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Prevalence of Malocclusion in Eastern Nepal

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ABSTRACT

Background

Malocclusion is the abnormal relationship between upper jaw and lower jaw. It is third most common prevalent oral pathology. Different environment may contribute to malocclusion, so treatment may also vary likewise. Determining the prevalence of malocclusion of different geographic region, ethnic groups and gender helps to identify the distribution of malocclusion, which in turn aids in preventive treatments. This study is an attempt to assess the prevalence of malocclusion among the individuals of eastern Nepal.

Methods

Data collection was done by direct observation of the patients using probe and mouth mirror. Descriptive cross-sectional study method was used in this research. The malocclusion based on Angle's classification, overjet, overbite, open bite, crowding, spacing and cross bites were recorded.

Results

A total of 429 patients were included in the study. Among them, 190 (44.3%) were males and 239 (55.7%) were females with male: female ratio 1:1.3. The mean age of patients was found to be 26.92 ±10.61years with the age range of 12- 65 years. Angle's class I (75.1%) was the most prevalent malocclusion whereas Angle's class III was observed in 16.6% of total samples followed by Angle's class II (8.4%).

Conclusions

The most prevalent malocclusion in our study is Angle's class I in both male and female patients. Crowding was the most prevalent occlusal traits observed whereas open bite was the least.

Keywords: angle's classification; eastern; malocclusion; Nepal.

INTRODUCTION

Malocclusion is any occlusion deviated from normal. It is the improper relationship of maxillary and mandibular teeth and may cause impairment of oral health, functions, esthetics. It may also affect the psychology of the individual. The prevalence of malocclusion varies among different populations of the world. This variation is attributed to genetic, racial and environmental aspects.[1-5] Even though it is not life threating, it may affect the patient's social life and their psychological status. Malocclusion is the third most frequent oral disorders, alongside tooth decay and periodontic disease. According to World Health Organisation (WHO), common oral diseases should be subjected to regular epidemiological surveys for treatment planning and providing preventive and corrective treatments.[6] It is important to collect all the relevant data of the community so that preventive measures can be applied to prevent further irregularities in the developing dentofacial complex, to create awareness among the community and also for the treatment planning of already developed or developing malocclusion.

METHODS

A descriptive cross-sectional study was conducted at village of Solukhumbu district during the dental camp. The study was conducted from June 2023 to September 2023 after the ethical approval from

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Institutional Review Committee (Ref. 71/23), Kathmandu University School of Medical Sciences. The following formula was used to calculate the sample size considering the prevalence rate as 68.2% (Sherchan P et al).[7]

$n = Z^2 \times p \times q / e^2 = (1.96)^2 \times 0.682 \times 0.312 / (0.05)^2$
$= 333.26 \quad = 334$

Where, n = required sample size, z = 1.96 for Confidence Interval at 95%, p = prevalence, which is 68.2%, at 95% CI , e = margin of error as 5%.

The minimum sample size is 334. However, as there were large number of patients in the camp, thus the current study was conducted among 429 patients. Only the participants who came to the dental camp and agreed to participate in the study were included. Informed verbal consent was taken from all the participants before starting the examination.

Patients visiting the camp and agreeing to the participate in study with all permanent first molar present were included in this study. while Patients who did not agree for the study, patients whose one or more first molars were absent, patients with grossly decayed first molars, patients with craniofacial anomalies or presence of any other systemic disease, patients with previous history of orthodontic treatment. The participants were evaluated according to their molar relation, overjet, overbite and crossbite. Clinical examination of the all patients were done with the help of mouth mirror, probe and a metal scale. All the parameters required for the examination were evaluated by a single examiner and measurements were noted. Molar relationship was recorded based on Angle's system of classification. Molar relationship was grouped as Class I, Class II, and Class III. Overjet and overbite were noted. Overjet between 1-2 millimetres (mm) was considered as normal, more than 2 mm was considered as increased. Overbite between one to three mm was considered as normal, more than three mm was considered as increased and less than one mm was considered as decreased. Reversed overjet was recorded as anterior cross bite. Absence or presence of crossbite was recorded.

Data analysis was performed using Microsoft Excel sheet and the distribution for occurrence of different malocclusion traits was determined on the basis of sex and age. Frequency and percentage were obtained for descriptive analysis.

RESULTS

A total of 429 patients were included in the study. Among them, 190 (44.3%) were males and 239 (55.7%) were females with male: female ratio 1:1.3 (Table 1). The mean age of patients was found to be 26.92 ±10.61 years with the age range of 12- 65 years. Of the total patients, Angle's class I, class II and class III occlusion were seen in 322 (75.1%), 36 (8.4%) and 71 (16.6%) respectively (Table 1).

Table 1. Frequency distribution based on gender and pattern of malocclusion.

Variables	Frequency (%)
Gender	
Male	190(44.3)
Female	239(55.7)
Angles classification of malocclusion	
Class I	322(75.1)
Class II	36(8.4)
Class III	71(16.6)

Out of 190 males, 150 (78.9%) showed class I molar relation on right side. Whereas class II and class III were seen only on 16 (8.4%) and 24 (12.6%) patients respectively. In case of females, 188 (78.7%) showed class I relation on right side whereas class II and class III were seen on 15(6.3%) and 36 (15.1%) patients respectively (Table 2).

Table 2. Comparison of malocclusion pattern between male and female on right side.

Class	Male Frequency(%)	Female Frequency (%)
I	150 (78.9)	188 (78.7)
II	16 (8.4)	15 (6.3)
III	24 (12.6)	36 (15.1)

On left side, in case of males; class I, class II and class III were seen on 155 (81.6%), 12 (6.3%) and 23 (12.1%) patients respectively. Whereas out of 239 females; class I, class II and class III were seen on 186 (77.8%), 12 (5%) and 41 (17.2%) patients respectively (Table 3).

Table 3. Comparison of malocclusion pattern between male and female on left side.		
Class	**Male (%)**	**Female (%)**
I	155 (81.6)	186 (77.8)
II	12 (6.3)	12 (5)
III	23 (12.1)	41 (17.2)

About 90 (21%) patients showed normal dentition. Majority of the patients (21.9%) presented with crowding. Cross bite, deep bite, over jet, spacing and open bite were note in 16.1%, 15.4%, 10.5%, 10%, and 5.1% patients respectively (Table 4).

Table 4. Frequency distribution based on occlusal traits	
Variables	**Frequency (%)**
Crowding	94(21.9)
Normal	90 (21)
Cross-bite	69(16.1)
Deep-bite	66(15.4)
Over-jet	45(10.5)
Spacing	43(10)
Open-bite	22(5.1)

DISCUSSION

The present study was conducted at Solukhumbu district involving three villages: Dorpu village, Kharikhola and Manekharka, where the main population are Rai and Sherpa who are referred as Adivasi Janajati (indigenous population). These groups mainly live in the hill and mountain areas of Nepal and belong to mainly Tibeto-Burmese group.[8] Studies from literature has shown higher prevalence of several oral disorders among the geographically isolated indigenous population.[9] Our study involves a total of 429 patients with the mean age of is 26.92 ±10.61 years.Majority of the patients were females (55.7%) compared to males (44.3%). The results of our study showed that Angle's class I malocclusion (75.1%) was the commonest type followed by Class III (16.6%) and Class II (7.2%). About 2/3rd of the total male and female patients had Class I malocclusion on both right and left side followed by class III and class II malocclusion. One of the studies from Mexico[9] conducted in indigenous population reported the prevalence of class III malocclusion to be much higher compared to other population which is in accordance to our study. Similar to our findings, several other studies done in Nepal [10-12] have reported class I malocclusion to be the most prevalent type. According to the study by Sherchan P[7] conducted among camp patients in two districts of Gandaki province, Nepal, class III was noted to be the second most common malocclusion which was in accordance to our study. However, many other studies[10-12] reported class II as second most common malocclusion which was in contrast to the present study. This could be due to the difference in sampling population, geographical distribution and ethnic group of the study subject as our study involves the indigenous people of Solukhumbu district and not the general population. Previous studies conducted in different population [5,12,15-16] reported class I as predominant malocclusion followed by class II which is in contrast to our study where class III was second predominant malocclusion. Difference in the finding may be attributed to age of the sampling population since their study was done in school children[12,15,16] whereas majority of our study subjects were adults. The enhanced growth of the mandible during late adolescence may contribute to the higher prevalence of class III malocclusion as seen in our study. We noted that majority of patients had crowding followed by crossbite, deep bite, over jet, spacing and open bite. According to the study done by Abu et al[15], crowding was found to be more prevalent than other occlusal malocclusion which was in accordance to our study. Ahangar Atashi MH[12] and Singh PS et al[16] in their study reported that deep bite was more prevalent occlusal trait which is in contrast to our findings. This may be due to difference in geographical pattern and ethnic groups. Thus, in present study we observed that, class I malocclusion was the most prevalent type followed by class III and class II malocclusion. However, the results couldn't be generalized as it represents samples from few villages of Solukhumbu districts only. Further studies with larger sample size involving generalized population are required to validate our findings.

CONCLUSIONS

Having the idea about prevalence of malocclusion

helps in the treatment planning and interception of malocclusion. Class I malocclusion was found to be the most common malocclusion among both genders irrespective of the sides. Class III was the second most common malocclusion followed by class II.

Conflict of interest: None

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