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# Prevalence and Pattern of Malocclusion among Urban and Rural School-Age Children: A Cross-Sectional Study

Syed Ahmed*[1], Md Masud Rana[2], Monwoar Kabir[3], Md Sumon Reza[4], Delower Hosen[5]

[1] *Associate Professor and Head, Department of Dentistry, Faridpur Medical College, Faridpur*
[2] *Associate Professor, Department of Orthodontics, MH Samorita Medical College, Dhaka*
[3] *Assistant Professor (Dentistry), Dental Unit, Chittagong Medical College, Chittagong*
[4] *Junior Consultant, Rajshahi Medical College Hospital, Rajshahi*
[5] *Junior Consultant, Faridpur Medical College Hospital, Faridpur*

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***Corresponding Author:**
Dr. Syed Ahmed



**ABSTRACT:** ***Background:*** Malocclusion is a common dental problem among school-age children and can adversely affect oral function, aesthetics, and psychosocial well-being. The prevalence and type of malocclusion may vary with age, gender, and geographic location. ***Objective:*** To determine the prevalence and pattern of malocclusion among urban and rural school-aged children (6–15 years) in Faridpur District ***Materials and Methods:*** A cross-sectional study was conducted on 150 school children aged 6–15 years in Faridpur, including 69 boys and 81 girls from both urban and rural areas. Data were collected through clinical examination based on Angle's classification. Statistical analysis was performed using chi-square tests to determine the significance of gender and area differences. A p-value <0.05 was considered statistically significant. ***Results:*** Among the 150 participants, 95 (63.33%) had malocclusion and 55 (36.67%) had normal occlusion. Malocclusion was slightly more prevalent in girls (64.20%) than in boys (62.32%), with the difference being statistically significant (p = 0.041). Class I malocclusion was the most common (60.67%), followed by Class II (29.33%) and Class III (10.00%). Increased overbite (57.33%) and dental crowding (53.33%) were the most frequently observed malocclusion traits. Other traits included increased overjet (29.33%), spacing (27.33%), crossbite (11.33%), and open bite (5.33%). Comparison with Indian and Pakistani studies showed similarity in trends, particularly with Indian data. ***Conclusion:*** The study reveals a high prevalence of malocclusion among school-aged children in Faridpur, with a dominance of Class I malocclusion and traits such as increased overbite and crowding. Girls showed a slightly higher prevalence than boys.

**Keywords:** Malocclusion, Increased Overjet, Spacing, Crossbite, Open Bite.

## INTRODUCTION

Physical appearance, particularly facial aesthetics and a confident smile, plays a crucial role in shaping an individual's self-esteem, social behavior, and interpersonal relationships. Orthodontics provides children with the opportunity to attain not only functional occlusion but also enhanced appearance, thereby improving their quality of life [1]. Malocclusion, meaning "bad bite," is defined as a misalignment between the dental arches or anomalies in tooth position, number, size, or developmental placement beyond normal limits [2]. It is not considered a disease but a developmental condition reflecting biological variation and diversity in craniofacial growth [3]. The etiology of malocclusion is multifactorial, involving genetic predisposition, environmental influences, and local factors such as oral habits and premature loss of deciduous teeth [4]. Although malocclusion does not typically cause pain, it can lead to psychosocial problems, including poor dentofacial aesthetics and reduced self-confidence, and may result in functional issues such as traumatic occlusion and speech difficulty [5]. Globally, malocclusion is considered the second most common dental problem in children, following dental caries [6]. Despite its prevalence, malocclusion often receives less attention, particularly in developing countries like Bangladesh, where the healthcare system prioritizes symptomatic conditions like caries

and periodontal disease. Furthermore, access to orthodontic care remains limited in rural areas, with most services being concentrated in urban centers and private clinics [7]. Several studies have demonstrated significant variation in the prevalence of malocclusion between rural and urban populations and between genders. For example, a study in India reported a higher prevalence in urban (20.8%) compared to rural children (14.8%) and more among girls than boys (21.8% vs. 13.2%) (8). Conversely, research from Jammu and Kashmir found higher prevalence in rural areas (62.3%) than urban ones (55.3%) [9]. A study from Peshawar reported similar trends, with higher malocclusion rates among rural girls (72.73%) compared to rural boys (50.67%) and urban girls (67.21%) compared to urban boys (44.20%) [10]. The most frequently observed malocclusion traits include Angle's Class I malocclusion and dental crowding, while Class III is typically least prevalent [11]. However, regional differences exist, as some studies in Jordan and Saudi Arabia found Class II or normal occlusions to be more common [12,13]. This study aims to determine the prevalence of malocclusion among 8–12-year-old schoolchildren in both urban and rural areas of Faridpur district, Bangladesh. Understanding the distribution of malocclusion in this age group will help guide early orthodontic intervention, promote awareness, and improve access to care during the mixed dentition period—when corrective measures are most effective.

## MATERIALS AND METHODS

A descriptive cross-sectional study was conducted by the Department of Dentistry, Faridpur Medical College Hospital, among 150 school-aged children (8–12 years) from urban and rural areas of Faridpur, Bangladesh. Four schools (two urban, two rural) were selected using stratified random sampling. Participants were selected by random sampling based on inclusion criteria: fully erupted first permanent molars, no ongoing orthodontic treatment, and willingness to participate. Children with craniofacial anomalies, mental disabilities, or unwillingness (self or guardian) were excluded. Data were collected using a pre-tested structured questionnaire through face-to-face interviews and clinical oral examinations. Examinations were performed using disposable diagnostic tools (mirror, probe, scale) under natural daylight, without radiographs. Angle's classification was used for malocclusion assessment. Measurements included overjet, overbite, open bite, crossbite, crowding, and spacing. Oral health education was provided to all participants. Data were recorded on structured forms, entered into SPSS (version 25.0), and checked for completeness and accuracy before final analysis.

## RESULTS

**Table 1: Sex wise distribution of malocclusion of school age children**

| Occlusion | Sex | | Total n (%) | p value |
|---|---|---|---|---|
| | Boys n = 69(%) | Girls n =81(%) | | |
| Malocclusion | 43 (62.32) | 52 (64.20) | 95 | 0.041[s] |
| Normal | 26 (35.80) | 29 (35.80) | 55 | |
| Total | 69 (100) | 81 (100) | 150 | |

s= significant

P value reached from chi square test

Out of a total of 150 school-age children examined, 69 were boys and 81 were girls. Among the boys, 43 (62.32%) were found to have malocclusion, while 26 (37.68%) had normal occlusion. Among the girls, 52 (64.20%) had malocclusion and 29 (35.80%) had normal occlusion. Overall, 95 (63.33%) children exhibited malocclusion, while 55 (36.67%) had normal occlusion. Although the prevalence of malocclusion was slightly higher in girls (64.20%) compared to boys (62.32%), the difference was found to be statistically significant (p = 0.041), indicating a meaningful association between sex and the presence of malocclusion in this study population

**Table 2: Frequency of malocclusion in school age children**

| Angle's class | Number | Percentage |
|---|---|---|
| Class I | 91 | 60.67 |
| Class II | 44 | 29.33 |
| Class III | 15 | 10.00 |
| **Total** | 150 | 100.00 |

Among the 150 school-age children examined, Class I malocclusion was the most prevalent, observed in 91 children (60.67%). Class II malocclusion was present in 44 children (29.33%), while Class III malocclusion was the least common, found in only 15 children (10.00%). These findings indicate that Class I malocclusion is the dominant type among the study population, followed by Class II and Class III. The distribution reflects a typical pattern of malocclusion observed in mixed dentition age groups.

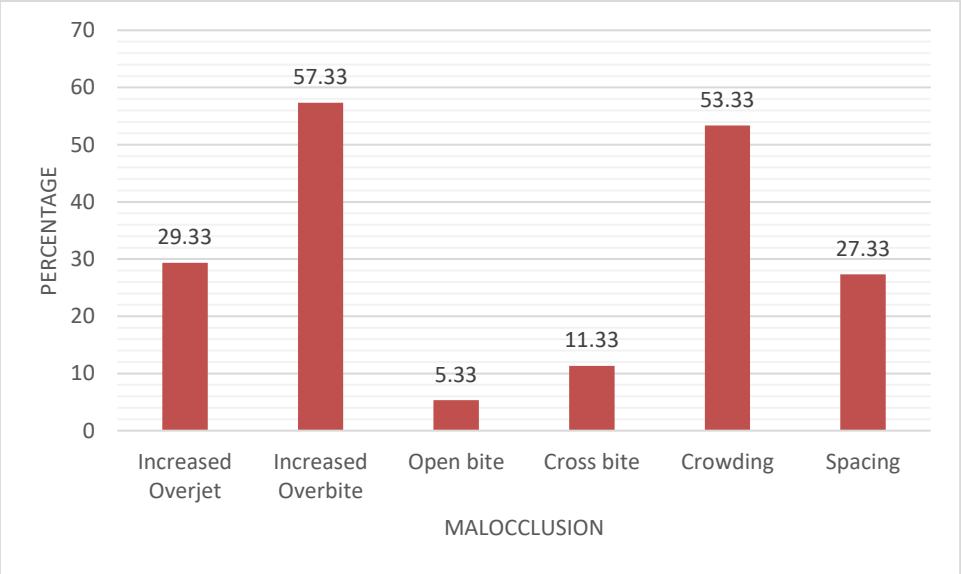


**Figure 1: Distribution of malocclusion in school age children of the study subjects**

Figure shows in the study population, various types of malocclusion traits were identified with differing frequencies. Increased overbite was the most commonly observed trait, affecting 57.33% of the children. Crowding was also highly prevalent, found in 53.33% of the participants. Increased overjet was present in 29.33%, while spacing between teeth was noted in 27.33% of cases. Less common findings included crossbite, observed in 11.33%, and open bite, which was seen in only 5.33% of the children. These results highlight that increased overbite and dental crowding are the most frequent malocclusion traits in this age group, indicating a potential need for early orthodontic evaluation and intervention.

## DISCUSSION

Out of a total of 150 school-age children examined, 69 were boys and 81 were girls. Among the boys, 43 (62.32%) were found to have malocclusion, while 26 (37.68%) had normal occlusion. Among the girls, 52 (64.20%) had malocclusion and 29 (35.80%) had normal occlusion. Overall, 95 (63.33%) children exhibited malocclusion, while 55 (36.67%) had normal occlusion. Although the prevalence of malocclusion was slightly higher in girls (64.20%) compared to boys (62.32%), the difference was found to be statistically significant ($p = 0.041$), indicating a meaningful association between sex and the presence of malocclusion in this study population. This statement was similar with an Indian study by Suma *et al*., where malocclusion was recorded more prevalent in urban school children(20.8%) than rural (14.8%) [8].Similarly the results of this study were also in agreement with that of Agarwal *et al*., who reported that malocclusion

was widely spread among population of Karnataka state(South India), with greater prevalence in urban population than rural [14]. The result of this study were different from a study by Khan *et al*. , the prevalence of malocclusion in rural school children was higher than urban in Peshawar district [10] .The results of this study were in agreement with the study of Khalid *et al*., who reported greater prevalence of malocclusion in rural (62.3%) than urban (55.3%) So, the prevalence of malocclusion varies from rural to urban areas in different populations and vice versa [9].The results of this study were in agreement with the study by Khalid *et al*., who reported greater prevalence of malocclusion was more in girls than boys in Jammu and Kashmir, school children [9].This statement also similar to regarding prevalence of malocclusion in girls and boys. Among the 150 school-age children examined, Class I malocclusion was the most prevalent, observed in 91 children (60.67%). Class II malocclusion was present in 44 children (29.33%), while Class III malocclusion was the least common, found in only 15 children (10.00%). These findings indicate that Class I malocclusion is the dominant type among the study population, followed by Class II and Class III.

The distribution reflects a typical pattern of malocclusion observed in mixed dentition age groups. The result of this study regarding the most common type of malocclusion were in agreement with a study carried out in Bhopal city by who observed that Angle class I was the most common prevalent malocclusion (52.0%), similarly the result of a study among 2,400 adolescents in Karnataka state, India to define difference in malocclusion status in urban and rural population by Kaur *et al*. reported Angle's class I was the most prevalent malocclusion(89.45% ) [15].But the results of this study were contraindicated by Sundareswaran *et al*. who reported Angles class II was the most commonly occurring malocclusion in north Jordanian school children [16]. In present study showed that figure shows in the study population, various types of malocclusion traits were identified with differing frequencies. Increased overbite was the most commonly observed trait, affecting 57.33% of the children. Crowding was also highly prevalent, found in 53.33% of the participants. Increased overjet was present in 29.33%, while spacing between teeth was noted in 27.33% of cases. Less common findings included crossbite, observed in 11.33%, and open bite, which was seen in only 5.33% of the children. These results highlight that increased overbite and dental crowding are the most frequent malocclusion traits in this age group, indicating a potential need for early orthodontic evaluation and intervention. An Indian study by Kaur *et al*. reported excessive overjet was seen in 33 .71%% [15]. The difference between urban and rural population was statistically significant ($P$ = 0.000) with urban population having more of increased overjet that result is agreement with our findings. However, Khan *et al*. reported that the distribution of increased overjet were more in rural (28.21%) than urban(18.18%) among school children of Peshawar [10]. This statement was different from our study. In an Indian study by Kaur *et al*. reported deep-bite was seen in 35.97% of total sample with no statistically significant difference between urban and rural population ($P$ = 0.083) [15].

The result of this study were different from Khan *et al*., study who reported that the distribution of increased over bite in rural school children (24.36%) were more than in Urban(14.69%) of Peshawar district [10]. But the result of study was different from the study of Khan *et al*. [10]. The distribution of open bite in school children of Peshawar district were more in rural 10.26% than Urban (23.78%). A similar study reported spacing (10.89%), the prevalence of spacing is half as common as crowding which is in support of study. In the present study 21.4 % had spacing, which is in agreement with the study conducted by Kaboré *et al*., In the Indian population with 26% spacing on upper and lower arch [17]. In contrast a higher prevalence was observed by Another study is attributed due to para functional habit such as thumb sucking, mouth breathing and tongue thrusting. Fsifis *et al*. reported the distribution of various traits of malocclusion in rural school children were spacing 11.54% while in urban 12.59% of Peshawar district [18]. In this study most of the results were similar with the results of. They did the survey in India. The current study will help to determine the prevalence of malocclusion in urban and rural school-age children during their mixed dentition period for the prevention of malocclusion. They might also be benefitted by creating an awareness program among them to have an orthodontic treatment just from an early age. So that higher correction can be given early to school age children.

## CONCLUSION

The present study demonstrates a high prevalence of malocclusion (63.33%) among school-age children in Faridpur, with a slightly higher rate in girls compared to boys, and Class I malocclusion being the most common type. Increased overbite and dental crowding were identified as the most frequent malocclusion traits. These results emphasize the need for early detection, preventive strategies, and orthodontic awareness programs targeting school children, particularly during the mixed dentition period. Community-based screening and timely orthodontic referrals could help reduce long-term oral health complications and improve the quality of life in growing children.

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