Research Article

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Prevalence of Malocclusion among Camp Patients in Two Districts of Gandaki Province, Nepal

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ABSTRACT

Introduction: Malocclusion is considered to be the third most prevalent oral pathology. Malocclusion can cause dental caries, periodontal diseases, aesthetic as well as functional problems. It can vary according to ethnicity, genetic, or environmental factors. There is a need to determine prevalence of malocclusion among different locations and ethnicities to help in determining the distribution of different malocclusion and planning awareness and interceptive programmes.

Objective: To determine the prevalence of malocclusion among individuals of Gandaki province based on Angle's classification of malocclusion along with various occlusal traits. To compare malocclusion between male and female and between the two locations of Gandaki province.

Materials and Method: A cross-sectional descriptive study was conducted at villages Kobang-8 of Mustang and Namjung-9 of Gorkha from January to October of 2018. Molar relation, overjet, overbite, crossbite, rotation, spacing, and crowding were recorded. All data were collected by a single dentist and analysed with Microsoft Excel. The data collected were presented as frequency, percentage, mean, and standard deviations.

Result: Among total 190 participants, Angle's Class I, II, and III were observed in 130 (68.42%), 18 (9.48%), and 42 (22.10%) respectively. Observed mean age was 30.69±13.75 years with 118 (62.11%) females and 140 (73.68%) Mongoloid forming the majority.

Conclusion: Class III malocclusion was seen to be more prevalent compared to other studies conducted in Nepal and abroad, which could be due to the ethnicity of the participants which was mostly Mongoloids.

Keywords: Dental health survey; malocclusion; nepal; prevalence; race factor.

INTRODUCTION

Malocclusion can be defined as improper relationship between the maxillary and mandibular teeth or jaws as a whole.[1] Prevalence of malocclusion can vary among different populations. It can depend upon ethnicity, genetic factors, or environmental factors. Various studies done in different geographic locations have yielded different prevalence rates of malocclusion.[2] There is a need to determine prevalence of malocclusion among male and

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female and among different geographic locations for epidemiological purposes. Malocclusion is considered to be the third most prevalent oral pathologies after dental caries and periodontal diseases. 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.[3] Knowledge about the distribution of different malocclusion can help a dentist, especially an orthodontist to better understand the problems existing in a particular geographic location and help in planning awareness and interceptive programmes.[3] The aim of this study was to determine the prevalence of malocclusion among population from western Nepal and distribution of malocclusion between male and female participants. This study also assessed malocclusion between samples of two districts in western Nepal.

MATERIAL AND METHOD

A cross-sectional descriptive study was conducted at village Kobang-8 of Mustang district on the occasion of "Barha Barsha Mela" (12-year festival) where a medical camp was organised on 9th, 10th and 11th of January 2018 and at village Namjung-9 of Gorkha district where a medical camp was organised on 24th, 25th, and 26th of October 2018. Ethical clearance for this study was taken from the institutional review committee (Ref. 08052017) of Kathmandu Medical College and Teaching Hospital. A total of 190 participants were included in the study utilising convenience sampling technique. The sample size calculation was done by using formula: $n=Z^2pq/e^2=188.92$. Here, Z=1.96 at 95% confidence interval; p=prevalence of condition=0.595 taken from Piya et al.[4]; q=1-p; e=margin of error=0.07 (7%). 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. All the participants were between the age group of 16 to 60 years and had all four first molars present.

The participants were evaluated on the basis of their molar relation, overjet, overbite, crowding, spacing, missing, rotation and soft tissue profile. Clinical examination of the patients was carried out using mouth mirror and probe and a metal ruler. A single examiner evaluated all the parameters required for the examination and measurements. The participants were grouped into Aryan and Mongoloid race based on their surnames.

Sagittal molar relationship was recorded based on the Angle's classification. Molar relationship was categorised into Class I, Class II, and Class III. Angle's Class I was characterised by mesiobuccal cusp of maxillary first permanent molar occluding in the buccal groove of mandibular first permanent molar. Angle's Class II was characterised by distobuccal cusp of maxillary first permanent molar occluding in the buccal groove of mandibular first permanent molar. Class III malocclusion was characterised by mesiobuccal cusp of maxillary permanent first molar occluding in the interdental space between mandibular permanent first and second molars.

Overjet is the horizontal relationship between maxillary and mandibular central incisors. Overjet between one to three millimetres (mm) was considered as normal, more than three mm was considered as increased and less than one mm was considered as edge to edge or anterior crossbite. Overbite is the vertical relationship between maxillary and mandibular central incisors. Overbite between one to three mm was considered as normal, more than three mm was considered as increased and less than one mm as decreased. The maxillary teeth are supposed to overlap the mandibular teeth in both anterior and posterior arch. If the maxillary teeth are in palatal relationship to the mandibular teeth it was considered as crossbite. Absence or presence of crossbite was recorded.

Spacing was assessed in the upper and lower arch. Gap of more than two mm in the arch was considered as spacing. Crowding was recorded if there was more than two mm of overlapping between adjacent teeth. Absence of any teeth in the arch mesial to the first molars were recorded as missing. Rotation of any teeth within its axis was recorded as rotation. The soft tissue profile was measured with the help of two metal scales from the Glabella to the Nasolabial angle and from Subnasale to soft tissue Pogonion. If the two scales formed a straight line

it was recorded as normal profile. If the two scales formed an obtuse angle away from the face, it was recorded as convex profile, and if the two scales formed an acute angle away from the face, it was recorded as concave profile.[1,5,6]

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 location. Frequency and percentage was obtained for descriptive analysis.

RESULT

Among the total participants (190) for this study, 72 (37.89%) were male and 118 (62.11%) were females with the mean age of the participants 30.69±13.75 years. Of the total sample, 142 (74.74%) were from Mustang and 48 (25.26%) were from Gorkha. On the basis of their surnames they were grouped into Mongoloid (140, 73.68%) and Aryan (50, 26.31%).

Angle's Class I malocclusion was seen in 130 (68.42%) of the participants, forming the majority (Table 1). Normal horizontal relationship of the incisors (overjet) was seen in 77 (40.53%) of the participants, whereas normal vertical relationship of the incisors (overbite) was seen in 106 (55.79%) of the participants (Table 2).

On comparing the occlusal parameters between male and female, there was no significant proportional difference in relation to molar relationship, overjet, overbite, crossbite, crowding, spacing, missing teeth, or profile (Table 3). However, the difference was significant in rotation between male and female where more female (49, 41.52%) had rotated tooth compared to male (19, 26.38%) participants.

Table 1: Pattern of malocclusion.

Angle's classification of malocclusion	n (%)
Class I	130 (68.42)
Class II	18 (9.48)
Class III	42 (22.10)
Total	190 (100)

Table 2: Occlusal traits (N=190).

Variables	n (%)
Normal overjet	77 (40.53)
Increased overjet	42 (22.10)
Decreased overjet	71 (37.37)
Normal overbite	106 (55.79)
Reduced overbite	55 (28.95)
Deep bite	29 (15.26)
Crossbite	34 (17.89)
Spacing	33 (17.36)
Crowding	82 (43.15)
Missing	50 (26.31)
Convex profile	14 (7.37)
Straight profile	142 (74.74)
Concave profile	34 (17.89)

Table 3: Comparison of occlusal traits between male and female, n (%).

Variables	Male n (%)	Female n (%)
Class I	47 (65.28)	83 (70.34)
Class II	8 (11.11)	10 (8.47)
Class III	17 (23.61)	25 (21.19)
Normal overjet	28 (38.89)	49 (41.53)
Increased overjet	20 (27.78)	22 (18.64)
Decreased overjet	24 (33.33)	47 (39.83)
Normal overbite	39 (54.17)	67 (56.78)
Reduced overbite	23 (31.94)	32 (27.12)
Deep bite	10 (13.89)	19 (16.10)
Crossbite	11 (15.27)	23 (19.49)
Spacing	11 (15.27)	22 (18.64)
Crowding	27 (37.50)	55 (46.61)
Missing	24 (33.33)	26 (22.03)
Rotation	19 (26.38)	49 (41.52)

Table 4: Comparison of occlusal traits between two locations, n (%).

Variables	Mustang n (%)	Gorkha n (%)
Class I	104 (73.24)	26 (54.17)
Class II	15 (10.56)	3 (6.25)
Class III	23 (16.20)	19 (39.58)
Normal overjet	52 (36.62)	25 (52.08)
Increased overjet	29 (20.42)	13 (27.08)
Decreased overjet	61 (42.96)	10 (20.84)
Normal overbite	77 (54.23)	29 (60.42)
Reduced overbite	48 (33.80)	7 (14.58)
Deep bite	17 (11.97)	12 (25.00)
Crossbite	19 (13.38)	15 (31.25)
Spacing	22 (15.49)	11 (22.91)
Crowding	48 (33.80)	34 (70.83)
Missing	44 (30.98)	6 (12.50)
Rotation	52 (36.61)	16 (33.33)

On comparing malocclusion among participants from Mustang and Gorkha, according to sex, 53 (37.32%) of the samples were males and 89 (62.68%) females in Mustang; and 19 (39.58%) males and 29 (60.42%) females in Gorkha. It was observed that Class I molar relation was seen in 104 (73.24%) in Mustang and 26 (54.17%) in Gorkha (Table 4). Decreased overjet was observed to be 61 (42.96%) in Mustang and 10 (20.84%) in Gorkha. Reduced overbite was seen in 48 (33.80%) in Mustang and in 7 (14.58%) in Gorkha. Crossbite was more prevalent in Gorkha (15, 31.25%) in comparison to Mustang (19, 13.38%). Rotation, spacing, and profile were similar in both the places (Table 4).

DISCUSSION

There have been many studies in Nepal and abroad to find the prevalence of malocclusion among different ethnicities, races, or genders. The participants for this study were selected while conducting a medical camp in two villages of Gandaki Province. Only patients coming to the dental department of the medical camp were included. The study found that 130 (68.42%) had Class I, 18 (9.48%) had Class II and 42 (22.10%) had Class III malocclusion.

Alhammadi et al. conducted a systematic review on global distribution of malocclusion, and found that global distribution of Class I, Class II, and Class III on permanent dentition was 74.7%, 19.56% and 5.93% respectively.[7] The Class I malocclusion based on race was higher in Africans (89.44%) but equivalent among Caucasians (71.61%) and Mongoloids (74.87%). Class II malocclusion based on race, it was higher in Caucasians (22.9%) lowest in Africans (6.76%) and in-between among Mongoloids (14.14%). Class III Malocclusion was seen most in Mongoloids (9.63%) least in Africans (3.8%) and in-between among Caucasians (5.92%).[7]

Prevalence study done among school children in Leh region, by Singh et al. found Class I, Class II, and Class III malocclusion among 87.4%, 1.4% and 2.5% of the participants.[8] Similar study conducted by Das et al. in various schools of Bangalore, India found Class I, Class II, and Class III malocclusion in 61.6%, 8.4%, and 0.6%.[9] These studies were done in school setting where the age of the participants were less than 18 years whereas the current study was done in camp patients with mean age of 30.69±13.75 years. The difference in Class III molar relationship could be due to change in the growth of the mandible during late adolescent years.

Similarly, Piya et al. found Class I, II, and III malocclusions in 59.5%, 26.7%, and 13.7% of the participants.[4] Sharma et al. found prevalence of Class I, II, and III malocclusion in 62.28%, 29.4%, and 8.2%.[10] The results of the present study imparts important knowledge with regard to the prevalence of Class II and Class III malocclusion, compared to the above-mentioned studies which were conducted in hospital setting on participants seeking orthodontic treatment. General population was not considered in those studies, which could be one of the reasons for the difference. The age group taken for the study done by Piya et al.[4] was between six to 35 years whereas the mean age for the study done by Sharma et al.[10] was 18.75 years. The participants were highly motivated wherein they visited the orthodontic department of respective colleges to seek orthodontic treatment. So there is less chance for change in their molar relationship due to various factors like missing tooth mesial to the first molar or proximal caries leading to change

in the arch length-tooth material discrepancies. The study conducted by Shrestha et al. found Class I, II, and III malocclusion among 59%, 25%, and 16%.[11] They further subdivided the study sample based on their ethnicities into Aryans and Janjati groups and found that Class II was more prevalent among Indo-Aryans and Class III more prevalent among Janjatis.[11] Baral found Class I, II, and III malocclusion in 71.5%, 24.6% and 4.1%.[12] He also compared Aryan and Mongoloid population of Nepal having malocclusion and found that 61.3% of Aryans and 64% of Mongoloid population had Class I malocclusion, 30.5% Aryans and 20.4% Mongoloid population had Class II malocclusion, and 8.2% Aryan and 15.6% Mongoloid had Class III malocclusion.[12,13] Karki et al. did a study on distribution of malocclusion among Tibetan adolescents found Angle's Class I, II, and III malocclusion in 52.90%, 5.10%, and 9.4%.[14] These studies were done in Kathmandu or in the Terai where the major ethnicity of the population are Dravidians or Aryans, so the prevalence is more similar with it. The difference in Class II and Class III molar relationship with present study could be due to the location.

The population monograph of Nepal 2014, an analytical report of the census 2011 reported 106 languages and dialects, of which the Indo-Aryan language family constituted 79% and Tibeto-Burmese 18.4%.[15,16] Of the Tibeto-Burmese group, 5.2% Tamang, 3.4% Newar, 3.4% Magar, 2.2% Rai-Kiranti, 1.5% Gurung, and 1.4% Limbu constituted the majority. The main population in Mustang district consists of Gurung, Thakali, Jhopa, Magar, Kami, Tamang, and in Gorkha consists of Gurung, Magar, Tamang, and Ghale.[15,16] These ethnic group are referred as Adivasi Janajati (indigenous population). These groups mainly live in the hill and mountain areas of Nepal and are the indigenous groups belonging to mainly Tibeto-Burmese group.[17]

The ethnic groups (Janjatis), comprise mainly of Mongoloid stock, speak various Tibeto-Burman languages, such as Tamang, Gurung, Newar, and Magar and profess religions such as Buddhism, Animism, and Kirant beside Hinduism. The studies conducted among Mongoloid population has observed a higher number of Class III molar relation. With most of the participants being Janjati (140, 74%), this could be the reason for the high number of Class III in this study.

The limitations of this study could be that the present study is a camp-based study done in two villages of Gandaki province, so the results do not represent the prevalence of malocclusion of the entire Gandaki Province. The selection criteria were only samples with medical or dental problems, so general population was not considered. The number of samples could be increased in future studies. The study also does not consider individual malocclusions based on true ethnicity which was determined solely on the basis of their surnames.

CONCLUSION

In the current study done during camps conducted at two villages of Mustang and Gorkha districts of western Nepal, the prevalence of Class I, II, and III was found to be 68.42%, 9.48%, and 22.10%. Between male and female, the difference in the rotation was observed. Between the samples from Mustang and Gorkha, there was a difference in Class II, Class III, reduced overjet, reduced overbite, deep bite, crossbite, crowding, and missing teeth. The number of Class III patients were more in both the location compared to previous studies conducted in Nepal and abroad, which could be due to the ethnicity of the participants which was mostly Mongoloids (140, 73.68%).

It is recommended that national surveys including various ethnic groups of Nepal with larger sample size be done for proper planning and treatment of orthodontic patients.

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Conflict of Interest: None.

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