 (58.8)	74.46	4.51	0.01	0.04	4.55 (0.39)	3.22	0.01	0.03	3.26 (0.23)
12 - 13 years age group										
Districts	N (%)	% caries	DS	MS	FS	DMFS (SE)	DT	MT	FT	DMFT (SE)
Bhaktapur	62 (19.1)	50.00	0.98	0.00	0.1	1.08 (0.20)	0.82	0.00	0.06	0.92 (0.14)
Lalitpur	86 (26.5)	4100	1.45	0.06	0.22	1.73 (0.34)	1.79	0.11	0.54	1.84 (0.2)
Kathmandu	177 (54.5)	57.06	1.51	0.14	0.07	1.72 (0.19)	1.28	0.03	0.05	1.36 (0.13)

DISCUSSION

The present study shows that in Nepalese children dental caries begins in an early age, as found in other studies.^{10,13} The study also showed a significant relationship between the age and dental caries in which the 5 - 6 years age group children were found to have significantly high dental caries than in the 12 - 13 years.^{10,13,14}

The 5 - 6 years age group is of interest because it shows the level of caries in the primary dentition which may reveal changes over a shorter time period than in the permanent dentition. This is also the age in which children begin primary school. The 12 - 13 years age group is especially important as all the permanent teeth except the third molars will have erupted as at this stage and generally this is the age at which children leave primary school.^{8,11}

A goal was formulated jointly by WHO and the FDI World Dental Federation for oral health to be achieved by the year 2000, to have 50 % of the 5 - 6 year-olds to be free of dental caries and the global average to be no more than 3 DMFT at 12 years of age. This study shows that DMFT of the 12 - 13 years age group was within the limit, whereas the dental caries percent of 5 - 6 years age group was found above the target level.⁸ This may be attributed to the changing pattern of lifestyle, the diet habit and the ignorance shown by the people regarding visits to the dentist.^{8,9,13} Thus, the assessment of caries status should be done at standard intervals of time, as recommended by WHO.^{8,11,15} A low dmft/dmfs and DMFT/DMFS and high caries percentage are indications of future dental complications.^{16,17}

In the 5 - 6 years age group no significant difference was observed ($p > 0.01$) in the caries status in relation to gender as found in other studies. A high decay component was found which indicates a high percentage of untreated caries and a high treatment need.¹⁸ In the 12 - 13 years age group, significant difference in caries DMFT/DMFS and caries percent was found ($p < 0.01$) with a high decay component. Thus, this study also confirms that in developing countries like Nepal, a large proportion of the dental disease is in the form of untreated caries which may be due to the increasing sugar consumption, low exposure to fluorides and poor access to oral health care.¹⁹⁻²² If left untreated this can lead to different systemic complications in the general health of the children.¹⁵

In both the age groups, the level of caries was found in an increasing order from Bhaktapur, Lalitpur to Kathmandu and in the 5 - 6 years age group, it was found significantly higher ($p > 0.01$) among school children from Kathmandu, with a high SiC value,

which may be due to the different pattern of lifestyle, urbanization and more use of sugary foods, as has been found in other studies.^{10,21}

In both of the age groups, that is 5 - 6 years and 12 - 13 years, no significant difference in caries prevalence was found in the government and private schools, which was found to be contrast to earlier studies.^{10,20, 21}

According to the pathfinder survey¹⁰ conducted in 2004, the dmft and dmfs of the 5 - 6 years age group was found lower whereas the caries prevalence was found higher than those of the current study. In the 12 - 13 years age group, the DMFT and DMFS and caries prevalence was found higher, which can be attributed to the changing pattern of lifestyle, diet and urbanization as well as the sample size.^{10,19-21} From the earlier studies conducted in Nepal, it has been found that there has been a decrease in the caries percent with the increase in dmft/DMFT and dmfs/DMFS in both the age groups^{10,13} which may be due to the dietary habits and other different indexes used to assess the caries status.

The present study demonstrated that in the 12 - 13 years age group, the mean DMFT has drastically increased (from 0.5 to 1.25) with the decrease in untreated decayed teeth than that reported in consultation with the WHO regional office for South-East Asia.²³ We found that the mean DMFT of the study population was found to be higher than that of Sri Lanka (mean DMFT 0.9) and Indonesia (mean DMFT 0.9) whereas the data was found lower than that of Bangladesh (2.2), India (1.8), Timor-Leste (1.8) and Thailand (1.6).²³ Variations in the methods used and sampling procedure may account for the differences.^{13, 14, 17}

These data on dental caries status helps to determine the appropriate treatment planning for children. Besides, there is an urgent need for periodic surveys of caries prevalence and severity so that the outcomes of preventive programmes can be monitored, as has been recommended by WHO.

This study has certain limitations which should be taken into consideration when interpreting the results. Since the study was conducted as a cross-sectional survey, conclusions about the issues related to the causation of the caries cannot be made.

CONCLUSIONS

Prevalence of dental caries, dmft/dmfs and DMFT/DMFS was found to be in an increasing trend, compared to previous studies. Thus, the current study shows that further emphasis should be given to the effective

implementation of the school-based oral health promotion and population directed preventive programmes in Nepal. Furthermore, scientific monitoring, evaluation and impact of such oral health promotion and planning programs directed towards the oral health should be conducted at regular intervals of time.

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