Original Article

Dental Caries prevalence and treatment needs in children aged uptol6 years attending at Kantipur Dental College and Hospital

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Abstract

Objective:

The study was conducted to know the prevalence of dental caries and corresponding treatment needs amongst 1-16 years old children who came to Kantipur dental college and hospital for their dental treatment.

Materials and Methods:

A total of 1253 children were examined, caries along with its treatment needs were recorded according to World Health Organization index.The sample consisted of 177, 592 and 484 children in the age groups of 1-5, 6-11 and 12-16 years respectively.

Result:

The prevalence of dental caries found in the study samples are , the mean Decayed missing and filled teeth (DMFT)= 3.5,the prevalence and mean DMF in age group of 1-5, 6-11 and 12-16 years were 22% (DMFT=4.9), 54% (DMFT=3.6) and 24% (DMFT=2.0) respectively. The point prevalence of dental caries showed a common pattern of occurrence i.e., the prevalence of dental caries consistently increased from age groups1-5 years to 6-11 years and subsequently decreased at age group12-16 years. Treatment needs evaluated the need of restoration was the maximum followed by extraction, RCT/pulpectomy and oral prophylaxis.

Conclusion:

There was high prevalence of untreated caries and treatment needs among the children who came to Kantipur dental college. In spite of increased number of dental facilities available nowadays, caries is yet not under control and there is need for implementation of dental health programes, preventive programs and creating awareness amongst the public about dental health measures.

Key words:

Dental caries, DMF teeth, prevalence, primary dentition, permanent dentition, treatment needs

Introduction

Dental caries is one of the most prevalent diseases afflicting human beings and it persists till date as a challenge to the medical and dental profession[1].Caries is the outcome of multiple complex process involving factors like diet, microorganisms, saliva, genetic predisposition and tooth morphology. Apart from this social, environmental and cultural factors are also responsible. The prevalence pattern of it varies with age, sex, socio economic status, race, geographical location, food habits and oral hygiene practices. It is the most common chronic disease of childhood that interferes with normal nutrition intake, speech, self-esteem and daily routine activities, because the caries pain adversely affects the normal food intake. This hampers in their growth and development and

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can severely jeopardize their health resulting in underweight children, with abnormal cognitive development[2]. The World Health Organization (WHO) has ranked it as number three among all chronic non communicable diseases that require worldwide attention for prevention and treatment[3]. It is a common disease with low mortality and high morbidity and has great impact in the general health of a population[4]. Nepal has a high morbidity of dental caries in all age groups of both genders Therefore advocacy efforts to improve the overall situation are still highly indicated[5].

Once it occurs, its manifestation persists throughout life, even after the lesion is treated. Caries in primary teeth can be a good predictor of caries development in permanent dentition[6]. Several studies have shown that children who are caries free in the primary dentition tend to remain caries free in the permanent dentition[7]. Caries is largely preventable so it's important to monitor its occurrence in children, one of the most important target groups for prevention.

Objectives of the study:

1. To determine the prevalence of dental caries in children aged upto 16 years who came for treatment at Kantipur dental college
2. To evaluate curative and preventive needs amongst the children.

Material and methods

A cross-sectional study on prevalence of dental caries among 1-16 year old children was undertaken at the department of Pedodontics and Preventive Dentistry, Kantipur Dental College and Hospital (Dhapasi, Kathmandu) in the year 2012-2013. The data was collected from the children who came for routine dental checkup and treatment. The aim of the study was to collect data toevaluate the prevalence of dental caries and the treatment needs.

Data collection:

All children were examined by the dentists, under standard conditions and recorded in dental files. Approval was obtained from the concerned hospital authorities prior to the start of the survey.The children were examined in a supine position in the dental chair, and the oral cavity was illuminated with a dental light. All teeth were inspected, diagnosis of presence of caries in each tooth and presence of plaque were examined with mirror and probe.The presence of caries was determined according to the world WHO criteria and indices[8].

Data processing and analysis:

The DMF index, that is, dmft for primary dentition and DMFT for permanent dentition was used as the standard tool for the caries status examination of the children. Intra analysis of deft + DMFT components were analysed as d+D teeth, m+M teeth and f+F in all age groups regarding treatment. The score "missing due to caries" was used in the subject Data recorded in the hospital files was transferred to computer data file for statistical analysis, corrected for logical errors. The study sample comprised of (sample size) n=1253 (Male - 718, Female - 535) in the age groups of 1-5 yrs, 6-11 yrs and 12-16 years respectively.

The Chi-square test was done for the comparison of the categorical variables and to test the association with factors and outcome variables. The t'–test was done for the comparison of the continuous variables between the two groups.

Results

A total of 1253 children were examined, among them 177, 592 and 484 children belonged to the age groups of 1-5 years, 6-11years and 12-16 years respectively. The gender distribution of the patients is shown in Table 1 where, 718 (57%) were male while 535(43%) were female. Sex-wise comparison revealed that caries prevalence was higher in male than in females but the difference was not significant statistically (p>0.05).

Table 1: Characteristics of study population

Age group	Sex				Total		P
	Female		Male				
	n	%	n	%	n	%	
1-5 years	70	13.1	107	14.9	177	14.1	0.507
6-11 Years	250	46.7	342	47.6	592	47.2	
12-16 Years	215	40.2	269	37.5	484	38.6	
Total	535	100.0	718	100.0	1253	100.0	

Table 2, Distribution of the caries according to number of decayed missing and filled teeth showed

that out of 3965 DMF teeth, 98.2% (n=3894) were decayed, 1.3% (n=51) were missing and 0.5% (20) was filled. The intra-analysis of the DMFT revealed that the 'D' component was predominant followed by 'M' component, whereas the 'F' component was negligible{The mean Decayed missing and filled teeth (DMFT)= 3.5}.The prevalence of caries and mean DMFT in age groups 1-5, 6-11 and 12-16 years were 22% (DMFT=4.9), 54% (DMFT=3.6) and 24% (DMFT=2.0) respectively. The point prevalence of dental caries showed a common pattern of occurrence i.e., the prevalence of dental caries consistently increased from age groups of 1-5 years to 6-11 years and subsequently decreased at age group of 12-16 years. In the study the difference in prevalence of caries in different age groups was statically significant (p< 0.05) with caries prevalence being highest in age group 6-11 years and the mean DMFT was highest in the age group 1-5 years.

Table 3 presents information related to demands of decayed teeth that required treatment needs where restorative procedures were needed for 56%, extraction due to caries were needed for 30% and pulpectomy/RCT procedure were needed for 3%/11% respectively. The study revealed significantly higher number of cases needed restoration rather than dental procedures such as; extraction, pulpectomy and RCT and it was statically significant with p<0.001. Further, the demand for restoration and pulpectomy were highest among 1-5 years age group which was statically significant at p<0.001, however the extraction was highest among 6-11 years age group. Lastly other treatments like oral prophylaxis was only required for 35% of patients and highest was required among 6-11 years age group.

Table 2: Comparison of mean DMFT scores between female and male patients

Age group	Total patients	Decayed			Missing			Filled			DMFT score						p
											Female		Male		Total		
		n	%	p	n	%	p	n	%	p	Mean	SD	Mean	SD	Mean	SD	
1-5 years	177	861	22.1	<0.001	2	3.9	<0.001	6	30.0	0.086	4.6	3.8	5.1	4.0	4.9	4.0	0.396
6-11 Years	592	2110	54.2		28	54.9		3	15.0		3.3	3.0	3.9	3.2	3.6	3.1	0.022
12-16 years	484	923	23.7		21	41.7		11	55.0		2.1	2.1	1.9	2.1	2.0	2.1	0.395
Total	1253	3894	100		51	100		20	100		3.0	2.9	3.3	3.2	3.2	3.1	0.091

p value represents comparison of extraction versus restoration by age group and total*

*p** value represents comparison of extraction versus RCT by age group and total*

*p *** value represents comparison of extraction versus pulpectomy by age group and total*

p$ value represents oral prophylaxis differences across the age groups

Association of frequency of brushing with the requirement of oral prophylaxis is shown in Table 4. It shows only 5.4% (39) had to undergo oral prophylaxis who brushed twice a day, 10.7% (29) had to undergo oral prophylaxis who brushed once a day and 7% (18) had to undergo oral prophylaxis who brushed sometimes. The result showed twice a brushing habit had to undergo lesser oral prophylaxis treatment than children

Table 3: Types of treatment required

Age groups	Decayed total		Treatment required													
			Extraction		Restoration			RCT			Pulpectomy			Oral prophylaxis		
	n	%	n	%	n	%	p*	n	%	p**	n	%	p***	N	%	p$
1-5 years	861	22.1	110	12.8	556	64.6	<0.001	0	0.0	<0.001	195	22.6	<0.001	46	10.4	<0.001
6-11 years	2110	54.2	751	35.6	1082	51.3	<0.001	30	1.4	<0.001	247	11.7	<0.001	268	60.8	
12-16 Years	923	23.7	290	31.4	548	59.4	<0.001	82	8.9	<0.001	3	0.3	<0.001	127	28.8	
Total	3894	100	1151	29.6	2186	56.1	<0.001	112	2.9	<0.001	445	11.4	<0.001	441	100	

who did once a day and sometimes brushing which was statically significant at p = 0.012.

Table 4: Association of frequency of brushes with the requirement of oral prophylaxis

Discussion

In the study three age groups were taken 1-5 years, 6-11 years and 12-16 years respectively. The age group 1-5 years 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. The age group 6-11 years shows the mixed dentition stage of the child and the age group 12-16 years is especially important as all the permanent teeth except the third molars will have generally erupted out by this age[4].

The gender distribution of the patients shows 57% (718) were males while 43% (535) were females.

Sex wise comparison revealed that caries prevalence was higher in male than in females but the difference was not significant statistically. Similar findings have been reported with no difference in caries prevalence among the two sexes[9,10] .The higher caries prevalence in males in primary dentition was due to early eruption and longer retention of these teeth in males[11].

	Brushes						p
	Twice a day		Once a days		sometime		
Oral prophylaxis	n	%	n	%	n	%	
No	688	94.6	241	89.3	238	93.0	0.012
Yes	39	5.4	29	10.7	18	7.0	
Total	727	100.0	270	100.0	256	100.0	

WHO states good oral health as an indicator of good health and one of the global goals to be achieved by the year 2000 is 85% of the population should have all teeth by the age of 18 years[12]. According to our study it showed higher prevalence rate than WHO goal thus making it a prevalent childhood diseases in need of treatment in country Nepal.

The study showed the prevalence of caries in age groups 1-5, 6-11 and 12-16 years were 22% (DMFT=4.9), 54% (DMFT=3.6) and 24% (DMFT=2.0) respectively with mean DMFT = 3.5.The point prevalence of dental caries showed a common pattern of occurrence i.e., the prevalence of dental caries consistently increased from age groups of 1-5 years to 6-11 years and subsequently decreased at age group of 12-16 years. The caries prevalence was highest in age group 6-11 years and the mean DMFT was highest in the age group 1-5 years. The DMFT scores declined progressively as the age advanced; whereas the scores increased at age group 12 -16 years. The decrease in the DMFT values might be attributed to the reduction in the number of primary teeth with age due to normal exfoliation. The increase in DMFT may be coinciding with the eruption of permanent teeth. A similar trend with the dmft declining from 4.52 ± 4.15 (5-6 years) to 1.81 ± 1.88 (11-12 years)have been reported[13]. DMFT in age group 1-5 years children was reported higher probably due to early exposure of teeth to caries associated with poor oral hygiene. As in other previous studies[14,15], the caries experience and the severity of caries were also found to increase with increasing age from age group 1-5 yrs to 6-11 years. This increasing trend may be partly due to the increased consumption of sugar containing food, the changes in the dietary habits and non use of proper oral hygiene measures. The caries experience in advanced age might also be due to more exposure of the teeth to the oral environment, as caries is a continuous and a cumulative process[16].

In the present study, the caries prevalence in the age group 1-5 years was 22% which was lower when comparing with other countries where the prevalence of dental caries among 4 years ranged from 39% USA(1997) to 46% Sweden (2002)[17,18] and among 5 year old children from 34% Norway (2007)[19] to 60% Spain (1998)[20]. Due to the lower calcium content and structural differences caries

susceptibility may increase in deciduous teeth[21]. The primary teeth are also highly cariogenic due to poor oral hygiene and early childhood caries.

The caries prevalence in the present study was 54% in the age group 6-11 years which was lower than Rao et al[13] who reported a prevalence of 82% in the 7-8-years age group and a 83% in the 9-10-years age group. However, our study showed similar result as a cross-sectional study conducted in Brazil which reported a much higher prevalence of dental caries (87%) in 12-year-old group as compared to other age groups[22]. The reason for the prevalence of dental caries being more at age group of 6-11 years compared to that of age group 1-5 years can be attributed to the fact that caries being a continuous and cumulative process, obviously increased with a span of these years. The dental caries experience in an individual in permanent dentition is also directly related to oral microflora established with completion of primary dentition.

The prevalenceof caries in the age group 12-16 years was 24% which was much lower than that observed by Avinash J et al[23] (63% in 12 year old and79.3% in 15 year old), Bajomo AS et al[24] and Damle and Patel[25](79%). The result of the present study is in concurrence with Sahooet al[26]. The fall in point of prevalence at 11-16 years age is understandable, because most of the deciduous teeth have been exfoliated and succedaneous premolar have not been in oral cavity long enough for caries process to set in. This could also be attributed to the fact that permanent teeth have a lower susceptibility to dental caries. There is no significant difference in prevalence of dental caries at this age group the possible reason for this can be explained by the fact that the new carious lesion appearing at the age of 11-12 years was being compensated by the exfoliation of deciduous molar. This could also be due to the increase in age there is an increased awareness of oral hygiene.

A total of 3894 decayed teeth were present in the study out of which 56% required restorative procedures, 29.6% required extraction due to caries and 3% /11% required pulpectomy/ RCT procedure respectively. The percentage of children requiring various type of dental treatment was found to be in accordance with dental caries prevalence at different age group. The study revealed significantly higher number of cases needed restoration rather than dental procedures such as extraction, pulpectomy and RCT. Similar results were shown by Mandal et al[27] and Kulkarni et al[28]. Further, the demand for restoration and pulpectomy was highest among age group 1-5 years however the extraction was highest among age group 6-11 years. It may be because children of age group1-5 years are more prone to early childhood caries and age group 6-11 years are in mixed dentition period and have to change their deciduous dentition. Lastly other treatments like oral prophylaxis was only for 35% of treatment needs and highest was among 6-11 years age group.

In this study the result showed twice a brushing habit had to undergo lesser oral prophylaxis treatment than once a day and sometimes brushing, which was statistically significant. Studies by Ainamo and Parviainen[29] and Shetty and Tandon[10] were unable to demonstrate a correlation between reported frequency of tooth brushing and caries prevalence. Bellini et al[30] reported that the relationship between caries and the amount of plaque on teeth or frequency of self-reported oral hygiene measure is vague. A study by Jaune R et al[31] showed the frequency of tooth brushing in relation to intensity of caries. Amongst dental diseases especially the risk of periodontal diseases is increased by the presence of plaque and it has also been identified as an etiological factor for caries and the most effective way to fight dental plaque is a regular tooth brushing. Thus it is a positive behavior in attaining good oral and dental health.

Conclusion

The caries prevalence figures along with high DMFT scores in all age groups indicate that dental caries is yet not under control and need for treatment needs is more among the children who came to Kantipur Dental College. It highlights the need for dental health programs and oral health education regarding continuous dental follow-ups with dietary instructions to maintain good oral hygiene. More dental professional services and a call for concentrated effort to

decrease caries prevalence and severity by strict preventive program has to be implemented in the children. Awareness and motivation should be built in the parents also. The negligible 'filled' component reveals that the treatment received for dental caries is still very low in this area of Kathmandu and there is a need for creating awareness amongst the public about dental health measures.

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