Indonesian Journal of Dental Medicine
Volume 6 Issue 2 2023; 66-69

Research Report

Knowledge enhancement about preventive orthodontic treatment for malocclusion and stunting in elementary school children after community empowerment

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ABSTRACT

Background: Nutritional insufficiency and stunting during infant growth and development also causes a delay in the ossification centers and may lead to poor skeletal and dental forms resulted in malocclusion. Early interceptive orthodontics can eliminate or reduce the severity of a developing malocclusion, the complexity of orthodontic treatment, the overall treatment time, and the cost. Proper oral and dental health knowledge and a favorable attitude toward oral and dental health are critical in preventing numerous dental issues such as malocclusion. **Purpose:** The aim of this community empowerment is to enhance the knowledge of preventive orthodontic treatment for malocclusion and stunting in elementary school children. **Methods:** The data was collected at Miftahul Ulum Melirang's *Madrasah* Ibtidaiyah, or elementary school, in Melirang Village, Bungah District, Gresik, East Java. For the community empowerment program assessment, participants were requested to fill out a Google form for the pre- and post-test to identify the enhancement of knowledge about or preventative orthodontic treatment for malocclusion and stunting in primary school children. **Results:** The majority of the community empowerment participants understood the presentation on oral and dental health empowerment. The post-test percentage was greater (91.5%) than the pre-test rate (53.75%). **Conclusion:** The dental and oral health empowerment program about preventive orthodontics, malocclusion, and stunting was effectively completed, enhancing the knowledge level of elementary school children.

Keywords: Dentistry; Medicine; Stunting; Malocclusion; Children Health

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INTRODUCTION

Among oral diseases, dental malocclusions have the third-greatest prevalence. In primary, mixed, and permanent dentition, the occlusion is examined. The majority of orthodontic patients are treated during their early permanent teeth. Early diagnosis of dental irregularities is critical for avoiding difficulties and can provide both short- and long-term advantages. Epidemiological statistics on malocclusion prevalence are a significant determinant in planning optimal orthodontic therapy. Dentists are responsible for recognizing, diagnosing, treating, or referring abnormalities. Previous research found that the prevalence of malocclusions ranges from 11% to 93%.[1]

Malocclusion is a widespread dental issue that affects afflicted people to varying degrees. Many variables, including inherited and environmental influences, lead to the abnormality in dentition. Dental caries, pulpal and periapical lesions, dental trauma, developmental abnormalities, and oral habits are the most frequent dental disorders in children that are significantly associated with malocclusion. To reduce the negative effects of these disorders on dentition, pediatric dental clinics manage oral health in the early infancy stage.[2] Because of the global high frequency of malocclusion and its early beginning throughout infancy, policymakers, as well as pediatric doctors and dentists, should develop policies and implement therapeutic measures to prevent malocclusion in children.[3]

The ratio of oral poor behaviors, mouth breathing, and malocclusion is an essential problem in the prevention and early treatment of craniofacial development disorders. While poor habits might interfere with tooth position and appropriate skeletal growth, restriction of the upper airway, resulting in mouth breathing, affects the pattern of craniofacial growth, leading to malocclusion. It is critical to intervene early on these etiological reasons for malocclusion in order to avoid its formation or worsening and, if it has already formed, to rectify it with early orthodontic therapy to promote eugnatic skeletal growth.[4]

Placing a pencil or other things between the teeth was the most prevalent oral habit. There were no significant connections found between the frequency of TMDs and

DOI: https://doi.org/10.20473/ijdm.v6i2.2023.66-69

gender or age groups. This study discovered links between TMDs and anxiety, malocclusion, and parafunctional behaviors.[5] Bottle feeding history and the existence of hazardous oral behaviors were revealed as predictors of malocclusion in preschoolers.[6] The posterior cross-bite, as well as overjet and overbite abnormalities, were found to be substantially linked with obstructive sleep apnea (OSA). The presence of these occlusal traits demonstrates the significance of an orthodontic examination in the screening process for pediatric OSA. Sleep-disordered breathing (SDB) was common and strongly linked with malocclusion. Because posterior cross-bite and anterior open bite were connected with being positively screened for SDB, early detection and management may help to avoid and limit the negative impacts of SDB on people's lives. Despite several studies on the frequency of malocclusion, there is a scarcity of evidence on the variables that contribute to it.[7] The current study sought to investigate the impact of three environmental variables on malocclusion: socioeconomic level (SES), nutritional status, and oral habits. The most common kind of malocclusion was Class I Type 1. Adolescents with a high socioeconomic level (HSS) showed higher malocclusion than those with a low socioeconomic status (LSS). Malocclusion was exacerbated by a soft diet. The current study focused on the impact of nutrition on the prevalence of malocclusion.[8]

Childhood stunting is the best overall measure of children's well-being and an accurate representation of societal inequality. Stunting is the most common kind of child malnutrition, with an estimated 161 million children globally falling below from the World Health Organization Child Growth Standards median in 2013. Many more millions suffer from some degree of development stalling since the whole length-for-age/height-for-age z-score distribution shifts to the left, suggesting that all children, not just those falling below a specified cut-off, are impacted. Stunting typically goes unnoticed in cultures where small stature is the norm, despite universal agreement on how to describe and quantify it since linear growth is not regularly measured in primary health care settings and it is difficult to physically discern. Growth stalling frequently occurs in utero and lasts for at least the first two years after birth. Linear growth failure is a marker for a number of pathological illnesses that are linked with higher morbidity and mortality, loss of physical growth potential, decreased neurodevelopmental and cognitive function, and an increased risk of chronic disease in adulthood. Human development is jeopardized by the severe, irreparable physical and neurocognitive impairment that comes with stunted growth. Stunting has been highlighted as a significant global health issue and the focus of international attention at the highest levels as a result of increased understanding of its scale and severe repercussions, with global objectives established for 2025 and beyond. The issue is to prevent linear growth failure while protecting children from becoming overweight or obese.[9]

One-quarter of children worldwide suffer from stunting, a kind of malnutrition defined by reduced linear development in the first two years of life. While dietary status remains the most important cause of stunting, there is evidence that environmental risk factors contribute to stunting. Childhood stunting is connected with foodborne mycotoxins, a lack of basic cleanliness, dirt flooring in the home, low-quality cooking fuels, and insufficient local waste management. A great deal of research has looked into access to clean water sources; however, the conclusions have been ambiguous due to varied study findings. Because there were few investigations into arsenic, mercury, and environmental tobacco, their impact on stunting remains unknown. The listed studies did not account for nutritional consumption. A wide range of environmental risk factors are connected with stunting to varied degrees, emphasizing the necessity of addressing how the environment interacts with nutrition. Environmental variables, in addition to dietary treatments, may make health promotion programs more successful. [10] Stunting is a significant public health issue in low- and middle-income nations, including Indonesia. Previous research has highlighted the difficulties in determining the causes of stunting. Stunting is connected with features not just at the child level but also at the family and community levels. To obtain successful results, interventions to eliminate stunting should take into consideration family and community variables.[11]

Nutritional insufficiency during infant growth and development also causes a delay in the ossification centers and may lead to poor skeletal and dental forms, according to the research. Furthermore, the contemporary human skull and face have shrunk with evolution, particularly in terms of anteroposterior length and vertical height. Individually, malocclusion can result in significant functional and aesthetic deficits that impact quality of life, resulting in decreased social relationships and psychological well-being. Furthermore, such occlusal irregularities place a strain on public services since they may necessitate long-term, multidisciplinary therapies as well as continuing examination and monitoring. Because human potential grows during childhood, problems during this period may have major effects on people and societies. As a result, prior knowledge of the elements that may jeopardize human development is critical for preventing or intervening in early-life diseases.[12]

The goal of interceptive orthodontics is to maximize dentofacial growth and development. This therapeutic approach aims to avoid or reduce dental development problems while allowing for craniofacial growth adjustments. It emphasizes habit modification while employing preventative holistic approaches. Monitoring for a range of problems, including excessive space, severe crowding, open or deep bites, anterior and/or posterior cross-bites, severe overjet, and atypical eruption patterns, is part of interceptive orthodontics in children.[13] Early orthodontic interventions are often initiated in the developing dentition to promote favorable developmental changes and remove or suppress those that are unfavorable. Early interceptive orthodontics can eliminate or reduce the severity of a developing malocclusion, the complexity of orthodontic

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treatment, the overall treatment time, and the cost. It also improves the subject's self-esteem and parental satisfaction. Early detection and appropriate referral of cases requiring interceptive orthodontics are important. However, a lack of awareness among schoolchildren, parents, and primary-care personnel (dental nurses and dental officers) may result in patients not being referred for timely interceptive intervention.[14]

Stunting occurs as a result of persistent dietary deficits in early infancy. Through their parenting skills, mothers are responsible for ensuring their children's nourishment. Maternal parenting approaches also have an impact on children's dental health. Early life gives mothers opportunities to shape their children's dental hygiene habits. Poor dental health can have an impact on nutritional status due to a variety of issues associated with specific parenting styles.[15] Parent educations, oral hygiene maintenance, avoiding oral habits, and dental care beginning with early deciduous teeth are all important markers in preventing malocclusion. Previous research has found that mothers' understanding of supplying and maintaining their children's oral hygiene is important for their children's oral health. As a result, proper oral health information and a favorable attitude toward oral health are critical in preventing numerous dental issues such as caries, gingivitis, and malocclusion.[16] Furthermore, the aim of this community empowerment is to enhance the knowledge of preventive orthodontic treatment for malocclusion and stunting in elementary school children.

MATERIALS AND METHODS

The data was collected at Miftahul Ulum Melirang's *Madrasah* Ibtidaiyah, or elementary school, in Melirang Village, Bungah District, Gresik, East Java. Data collection was the responsibility of three surveyors. The sample size for this study was 100 participants in grades four through six. Study subjects were in a questionnaire state when data was collected. The campaign employed an indirect health education strategy that included parents and school instructors. The session, which addressed dental and oral health, was delivered via teledentistry. For the community empowerment program assessment, participants were requested to fill out a Google form for the pre- and post-test to identify the enhancement of knowledge about or preventative orthodontic treatment for malocclusion and stunting in primary school children.

RESULTS

Table 1 depicts community empowerment and engagement in preventive orthodontic treatment and stunting. The majority of the community empowerment participants understood the presentation on oral and dental health empowerment. The post-test percentage was greater (91.5%) than the pre-test rate (53.75%).

Table 1. The participant information as well as the pre-test and post-test questionnaires (N=100), participants Percentage (%)

Participant details (N=100)		Percentage (%)
Gender	Female	50
	Male	50
Age (years old)	7-8	33.3
	9-10	33.3
	11-12	33.3
Grade	4th	33.3
	5th	33.3
	6th	33.3
Pre-test score		53.75
Post-test score		91.5

DISCUSSION

This community empowerment activities focused on enhancing elementary school childrens' knowledge about stunting and preventive orthodontics for malocclusion revealed an improvement in knowledge, as evidenced by the average value of the pre-test and post-test (36.75% margin). Participant socialization of elementary school childrens' knowledge is tremendously significant for the success of health services, particularly in the avoidance of oral health issues. Previous studies have shown that knowledge and training have a significant impact on enhancing community health care.[17]

Oral health is an important component of total physical well-being. A healthy dental cavity can help you digest nutritious foods more effectively, maintain your quality of life, and be more productive. One of the most critical things parents can do to preserve their children's general health and development is to maintain the health of their child's oral cavity. Stunting in Indonesia is tied to the health of the child's oralcavity as a result of diet and nutrition, which are related to education, behavior, and the family's socioeconomic conditions. Stunting is a chronic nutritional status problem that affects a child's height when it is not appropriate for the child's age at a critical period of child development.[18]

Elementary school is a golden age for teaching clean and healthy living behavior (CHLB) ideals, and it has the capacity to act as a change agent to promote CHLB in the school, family, and community environments, resulting in the creation of excellent human resources later on. Children are especially vulnerable to dental and oral health problems because they are in the process of transitioning from primary teeth to permanent teeth. As a result, special attention must be paid to dental and oral health in order to maintain proper tooth growth and development.[19]

Malocclusion is caused by two basic sources: genetic factors and environmental ones. Environmental variables, such as poor dental hygiene, can also be induced by trauma. Growth and development abnormalities can also induce malocclusion. This study solely looks at the causes of malocclusion induced by respondents' ignorance. Malocclusion is a common orthodontic condition that is often overlooked since it is not associated with significant mortality or morbidity. The participant's understanding of oral health improved following the dental health

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empowerment program. Other research, however, has found that malocclusion has a major influence on the emotional health of those affected.[20] Participants in the oral and dental health empowerment program were enthusiastic about maintaining and monitoring oral and dental health. All elementary school children expressed a wish to learn more about oral and dental health. Childrens' knowledge relates to malocclusion, stunting and preventive orthodontic treatment in early infancy which is important.[21,22] Dental and oral health education is a critical component of health services and community empowerment. The community empowerment program was expected to educate the students about dental and oral health and encourage them to adopt healthier behavior especially about malocclusion and stunting.[23]

CONCLUSION

The dental and oral health empowerment program about preventive orthodontics, malocclusion, and stunting was effectively completed, enhancing the knowledge level of elementary school children (37.5%). However, socialization activities about the impact of malocclusion on quality of life are still required.

ACKNOWLEDGEMENTS

The authors would like to thank Faculty of Dental Medicine, Universitas Airlangga for the support and Madrasah Ibtidaiyah Miftahul Ulum Melirang, Melirang, Bungah, Gresik, East Java for the kind support. This empowerment program was supported by Program Pengabdian kepada Masyarakat funding from Universitas Airlangga with appointment number 1023/UN/2023.

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