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The Correlation Between The Hmar (Handicapping Malocclusion Assessment Record) Index-Based Malocclusion Severity And The Quality Of Life

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ABSTRACT

The prevalence of malocclusion in Indonesia is still very high (80%). Malocclusion significantly impacts individuals and society regarding quality of life, anxiety, functional limitations, and emotional conditions. A person with malocclusion may feel isolated in social settings, embarrassed about the appearance of their teeth, or even miss out on employment opportunities. The purpose of this study is to investigate the correlation between the HMAR (The Handicapping Malocclusion Assessment Record) index-based malocclusion and the quality of life. This study used the analytical survey method with the *cross-sectional* design approach. This study was conducted at *Dentes* of Wirobrajan in Yogyakarta. The sampling was purposive sampling and obtained 34 respondents. The data for malocclusion severity were collected using the Handicapping Malocclusion Assessment Record (HMAR) index and the questionnaire on the quality of life of Oral Health Impact Profile (OHIP-14), and then they were analyzed using the Gamma test. Most respondents had heavy malocclusion and needed treatment were 47.1%. Respondents with a quality of life with poor criteria were 52.9%. Respondents with heavy malocclusion and poor quality of life were 50.0%. The malocclusion severity level with the quality of life and significant value (p = 0.000) and coefficient of correlation at 1.000 had a strong correlation. The malocclusion severity level significantly correlates with the quality of life. The heavier the malocclusion, the poorer the quality of life.
Keywords: Malocclusion; HMAR; Quality of Life; OHIP-14
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Introduction

The assessment of quality of life provides new insights into evaluating long-term outcomes based on the definition of "health." According to the World Health Organization (WHO), health is not merely the absence of disease or disability but also encompasses physical, mental, and social well-being. Physical, mental, and social health disorders can reduce the quality of life. [1] Oral health is integral to overall human health. Teeth play roles in chewing, speaking, and appearance. Various dental and oral disorders can affect mouth function, one of which is dental malocclusion. [2] Malocclusion is one of the most common oral cavity issues after dental caries and periodontal disease. According to

WHO, malocclusion results from dental anomalies, jaw abnormalities, a combination of teeth and jaw issues, or muscle disorders and other factors like bad habits and genetics. [3] Genetic and environmental factors typically cause malocclusion. It is also associated with tooth malposition, abnormal dental arch relationships, and nerve and muscle function disorders. Bad habits, persistent primary teeth, early loss of primary teeth, or extensive tooth damage can also cause malocclusion. [4] According to the 2018 Basic Health Research (Riskesdas), dental and oral health problems remain significant in Indonesia, with a prevalence rate of 57.6% and malocclusion prevalence reaching around 80%, ranking third after caries and periodontal disease in Indonesia.[4] This

high rate is due to a low awareness of dental care. The prevalence rate of people choosing orthodontic treatment in Indonesia in 2018 was 0.3%, with Yogyakarta having one of the highest rates, exceeding the national average at 0.7%. [5]

Orthodontic treatment is necessary for individuals with malocclusion. The Handicapping Malocclusion Assessment Record (HMAR) index is used to assess the condition and severity of malocclusion, introduced by Salzmann. [2] The HMAR index can be applied directly to patients or study models. The HMAR index quantitatively and objectively assesses occlusal features and determines the need for orthodontic treatment based on malocclusion severity. The evaluation does not require complex equipment like other indices. The HMAR index is based on tooth deviations within one jaw, abnormalities in occlusal relationships, and dentofacial abnormalities. [2]

Malocclusion significantly impacts individuals and society in terms of quality of life, anxiety, functional limitations, and emotional conditions. Individuals with malocclusion may feel socially isolated, embarrassed about their teeth, or miss job opportunities. Besides these impacts, malocclusion increases the risk of dental caries,

affects periodontal health, and can cause severe psychological issues. [6]

A preliminary study conducted at Dentes Dental Clinic, Wirobrajan, in March 2023, showed an increase in orthodontic treatment visits, with 122 visits in 2021 and 150 visits in 2022. The authors aim to explore the correlation between malocclusion severity using the HMAR index and quality of life.

Methods

This research utilized an analytical survey method with a cross-sectional design. The study sample consisted of respondents who had received orthodontic treatment in the past three months, totaling 34 individuals. The independent variable was malocclusion severity, while the dependent variable was the quality of life for orthodontic users. Data analysis was conducted using the Gamma test, where a p-value less than α (0.05) indicated a significant relationship between the two variables. This research was conducted after receiving ethical approval from the Ethics Committee of Poltekkes Kemenkes Yogyakarta, dated June 20, 2023, No.e-KEPK. 1/671/2023.

Results and Discussion

Table 1.
Characteristics of Respondent

Characteristics	n	(%)
Gender		
Male	8	23,5
Female	26	76,5
Total	34	100
Age (y.o)		
14-17	8	23,5
18-21	14	41,2
22-25	12	35,3
Total	34	100

Table 2.
Frequency Distribution of Respondents Based on Malocclusion Severity

Malocclusion Severity	n	%
Normal occlusion variation	0	0,0
Mild malocclusion, no treatment needed	4	11,8
Mild malocclusion, specific cases need treatment	5	14,7
Severe malocclusion, treatment needed	16	47,1
Severe malocclusion, treatment urgently needed	9	26,5
Total	**34**	**100**

Table 3.
Frequency Distribution of Respondents Based on Quality-of-Life Criteria

Quality of Life	n	%
Good	0	0,0
Moderate	16	47,1
Poor	18	52,9
Total	**34**	**100**

Table 4.
Cross Tabulation of Gender and Malocclusion Severity

Gender	Malocclusion Severity										Total	%
	A	%	B	%	C	%	D	%	E	%		
M	0	0,0	1	12,5	0	0,0	4	50,0	3	37,5	8	100
F	0	0,0	3	11,5	5	19,2	12	46,2	6	23,1	26	100
Total	0	0,0	4	11,8	5	14,7	16	47,1	9	26,5	34	100

Notes: A = Normal occlusion variation

B = Mild malocclusion, no treatment needed

C = Mild malocclusion, specific cases need treatment

D = Severe malocclusion, treatment needed

E = Severe malocclusion, treatment urgently needed

Table 5.
Cross Tabulation of Age and Malocclusion Severity

Age (y.o)	Malocclusion Severity										Total	%
	A	%	B	%	C	%	D	%	E	%		
14-17	0	0,0	2	25,0	1	12,5	4	50,0	1	12,5	8	100
18-21	0	0,0	1	7,1	2	14,3	7	50,0	4	28,6	14	100
22-25	0	0,0	1	8,3	2	16,7	5	41,7	4	33,3	12	100
Total	0	0,0	4	11,8	5	14,7	16	47,1	9	26,5	34	100

Notes: A = Normal occlusion variation

B = Mild malocclusion, no treatment needed

C = Mild malocclusion, specific cases need treatment

D = Severe malocclusion, treatment needed

E = Severe malocclusion, treatment urgently needed

Table 6.
Cross Tabulation of Gender and Quality of Life

Gender	Quality of Life						Total	%
	Good	%	Moderate	%	Poor	%		
M	0	0,0	4	50,0	4	50,0	8	100
F	0	0,0	12	46,2	14	53,8	26	100
Total	0	0,0	16	47,1	18	52,9	34	100

Table 7.
Cross Tabulation of Age and Quality of Life

Age (y.o)	Quality of Life						Total	%
	Good	%	Moderate	%	Poor	%		
14-17	0	0,0	4	50,0	4	50,0	8	100
18-21	0	0,0	7	50,0	7	50,0	14	100
22-25	0	0,0	5	41,7	7	58,3	12	100
Total	0	0,0	16	47,1	18	52,9	34	100

Table 8.
Cross Tabulation of Malocclusion Severity with Quality of Life

Malocclusion Severity	Quality of Life							
	Good (0-18)	%	Moderate (19-37)	%	Poor (38-56)	%	Total	%
Normal occlusion variation	0	0,0	0	0,0	0	0,0	0	0,0
Mild malocclusion, no treatment needed	0	0.0	4	100	0	0.0	4	100
Mild malocclusion, specific cases need treatment	0	0,0	5	100	0	0,0	5	100
Severe malocclusion, treatment needed	0	0,0	7	43,8	9	56,3	16	100
Severe malocclusion, treatment urgently needed	0	0,0	0	0,0	9	100	9	100
Total	0	0,0	16	47,1	18	52,9	34	100

Table 2 shows that there were 16 respondents (47.1%) with severe malocclusion requiring treatment. Habits formed at a young age, such as thumb sucking and bottle feeding, can lead to malocclusion that affects teenagers later on. Children with thumb-sucking habits tend to place their thumb between the upper and lower incisors, pressing against the lingual part of the upper incisors and the labial part of the lower incisors. [8]

Table 3 indicates that 18 respondents (52.9%) had poor quality of life. The impact of malocclusion on quality of life is reflected in issues of self-confidence experienced by 27 respondents (79.5%), feelings of embarrassment by 26 respondents (76.5%), and speech difficulties by 26 respondents (76.4%). Most complaints were related to aesthetics, especially among teenagers who feel self-conscious about smiling and try to cover their mouths due to malocclusion. [6] Additionally, individuals with malocclusion often experience anxiety, embarrassment, and irritability compared to those with mild malocclusion. [6]

Table 4 shows that the largest group of respondents with severe malocclusion needing treatment was male (50.0%). This finding aligns with research by Lima et al. [9], which states that malocclusion tends to be more severe in males due to the influence of testosterone, which can accelerate facial structure development. Another factor is that males are less likely to seek orthodontic treatment due to lower awareness of the importance of dental appearance, leading to more severe malocclusion by the time they eventually seek treatment. [10]

Table 5 shows that most respondents aged 14-17 and 18-21 years had severe malocclusion requiring treatment (50.0%). Changes in occlusion during adolescence can lead to crowding, crossbite, open bite, deep bite, and the loss of permanent teeth due to caries, making treatment necessary to prevent malocclusion. The relationship between malocclusion and age demonstrates the importance of early orthodontic care to prevent and correct malocclusion. [11]

Table 6 shows that most female respondents had poor quality of life (53.8%). The impact of malocclusion on quality of life is thought to be greater for females, who may have lower self-confidence regarding appearance. Females often face social pressures to meet beauty standards, and dissatisfaction with physical appearance can affect their perception of quality of life, especially in terms of dental health, facial appearance, and aesthetics. [12][13] This finding is supported by Amuasi [14],

who stated that females tend to be more responsive to societal expectations regarding aesthetics than males.

Table 7 shows that the highest percentage of respondents with poor quality of life were aged 22-25, totaling 7 respondents (58.3%). At this age, individuals often face more intense mental health challenges, such as anxiety and depression, due to increasing life pressures. Psychological well-being becomes more vulnerable due to dissatisfaction or concerns about prospects. [15] Age has an impact on the relationship between malocclusion and quality of life, especially among individuals who have lived with malocclusion for a long time and tend to feel more anxious, embarrassed, and irritable than those with mild malocclusion. [14]

Table 8 shows that respondents with severe malocclusion who urgently need treatment and have poor quality of life make up the largest group, with 9 respondents (100%). Individuals with severe malocclusion tend to have poor oral health-related quality of life. This is evidenced by questionnaire results showing that 27 respondents (79.5%) reported feelings of embarrassment, 26 respondents (76.5%) reported difficulties with speech, and 26 respondents (76.4%) reported feelings of anxiety. Adolescents with malocclusion frequently report anxiety, embarrassment, and irritability compared to those with mild malocclusion. [6]

The Gamma test analysis between malocclusion severity and quality of life in orthodontic users yielded a p-value of $0.000 < 0.05$ with a correlation coefficient of 1.000, indicating a strong correlation between malocclusion severity and quality of life in orthodontic users. The findings suggest that individuals with higher malocclusion severity scores have a poorer quality of life due to oral health issues, which may include speech difficulties, discomfort, learning disruptions, and social interaction problems. [16] This finding is consistent with Almoammar et al. [17], who found that severe malocclusion can reduce self-confidence, particularly among adolescents and young adults. Severe malocclusion also affects oral functions, such as chewing and speaking, which impacts eating patterns and activities, thereby lowering quality of life. [18] Other studies also indicate that adolescents who feel dissatisfied with their dental appearance tend to experience negative feelings about their appearance, which affects psychological well-being and leads them to avoid social interactions. [19][20]

Conclusion

According to this research results, we can conclude that the malocclusion severity level significantly correlates with the quality of life. The heavier the malocclusion, the poorer the quality of life.

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