INTRODUCTION

Oral health is an important component of general health and quality of life, and dental caries possess significant impact on a person’s ability to eat, speak or socialize. Dental caries is the most common chronic infectious disease of oral hard tissues. It varies from place to place as well as among gender and various age groups. Children are the ones who are most commonly afflicted by dental caries. It is still a major health problem in most industrialized countries as the disease affects 60 to 90% of school children and the vast majority of adults. The prevalence of caries on first permanent molar has been reported to be 40.2%, 66.4%, and 75.5% among 6–7, 7–10, and 9–12-year-old children, respectively. Therefore, the purpose of the study was to assess the prevalence of dental caries on the first permanent molars of a children 6 to 14 years of age.

METHODS

A descriptive cross-sectional study was conducted at Department of Pedodontics, Chitwan Medical College. Data for the study was collected from 1st October 2022 till 30th April 2023. The study was conducted among children who visited the pedodontics department. Children aged 6-14 years were included in the study. Medically compromised patients, uncooperative children and who do not wish to be part of study were excluded. The written consent and ascent were taken from both children and parents. The study was conducted after obtaining the Ethical clearance from the Institutional Review Committee of Chitwan Medical College (Ref. CMC-IRC/079/20052).

The sampling method used in this study was the convenience sampling method. The sample size of 270 was calculated using the formula: 
\[ n = \frac{Z^2\hat{p}(1-\hat{p})}{d^2} \]
where, \( \hat{p} = 54.5\% \), \( q = 1-\hat{p} = 45.4\% \), \( d = 6\% \) margin error and \( Z \) at 95% confidence interval.

A convenience sampling technique was used in the study to achieve the sample size. Dental examination was done by the researcher herself. The children were advised to sit in the dental chair and the oral examination was done with the help of a dental mirror and
explorer. The number of carious, missing and filled teeth and surfaces of maxillary and mandibular first permanent molar were recorded using DMFT index.

The data was then entered into SPSS version 26. The data was then analysed using descriptive statistical tests (mean, standard deviation, frequency and percentage). The results were presented in form of table.

RESULTS

A total of 270 children of age group 6-14 years (Mean ± SD: 9.84 ± 2.24 years, median 10 years) participated in the study among which 109 (40.4%) were females and 161 (59.6%) were males (Table 1).

Table 1: Age and gender wise distribution of children

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>161 (59.6%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>109 (40.4%)</td>
</tr>
<tr>
<td>Age (Mean ± S.D.)</td>
<td></td>
<td>9.84 ± 2.24</td>
</tr>
</tbody>
</table>

Table 2 shows the prevalence of dental caries on permanent first molar of children. The prevalence of dental caries of left mandibular first permanent molar was high 108 (40%) among the studied teeth.

Table 2: Prevalence of dental caries on permanent first molars of children (n=270)

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxillary right first permanent molar (16)</td>
<td>72 (26.7)</td>
<td>198 (73.3)</td>
</tr>
<tr>
<td>Maxillary left first permanent molar (26)</td>
<td>78 (28.9)</td>
<td>192 (71.1)</td>
</tr>
<tr>
<td>Mandibular left first permanent molar (36)</td>
<td>108 (40.0)</td>
<td>162 (60.0)</td>
</tr>
<tr>
<td>Mandibular right first permanent molar (46)</td>
<td>100 (37.0)</td>
<td>170 (63.0)</td>
</tr>
<tr>
<td>Total</td>
<td>358 (33.1)</td>
<td>722 (66.9)</td>
</tr>
</tbody>
</table>

DISCUSSION

This study investigated the prevalence of dental caries exclusively in first permanent molars among children aged 6 to 14 years. Since the first permanent molar are the first to erupt in the oral cavity they play a key role in establishing vertical occlusion relationships and exhibit a greater control over the teeth that erupt later behind and in front of them as they are forced to position to the already erupted and in occlusion functioning first molars. Moreover, they are the largest tooth in the oral cavity and bear the maximum occlusal load. Apart from this, since they have the maximum root surface area they are considered to be the best source of anchorage for moving the tooth. The overall oral health of an individual can be predicted by first permanent molars as they are more prone to caries due to their morphological and chronological characteristics. Permanent first molars when lost at an early age because of dental caries negatively affect both the arches and occlusion as well as create periodontal problems.

The DMFT index is used in this study which is one of the simplest and most commonly used indices in epidemiologic surveys of dental caries. It quantifies dental health status based on the number of carious, missing and filled teeth. The index, however, does not provide an accurate description of previous dental care. Nor does it provide information regarding the severity of the carious attack or the indicated treatment.

The prevalence of caries in our study was 33.1%, this is in accordance with a study by Agrawal et al.(2023) i.e. 38.6% and the data reported in 2014 National Oral Health Policy, where 41% of permanent dentition was found to be carious in children of age 12 to 13. Whereas Khapung et al. found that half of the children had carious first permanent molar 54.5%. A study done in Saudi Arabia by Al-Samadani KH et al. (2012) reported a caries prevalence of 75.5%, finding a higher rate than the present study. In Saudi Arabia, 6-9-year-old school girls had carious first permanent molars, which is lower than the results of the present study. Caries in schoolchildren in Romania (44.0%), Jordan (66.0%), and India (55.3%) were more common than in Nepal.

The study also found that the lower jaw was more affected by dental caries than the upper jaw, which is in accordance with the results reported by Vanderas et al. and Prabhu P et al. The reason for the mandibular first permanent molar exhibiting higher DMFT may be due to the location, morphology and the eruption time. Mandibular first permanent molar has more number of pits and supplementary grooves which can act as food-retentive areas promoting caries. The other factor could be that in the majority of children mandibular first permanent molar erupts slightly earlier than its maxillary counterpart, hence mandibular first permanent molar is exposed to the oral environment for a longer period, making it more susceptible to caries than the maxillary first permanent molar.

If the data on the prevalence of caries is collected in the different regions of the nation it becomes easier to know about the oral health status of the overall population of the whole country. Depending upon the finding of national data we can educate the people about the causes of caries and play a vital role in the prevention of the diseases. The preventive measures for the prevention of caries are - the application of fissure sealant, use of remineralizing agents, fluoride, oral hygiene instructions, motivation and reinforcement to children regarding maintenance of oral hygiene and regular visits to the dentist.

The study was conducted at Chitwan Medical College, thus the results obtained cannot be generalized.

CONCLUSION

Oral health is an important component of general health and quality of life, with dental caries impacting a person’s ability to eat, speak, or socialize. In the above study, the overall
prevalence of dental caries is found to be higher and more in mandibular arch. Our effort to control the disease of dental caries is still not very effective in society. We have to play a key role in the control of dental caries through school and community oral health awareness programs.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

REFERENCES:


