

# Prevalence of Dental Caries among School Going Children in Dolakha, Nepal

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## ABSTRACT

### Introduction

There is a significant prevalence and morbidity of dental caries due to a lack of health education and insufficient preventive measures and the health status of students is not satisfactory. A number of oral disorders are linked to chronic diseases, and poor oral health has a major negative impact on overall health. People's everyday lives and general well-being are significantly impacted by pain, issues with eating, chewing, smiling, and communication brought on by missing, discolored, and damaged teeth. The aim of the study was to assess dental caries status among age groups, 3-14 years based on government and private schools.

### Methods

A cross-sectional comparative study done among 377 school going students age 3-15 years. Children from both private and public schools were included in the study. Dental caries status was assessed using the WHO oral health assessment form for children 2013.

### Results

The overall caries prevalence among the study participants was 341 (90.2%). Dental caries varied among age groups. Males scored higher dental caries levels than females. The private school students ( $5.78 \pm 4.69$ ) showed significantly higher levels of dental caries than the government school students ( $5.01 \pm 4.61$ ).

### Conclusions

The caries prevalence is very high in the school children of Dolakha with the highest burden among middle childhood age group with high number of untreated caries which emphasizes the need for further intervention.

**Keywords:** dental caries prevalence; Dolakha district; private and public schools.

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## INTRODUCTION

Dental caries is an irreversible microbial disease of calcified tissue of teeth characterized by demineralization of inorganic portion and destruction of organic substances, which often leads to cavitation.<sup>1</sup> Dietary sugar consumption, salivary flow, fluoride exposure and preventative behavior are risk factors for formation of dental caries.<sup>2</sup> Poor oral health has a major negative impact on overall health. People's everyday lives and general well-being are significantly impacted by pain, issues with eating, chewing, smiling, and communication brought on by missing, discolored, and damaged teeth. Each year, oral illnesses around the world result in lost working hours due to issues at home, at work, and in school.<sup>3</sup>

According to WHO dental caries affects 60-90% of school children worldwide.<sup>4</sup> Center of disease control (CDC) reported untreated dental caries is seen in more than 19% of children and in deciduous dentition it is seen in approximately 41% of children. The school going children of Nepal has higher caries percentage than recommended level of WHO.<sup>5</sup> A study has shown that a high decaying component in both the primary and permanent dentition is linked to missing school days, toothaches, and other impairments of daily life activities.<sup>6</sup> There is no doubt that factors like income, education, and social environment have an impact on eating and dental hygiene practices.<sup>7</sup> Dolakha district is situated in remote mountains where access to oral health care is limited and the population is of low socio-economic conditions. Primary data for planning any oral health program is lacking from this sector, Hence the present study was aimed to find the dental caries prevalence among public and private school children in the age group of 3-14 years.

## METHODS

The cross-sectional study was conducted in Dolakha from March 12, 2023 to May 3,

2023. Ethical clearance was obtained from the Institutional review committee (IRC), Kathmandu University School of Medical Sciences. IRC approval number 34/23. Following ethical approval, approval from various schools were taken to conduct the study. School going children of age 3-15 years were selected for the study. A study conducted by Adhikari et al.<sup>10</sup> showed the prevalence dental caries as 63.83%. By considering this as a prevalence with 95% confidence interval, with 5% margin of error, sample size was determined based on the formula,  $n = z^2 pq / e^2$ , where,  $Z = 1.96$  for 95% confidence interval. Then,  $n = (1.96)^2 * (0.63) * (0.37) / (0.05)^2$   $n = 358$  but this study was conducted among 377. A sample size of 377 of age group 3-15 was selected from four different schools of Dolakha. Stratified random sampling was employed for the selection of the participants. Students who were willing to participate were included in the study, students who had oral conditions which could include bias in their response or hamper their oral hygiene practice were excluded. Students with any physical imparities which could hamper oral hygiene maintenance were also excluded. The study was conducted during the lunch hours of the students in their classrooms. Examination was done a by single qualified examiner in their respective schools with the help of dental explorer and mouth mirror. World Health Organization (WHO) oral health assessment form 2013 was used for recording dentition status. WHO diagnostic criteria for the number of decayed teeth, missing teeth and filled teeth (DMFT and/or dft) was used, when the examiner was in doubt, no caries was recorded. For the analysis, the students were categorized according to their age group, gender and category of school. SPSS 17 was used for data analysis. Tests for normality were conducted using Shapiro Wilk and Kolmogorov-Smirnov (K-S) test. Descriptive statistics, unpaired t-test and ANOVA test were used for comparison of

mean values across groups. Significance level was set at <0.05 for data analysis.

**RESULTS**

The present study had 378 participants. Among these 197 (52.1%) were males and 181 (47.9%) were

female. The majority of the participants were in the age group of 6-10 years, 155(41%) followed by 147 (38.9%) students in the age group of 11-15 years. Private school participants were 220 (58.3%) whereas 158 (41.7%) were from the government as shown in (Table 1).

**Table 1.** Distribution of study participants based on Gender, Age, and Type of School (n=378).

Variables	Frequency (%)
<b>Gender</b>	
Male	197 (52.1%)
Female	181 (47.9%)
<b>Age groups</b>	
2-5	76 (20.1%)
6-10	155 (41%)
11-15	147 (38.9%)
<b>Type of School</b>	
Private	220 (58.3%)
Government	158 (41.7%)

The overall caries prevalence among the study participants was 341 (90.2%). A comparison of caries experience showed that mean caries affecting the males (5.62 + 4.74) was slightly higher than females (5.28 + 4.60), however, these differences were not statistically significant. When compared among ages, the highest caries experience was present in 6-10 years (6.70 + 5.46) followed by 11-15 years (4.93 + 3.88). The lowest was among 2-5 years (3.96 + 3.65). These differences were found to be statistically significant. Multiple comparisons showed significant differences between the mean caries levels of all 3 groups. The private school students

(5.78 + 4.69) showed significantly higher levels of dental caries than the government school students (5.01 + 4.61). These figures are shown in the below (Table 2).

**Table 2.** Descriptives and comparison of Mean caries experience among participants (n=378).

Variables	DMFT+dft (Mean ± SD)	p-value
<b>Gender</b>		
Male	5.62 ± 4.74	0.58
Female	5.28 ± 4.60	
<b>Age groups</b>		
2-5	3.96 ± 3.65	
6-10	6.70 ± 5.46	<0.001*
11-15	4.93 ± 3.88	
<b>Type of school</b>		
Private	5.78 ± 4.69	0.038*
Government	5.01 ± 4.61	

The overall prevalence of dental caries was found to be 341 (90.2%). Caries prevalence was found to be high in all three age groups as shown in (Table 3).

**Table 3.** Prevalence of dental caries among students (n=378).

Dental caries	Frequency	Percentage	95% CI	
			Lower	Upper
Yes	341	90.2	87.2	93.2
No	37	9.8		

The prevalence of dental caries was highest among children of age group 11-15 years (Table 4).

**Table 4.** Dental caries prevalence based on age groups (n=378).

Age groups	Prevalence (%)
2-5	59 (77.6%)
6-10	143 (92.3%)
11-15	139 (94.6%)

## DISCUSSION

The goal as given by WHO and Fédération dentaire internationale (FDI) was to have 50% of the 5–6-year-olds to be free from dental caries. The present study analyzed the prevalence of dental caries among various age groups and school types in the area and found the caries prevalence to be very high among all the age groups. The overall caries prevalence of 90.2% was found to be much higher than the data reported in the National oral health survey.<sup>8</sup> This prevalence is also higher than the desired dental caries prevalence stated in the National oral health policy of Nepal.<sup>9</sup> Similar high prevalence rates were reported by Adhikari et al,<sup>10</sup> Khanal et al.<sup>11</sup> done in various parts of Nepal. The high caries prevalence may be due to the lack of oral health awareness and poor oral hygiene practices as demonstrated by the high mean DMFT+dmf index value of 5.46±4.67. Various studies have been done comparing the caries status of different regions of Nepal. Regardless of urbanization, caries rates have been observed to be high among the study participants. The study done by Dixit et al in Central and Western Nepal showed 67% caries prevalence. Central sites like Kathmandu, Pokhara, Bhaktapur, Lalitpur showed caries prevalence in the range of 60-80%. (Yee,<sup>8</sup> Subedi,Karki,Khanal,Suttagul)<sup>11-14</sup> Various studies have shown that with increasing age the caries experience reduces from middle to late childhood<sup>16</sup> (Adhikari et al,<sup>10</sup> studies quoted in same article), however in the present study the caries rates were almost similar across the age groups which could suggest lack of awareness and reduced focus on oral health among the children of this region. This highlights the need for oral health education programs and use of

fluoridated toothpaste which have been shown to be effective among school children to reduce the incidence of dental caries. (Petersen et al).<sup>21</sup> Type of schools were evaluated for dental caries status to see for possible changes. The present study showed that there is no significant differences among the caries status. Which is in accordance to the studies done in various schools by Subedi et al<sup>18</sup> and Adhikari et al.<sup>16</sup> The present study highlights the burden on disease among schoolchildren of the district. One effective strategy is the use of fluoride in school-based settings. WHO has recommended the use of fluoridated tooth paste where other forms of fluoride delivery are not possible.<sup>16</sup> In a country like Nepal, where centralized water fluoridation is difficult and lack of skilled manpower limits the school water fluoridation, Affordable fluoride toothpaste could be employed for usage with supervised tooth brushing. School teachers could be trained as there is a shortage of dental manpower to work in such rural school settings. Such an intervention can not only reduce caries burden but it helps in improving oral health status as well.<sup>17</sup>

## CONCLUSIONS

The study shows that caries prevalence is very high in the school children of Dolakha in all three age groups, with the highest burden among middle childhood age of 6 to 11 years with significant proportion of the children having untreated caries. The private school students showed significantly higher levels of dental caries than the government school students. The increase in Dental Caries prevalence shows lack of awareness among school going children. Thus, the need of intervention through both preventive and curative approach seems urgent.

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