

Prevalence and Associated Factors of Dental Caries among School Children in Bharatpur, Chitwan

Poudel S,¹ Sapkota D,¹ Poudel L,² Poudel S,³ Khatri E,³ Sapkota K⁴

¹Bharatpur Hospital Nursing College,

²CTEVT Dental Department,

Chitwan, Nepal.

³Nepal Health Research Council,

Kathmandu, Nepal.

⁴Department of Medicine, Bharatpur Hospital,

Chitwan, Nepal.

Corresponding Author

Sudipa Poudel

Bharatpur Hospital Nursing College,

Chitwan, Nepal.

E-mail: sudipa.poudel1@gmail.com

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ABSTRACT

Background

The burden of dental caries among children is increasing due to consumption of sugary substances, poor oral care practices, and inadequate health service utilization. This study aimed to identify the prevalence and associated factors of dental caries among school children. The objectives of the study were to assess the prevalence of dental caries and associated factors among school children of private school of Bharatpur metropolitan city.

Objective

To assess the prevalence of dental caries and associated factors among school children of private school of Bharatpur metropolitan city.

Method

A descriptive cross-sectional study was carried out among 150 children of two different private schools of Chitwan by using multi-stage probability sampling technique. The data was collected from 22nd November 2019 to 4th December 2019. Data were collected by using a semi-structured questionnaire to identify the prevalence of and associated factors of dental caries and decayed, missing and filled Permanent teeth (DMFT) index criteria.

Result

Out of total 150 children, 68% had dental caries. Among them, 64.5 % had caries in deciduous teeth, 17.6 % in permanent teeth and 17.6% had caries on both types of dentition. Only 40.7% of children had received dental check-ups. The mean Decayed, missing and filled primary teeth (DMFT)/ decayed, missing and filled Permanent teeth (DMFT) was 1.91 and 0.54 respectively. 83.3% and 57.1% of children had low severity caries in permanent and deciduous dentition respectively. The educational level, brushing habits, sugar consumption, and snack consumption, bottle feeding at infancy and mother's occupation was found to be associated with dental caries.

Conclusion

The study showed high prevalence of dental caries among school children. Less than 50% of children had a dental checkup in case of dental problems only. Association of dental caries was found with level of education, brushing habits, sugar consumption, snack consumption bottle feeding at infancy and mother's occupation.

KEY WORDS

Children, Dental caries, Prevalence, Severity

INTRODUCTION

Dental caries is a serious multifactorial oral disease that causes demineralization of the tooth's hard tissues and affects more than half of the world's population.¹ Due to the excess consumption of sugary substances, poor oral care practices and inadequate health service utilization the burden of dental caries has been increasing among children.² Owing to the implementation of preventive programs, incidence of dental caries in developed countries are declining whereas the problem is still increasing in the developing countries.³

The Global Burden of Disease Study estimated that oral diseases affected at least 3.58 billion people worldwide, with caries of the permanent teeth being the most prevalent of all conditions assessed. Worldwide, it is estimated that 2.4 billion people suffer from caries of permanent teeth and 486 million children suffer from caries of primary teeth.⁴ World Health Organization reported 60-90% of school children worldwide have experienced caries, and the disease is most prevalent in Asian and Latin American countries.⁵ Despite preventive measures and treatments, developing countries still suffered from high caries incidence.⁶

Despite of increase in prevalence of dental caries among children in Nepal, limited researches regarding prevalence and its associated factors have been carried out in Nepal. Also, there is a paucity of epidemiological data on dental caries among the urban area school children and there has been relatively little data reported concerning the prevalence of dental caries among urban area children. Therefore this study is conducted to identify the prevalence of dental caries and its associated factors among school children so that early interventions could be taken to control dental caries cases.

METHODS

The study was approved from the IRC (IRC No: 005/076/77) of Bharatpur Hospital. A descriptive cross-sectional study was carried out among school children in Bharatpur metropolitan city ward No. 9 and 21 from 22nd November 2019 to 4th December 2019. The children between the age group 6 to 12 years, and studying in grade 1 to 5 were included in this study. The sample size was calculated at 95% confidence interval with 5% allowable error, and 10% non-response rate with the prevalence of dental caries as 62% based on the findings of the previous study conducted by Khanal et al.² The minimum sample size was obtained as 150.

Purposive sampling was done to select the school children from two private schools of Bharatpur metropolitan city ward no. 9 and 21. The study tool was developed based on the extensive literature review and was further validated by subject experts. The semi-structured questionnaire consists of three sections with such as socio-demographic variable,

DMFT/dmft index criteria to identify the prevalence of dental caries, and factors associated with dental caries. The data was entered in Microsoft Excel 2013 and Statistical analysis was done by using SPSS V 21. Descriptive statistic like frequency, mean, median and standard deviation was calculated. 'χ² test' was used to calculate the association between the variables.

Ethical approval was obtained from the institutional review committee (IRC) of Bharatpur hospital. Written consent was taken from the children's primary caretaker. Clinical examination was done by the dentist and the data regarding associated factors were obtained by using a semi-structured questionnaire through face-to-face interviews with children's primary caretakers. Primary caretaker as well as children was well informed about the nature and purpose of this study prior data collection. Confidentiality was maintained by using a separate code number for each participant. The collected data were checked for completeness and accuracy. Descriptive and inferential analysis was done to determine the prevalence of dental caries and factors associated with dental caries among school children.

RESULTS

The study found that majority (80%) of children was of age group 9 to 12 years with mean age as 9.56 (±1.60). Also, majority of children were male. Similarly, majority of children belong to Brahmin and most of the children were Hindu by religion (Table 1).

Table 1. Socio-demographic characteristics of children

Characteristics	Number (n=150)	Percent (%)
Age in years		
6-9	30	20.0
9-12	120	80.0
Mean ±SD= 9.5 ±1.6, Range=(6-12)		
Gender		
Male	87	58.0
Female	63	42.0
Grade		
Grade 1	20	13.3
Grade 2	9	6.0
Grade 3	17	11.3
Grade 4	66	44.0
Grade 5	38	25.3
Ethnicity		
Bhramin / Chhetri	79	52.7
Adhibasi / Janajati	47	31.3
Others (Dalit)	24	16.0
Religion		
Hindu	127	84.7
Buddhism	14	9.3
Christianity	6	4.0
Islam	3	2.0
Total	150	100

Oral Health Behavior of Children

The oral health behavior of school children was assessed which depicts that almost 72% of children brush their teeth regularly. Among them 60.2% children had the habits of brushing teeth once a day. However, two-third children did not brush their teeth regularly (Table 2).

Table 2. Oral health behavior of children

Characteristics	Number (n=150)	Percent (%)
Frequency of brushing teeth habit		
Regularly	108	72
Irregularly	42	28
Regular brushing teeth habits		
One time daily	65	60.2
Two times daily	43	39.8
Toothpaste used by children	150	100
Type of toothpaste		
Non- fluoride	11	7.3
Fluoride	51	34.0
Do not know	88	58.7
Habit of brushing teeth before going to bed		
Yes	51	34.0
No	99	66.0
Interval of changing tooth brush		
2 months	86	57.3
3 months	47	31.3
6 months	12	8.0
More than 6 months	5	3.3
Duration of brushing teeth		
Less than 1 minutes	18	12.0
1 to 2 minutes	80	53.3
More than 2 minutes	52	34.7
Total	150	100

Utilization of dental services

The study revealed that 40.7% of children had a dental check-up for tooth pain, dental caries and oral ulcer respectively (Table 3).

Table 3. Utilization of dental services

Characteristics	Number (n=61)	Percent (%)
Frequency of dental check-up		
1 times	33	54.1
2 times	23	37.7
3 times	2	3.2
≥ 3 times	3	4.9
Reasons for dental check-ups		
Tooth pain	35	57.4
Dental caries	24	39.3
Oral ulcer	2	3.3

Dietary habits of children

It was found that more than half of the children (58.7%) were bottle feed during their infancy period. Also, forty two percent of children were found to consume sweets daily and for half of the children the time of consumption of sweet was found to be between lunch and dinner. Likewise, 90% of the children were found to consume soft drinks daily (Table 4).

Table 4. Dietary habits of children

Characteristics	Number (n=150)	Percent (%)
Bottle feeding practice during infancy	88	58.7
Consumption of sweets		
Daily	63	42.0
Weekly 2-3 times	32	21.3
Sometimes	55	36.7
Time of sweet consumption		
Before lunch	11	7.3
Between lunch and dinner	75	50.0
After lunch	21	14.0
Every time as wish	43	28.7
Snacks consumption		
Daily	56	37.3
Weekly 2-3 times	30	20.0
Sometimes	64	42.7
Time of snacks consumption		
Before lunch	9	6.0
Between lunch and dinner	76	50.7
After dinner	20	13.3
Every time as wish	45	30.0
Soft drinks consumption by children		
Yes	135	90.0
No	15	10.0

Prevalence and severity of dental caries

The findings showed that more than half (68%) of school children had dental caries. Among them, 64.8% had dental caries only in deciduous teeth, 17.6% in permanent teeth and 17.6% had dental caries on both dentition. Similarly, it was found that in total up to 8 deciduous teeth were found to be infected with dental caries. Similarly, for permanent teeth up to 13 were found to be infected with dental caries. The mean dmft/DMFT for deciduous and permanent teeth was found as 2 and 1 respectively (Table 5).

Factors associated with dental caries among school children

The findings depicts that prevalence of dental carries was associated with education of children ($p=0.042$), occupation of mother ($p=0.019$), irregular teeth brushing practices of children ($p=0.012$) and habits of the brushing after a meal ($p=0.014$). Similarly, dental caries was found to

be associated with sweet consumption (p=0.003), snacks consumption (p=0.002) and bottle feeding during infancy (p=0.029) (Table 6).

Table 5. Prevalence and severity of dental caries in permanent and deciduous dentition in children

Characteristics	Number (n=150)	Percent (%)
Dental caries		
Present	102	68.0
Absent	48	32.0
Caries on dentition (n=102)		
Deciduous teeth (DMFT)	66	64.8
Mean ± SD=2±1, Range= (1-8)		
Permanent teeth (DMFT)	18	17.6
Mean ± SD=1±2, Range= (1-13)		
Both deciduous and permanent teeth	18	17.6
Severity of deciduous dentition (n=84)		
Low severity (DMFT > 0)	48	57.1
Moderate severity (DMFT ≥ 4)	27	32.2
High severity (DMFT ≥7)	9	10.7
Severity of permanent dentition (n=36)		
Low severity (DMFT > 0)	30	83.3
Moderate severity (DMFT ≥ 4)	4	11.1
High severity (DMFT ≥ 7)	2	5.6

DISCUSSION

This study aimed to assess the prevalence of dental caries and its associated factors among school children. In this study, majority of school children were aged between 9 to 12 years with mean age 9.5 years which is comparable with the findings from the study done by Joshi et al. in which more than half (57.65%) belonged to age group 9-12 years.⁷ Likewise, more than two third (72%) of children had habit of brushing their teeth regularly and 39.3% of children brushed their tooth twice a day which is almost similar with the study conducted by Prasai and Dixit et al. which revealed that 56% of children brushed their teeth regularly and only 24% reported brushing their teeth twice a day.⁵ However, this finding is in contrasts with the finding of Mannaa et al. which revealed that less than half (47.7%) of children brushed their teeth daily and only 43.9% twice a day.⁸

Despite the availability of different types of fluoridated toothpaste in Nepal, more than half (58.7%) of primary caretakers were unaware whether the toothpaste was fluoridated or not. This finding is supported by Mannaa et al. which showed that third quartile (75%) were unaware about the toothpaste.⁸ Regarding interdental cleaning half of the children (51.3%) used nothing on interdental cleaning which is in contrary to the findings of study carried out at Saudi Arabia where 97.7% children used nothing for interdental cleaning.⁸

Table 6. Association of socio-demographic characteristics, oral behavior and dietary habits with prevalence of dental caries

Characteristics	Dental caries Absent n (%)	Dental caries Present n (%)	χ ²	p-value
Age				
6-9	10(33.3)	20(66.7)	0.031	0.861
9-12	38(31.7)	82(68.3)		
Grade				
Class 1	7(35)	13 (65)	9.89	0.042*
Class 2	3(33.3)	6 (66.7)		
Class 3	9(52.9)	8(47.1)		
Class 4	13(19.7)	53(80.3)		
Class 5	16(42.1)	22(57.9)		
Occupation of mother				
House wife	35(28.0)	90(72.0)	5.51	0.019 *
Working mother	13(52.0)	12(48.0)		
Brushing teeth by children				
Regular	41(38.0)	67(62.0)	6.30	0.012*
Irregular	7(16.7)	35(83.3)		
Habits of the brush after a meal				
No	25(25.3)	74(74.7)	6.09	0.014*
Yes	23(45.1)	28(54.9)		
Type of toothpaste				
Non-fluoride	4(36.4)	7(63.6)	0.59	0.743
Fluoride	18(35.3)	33(64.7)		
Do not know	26(29.5)	62(70.5)		
Sweet Consumption				
Daily	9(15.5)	49(84.5)	11.8	0.003*
Weekly 2-3 times	14(43.8)	18(56.3)		
Sometimes	25(41.7)	35(58.3)		
Snacks consumption				
Daily	11(19.6)	45(80.4)	12.33	0.002*
Weekly 2-3 times	17(56.7)	13(43.3)		
Sometimes	20(31.3)	44(68.8)		
Bottle feeding during infancy				
Yes	22(25)	66(75)	4.7	0.029*
No	26(41.9)	36(58.1)		

*level of significance <0.05

Furthermore, this study depicts that more than half (59.3%) children had never gone for dental checkup which is in contrast with the findings reported by study conducted by Dixit et al. in which 93% of children had never visited the dental clinic leading to 100% untreated caries in absence of affordable health care services.³ In this study, more than half (57.4%) of children had visited the dental clinic for tooth pain, 39.3% for dental caries and 3.3% for oral ulcers which is in contrast with study done by Veiga et al. where 33.2% visited dental clinic in an emergency situation due to toothache.⁹

The findings of the study revealed that less than half (42%) of the children consume sweets daily supportive to study conducted on Kathmandu Jorpati which revealed that 51.6% of children consume sweets daily and more than 3 times a day.³ Likewise, 37.5% of children consume snacks daily which was similar to study conducted by Alhabdan et al. where 26.9% of children consume snacks daily.¹⁰

Majority of children (90%) in this study consumed soft drinks which is comparable with the study carried out in Brazil on factors associated with dental caries showing that 96.5% children consume soft drinks.¹⁰ More than half (58.7%) of children's parents responded that their child had history of bottle feeding at infancy. This finding contradicts the finding conducted in Saudi Arabia by Alhabdan et al. where 94.98% had bottle feeding history.¹¹

Regarding prevalence of dental caries, 68% children had dental caries which was almost similar with the study conducted by the Joshi et al. in which prevalence was obtained as 69.12%.⁷ Furthermore study conducted by Khanal et al. also found similar findings on prevalence of dental caries that is 58.3%.³ Similarly, the study done by Andegiorgish et al. and study conducted by Khawaja Khali also revealed the comparable findings.^{11,12} In contrast to this, the study conducted in North East India by Plaka et al. found the prevalence of dental caries as 36.5% and the study conducted in Nigeria by Onyejaka et al. reported as prevalence of caries was 22.7%.^{13,14} In this study, 64.8% of children had dental caries on deciduous teeth, 17.6% on permanent teeth and 17.6% on both type of teeth. These results were supportive to an epidemiological study carried out at vadodara city by Joshi et al. where higher prevalence of dental caries was higher on deciduous teeth than in permanent teeth.⁷

In deciduous dentition low severity of dental caries was observed in 57.1% children, moderate severity in 32.2% and high severity was observed in 10.7%. The finding of this study is supported by the study conducted by Joshi et al. as low severity of caries was observed in 46.51% children, moderate severity in 39.05% and high severity was observed in 14.44% suggesting low to moderate severity of caries in the majority of children.⁷ In permanent dentition (DMFT) low severity of caries was observed in 83.3% of children, moderate severity in 11.1% and high severity was observed in 5.6%. The finding of this study is well supported by Joshi et al. as low severity of caries was observed in 91.15% children, moderate severity in 8.15%.⁷

Similarly, this study showed an association between dental caries and grade of children which is comparable with study conducted at Dharan by Sigdel et al. which showed association of dental caries with increasing grade.¹⁵ The study showed an association between prevalence of caries and occupation of mother which was similar to study conducted by Alraqiq et al.¹⁶

This study clearly demonstrate that dental caries is associated with brushing habits and history of bottle feeding which is supportive to study by Mannaa et al.^{8,17-19} The habits of consumption of sweets was found to be associated with dental caries which is similar to the study conducted by Alshammary et al. in Saudi Arabia.²⁰

The study only covers private schools of a particular location; hence the findings may not be generalized.

Implications of the study

The finding of this study will be useful to provide the baseline information on the prevalence of dental caries among school children in Chitwan district. It might help family member, health care providers, and public health professionals to be aware about factors associated with dental caries among the children.

CONCLUSION

There is high prevalence of dental caries both in deciduous and permanent teeth among school children. The children's brushing habit, consumption of snacks and sweets, history of bottle feeding at infancy and mother's occupation were identified as factors associated with dental caries among school children. The findings clearly depict the need to aware children about importance of brushing teeth in preventing dental caries. Likewise, parents focused awareness program need to be conducted in order to improve children's habit of consuming sweets and snacks. The concerned authorities need to plan focused actions including public awareness programs and dental screening program for school children and their care taker.

Recommendations

Awareness program on oral hygiene, dietary habits, screening and preventive programs of dental carries might decrease the prevalence of dental caries. A similar study can be replicated on a large sample in order to generalize the findings in larger population. A comparative study can be carried out between government and private school children.

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