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Original Research Article

Determinants of Oral Hygiene Status among Adolescents in Jember, Indonesia

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Abstract: ***Background***: Oral health problems affected 55.6% of adolescents aged 10-14 in Indonesia. This can be prevented by maintaining oral hygiene. Many physical and psychological changes happen in the adolescent phase, and more attention is needed to maintain oral hygiene. Oral hygiene is influenced by various factors, including demographic and socioeconomic factors. ***Objectives***: This study aimed to determine factors associated with oral hygiene among adolescents in Jember, Indonesia. ***Method*:** There were 409 students from eight different junior secondary schools in Jember Regency as participants in this study. The sample was obtained using the cluster random sampling method. Data on oral hygiene as a dependent variable was collected through the OHI-S examination. Data on sex, school, ethnicity, mother and father education, father and mother employment, monthly income, and number of children as independent variables was gathered from questionnaires and students' data from the school database. First, a univariate Spearmen test was run for all independent variables ($p<0.05$). The significant variables were then analyzed using multiple regression to determine factors associated with oral hygiene ($p<0.05$). ***Results*:** The average OHI-S score was 2.53, which was categorized as moderate. Multivariate analysis results showed that females were more likely to have better OHIS-S scores than males (B=-0.716; p=0.000); ethnic Javanese were more likely to have better OHI-S scores than Maduranese (B=0.293; p=0.004); and middle-income students more likely have better OHI-S than low-income students (B=-0.307; p=0.003). ***Conclusion*:** It can be concluded from this study that adolescents' socioeconomic background is associated with their oral hygiene. This suggests the need to give more attention to a new model of oral health promotion programs targeting gender, ethnicity, and lower-income groups.

Keywords: Oral health; adolescent health; oral hygiene; socioeconomic factors; gender; ethnicity.

INTRODUCTION

Oral health problems are detrimental health problems globally. In Indonesia, based on the National Basic Health Survey in 2018, the prevalence of oral health problems was 57.6%. One group of people who experience dental and oral problems is adolescents. Adolescents aged 10-14 years have a prevalence of oral health problems of 55.6%, and adolescents aged 15-24 years have a prevalence of oral health problems of 51.9%. The Jember Regency has a higher prevalence of oral health problems than the national prevalence of more than 60% [1].

Oral health problems have an impact on daily life. In several studies, there is a relationship between oral health problems with cardiovascular disease, diabetes, lung disease, and complications during pregnancy [2]. Oral health problems can affect a person's self-confidence [3]. Adolescents with poor oral hygiene status are at risk of not attending school and decreasing achievement [4, 5]. If this problem is not resolved, it can result in someone losing productivity, getting sick, and being absent [6]. Oral health problems are greatly influenced by oral hygiene [7]. Adolescents often neglect dental and oral hygiene [8, 9].

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Adolescence is a transition period between childhood and adulthood [10]. According to WHO, adolescence starts at age 10-19 years old [10]. Adolescence coincides with an increase in hormone levels that leads to complete sexual maturity, which becomes apparent with a physical remodeling of adipose tissue and muscle, growth of genitals, and development of secondary sexual characteristics [11]. The oral cavity is also affected by physical and psychological changes. During puberty, sexual hormones were increased, which has a marked effect on the composition of subgingival bacteria flora, showing her high level of Gram-negative bacteria compared to earlier or later stages of life [7]. A previous study among male adolescents in Costa Rica showed a 92% increase in the prevalence of periodontal problems [12]. In many adolescents, their oral health status is affected by socioeconomic backgrounds [13, 14].

Most oral conditions have a multifactorial etiology that is affected by biological, social, economic, cultural, and environmental factors [13]. The socioeconomic status of each person is different. Socioeconomic status can be seen based on education, employment, income, and ethnicity. Based on socioeconomic status, it can affect oral health [15].

Jember Regency is one of the regions located in East Java Province with an area of 3.306.689 Km2 and a population of 2.5 million people. There were 1.288.774 males and 1.292.712 females. Jember Regency has 31 districts, 22 sub-districts, and 226 villages [16]. Most Jember Regency residents have a work background as entrepreneurs and housewives. Apart from that, the highest level of education in Jember Regency is secondary school [16].

This study aims to determine the relationship between sex, school, ethnicity, mothers' education, fathers' education, mothers' employment, fathers' employment, number of children in the family, and monthly income on the oral hygiene of adolescents in Jember, Indonesia and to find out which variables which has the most dominant influence on oral hygiene.

METHODS

Study Design

This type of research is an observational analytic with a cross-sectional research design.

Participants

The population of the research is all junior secondary school students in the Jember Regency who are registered in the basic education data for the 2023 academic year. Samples were taken using cluster random sampling and the sample size was 409. The sample criteria were being willing to follow all research procedures to completion, signing informed consent, and having permanent teeth that could be used as an index.

Ethics and Data

This research has been approved by the Health Research Ethics Commission (KEPK) of the Faculty of Dentistry, University of Jember. Informed consent was obtained directly from the respondent directly.

Measurements

Socioeconomic status variables were obtained from questionnaires and student data from the schools. The independent variables are sex, school, ethnicity, father's education, mothers' education, fathers' employment, mothers' employment, number of children, and monthly income (IDR). Oral hygiene variables were taken from oral examination results using the OHI-S index.

Statistical Analysis

Data analysis was performed using multiple regression analysis to determine the factors related to OHI-S score ($p<0.05$). To select which variables were included in the regression model, a univariate Spearman rank test was performed ($p<0.05$). The significant variables from univariate analysis were entered into the regression model. The reference groups in the variable were male, public school, Javanese, primary education or less, and low income.

RESULTS

Table 1 shows the frequency distribution of respondent characteristics. The majority of respondents were female, with a percentage of 51.3%, and from public schools (62.3%). The highest percentage of respondents were 13-year-old students (45.0%) originating from the Javanese ethnicity, 63.6%. Most of the students have fathers with secondary education (52.3%) and self-employed (76.8%). The highest percentage of mother's education was secondary education and housewives (63.8%). The participants mostly lived in families with reported monthly incomes that were low (64.3%) and had 1-2 children (55.5%).

The mean data of the OHI-S score is 2.53, which was in the moderate category. There is a standard deviation of 1.023 with a minimum value of 0.40 and a maximum value of 5.40.

Table 1: Socioeconomic Characteristics of Respondents (N=409)

Characteristics	N	%
Sex		
Male	199	48.7
Female	210	51.3
Age (years)		
12	24	5.9
13	184	45.0
14	160	39.1
15	34	8.3
16	7	1.7
School		
Public	255	62.3
Private	154	37.7
Ethnicity		
Javanese	260	63.6
Maduranese	144	35.2
Others	5	1.2
Fathers' education		
Primary education or less	165	40.3
Secondary education	214	52.3
Higher education	30	7.3
Mothers' education		
Primary education or less	172	42.1
Secondary education	201	49.1
Higher education	36	8.8
Fathers' employment		
Unemployed	18	4.4
Self-employed	314	76.8
Employee	77	18.8
Mothers' employment		
Housewives	261	63.8
Self-employed	107	26.2
Employee	41	10.0
Number of children		
1-2	227	55.5
3-4	168	39.9
5+	19	4.6
Monthly income (IDR)		
Low : <1,500,000	263	64.3
Middle :1,500,000-2,500,000	124	30.3
High : >2,500,000	22	5.4

There is a significant association between the variables sex, ethnicity, mothers' education, fathers' education, and monthly income and OHI-S score based on the univariate analysis presented in Table 2 ($p<0.05$).

Significant dependent variables from univariate analysis were entered into a multiple regression model. The total variance the model explained was R=47.1%, $F(5)=23.011$, $p=0.000$. Sex, ethnicity, and income were significantly associated with oral hygiene ($p<0.05$). Females were more likely to have lower OHI-S scores than males. Maduranese were more likely to have higher OHI-S scores than Javanese. Middle-income students were more likely to have lower OHI-S scores than low-income groups.

Table 2: Univariate and multivariate analysis of factors associated with OHI-S score (N=409)

Variable	Univariate	Multivariate		
	Sig	B	95%CI for B	Sig
Sex	0.000			
Male (Ref)				
Female		-0.716	-0.895 – -0.537	0.000
School	0.351	-		
Ethnicity	0.000			
Javanese (Ref)				
Maduranese		0.293	0.094 – 0.493	0.004
Others		0.271	-0.552 – 1.094	0.518
Mothers education	0.000			
Primary education or less(Ref)				
Secondary education		-0.169	-0.416 – 0.077	0.178
Higher education		-0.358	-0.788 – 0.071	0.102
Father education	0.000			
Primary education or less(Ref)				
Secondary education		-0.037	-0.285 – 0.211	0.771
Higher education		-0.100	-0.552 – 0.352	0.664
Mother employment	0.125	-		
Father employment	0.549	-		
Monthly income (IDR)	0.000			
Low (Ref)				
Middle		-0.307	-0.511 – -0.102	0.003
High		-0.280	-0.687 – 0.128	0.178
Number of Children	0.862	-		

Ref = Reference category
Sig p< 0.05

DISCUSSION

Respondents had an average OHI-S score of 2.53, including the moderate category. In line with research by Diamanti *et al*., (2021) in a region in Indonesia, 51.7% of teenagers have moderate oral hygiene status [17]. However, this study's result is higher than a study among adolescents in Iran, which showed an average OHIS score of 1.24 [18]. This can be influenced by several factors.

Based on multivariate analysis, this study found that factors influencing oral hygiene scores are sex, ethnicity, and income. Oral hygiene is getting better in female students. Several studies state that females have better attitudes and behaviors in maintaining oral hygiene than males. In addition, females make more regular visits to the dentist and spend more time brushing their teeth than males [19]. In line with research [7], females are more obedient or diligent than males when brushing their teeth and flossing. In addition, females pay more attention to the cleanliness of their tongue to reduce bacteria in the oral cavity to avoid halitosis [7].

Ethnicity has a significant correlation with oral hygiene. The Javanese ethnic group has the best OHI-S score compared to other ethnicities. In line with research by [20], the prevalence of caries is higher in ethnic minorities. The prevalence of caries indicates the low level of oral hygiene in this community (20). Among adolescents in Brazil, ethnicity was related to oral health literacy [21]. The different ethnic backgrounds were also related to access to oral health care [22].

There is a correlation between monthly income and oral hygiene. Monthly income will control access related to education and oral health services. Families with low incomes usually consume diets rich in sugar and fat, which will increase the risk of caries in their children. Therefore, a low economic level is associated with scarce preventive care and a lowered prevalence of dental visits [20].

Another study in Nigeria shows that there is a relationship between income and oral hygiene. A person with a low income will have low financial capacity, limiting access to visiting existing health services. People with low economic conditions tend to have problems, which creates mental stress and results in low prioritization of oral hygiene practice. People with low economic status also need more literacy about dental and oral health, which is related to poor knowledge, attitudes, and practices in maintaining dental and oral hygiene [19].

This study is a cross-sectional study which limits causal inference. The income data was gathered from the school database, which may need to be updated. However, this study was the first conducted among adolescents in Jember, Indonesia, which can provide data on oral hygiene status to create more effective oral health promotion.

CONCLUSION

There is a significant correlation between oral hygiene index with sex, ethnicity, and monthly income.

This suggests the need for a broader socioeconomic approach to design an oral health program.

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