Relationship between Socioeconomic Status and Self-Perceived Orthodontic Treatment Need Among Adolescents

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Abstract

Past research shows that self-perceived orthodontic treatment need has an important role in orthodontic treatment-seeking. Socioeconomic status is one of the factors that affects self-perceived orthodontic treatment need. A research on socioeconomic status has never been conducted in Indonesia.

This study was conducted to determine whether socioeconomic is associated with self-perceived orthodontic treatment need among adolescents. Methods: A total of 85 students of SMAN 27 Jakarta aged 15-17 years were included in this cross-sectional study. Family Affluence Scale III questionnaire was used to assess their socioeconomic status and the Index of Orthodontic Treatment Need – Aesthetic Component sheet was used to assess their self-perceived orthodontic treatment need.

The majority of subjects from the low socioeconomic status group perceived that they have a definite need for orthodontic treatment. However, most of them from the middle socioeconomic status group perceived that they have borderline need for orthodontic treatment. Furthermore, 52.9% of subjects from the high socioeconomic status group perceived that they do not need orthodontic treatment.

There was a statistically significant difference between socioeconomic status and self-perceived orthodontic treatment need among adolescents in Jakarta, which demonstrates an association the two variables.

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Introduction

Malocclusion has emerged as an oral health problem, with its prevalence ranking the third in the world, after caries and periodontal disease.[1] Individuals with malocclusion can experience problems with oral function and become more susceptible to trauma, periodontal disease, or caries. Moreover, these individuals are often discriminated due to their facial appearance.[2] Despite these issues, the major impact of malocclusion does not persuade all the affected individuals to go for orthodontic treatment.[3] This fact was illustrated by the results

of "Riset Kesehatan Dasar 2013," which described that only 0.7% of Indonesian population had received orthodontic treatment.[4] This proportion does not match with the prevalence of crowding teeth in Indonesia, which amounts to 14%.[5] According to Profitt *et al.,* the primary factor that determines the amount of orthodontic treatment received by the community is the expensive cost that is not comparable to the family income. Individuals with low socioeconomic status generally find it difficult to receive oral health care.[2,6] In addition, such individuals often have lower levels of oral health knowledge.[7] Most often, people do not seek orthodontic treatment because they are not aware that treatment is needed.[2] It has been estimated that 80% of orthodontic patients seek oral care services out of a concern for aesthetics rather than for reasons related to health or function.[8] This indicates that self-perceived orthodontic treatment need has an important role

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in determining whether a person intends to receive orthodontic treatment or not. Regarding the analysis of self-perceived orthodontic treatment need, a sample of adolescents is generally chosen because adolescents tend to consider dental appearance as an important aspect, related to the process of building self-confidence.[9] Changes in appearance can impact how adolescents perceive about themselves.[10]

As reported in previous studies, there have been contradictions regarding the association between socioeconomic status and self-perceived orthodontic treatment need. For instance, Kerosuo et al. reported that self-perceived orthodontic treatment need was not different among various socioeconomic status groups.[11] Conversely, Al–Sarheed et al. described that socioeconomic status is one of the determinants of self-perceived orthodontic treatment need.[12] Considering the aforementioned findings, and that similar studies have not been conducted in Indonesia, this study was conducted to investigate the relationship between socioeconomic status and self-perceived orthodontic treatment need among adolescents.

Materials and methods

The inclusion criteria for selecting the adolescent subjects for this study were those aged 15-17 years during data collection and those who were willing to follow up the series of research. Adolescents who had undergone orthodontic treatment were excluded from the study. This study was conducted at SMAN 27, Johar Baru, Central Jakarta, from July to September 2018. This research was an analytical study with a cross-sectional design. The independent variable in this study was socioeconomic status, and self-perceived orthodontic treatment need was the dependent variable.

Johar Baru was chosen as the study site because this area was within the radius of The Dental and Oral Hospital, Faculty of Dentistry, Universitas Indonesia service. It was an effort to bring services closer to the community's needs. The initial information obtained from the Johar Baru profile indicated that this area is densely populated with residents who have diverse socioeconomic status conditions,[13] due to which this region was considered to be suitable for our research so that researchers can observe the differences in self-perceived orthodontic treatment need of each socioeconomic status group. A total of 85 students of SMAN 27 Jakarta were the study subjects, who were recruited according to the unpaired categorical comparative analytical calculation. Ethical approval was obtained from the Ethics Committee of the Faculty of Dentistry, Universitas Indonesia.

As Johar Baru had a very lardge number of adolescents, the sampling technique was performed using a multi-stage cluster sampling method with the following stages: (1) selection of high school or the equivalent in Johar Baru, (2) selection of class in the selected high school, and (3) selection of students in the selected classes. This technique is consistent with the indications of multi-stage cluster sampling, i.e., for studies with large populations and occupying large areas. An advantage of this technique is the effectiveness of time and cost.[14]

Data collection was done using self-administered questionnaires consisting of the information sheet, the informed consent sheet, the self-data sheet, Family Affluence Scale III (FAS III) questionnaire sheet, and the Index of Orthodontic Treatment Need-Aesthetic Component (IOTN-AC) sheet. Students were instructed on how to fill in the questionnaire and were also informed that only the researcher will read their answers.

The FAS III questionnaire consists of five questions that can be easily answered.[15] The questions and codes of FAS III used in the present study are as follows:
"Does your family own a car, van, or truck?"
The response categories were: No (=0), Yes; one (=1); Yes, two or more (=2).
"Do you have your own bedroom for yourself?"
The response categoires were: No (=0); Yes (=1).
"During the past 12 months, how many times did you travel away on holiday with your family?"
The response categories were: Not at all (=0); Once (=1); Twice (=2); More than twice (=3).
How many computers does your family own?
The response categories were: None (=0); One (=1); Two (=2); More than two (=3).
What do you think about your family's wealth?
The response categories were: Not at all well off (=0); Not very well off (=1); Average (=2); Quite well off (=3); Very well off (=4).

These questions are not sensitive (does not make the subject of research reluctant to answer).[16] Each question inquiries about things that are naturally known by adolescents about their families, thereby minimizing the number of non-responses. This is why FAS III was chosen for this study. Based on previous research, it is known that there are often problems in collecting data on other socioeconomic status indicators such as education, income, and work of parents from adolescents because they are generally unable or unwilling to provide accurate information about their parents.[17] The use of FAS III is also supported by the previous usage of this questionnaire in Indonesia and was confirmed to have high reliability and good validity.[16] A composite FAS III score was calculated for each respondent based on his or her answers to the questions, ranging from 0 to 13. The following three groups were categorized in terms of the composite FAS III score: low, middle, and high socioeconomic status.

The IOTN-AC assessment is based on the patient's self-identification to a set of malocclusion photographs.[18] It represents their self-perceived orthodontic treatment need.[19] Ten photographs are used to represent varying degrees of dental appearance, ranging from those that do not need to those that need orthodontic treatment.[6] As a visual aid, the IOTN-AC has numerous of advantages over verbal descriptions.[8] Visual stimuli are more comprehensible as communication tools than verbal descriptions, particularly for adolescents. A visual aid makes it easier for adolescents to determine the convenient answer. AC grades 1-4 represent no need or slight need for treatment; AC grades 5-7 represent a moderate to borderline need for treatment; and AC grades 8 - 10 represent a need or definite need for orthodontic treatment.

The questionnaire trial was implemented on nine respondents (10% of the sample size), and then the validity and reliability were confirmed by the Statistical Package for the Social Sciences (SPSS) test. To assess the validity of the FAS III questionnaire, Pearson's correlation test was conducted on each value of each question with the total value of the questionnaire. This test included 9 respondents, so that based on the r-table the minimum critical value is 0.666. After obtaining valid responses, the reliability of the FAS III questionnaire was assessed using the

Cronbach's alpha test. Test and retest were performed to determine the reliability of the IOTN-AC in the study population, wherein the same respondent was asked to refill the IOTN-AC sheet with an interval of 1 week. Reliability indicataes to the consistency of the score or the level a person obtains when performing the same test at different time points.

Univariate data analysis was performed to evaluate the frequency distribution and the proportion of socioeconomic status distribution as well as the self-perceived orthodontic treatment need. Then, bivariate data were analyzed using the chi-square test to determine the association between the two variables, i.e., socioeconomic status and self-perceived orthodontic treatment need.

Results

Tests of validity and reliability of the questionnaire were conducted on nine respondents (10% of the sample size). The respondents consisted of students at SMAN 27 Jakarta who met the inclusion and exclusion criteria and would not be included as subjects when collecting the research data. The data obtained after filling out the FAS III questionnaire and the IOTN-AC sheet. The data were processed using the SPSS 20 software. Pearson's correlation test was conducted to assess the validity of all FAS III questionnaire questions.

Questions	r
Does your family own a car, van, or truck?	0.716*
Do you have your own bedroom for yourself?	0.872**
During the past 12 months, how many times did you travel away on holiday with your family?	0.886**
How many computers does your family own?	0.905**
What do you think about your family's wealth?	0.902**

Table 1. Pearson correlation value of FAS III questionnaire.
* Pearson correlation; strong correlation (p ≤ 0.05);
**Pearson correlation; very strong correlation (p ≤ 0.01)

As shown in Table 1, the Pearson's correlation value of each question is greater than the critical value obtained from the r-table. This test included nine respondents, so that based on the r-table, the minimum critical value is 0.666. The r-value of all questions >0.666; therefore, it can be concluded that each question in the FAS III questionnaire is valid.

After confirming that the questions are valid, the Cronbach's alpha test was implemented to determine the reliability of the FAS III questionnaire. A Cronbach's alpha value of 0.814 was obtained, which is >0.05, and hence, it can be concluded that the FAS III questionnaire is reliable. To determine the reliability of the IOTN-AC, the same respondent was asked to refill the IOTN-AC sheet with an interval of 1 week. Reliability implies the consistency of the score or the level a person obtains when doing the same test at different time points. The reliability of the IOTN-AC was statistically confirmed by the results of the test-retest, which resulted in a Pearson's correlation value of 0.991. As this value is >0.9, it was concluded that the IOTN-AC has a very good reliability.

The research subjects in this study consisted of 85 students of SMAN 27 Jakarta. The frequency distribution of the research subjects according to gender and age is presented in Table 2.

Variable	Number (N)	Percentage(%)
Gender		
Male	45	52.9
Female	40	47.1
Age (years)		
15	14	16.5
16	67	78.8
17	4	4.7

Table 2. Frequency distribution of research subjects according to gender and age.

As shown in Table 2, the gender distribution of the research subjects is quite balanced. The number of male and female subjects was not much different. There was a difference of only five subjects between males and females. Regarding the age of the subjects, the majority of them were aged 16 years, followed by those aged 15 years. Those aged 17 years were less in number.

All research subjects were asked to fill in the FAS III questionnaire. After calculating the score of each component of the FAS III question, we summed up the scores of each question with those of each research subject. The frequency distribution of the research subjects based on the total FAS III score is presented in Table 3.

FAS III Total Score	Number (N)	Percentage (%)	Average ± SD
Low			
0	1	1.2	
1	1	1.2	
2	2	2.4	
3	17	20.0	
Middle			
4	3	3.5	
5	12	14.1	5.87 ± 2.43
6	15	17.6	
High			
7	12	14.1	
8	11	12.9	
9	3	3.5	
10	6	7.1	
11	2	2.4	
12	0	0.0	
13	0	0.0	

Table 3. Frequency distribution of the research subjects based on the total FAS III score.

As shown in Table 3, research subjects with score 3 are the highest in number. The average FAS III score among the study subjects was 5.87, which belonged to the middle socioeconomic status group. The standard deviation was 2.43, and the range of FAS III scores obtained among the study subjects was 3.44-8.3, i.e., medium to high range. Based on the total FAS III scores, the research subjects were categorized into low (score ≤ 3), middle (score 4-6), and high (score ≥ 7) socioeconomic status groups. In addition to filling in the FAS III questionnaire, the research subjects were asked to fill in the IOTN-AC sheet. Details regarding the frequency distribution of IOTN-AC grades are shown in Table 4.

IOTN-AC Grade	Number (N)	Percentage (%)
1	16	18.8
2	5	5.9
3	3	3.5
4	6	7.1
5	18	21.2
6	11	12.9
7	2	2.4
8	22	25.9
9	2	2.4
10	0	0.0

Table 4. Frequency distribution of IOTN-AC grades.

Table 4 shows that the majority of research subjects selected grade 8, and none selected grade 10. Based on the IOTN-AC grade, the research subjects were grouped into several levels of self-perceived orthodontic treatment need. Grade 1-4 implied that the subjects do not or slightly need orthodontic treatment. Grade 5-7 indicated that the subjects tended to need

orthodontic treatment (moderate/borderline). Grade 8-10 indicated that the subjects have a definite need for orthodontic treatment.

After grouping, the frequency distribution of the research subjects from each group was obtained by the univariate analysis. Subjects with high socioeconomic status showed the highest frequency. The next rank was the middle socioeconomic status with a slight difference. The last rank was occupied by research subjects with low socioeconomic status. Results also revealed that the socioeconomic status of the research subjects was heterogeneous. Those in the "borderline/moderate need" group showed the highest frequency, followed by subjects in the "no/slight need" group with slight difference. Subjects in the "definite need for treatment" group showed the least frequency. Results also showed that self-perceived orthodontic treatment need of the subject of the study was heterogeneous (Table 5).

Variable	Number (N)	Percentage (%)
Socioeconomic Status		
Low	21	24.7
Middle	30	35.3
High	34	40.0
Self-Perceived Orthodontic Treatment Need		
No/slight need	30	35.3
Borderline/moderate need	31	36.5
Definite need for treatment	24	28.2

Table 5. Distribution of adolescents' socioeconomic status and self-perceived orthodontic treatment need.

After obtaining the frequency distribution data or the socioeconomic status and self-perceived orthodontic treatment need variables, we conducted a bivariate analysis to determine the association between the two variables. The data obtained was analyzed by Pearson's chi-square test.

		Self-perceived orthodontic treatment need						
		No/Slight Need		Borderline/Moderate Need		Definite Need		p
		N	%	N	%	N	%	
	Low	4	19.0	6	28.6	11	52.4	
Socioeconomic status	Middle	8	26.7	15	50.0	7	23.3	0.009
	High	18	52.9	10	29.4	6	17.6	
Gender	Male	15	33.3	15	33.3	15	33.3	0.537
	Female	15	37.5	16	40.0	9	22.5	

Table 6. Results of the bivariate analysis: distribution of adolescents' self-perceived orthodontic treatment needs according to socioeconomic status and gender.

Chi-square test; significance with p ≤ 0.05

As shown in Table 6, there are more subjects with low socioeconomic status than with middle and high socioeconomic status who were categorized into the "definite need" group. In addition, the majority of subjects with middle socioeconomic status were categorized into the "borderline/moderate need" group. Furthermore, only a few subjects with low socioeconomic status but more than half of them with high socioeconomic status were categorized into the "no/slight need" group, whereas more than half of subjects with high socioeconomic status were in "no/slight need" group. Results of the Pearson's chi-square test revealed a significant value of <0.05 (p = 0.009), indicating that there were statistically significant differences between socioeconomic status and self-perceived orthodontic treatment need. A bivariate analysis was also conducted to assess the relationship between gender and self-perceived orthodontic treatment need. The data obtained was analyzed by Pearson's chi-square test.

As shown in Table 6, there is an even distribution in terms of self-perceived orthodontic treatment need among the 45 male subjects. In addition, the proportion of research subjects with "no/slight need" for orthodontic treatment was equal among male and female subjects. Similarly, there was not much difference between the proportion of male and female subjects in the "borderline/moderate need" group. However, in the "definite need" group, there were more males than females. The Pearson's chi-square test results in table 6 show a significance value >0.05 (p = 0.537), indicating no statistically significant difference between gender and self-perceived orthodontic treatment need.

Discussion

This study demonstrated a statistically significant difference between socioeconomic status and self-perceived orthodontic treatment need among adolescents in Jakarta. This result is consistent with the studies conducted by Al-Sarheed et al. and Badran et al., in which socioeconomic status was reported as one of the determinants of self-perceived orthodontic treatment need.[12,20] In another study conducted by Rampersadh, it was observed that socioeconomic status can influence self-perceived orthodontic treatment need depending on the varied level of education and the access

to orthodontic treatment among the various socioeconomic status group.10 However, Kerosuo et al. reported a contradictory result that there is no significant difference between socioeconomic status and self-perceived orthodontic treatment need.11 This difference in the result may be due to the variation of the study population, wherein Kerosuo et al. implemented their study on high school students in Kuwait.

Results of the present study showed that the "definite need" group was dominated by subjects with low socioeconomic status, which is consistent with the study of Badran et al. who also reported that the majority of subjects with low socioeconomic status were confined to the "definite need" group.20 This finding may be attributed to the difficulty of the subjects in the low socioeconomic status group in obtaining orthodontic treatment. Socioeconomic status is a strong predictor of oral health just as it has been in most other aspects of wellness.21 Previous study stated that individuals with low socioeconomic status generally have difficulty in obtaining dental and oral health care.21,22 This could result in poor dental condition and poorly maintained malocclusion. These individuals often delay or even refuse treatment because of the high costs.21 In this study, poor dental conditions and poorly maintained malocclusion made the research subjects choose images that represent aesthetically poor dental conditions that are between images 8 and 10.

Furthermore, the study result showed the "borderline/moderate need" group was dominated by subjects with middle socioeconomic status. This is different from the study of Badran et al. who reported that the "borderline/moderate need" group was dominated by subjects with low socioeconomic status. This difference might have occurred due to the differences in the research methods. Badran et al. conducted their study in Jordan with subjects aged 13-17 years. Moreover, the research instrument that they used to measure socioeconomic status was an index developed specifically for the Jordanian population.20

The "no/slight need" group was dominated by subjects with high socioeconomic status, which might be because these subjects are generally able to receive dental and oral health care so that malocclusion can be prevented and the teeth could be in a fairly good condition. This good condition made the research subjects choose the IOTN-AC image with a fairly good dentition condition, which is between images 1 and 4.

Our data also demostrated a lack of statistically significant differences between gender and self- perceived orthodontic treatment need. This result is in line with that Marques et al. who reported a similar finding.8 Furthermore, Al-Zubair et al. reported that females had a higher perceived orthodontic treatment need than males.10 This might be due to the difference in the study population. Al-Zubair et al. conducted thir study on college students, implying that the age of the research subjects is different from our study.A limitation of this study was that it was conducted in a certain small area; therefore, further study is required representing a wider area of coverage, such as in the entire Jakarta or Indonesia. The continuation of this study in a wider area can be used as an input for policymakers to create strategies related to the access to oral health treatment, particularly orthodontic treatment.

Conclusions

The bivariate analysis conducted in this study demonstrated that there exist a statistically significant relationship between socioeconomic status and self-perceived orthodontic treatment need among adolescents in Jakarta. However, there was no significant relationship between gender and self-perceived orthodontic treatment need among the adolescents.

Acknowledgements

Declaration of Interest

The authors report no conflict of interest.

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