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Prevalence of malocclusion and orthodontic treatment need amongst 12-15 years old school-going children using Index of Orthodontic Treatment Need (IOTN) of Khudel Village, Madhya Pradesh, Indore

Poonam Tomar Rana¹, Kuldeep Singh Rana², Kratika Mishra^{3,*}¹Dept. of Public Health Dentistry, Index Institute of Dental Sciences, Indore, Madhya Pradesh, India²Dept. of Conservative Dentistry and Endodontics, Government College of Dentistry, Indore, Madhya Pradesh, India³Dept. of Orthodontics and Dentofacial Orthopaedics, Index Institute of Dental Sciences, Indore, Madhya Pradesh, India

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ABSTRACT

Background: Epidemiology of malocclusion and assessment of orthodontic treatment needs are of great importance in many countries and are included in numerous national-level surveys. The aim of orthodontic treatment is to achieve the best possible occlusion within the framework of function, stability, and esthetics.

Objective: The present study aims to assess the prevalence of malocclusion and Orthodontic treatment needs of 12–15-year-old school-going children using the Index of Orthodontic Treatment Need (IOTN) of Khudel Village, Madhya Pradesh, Indore.

Materials and Methods: 300 school children (180 girls and 120 boys) of government schools of age group 12-15-year-old were examined. Type 3 examination method was used to record the orthodontic treatment need was using the Index of Orthodontic Treatment Needs (IOTN).

Result: Result showed that only 38.6% had no need of treatment, (23.3%) were assigned grade 2 of IOTN Dental Health Component (DHC) score, (14.3%) required borderline treatment, (12.3%) of the total population required severe orthodontic treatment that is score 4. Extreme treatment is required by (11.3%) of the study population.

Conclusion: There seems to be an inconsistency in the proportion of children needing orthodontic treatment on esthetic and dental health basis. It indicates a general lack of awareness among the school children about the severity of their existing malocclusion. More awareness programs and camps need to be conducted regarding spread of awareness of orthodontic treatment needs.

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1. Introduction

The severity of malocclusion and its influence on the oral cavity and facial aesthetics has a great concern, so the demand for orthodontic treatment is increasing in most countries including India. In recent years, evaluating malocclusion and the related requirements for orthodontic treatment has received a wealth of research consideration.¹

Epidemiology of malocclusion and assessment of orthodontic treatment needs are of great importance in many countries and are included in numerous national level surveys.^{2,3}

There are many benefits of orthodontic treatment like prevention of tissue damage, correction of aesthetic components, improved oral health, and enhanced psychosocial well-being.⁴ After orthodontic rehabilitation, patients reported better body reflection and self-confidence related to appearance.⁵ The individual with malocclusion

* Corresponding author.

E-mail address: kratikamishra1990@gmail.com (K. Mishra).

may feel shy in social life, may lose career opportunities, and might feel shame about their dental appearance.

The aim of orthodontic treatment is to achieve the best possible occlusion within the framework of function, stability, and esthetics.

Malocclusion can occur due to a number of causes like as genetic or by environmental factors. Environmental factors like metabolism, drug-induced, prenatal influences from maternal diet, injury or trauma, any infections, and birth injury also play an important role in determining the fate of tooth placement.⁶ Local factors such as adverse or deleterious oral habits and alterations in tooth shape, their number, and position in the arches are responsible for malocclusion.

World Health Organization says the main oral diseases should be subjected to periodic epidemiologic surveys. These assessments are compulsory to plan sufficient treatment facilities and develop adequate training programs for respective specialists.⁷

Malocclusions can be assessed with various methods^{8–10} but not one has gained universal acceptance.

A number of different indices have been used for assessing orthodontic treatment needs. According to a literature review, Shaw et al.'s proposed Index of Orthodontic Treatment Need (IOTN) is one of the most regularly used index,¹¹ that is user-friendly and reliable.^{12,13}

Despite the fact that a large number of studies on the prevalence of malocclusion in diverse populations have been available, its prevalence has been the question for so many years. Virtually, the problems are encountered due to the fact that malocclusion is not considered as a disease but a physical variation which may or may not be associated with pathological conditions. Hence, it has been difficult to obtain the desired international standardization for the registration of malocclusion.¹¹

Even though data on orthodontic awareness and treatment needs are very limited, malocclusion is unquestionably a public health alarm in young populations. There are few studies to estimate the percentage of the population that requires orthodontic treatment in India.

In a diverse country like India, a large variation in the prevalence of malocclusion exists in varying regions of our country. This can be due to variations in traditions, nutritional grades, religious beliefs, and dietary habits.

Epidemiologically, the prevalence of malocclusion varies from nation to nation and between different age and gender groups. The prevalence of malocclusion in India varies from 20% to 43%.^{14–16}

Epidemiological studies on occlusion and malocclusion not only help in orthodontic treatment planning and evaluation of dental health services but also propose a valid research tool for ascertaining the operation of distinct environmental and genetic factors in the etiology of

malocclusion.¹⁷

The present study aims to assess the prevalence of malocclusion and Orthodontic treatment needs of 12-15-year-old school-going children of Khudel Village, Madhya Pradesh, Indore.

2. Materials and Methods

A descriptive cross-sectional study was conducted among 12-to-15-year school children studying in government schools of Khudel, Village, Madhya Pradesh, Indore, 12- to 15-year-olds children were selected because this age group was anticipated to be in permanent dentition.

300 school children (180 girls and 120 boys) of government schools of age group 12-15-year-old were examined. Consent was obtained from all parents before recording data. The subjects from the selected schools were included only if their chronological age was 12–15 years. Those who were undergoing orthodontic treatment or completed orthodontic treatment earlier, any facial trauma, cleft, syndrome, or suffering from any other systemic diseases were excluded from the study.

Examination of the selected students was done by the examiner himself within the premises of their school. Examinations were conducted under available natural daylight with the students seated on a chair. Type 3 examination method was used to record the findings. Artificial illumination was also used at times when required. Basic infection control procedures in hand Hygiene and personal protective equipment were adopted. The instruments and supplies used were cheek retractors, enamel bowls, kidney trays, disposable mouth masks, disposable gloves, and towels. The examiner and recording assistant were trained prior to the commencement of the study to ensure reliability.

A team of 3 orthodontists was asked to help in the screening of all the children and the whole dental history which included oral habits, family history and childhood diseases, past dental and medical history, and other details like Angle's classification of malocclusion, was recorded.

The DHC of the IOTN was graded in five categories for each patient. Patients were examined for missing teeth, overjet, crossbite, displacement of contact points, and overbites.

3. Results

Among the 300 participants in the present study 180 were girls and 120 are boys. The distributions of the ages (Table 2) 27.3 % were 12 years of age, 26.6% were 13 years of age, 21.6% were 14 years of age and 24.3% were 15 years of age. In terms of the molar relationship, (Table 3) a class I malocclusion prevalence of 47% was found, 22% and 15.3% for class II division 1 malocclusion and class II division 2 malocclusion was found respectively

Table 1: Gender distribution of the study participants.

Sex	Frequency (n)	Percentage
Female	180	60%
Male	120	40%
Total	300	

Table 2: Distribution of 300 students related to chronological age

Age	Girls		Boys		Total	
	n	%	n	%	n	%
12	48	26.6%	34	28.3%	82	27.3
13	50	27.7%	30	25%	80	26.6
14	39	20.5%	26	21.6%	65	21.6
15	43	23.8%	30	25%	73	24.3
Total		180		120		300

Table 3: Distribution of Malocclusion amongst girls and boys according to Angle's classification of malocclusion.

Type of Malocclusion	Girls	Boys	Total	Percentage
Class I Malocclusion	87	54	141	47%
Class II, Division I Malocclusion	38	28	66	22%
Class II, Division II Malocclusion	25	21	46	15.3%
Class III Malocclusion	30	17	47	15.6%
Total	180	120	300	

Table 4: Prevalence of grade of Dental HealthComponent (DHC)

DHC grade	Need for treatment	Girls	Boys	Total %
Grade I	No treatment required	72	44	116(38.6%)
Grade II	Little or no treatment need	48	22	70(23.3%)
Grade III	Moderate or Borderline	26	17	43(14.3%)
Grade IV	Severe treatment need	18	19	37(12.3%)
Grade V	Extreme treatment need	16	18	34(11.3%)
Total		180	120	

Table 5: Assessment of Aesthetic Component (AC) of IOTN

AC Grade	Need for treatment	Girls	Boys	Total %
Grade 1	Most aesthetic arrangement of the dentition.	71	41	112(37.3%)
Grade 1-4	Little or no treatment required	47	24	71(23.6%)
Grade 5-7	Moderate or Borderline	37	26	63(21%)
Grade 8-10	Definite treatment required	25	29	54(18%)
Total		180	120	

and 15.6% showed class III molar relationship. Table 4 presents the distribution of Index of orthodontic treatment need IOTN in the study population. Only 38.6% had no need of treatment, (23.3%) were assigned grade 2 of IOTN DHC score, (14.3%) required borderline treatment, (12.3%) of the total population required severe orthodontic treatment that is score 4. Extreme treatment is required by (11.3%) of the study population.

Table 5 shows that determining the perceived need for orthodontic treatment in the AC(Aesthetic Component) of the IOTN, revealed that 18 % of students required definite treatment, 21% of the total students required moderate or borderline orthodontic treatment, 23.6% students required

little or no treatment, while most aesthetic arrangement of the dentition were found in 37.3% of the total population.

4. Discussion

The present study was designed to assess the prevalence of malocclusion and orthodontic treatment need in 12–15-year-old school going children using Index of Orthodontic Treatment Need (IOTN) of Khudel Village, Madhya Pradesh, Indore. Thus, providing baseline data about malocclusion in order to help health professional in providing the essential services in the future. To determine the need for orthodontic treatment, the Index of Orthodontic Treatment Need (IOTN) was used in this study. The Index

incorporates a Dental Health Component (DHC) and an Aesthetic Component (AC). Dental Health Component of IOTN is universally applauded for determining the need of orthodontic treatment. Researches around the world have used IOTN to determine the need of malocclusion treatment in different population groups.^{18–20}

A review conducted on malocclusion studies in India exposed wide variation in the prevalence, which can be accredited to lack of uniformity in data collection and variations in the indices used for assessing the severity of malocclusion. The prevalence of malocclusion had been found to vary with the different population, origin and race.

In the present study, 14.3 % of the participants were in need of orthodontic treatment (Moderate or Borderline), Severe treatment need 37(12.3%), Extreme treatment need 34 (11.3%), similar study conducted by Chestnutt et al., and Van Wyk et al.^{21,22} according to which 35% of 12-year-olds and 21% of 15-year-olds had definite need for orthodontic treatment. On the contrary in an exclusive study on the orthodontic treatment need in school students of Dubai City, it was found that children belonging to India had a higher need of orthodontic treatment compared with those belonging to UAE, Iran, Syria, and Yemen.²³

In Iran, Hedayati et al. obtained similar results (18.4%) in a sample aged between 11 and 14 years, same as Puertes-Fernández et al. in a sample of 12-year-old children in the Western Sahara (18.1%).^{24,25}

However, studies done by Singh et al.,¹⁴ showed 68.4% need orthodontic treatment. Higher percentages of malocclusion from these studies may be due to different age of the sample, racial variations differences in lifestyle, variation in growth and facial skeleton.

Based on Angles classification a class I malocclusion was found in 47%, class II malocclusion was found in 37.3% and 15.6% showed class III molar relationship. Same prevalence results were reported by Al‑Emran et al.,²⁶ Murshid et al.,²⁷ and Aldrees.²⁸ Disagreement was there with Albarakati et al. who reported that the most common type of malocclusion was Class I, followed by Class III and then Class II malocclusion.²⁹

In the present study, Aesthetic component for IOTN, the definite orthodontic treatment need is required by 18% of the population similar result has been reported in other studies.^{10,30}

According to Tausche et al, the AC of IOTN alone unsuccessful to identify any children require orthodontic treatment.³¹

5. Conclusion

There was no significant difference in the distribution of malocclusion classes between girls and boys neither was any significant difference in the treatment need for both genders. The study suggests the need for conducting regular dental checkup camps to spread the awareness regarding

the deleterious effects of malocclusion. The IOTN data give support of early orthodontic treatment need and is also suitable for planning public dental health resources. There seems to be an inconsistency in the proportion of children needing orthodontic treatment on esthetic and dental health basis. It indicates a general lack of awareness among the schoolchildren about the severity of their existing malocclusion. More awareness programs and camps need to be conducted regarding spread of awareness of orthodontic treatment needs.

6. Source of Funding

None.

7. Conflict of Interest

None.

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Author biography

Poonam Tomar Rana, Reader

Kuldeep Singh Rana, Lecturer

Kratika Mishra, Reader

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