PREVALENCE OF MALOCCLUSION IN STUDENTS OF KALINYAMAT KULON 3 PRIMARY SCHOOL, MARGADANA DISTRICT, TEGAL CITY

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ABSTRACT

Background: Malocclusion is a deviation in the alignment of teeth on the dental arch, leading to dental and oral health problems. Malocclusion can occur in both mixed and permanent dentitions. The causes of malocclusion vary, including genetic factors and environmental factors such as bad habits. Public awareness regarding bad habits and general oral health care is inadequate in coastal areas. This study aims to determine the prevalence of malocclusion among students at SD Kalinyamat Kulon 3, located in the Margadana District, Tegal City.

Method: The research was an observational descriptive study using total sampling. The sample size in this study was 71 respondents. Angle's Classification of Malocclusion was used to assess each sample.

Outcome: The results showed a prevalence of 58% for Angle Class I Malocclusion, 38% for Angle Class II Malocclusion, and 4% for Angle Class III Malocclusion. The data distribution by gender showed that 42.25% of females and 57.75% of males exhibit malocclusion.

Conclusion: This study concluded that Angle Class I Malocclusion has the highest prevalence among students.

INTRODUCTION

Malocclusion is a condition of misaligned teeth or jaw relationships during centric occlusion. Malocclusion is a condition of misalignment of teeth that can cause various oral health problems. Mixed dentition and permanent dentition can experience malocclusion, which is influenced by various factors, namely genetic factors, environment, and bad habits. Genetic factors have an essential role in the etiology of malocclusion. Class III malocclusion is often associated with MYO1H gene polymorphisms and an increased risk of prognathic mandible.[1]

Research in Indonesia shows that around 80% of the population experiences malocclusion.[2] A study conducted by Dayataka et al. (2019) reported that 96.7% of students at SMP Negeri 1 Cimahi City experienced malocclusion.[3] Similarly, Utari and Putri (2019) found that 61% of students at SMP Muhammadiyah 3 Yogyakarta required malocclusion treatment.[4] However, to date, no studies have examined the prevalence of malocclusion in Central Java Province, particularly in Tegal City.

Environmental factors that are considered secondary to genetic factors contribute to the development of malocclusion, such as thumb sucking, tongue protrusion, and mouth breathing.[5-6] These kinds of bad habits can cause functional and aesthetic problems. Malocclusion can cause various health problems, including mastication, phonation, and psychosocial issues such as low self-esteem and social anxiety.[8]

Dental development and occlusion enter the mixed dentition stage at 6 to 12 years, replacing deciduous teeth with permanent teeth.[9] Children with malocclusion often lack the incentive to seek treatment, as school-age children typically exhibit little concern for dental care; thus, parental involvement is essential for their growth and development.[10] Research shows that parents are crucial in forming children's oral health literacy. Parents are accountable for promoting and preventing their children's dental health. Parents' awareness of oral health affects the oral health behaviors of their family members.[11] This condition is relevant in Indonesia, where beliefs and habits influence children's dental care-seeking behavior.[12] Mothers' knowledge of malocclusion shows that educational interventions are targeted to bridge the gap between urban and rural areas.[13] A lack of understanding about the severity of malocclusion and awareness of orthodontic treatment also leads to the individual not understanding the importance of orthodontic care as soon as possible to prevent worsening dental health and other supporting tissues.[14]

Tegal City, located in Central Java province, has an interesting and growing demographic. The number of significant population growth trends every year in Tegal City. There are several health centers in Margadana District, but the ratio of dentists remains insufficient, resulting in limited access to dental care. The primary challenge is the lack of public awareness regarding oral dental health; numerous parents remain unaware of the long-term consequences of their children's dental issues. The utilization of referral services from school examinations to the health center is inadequate despite suggestions from the examiner.[15] This study aims to determine the prevalence of malocclusion in primary school students at Kalinyamat Kulon 3, Margadana District, Tegal City.

RESEARCH METHOD

Data Collection

This research design is a cross-sectional study. The study was conducted at SD Kalinyamat Kulon 3, Margadana District, Tegal City. The population in this study consists of all students at SD Kalinyamat Kulon 3 Margadana, Tegal City. The target population in this study is 71 students. The research sample is all students from SD Kalinyamat Kulon 3 Margadana, Tegal City. The sampling technique used is total sampling with inclusion and exclusion criteria, resulting in a sample of 71 students.

The inclusion criteria for this study were: children aged 6-12 years, the upper and lower first molars were fully erupted, and parents of the students agreed to informed consent. The exclusion criteria are children currently undergoing orthodontic treatment and children who were absent from study. The implementation of this research involved preparation and research stages. The preparation stage required three-months and included a preliminary survey, obtaining research permits, securing ethical approval from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta, Indonesia (Ethical Clearance No. 161/EC-KEPK FKIK UMY/V/2025), aligning perspectives among operators, and obtaining research permits from SD Kalinyamat Kulon 3 Margadana, Tegal City. The research stages are collecting subjects based on inclusion and exclusion criteria, preparing research tools and materials, collecting data and identities from research subjects, including name, gender, age, and obtaining informed consent from parents, and conducting clinical examinations to determine the classification of malocclusion.

This study used an intraoral examination method conducted by dental students and general practitioners who had undergone perception alignment and calibration to assess dental conditions based on Angle's malocclusion criteria. The children were asked to bite comfortably as if eating and were instructed to swallow. Angle Class I Malocclusion is characterized by the mesiobuccal cusp of the upper permanent first molar residing in the buccal groove of the lower permanent first molar. Angle Class II malocclusion is defined by the mesiobuccal cusp of the upper permanent first molar being positioned between the first molar and the second premolar of the lower jaw or more mesial to the buccal groove. Angle Class III malocclusion is characterized by the mesiobuccal cusp of the upper permanent first molar being positioned between the first molar and the second molar of the lower jaw.

Data Analysis

A descriptive overview of malocclusion prevalence among the 71 students is presented in tabular form, with data distributed by Angle classification, gender, and age. The research data were analyzed using descriptive statistical analysis. Descriptive data of the research results are presented in tables.

RESEARCH FINDING

This study included 71 children who met the inclusion criteria, consisting of 41 males (57.75%) and 30 females (42.25%).

Table 1. Frequency Distribution of Malocclusion Prevalence Among Primary School Students of Kalinyamat Kulon 3, Tegal City

Classification of Malocclusion	Number of subjects	Prevalence
Class I	41	58%
Class II	27	38%
Class III	3	4%

Based on Table 1. it was found that the total diagnosis of Angle class I malocclusion classification was 41 children, with a prevalence of 58%. The total number of Angle class II malocclusions was 27 children, with a prevalence of 38%. The number of Angle class III malocclusions was 3 children, with a prevalence of 4%.

Table 2. Frequency Distribution of Malocclusion Prevalence Based on Age Among Primary School Students of Kalinyamat Kulon 3, Tegal City

	Age						Total
	<8 Years	8 Years	9 Years	10 Years	11 Years	>11 Years	
Class I	0 0%	9 22,0%	10 24,4%	16 39,0%	5 12,2%	1 2,4%	41 100%
Class II	1 3,7%	4 14,9%	6 22,2%	9 33,3%	6 22,2%	1 3,7%	27 100%
Class III	0 0%	0 0%	1 33,3%	2 66,7%	0 0%	0 0%	3 100%
Total	1 1,4%	13 18,3%	17 23,9%	27 38,1%	11 15,5%	2 2,8%	71 100%

Table 2. indicates that the largest prevalence of malocclusion occurs at age 10 years, with class I malocclusion affecting 16 children (39.0%), class II malocclusion affecting 9 children (33.3%), and class III malocclusion affecting 2 children (66.7%).

Table 3. Frequency Distribution of Malocclusion Prevalence Based on Gender Among Primary School Students of Kalinyamat Kulon 3, Tegal City

Classification of Malocclusion	Gender		Total
	Male	Female	
Class I	24 58,5%	17 41,5%	41 100%
Class II	16 59,3%	11 40,7%	27 100%
Class III	1 33,3%	2 66,7%	3 100%
Total	41 57,7%	30 42,3	71 100%

Table 3. shows that the prevalence of children with class I malocclusion is 24 males (58.5%) and 17 females (41.5%). The prevalence of children with class II malocclusion is 16 males (59.3%) and 11 females (40.7%). The prevalence of children with class III malocclusion is one male (33.3%) and 2 females (66.7%).

DISCUSSION

The study was conducted on students of SD Kalinyamat Kulon 3, Margadana District, Tegal City, with the number of respondents as many as 71 children who had met the inclusion criteria. The results of this study revealed that 41 children (58%) were diagnosed with class I malocclusion, the number of diagnoses of class II angle malocclusion was 27 children with a prevalence of 38%, and the total diagnosis of class III angle malocclusion was 3 children with a prevalence of 4%. The prevalence of class I angle malocclusion was the most common malocclusion, followed by class II angle

malocclusion and the lowest class III angle malocclusion. This finding is supported by the results of research by AL-Awadi et al. (2020) which states that the prevalence of class I malocclusion (70.4%) is the most common compared to class II angle malocclusion (9.5%) and class III angle malocclusion (1.1%) in primary school students. This finding is also consistent with a study by Alwadei S et al. (2023) which revealed that class I angle malocclusion is the main proportion of malocclusion found in 58.8% of the population of children aged 6-12 years who have been studied.

Based on Table 2. the prevalence of malocclusion is most common among children aged 10 years, with 16 children (39.0%) classified as having class I malocclusion, 9 children (33.3%) with class II malocclusion, and 2 children (6.7%) exhibiting class III malocclusion. The malocclusion level in children can generally be caused by genetic factors related to jawbone development and environmental factors, such as premature loss of primary teeth, which may lead to abnormalities in the eruption and alignment of permanent teeth.[18] Bad habits such as mouth breathing, thumb sucking, and tongue thrusting can also contribute to malocclusion in children.[19]

Mouth breathing can induce muscle imbalances that may result in alterations to oral and craniofacial structures. Children who breathe through their mouths exhibit reduced tongue pressure, which can lead to compression of the upper teeth and constriction of the maxillary dental arch.[20] Prolonged thumb sucking can exert pressure on the jaw and developing dentition. This detrimental practice can disrupt the dental eruption process, resulting in delayed tooth eruption and deformities.[21] The forward migration of the tongue between the incisors may impede eruption and result in an anterior open bite.[22] Research conducted by Zakirulla M et al. (2020) on children aged 7-13 years shows that the prevalence of malocclusion associated with detrimental oral habits significantly influences the incidence of malocclusion. Bad oral habits such as mouth breathing, thumb sucking, and tongue thrusting significantly contribute to malocclusion. The dental program must collaborate with schoolteachers to identify at-risk children and provide counselling to break habits within the school. Meanwhile, encouraging parents at home to perform simple monthly checks by looking for misaligned bites, persistent teeth, or open bites to seek professional advice if there are concerns, thus strengthening school screening efforts. The implications of this research can be used for initial and routine screening of malocclusion. Integrate orthodontic screening into school health policies that mandate annual dental checkups, including an assessment of malocclusion.

The results of this study indicate that malocclusion can occur in males and females. According to Table 3, the total prevalence of malocclusion in males is greater than in females. A subsequent investigation by Mai W et al. (2024) also showed similar results, where the prevalence of malocclusion in males was significantly greater (60.9%) compared to females (55.5%) among the total participants examined. On the other hand, according to the results of a study by Tanni FT et al. (2021) conducted

on children aged 8-12 years, malocclusion was significantly more common in females than males in both urban and rural areas. The high prevalence of malocclusion can be associated with the educational background of the child's parents. Parents with less than a college education exhibit a significantly higher incidence of malocclusion in children compared to those whose parents had a college degree. Aljehani DK et al. (2022) reported that most parents with higher educational qualifications had better awareness and understanding of dental and oral health, as well as early malocclusion in children.

The limitations of this study include a restricted number of respondents due to constraints in time, location, and access to the research setting. Furthermore, the study did not examine respondents' habits and oral health literacy through questionnaires distributed to their parents, which limited the ability to further elaborate on these aspects.

CONCLUSION

The incidence of malocclusion among primary school students at Kalinyamat Kulon 3, Margadana District, Tegal City, was highest for Class I Angle malocclusion at 58%, followed by Class II Angle malocclusion at 38%, and Class III Angle malocclusion at 4%, as the lowest prevalence. Malocclusion in elementary school children aged 6-12 years is common. Malocclusion screening activities should be carried out regularly to determine the incidence of malocclusion in children of that age.

ACKNOWLEDGMENTS

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