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ORIGINAL ARTICLE

Factors Affecting the Preference of Orthodontic Appliances Among Undergraduate Students in West Jakarta

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ABSTRACT

Malocclusion's negative impact is not only limited to dentofacial appearance but also related to quality of life. Nowadays, orthodontic treatment can be done using conventional fixed appliances, or removable appliances called clear aligners. The preference for orthodontic appliances can be affected by several factors, including patient characteristics, self-perception, psychosocial, and oral-disorder factors. **Objective:** This study aims to evaluate the factors affecting the preference for orthodontic appliances among undergraduate students in West Jakarta. **Methods:** In this cross-sectional study, 244 undergraduate students were retrieved by purposive sampling from 7 universities located in West Jakarta. A self-administered questionnaire was used to collect data, and logistic regression analysis was carried out. **Results:** Fixed orthodontic appliances were commonly used (79.5%), and the majority of treatment providers were orthodontists (64.8%). Students' belief that poor dental alignment is related to decreased social attractiveness was significantly associated with the preference for orthodontic appliances (p = 0.026; 95% CI = 1.170-11.317). Orthodontic treatment provider was significantly associated with a preference for orthodontic appliances (p = 0.000; 95% CI = 0.678-3.156). **Conclusion:** Fixed orthodontic appliances still become the main preference for malocclusion treatment among undergraduate students in West Jakarta. Besides that, the qualification of orthodontic treatment providers affects the preference for orthodontic appliances among undergraduate students in West Jakarta.

Key words: clear aligners, fixed orthodontic appliances, malocclusion, orthodontic treatment, preference

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INTRODUCTION

Malocclusion is considered as the misalignment of teeth and/or jaws that results from disorders in the dynamic process of craniofacial growth and development. This condition may cause psychosocial problems due to impaired dentofacial aesthetics such as difficulties of social interaction or disturbances in oral functions, such as mastication, swallowing and speech.[1] Untreated malocclusions are connected to an increased negative impact on the health profile and psychosocial aspects, while good dental appearance can lead to a better social function.[2] Malocclusion can be treated using orthodontic appliances, that is best carried out by an orthodontist in order to provide appropriate treatment.[3]

The upsurge in orthodontic treatment demand continuously rising based on awareness to improve dentofacial appearance and quality of life. Currently, orthodontic appliances are known to be divided into conventional fixed appliances (braces) or types of removable appliances commonly known as clear aligners.[3] Clear aligners was firstly introduced in 1997 (Invisalign, Align Technology, Santa Clara, CA) and have been evolving in material, design and software simulation.[4] Clear aligners provide more esthetic and comfortable treatment experience, simplify oral hygiene treatment, causing less pain as well as emergency visits as compared to fixed appliances. Despite the benefits and increased number of cases treated, it is improbable for clear aligners to treat all types of malocclusions. Clear aligners may be appropriate for mild to moderate crowding cases, but vigilance still needed in more complex cases.[5] Clear aligners is associated with shorter treatment, better periodontal health status, and lower risk of

root resorption, yet there were still indistinct results regarding pain.[6]

Orthodontic treatment uptake might be influenced by many predictors such as gender, socioeconomic class, type of financial responsibility, self-perception, and dissatisfaction with dental appearance.[7] Family income, cause of the problem, and self-esteem were also important attributes influencing patient decision to have orthodontic treatment.[8] Although many patients take personal appearance into consideration, preference of orthodontic appliance is also determined by financial issues.[9] Previous studies found that there are statistically significant differences in regard to pain, psychological discomfort, psychological disability, social ability and oral health quality of life between different groups of orthodontic treatment.[9,10] Less psychological discomfort, functional limitation, and physical disability were found in clear aligners users, though income level may impact pain perception and quality of life in populations with different socio-economic status.[9]

Preference for orthodontic appliances can also be associated with certain outcomes, including sleeping, absences for work or school, difficulties in daily psychosocial improvement, social performance, and concentration during work or studies.[11] Preference factors such as attractiveness, acceptability, or monetary value may also vary across different populations.[12] Although previous studies have examined the efficacy and efficiency of treatment using fixed appliances compared to clear aligners, yet there are still lack of findings regarding the characteristic or self-perception of user. This study aimed to evaluate the characteristic, self-perception, psychosocial and oral disorder factors affecting preference of orthodontic appliance among undergraduate students in West Jakarta.

METHODS

This cross-sectional study was conducted in October until December 2022. The seven main universities in West Jakarta based on the number of students body were included in the study population. In accordance with the minimum sample size calculation, the study sample consists of 244 undergraduate students receiving clear aligners or fixed orthodontic appliance, taken by purposive sampling. Following their informed consent, participants were asked to complete a validated and modified version of a previously published questionnaire[13] by completing the Google Forms (Google LLC, Mountain View, CA). Self-administered questionnaire that was sent through social media (WhatsApp or Instagram direct messenger) required participants to send photo of their orthodontic appliances. If there are any questions that the participant is unable to understand, the investigator is on hand to assist them throughout the process.

The questionnaire was organized into 4 sections representing characteristic of students, self-perception, psychosocial, and oral disorder factors. Characteristic of students consist of age, gender, study major, parents' educational level, parents' monthly income, provider of orthodontic appliances, first person who noticed the teeth misalignment, and suggested orthodontic treatment. This study was approved by the Ethics Committee of the Faculty of Dentistry Universitas Trisakti with the ethical clearance No.589/S1/KEPK/FKG/8/2022.

Data analysis

The statistical analysis was performed using the Statistical Package of the Social Sciences 24.0 (SPSS Inc., Chicago, IL). Descriptive statistics was obtained for all measured variables. Logistic regression was carried out to determine the preference of orthodontic appliance based on student' characteristic, self-perception, psychosocial, and oral disorder factors. A level of significance ($p < 0.05$; 95% CI) was used for the statistical test.

RESULTS

The distribution of students' characteristics was presented in Table 1. The majority of the students were female (71.7%), aged older than 20 years (65.2%), and undergoing study in non-medical faculty (63.5%). Based on parental educational level, 69.7% of the fathers and 68.4% of the mothers had completed at least a diploma degree or higher. Based on parental monthly income, 86.1% of the fathers and 47.5% of the mothers had monthly income higher than IDR 3,500,000. Most of the students used fixed orthodontic appliances (79.5%) and selected orthodontists as the providers of orthodontic treatment (64.8%). As much as 43% of students realized that they had teeth misalignment prior to treatment, while orthodontic treatment was mostly suggested by family, friends, or dentists (77.9%).

Logistic regression between self-perception factors and preference for orthodontic appliances was presented in Table 2. Student' awareness regarding their poor dental arrangement ($p = 0.222$; 95% CI = 0.582-10.315), their dissatisfaction of dental arrangement ($p = 0.227$; 95% CI = 0.743-3.495), the expectation that their appearance will improve after orthodontic treatment ($p = 0.646$; 95% CI = 0.182-15.581), as well as their self-confidence ($p = 0.805$; 95% CI = 0.436-2.917), were not significantly associated with their preference of orthodontic appliance.

Table 1. Characteristic of undergraduate students using orthodontic appliance in West Jakarta

Variables	n	%
Gender		
Female	175	71.7
Male	69	28.3
Age		
≤ 20 years	85	34.8
>20 years	159	65.2
Faculty		
Medical	89	36.5
Non-Medical	155	63.5
Father's education level		
Low - Intermediate	74	30.3
High	170	69.7
Mother's education level		
Low - Intermediate	77	31.6
High	167	68.4
Father's monthly income		
≤IDR 3,500,000	34	13.9
>IDR 3,500,000	210	86.1
Mother's monthly income		
≤IDR 3,500,000	128	52.5
>IDR 3,500,000	116	47.5
Provider of orthodontic appliances		
General Dentist	86	35.2
Orthodontist	158	64.8
First person who noticed teeth misalignment		
Myself	105	43.0
Others (family/friends/dentists)	139	57.0
First person who suggested orthodontic treatment		
Myself	54	22.1
Others (family/friends/dentists)	190	77.9
Type of orthodontic appliance used		
Fixed Orthodontic	194	79.5
Clear Aligners	50	20.5

Table 2. Association between self-perception factors and preference of orthodontic appliance among undergraduate students in West Jakarta

Questions	Fixed Orthodontic	Clear Aligners	p	Exp (B)	95% CI
Do you realize having poor dental arrangement?					
No	23 (11.9%)	3 (6%)			
Yes	171 (88.1%)	47 (94%)	0.222	2.449	0.582-10.315
Are you satisfied with your dental arrangement?					
No	146 (75.3%)	36 (72%)			
Yes	48 (24.7%)	14 (28%)	0.227	1.1611	0.743-3.495
Do you think your dental and facial appearance will improve after orthodontic treatment?					
No	9 (4.6%)	1 (2%)			
Yes	185 (95.4%)	49 (98%)	0.646	1.684	0.182-15.581
Do you think your self-confidence will improve after undergoing orthodontic treatment?					
No	33 (17%)	7 (14%)			
Yes	161 (83%)	43 (86%)	0.805	1.127	0.436-2.917
Total	194 (100%)	50 (100%)			

*p-value from logistic regression (<0.05)

Table 3. Association between psychosocial factors and preference of orthodontic appliance among undergraduate students in West Jakarta

Questions	Fixed Orthodontic	Clear Aligners	p	Exp (B)	95% CI
Are you sure that you will get good career opportunities after orthodontic treatment?					
No	96 (49.5%)	20 (40%)			
Yes	98 (50.5%)	30 (60%)	0.318	1.414	0.717-2.791
Do you expect good social interaction after orthodontic treatment?					
No	59 (30.4%)	15 (30%)			
Yes	135 (69.6%)	35 (70%)	0.256	0.643	0.300-1.378
Do you think poor dental alignment is related to decreased social attractiveness?					
No	43 (22.2%)	4 (8%)			
Yes	151 (77.8%)	46 (92%)	0.026*	3.638	1.170-11.317
Total	194 (100%)	50 (100%)			

Table 4. Association between oral disorder factors and preference of orthodontic appliance among undergraduate students in West Jakarta

Questions	Fixed Orthodontic	Clear Aligners	p	Exp (B)	95% CI
Do you have any problem while speaking?					
No	144 (74.2%)	35 (70%)			
Yes	50 (25.8%)	15 (30%)	0.211	1.626	0.759-3.484
Do you sense any pain/clicking sound around your ears (at the TMJ joint)?					
No	110 (56.7%)	34 (68%)			
Yes	84 (43.3%)	16 (32%)	0.068	0.504	0.241-1.052
Do you think your dental health will improve after orthodontic treatment?					
No	7 (3.6%)	3 (6%)			
Yes	187 (96.4%)	47 (94%)	0.475	0.592	0.140-2.499
Do you think your biting and chewing will improve after orthodontic treatment?					
No	39 (20.1%)	7 (14%)			
Yes	155 (79.9%)	43 (86%)	0.230	1.727	0.708-4.216
Total	194 (100%)	50 (100%)			

*p-value from logistic regression (<0.05)

Logistic regression between psychosocial factors and preference for orthodontic appliances was presented in Table 3. There was a significant association between awareness that poor dental alignment is related to decreased social attractiveness and preference for orthodontic appliances (p = 0.026). Students think that poor dental alignment is related to decreased social attractiveness and had higher number in the fixed orthodontic appliance group (3.638; 95% CI = 1.170-11.317).

Logistic regression between oral disorder factors and preference for orthodontic appliance was presented in Table 4. There was no significant association between any problem while speaking (p = 0.211; 95% CI = 0.759-3.484) or sense of pain/clicking sound around the temporomandibular joint (p = 0.068; 95% CI = 0.241-1.052), with the preference of orthodontic appliance. Student' beliefs regarding their dental health improvement (p = 0.475; 95% CI = 0.140-2.499), as well as their biting and chewing improvement (p = 0.230; 95% CI = 0.708-4.216), were also not significantly associated with preference of orthodontic appliance.

Multivariate analysis between student' characteristics and preference of orthodontic appliance was presented in Table 5. Logistic regression analysis revealed that most of characteristic variables were not significant in predicting preference of orthodontic appliances. The only significant predictor for preference of orthodontic appliances was provider of orthodontic appliances (p = 0.000; 95% CI = 0.678-3.156).

Table 5. Association between personal characteristics and preference of orthodontic appliance among undergraduate students in West Jakarta

Variables	Fixed Orthodontic	Clear Aligners	Total (100%)	p	Exp (B)	95% CI
Gender						
Female	145 (82.9)	30 (17.1)	175		1	
Male	49 (71.0)	20 (29.0)	69	0.092	1.974	0.895-4.353
Age						
≤ 20 years	68 (80.0)	17 (20.0)	85		1	
>20 years	126 (79.2)	33 (20.8)	159	0.729	0.874	0.409-1.867
Faculty						
Medical	76 (85.4)	13 (14.6)	89		1	
Non-Medical	118 (76.1)	37 (23.9)	155	0.332	1.463	0.678-3.156
Father's education level						
Low - Intermediate	56 (75.7)	18 (24.3)	74		1	
High	138 (81.2)	32 (18.8)	170	0.101	0.357	0.104-1.224
Mother's education level						
Low - Intermediate	60 (77.9)	17 (22.1)	77		1	
High	134 (80.2)	33 (19.8)	167	0.827	0.871	0.254-2.988
Father's monthly income						
≤IDR 3,500,000	31 (91.2)	3 (8.8)	34		1	
>IDR 3,500,000	163 (77.6)	47 (22.4)	210	0.308	2.094	0.506-8.670
Mother's monthly income						
≤IDR 3,500,000	106 (82.8)	22 (17.2)	128		1	
>IDR 3,500,000	88 (75.9)	28 (24.1)	116	0.419	1.362	0.644-2.881
Provider of orthodontic appliances						
General Dentist	82 (95.3)	4 (4.7)	86		1	
Orthodontist	112 (70.9)	46 (29.1)	158	0.000*	11.574	0.678-3.156
First person who noticed teeth misalignment						
Myself	79 (75.2)	26 (24.8)	105		1	
Others (family/friends/dentists)	115 (82.7)	24 (17.3)	139	0.252	0.625	0.280-1.397
First person who suggested orthodontic treatment						
Myself	40 (74.1)	14 (25.9)	54		1	
Others (family/friends/dentists)	154 (81.1)	36 (18.9)	190	0.173	0.510	0.193-1.343

*p-value from logistic regression (<0.05)

DISCUSSION

According to this study, the majority of undergraduate students undergoing orthodontic treatment were female, aged older than 20 years, and undergoing study in non-medical faculty. Based on parental educational level, majority had completed at least diploma degree or higher. Based on parental monthly income, majority of the fathers had high monthly income but on the contrary majority of the mothers had low monthly income. Most of students using fixed orthodontic appliance and selected orthodontist as the provider of orthodontic treatment. Several studies showed that women have a significantly higher rate of interest in orthodontic treatment,[7,14] and were incline to choose clear aligners as orthodontic treatment.[15,16] Decision for orthodontic treatment is generally based on esthetic improvement, other than physical and oral health well-being. The interest and consideration in women due to orthodontic treatment may be caused by higher aesthetic standards and self-perception.[2,15] Since family income was suspected as the main influencing factor in preference of orthodontic appliance, special attention was given to that variable by classifying the family income according to Indonesian Central Agency

on Statistics classification on Indonesian population monthly income[17] and also dividing parents' income to the single income or double income.

Student awareness regarding their self-perception factors, the psychosocial aspects, and oral disorder factors were not associated with preference of orthodontic appliance. That finding is consistent with earlier research that found there is currently not enough evidence to identify a decisive element in relation to patient's preference for one orthodontic appliance over another.[11]

Multivariate analysis showed that there was no significant association between age, study major, parents' educational level, and parents' monthly income, with preference of orthodontic appliance. This finding is in contrast with previous study that stated family income, cause of the problem, age and self-esteem were found to be the most important attributes influencing patient decision in orthodontic treatment.[8]

Based on the orthodontic treatment, most of students were using fixed orthodontic appliance. It is known that clear aligner is not effective in controlling several cases such as anterior extrusion movement or rotations. Clear aligners also require the use of other auxiliaries such as attachments, inter-arch elastics, or altered aligner geometries to improve the predictability of orthodontic movement.[18] All these considerations might affect students' decision in determining treatment options. Though a prediction of interest in European Union found that Invisalign was chosen to represent all orthodontic aligners as the most searched term in Google Trends, there might be different results in developing countries.[19] Majority of orthodontists currently use clear aligners in their practice stated that it was not because they believe clear aligners are more effective or more comfortable than braces or because they are more profitable, but rather to have prestige in the community and not to lag behind in technology. Therefore, it seems that fixed appliance treatment will maintain its place in orthodontic practice as an option for the near future.[20]

This study found a significant association between provider of orthodontic treatment with preference of orthodontic appliance. Orthodontist had become the most choices among undergraduate students in West Jakarta, and higher number of them underwent fixed orthodontic appliance. Patients with the highest level of interest in pursuing orthodontic care tend to prefer orthodontists, primarily because of treatment quality.[21] Orthodontists were seen as being better at identifying and managing complications as well as delivering reliable results. Patients with higher educational level and incomes preferred treatment by orthodontists although they knew that they would be charged up. Preference for care by orthodontists was based on functional reasons and anticipating complications.[22]

This study showed that the undergraduate students in West Jakarta self-awareness regarding malocclusion and the needs to seek orthodontic treatment is still rather low. That finding suggest that orthodontists in West Jakarta need to be more proactive in public campaign regarding awareness about malocclusion and orthodontic treatment. However, when they seek orthodontic treatment, they already have a good understanding to have the treatment done by orthodontic specialists.

The main limitation of this study was the small sample size and only taken from several universities in West Jakarta, which might be insufficient to represent the general population of undergraduate students. Further research with larger and more representative samples to evaluate the preference of orthodontic appliance is required. Other variables such as ethnicity, daily oral hygiene practice, treatment expenses, and dental health insurance, need to be investigated.

CONCLUSION

The findings in this study indicate that fixed orthodontic appliance still become the main preference for malocclusion treatment among undergraduate students in West Jakarta. Besides that, qualification of orthodontic treatment provider affecting the preference of orthodontic appliances among undergraduate students in West Jakarta.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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ORIGINAL ARTICLE

Factors Affecting the Preference of Orthodontic Appliances Among Undergraduate Students in West Jakarta

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ABSTRACT

Malocclusion's negative impact is not only limited to dentofacial appearance but also related to quality of life. Nowadays, orthodontic treatment can be done using conventional fixed appliances, or removable appliances called clear aligners. The preference for orthodontic appliances can be affected by several factors, including patient characteristics, self-perception, psychosocial, and oral-disorder factors. **Objective:** This study aims to evaluate the factors affecting the preference for orthodontic appliances among undergraduate students in West Jakarta. **Methods:** In this cross-sectional study, 244 undergraduate students were retrieved by purposive sampling from 7 universities located in West Jakarta. A self-administered questionnaire was used to collect data, and logistic regression analysis was carried out. **Results:** Fixed orthodontic appliances were commonly used (79.5%), and the majority of treatment providers were orthodontists (64.8%). Students' belief that poor dental alignment is related to decreased social attractiveness was significantly associated with the preference for orthodontic appliances (p = 0.026; 95% CI = 1.170-11.317). Orthodontic treatment provider was significantly associated with a preference for orthodontic appliances (p = 0.000; 95% CI = 0.678-3.156). **Conclusion:** Fixed orthodontic appliances still become the main preference for malocclusion treatment among undergraduate students in West Jakarta. Besides that, the qualification of orthodontic treatment providers affects the preference for orthodontic appliances among undergraduate students in West Jakarta.

Key words: clear aligners, fixed orthodontic appliances, malocclusion, orthodontic treatment, preference

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INTRODUCTION

Malocclusion is considered as the misalignment of teeth and/or jaws that results from disorders in the dynamic process of craniofacial growth and development. This condition may cause psychosocial problems due to impaired dentofacial aesthetics such as difficulties of social interaction or disturbances in oral functions, such as mastication, swallowing and speech.[1] Untreated malocclusions are connected to an increased negative impact on the health profile and psychosocial aspects, while good dental appearance can lead to a better social function.[2] Malocclusion can be treated using orthodontic appliances, that is best carried out by an orthodontist in order to provide appropriate treatment.[3]

The upsurge in orthodontic treatment demand continuously rising based on awareness to improve dentofacial appearance and quality of life. Currently, orthodontic appliances are known to be divided into conventional fixed appliances (braces) or types of removable appliances commonly known as clear aligners.[3] Clear aligners was firstly introduced in 1997 (Invisalign, Align Technology, Santa Clara, CA) and have been evolving in material, design and software simulation.[4] Clear aligners provide more esthetic and comfortable treatment experience, simplify oral hygiene treatment, causing less pain as well as emergency visits as compared to fixed appliances. Despite the benefits and increased number of cases treated, it is improbable for clear aligners to treat all types of malocclusions. Clear aligners may be appropriate for mild to moderate crowding cases, but vigilance still needed in more complex cases.[5] Clear aligners is associated with shorter treatment, better periodontal health status, and lower risk of

root resorption, yet there were still indistinct results regarding pain.[6]

Orthodontic treatment uptake might be influenced by many predictors such as gender, socioeconomic class, type of financial responsibility, self-perception, and dissatisfaction with dental appearance.[7] Family income, cause of the problem, and self-esteem were also important attributes influencing patient decision to have orthodontic treatment.[8] Although many patients take personal appearance into consideration, preference of orthodontic appliance is also determined by financial issues.[9] Previous studies found that there are statistically significant differences in regard to pain, psychological discomfort, psychological disability, social ability and oral health quality of life between different groups of orthodontic treatment.[9,10] Less psychological discomfort, functional limitation, and physical disability were found in clear aligners users, though income level may impact pain perception and quality of life in populations with different socio-economic status.[9]

Preference for orthodontic appliances can also be associated with certain outcomes, including sleeping, absences for work or school, difficulties in daily psychosocial improvement, social performance, and concentration during work or studies.[11] Preference factors such as attractiveness, acceptability, or monetary value may also vary across different populations.[12] Although previous studies have examined the efficacy and efficiency of treatment using fixed appliances compared to clear aligners, yet there are still lack of findings regarding the characteristic or self-perception of user. This study aimed to evaluate the characteristic, self-perception, psychosocial and oral disorder factors affecting preference of orthodontic appliance among undergraduate students in West Jakarta.

METHODS

This cross-sectional study was conducted in October until December 2022. The seven main universities in West Jakarta based on the number of students body were included in the study population. In accordance with the minimum sample size calculation, the study sample consists of 244 undergraduate students receiving clear aligners or fixed orthodontic appliance, taken by purposive sampling. Following their informed consent, participants were asked to complete a validated and modified version of a previously published questionnaire[13] by completing the Google Forms (Google LLC, Mountain View, CA). Self-administered questionnaire that was sent through social media (WhatsApp or Instagram direct messenger) required participants to send photo of their orthodontic appliances. If there are any questions that the participant is unable to understand, the investigator is on hand to assist them throughout the process.

The questionnaire was organized into 4 sections representing characteristic of students, self-perception, psychosocial, and oral disorder factors. Characteristic of students consist of age, gender, study major, parents' educational level, parents' monthly income, provider of orthodontic appliances, first person who noticed the teeth misalignment, and suggested orthodontic treatment. This study was approved by the Ethics Committee of the Faculty of Dentistry Universitas Trisakti with the ethical clearance No.589/S1/KEPK/FKG/8/2022.

Data analysis

The statistical analysis was performed using the Statistical Package of the Social Sciences 24.0 (SPSS Inc., Chicago, IL). Descriptive statistics was obtained for all measured variables. Logistic regression was carried out to determine the preference of orthodontic appliance based on student' characteristic, self-perception, psychosocial, and oral disorder factors. A level of significance ($p < 0.05$; 95% CI) was used for the statistical test.

RESULTS

The distribution of students' characteristics was presented in Table 1. The majority of the students were female (71.7%), aged older than 20 years (65.2%), and undergoing study in non-medical faculty (63.5%). Based on parental educational level, 69.7% of the fathers and 68.4% of the mothers had completed at least a diploma degree or higher. Based on parental monthly income, 86.1% of the fathers and 47.5% of the mothers had monthly income higher than IDR 3,500,000. Most of the students used fixed orthodontic appliances (79.5%) and selected orthodontists as the providers of orthodontic treatment (64.8%). As much as 43% of students realized that they had teeth misalignment prior to treatment, while orthodontic treatment was mostly suggested by family, friends, or dentists (77.9%).

Logistic regression between self-perception factors and preference for orthodontic appliances was presented in Table 2. Student' awareness regarding their poor dental arrangement ($p = 0.222$; 95% CI = 0.582-10.315), their dissatisfaction of dental arrangement ($p = 0.227$; 95% CI = 0.743-3.495), the expectation that their appearance will improve after orthodontic treatment ($p = 0.646$; 95% CI = 0.182-15.581), as well as their self-confidence ($p = 0.805$; 95% CI = 0.436-2.917), were not significantly associated with their preference of orthodontic appliance.

Table 1. Characteristic of undergraduate students using orthodontic appliance in West Jakarta

Variables	n	%
Gender		
Female	175	71.7
Male	69	28.3
Age		
≤ 20 years	85	34.8
>20 years	159	65.2
Faculty		
Medical	89	36.5
Non-Medical	155	63.5
Father's education level		
Low - Intermediate	74	30.3
High	170	69.7
Mother's education level		
Low - Intermediate	77	31.6
High	167	68.4
Father's monthly income		
≤IDR 3,500,000	34	13.9
>IDR 3,500,000	210	86.1
Mother's monthly income		
≤IDR 3,500,000	128	52.5
>IDR 3,500,000	116	47.5
Provider of orthodontic appliances		
General Dentist	86	35.2
Orthodontist	158	64.8
First person who noticed teeth misalignment		
Myself	105	43.0
Others (family/friends/dentists)	139	57.0
First person who suggested orthodontic treatment		
Myself	54	22.1
Others (family/friends/dentists)	190	77.9
Type of orthodontic appliance used		
Fixed Orthodontic	194	79.5
Clear Aligners	50	20.5

Table 2. Association between self-perception factors and preference of orthodontic appliance among undergraduate students in West Jakarta

Questions	Fixed Orthodontic	Clear Aligners	p	Exp (B)	95% CI
Do you realize having poor dental arrangement?					
No	23 (11.9%)	3 (6%)			
Yes	171 (88.1%)	47 (94%)	0.222	2.449	0.582-10.315
Are you satisfied with your dental arrangement?					
No	146 (75.3%)	36 (72%)			
Yes	48 (24.7%)	14 (28%)	0.227	1.1611	0.743-3.495
Do you think your dental and facial appearance will improve after orthodontic treatment?					
No	9 (4.6%)	1 (2%)			
Yes	185 (95.4%)	49 (98%)	0.646	1.684	0.182-15.581
Do you think your self-confidence will improve after undergoing orthodontic treatment?					
No	33 (17%)	7 (14%)			
Yes	161 (83%)	43 (86%)	0.805	1.127	0.436-2.917
Total	194 (100%)	50 (100%)			

*p-value from logistic regression (<0.05)

Table 3. Association between psychosocial factors and preference of orthodontic appliance among undergraduate students in West Jakarta

Questions	Fixed Orthodontic	Clear Aligners	p	Exp (B)	95% CI
Are you sure that you will get good career opportunities after orthodontic treatment?					
No	96 (49.5%)	20 (40%)			
Yes	98 (50.5%)	30 (60%)	0.318	1.414	0.717-2.791
Do you expect good social interaction after orthodontic treatment?					
No	59 (30.4%)	15 (30%)			
Yes	135 (69.6%)	35 (70%)	0.256	0.643	0.300-1.378
Do you think poor dental alignment is related to decreased social attractiveness?					
No	43 (22.2%)	4 (8%)			
Yes	151 (77.8%)	46 (92%)	0.026*	3.638	1.170-11.317
Total	194 (100%)	50 (100%)			

Table 4. Association between oral disorder factors and preference of orthodontic appliance among undergraduate students in West Jakarta

Questions	Fixed Orthodontic	Clear Aligners	p	Exp (B)	95% CI
Do you have any problem while speaking?					
No	144 (74.2%)	35 (70%)			
Yes	50 (25.8%)	15 (30%)	0.211	1.626	0.759-3.484
Do you sense any pain/clicking sound around your ears (at the TMJ joint)?					
No	110 (56.7%)	34 (68%)			
Yes	84 (43.3%)	16 (32%)	0.068	0.504	0.241-1.052
Do you think your dental health will improve after orthodontic treatment?					
No	7 (3.6%)	3 (6%)			
Yes	187 (96.4%)	47 (94%)	0.475	0.592	0.140-2.499
Do you think your biting and chewing will improve after orthodontic treatment?					
No	39 (20.1%)	7 (14%)			
Yes	155 (79.9%)	43 (86%)	0.230	1.727	0.708-4.216
Total	194 (100%)	50 (100%)			

*p-value from logistic regression (<0.05)

Logistic regression between psychosocial factors and preference for orthodontic appliances was presented in Table 3. There was a significant association between awareness that poor dental alignment is related to decreased social attractiveness and preference for orthodontic appliances (p = 0.026). Students think that poor dental alignment is related to decreased social attractiveness and had higher number in the fixed orthodontic appliance group (3.638; 95% CI = 1.170-11.317).

Logistic regression between oral disorder factors and preference for orthodontic appliance was presented in Table 4. There was no significant association between any problem while speaking (p = 0.211; 95% CI = 0.759-3.484) or sense of pain/clicking sound around the temporomandibular joint (p = 0.068; 95% CI = 0.241-1.052), with the preference of orthodontic appliance. Student' beliefs regarding their dental health improvement (p = 0.475; 95% CI = 0.140-2.499), as well as their biting and chewing improvement (p = 0.230; 95% CI = 0.708-4.216), were also not significantly associated with preference of orthodontic appliance.

Multivariate analysis between student' characteristics and preference of orthodontic appliance was presented in Table 5. Logistic regression analysis revealed that most of characteristic variables were not significant in predicting preference of orthodontic appliances. The only significant predictor for preference of orthodontic appliances was provider of orthodontic appliances (p = 0.000; 95% CI = 0.678-3.156).

Table 5. Association between personal characteristics and preference of orthodontic appliance among undergraduate students in West Jakarta

Variables	Fixed Orthodontic	Clear Aligners	Total (100%)	p	Exp (B)	95% CI
Gender						
Female	145 (82.9)	30 (17.1)	175		1	
Male	49 (71.0)	20 (29.0)	69	0.092	1.974	0.895-4.353
Age						
≤ 20 years	68 (80.0)	17 (20.0)	85		1	
>20 years	126 (79.2)	33 (20.8)	159	0.729	0.874	0.409-1.867
Faculty						
Medical	76 (85.4)	13 (14.6)	89		1	
Non-Medical	118 (76.1)	37 (23.9)	155	0.332	1.463	0.678-3.156
Father's education level						
Low - Intermediate	56 (75.7)	18 (24.3)	74		1	
High	138 (81.2)	32 (18.8)	170	0.101	0.357	0.104-1.224
Mother's education level						
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High	134 (80.2)	33 (19.8)	167	0.827	0.871	0.254-2.988
Father's monthly income						
≤IDR 3,500,000	31 (91.2)	3 (8.8)	34		1	
>IDR 3,500,000	163 (77.6)	47 (22.4)	210	0.308	2.094	0.506-8.670
Mother's monthly income						
≤IDR 3,500,000	106 (82.8)	22 (17.2)	128		1	
>IDR 3,500,000	88 (75.9)	28 (24.1)	116	0.419	1.362	0.644-2.881
Provider of orthodontic appliances						
General Dentist	82 (95.3)	4 (4.7)	86		1	
Orthodontist	112 (70.9)	46 (29.1)	158	0.000*	11.574	0.678-3.156
First person who noticed teeth misalignment						
Myself	79 (75.2)	26 (24.8)	105		1	
Others (family/friends/dentists)	115 (82.7)	24 (17.3)	139	0.252	0.625	0.280-1.397
First person who suggested orthodontic treatment						
Myself	40 (74.1)	14 (25.9)	54		1	
Others (family/friends/dentists)	154 (81.1)	36 (18.9)	190	0.173	0.510	0.193-1.343

*p-value from logistic regression (<0.05)

DISCUSSION

According to this study, the majority of undergraduate students undergoing orthodontic treatment were female, aged older than 20 years, and undergoing study in non-medical faculty. Based on parental educational level, majority had completed at least diploma degree or higher. Based on parental monthly income, majority of the fathers had high monthly income but on the contrary majority of the mothers had low monthly income. Most of students using fixed orthodontic appliance and selected orthodontist as the provider of orthodontic treatment. Several studies showed that women have a significantly higher rate of interest in orthodontic treatment,[7,14] and were incline to choose clear aligners as orthodontic treatment.[15,16] Decision for orthodontic treatment is generally based on esthetic improvement, other than physical and oral health well-being. The interest and consideration in women due to orthodontic treatment may be caused by higher aesthetic standards and self-perception.[2,15] Since family income was suspected as the main influencing factor in preference of orthodontic appliance, special attention was given to that variable by classifying the family income according to Indonesian Central Agency

on Statistics classification on Indonesian population monthly income[17] and also dividing parents' income to the single income or double income.

Student awareness regarding their self-perception factors, the psychosocial aspects, and oral disorder factors were not associated with preference of orthodontic appliance. That finding is consistent with earlier research that found there is currently not enough evidence to identify a decisive element in relation to patient's preference for one orthodontic appliance over another.[11]

Multivariate analysis showed that there was no significant association between age, study major, parents' educational level, and parents' monthly income, with preference of orthodontic appliance. This finding is in contrast with previous study that stated family income, cause of the problem, age and self-esteem were found to be the most important attributes influencing patient decision in orthodontic treatment.[8]

Based on the orthodontic treatment, most of students were using fixed orthodontic appliance. It is known that clear aligner is not effective in controlling several cases such as anterior extrusion movement or rotations. Clear aligners also require the use of other auxiliaries such as attachments, inter-arch elastics, or altered aligner geometries to improve the predictability of orthodontic movement.[18] All these considerations might affect students' decision in determining treatment options. Though a prediction of interest in European Union found that Invisalign was chosen to represent all orthodontic aligners as the most searched term in Google Trends, there might be different results in developing countries.[19] Majority of orthodontists currently use clear aligners in their practice stated that it was not because they believe clear aligners are more effective or more comfortable than braces or because they are more profitable, but rather to have prestige in the community and not to lag behind in technology. Therefore, it seems that fixed appliance treatment will maintain its place in orthodontic practice as an option for the near future.[20]

This study found a significant association between provider of orthodontic treatment with preference of orthodontic appliance. Orthodontist had become the most choices among undergraduate students in West Jakarta, and higher number of them underwent fixed orthodontic appliance. Patients with the highest level of interest in pursuing orthodontic care tend to prefer orthodontists, primarily because of treatment quality.[21] Orthodontists were seen as being better at identifying and managing complications as well as delivering reliable results. Patients with higher educational level and incomes preferred treatment by orthodontists although they knew that they would be charged up. Preference for care by orthodontists was based on functional reasons and anticipating complications.[22]

This study showed that the undergraduate students in West Jakarta self-awareness regarding malocclusion and the needs to seek orthodontic treatment is still rather low. That finding suggest that orthodontists in West Jakarta need to be more proactive in public campaign regarding awareness about malocclusion and orthodontic treatment. However, when they seek orthodontic treatment, they already have a good understanding to have the treatment done by orthodontic specialists.

The main limitation of this study was the small sample size and only taken from several universities in West Jakarta, which might be insufficient to represent the general population of undergraduate students. Further research with larger and more representative samples to evaluate the preference of orthodontic appliance is required. Other variables such as ethnicity, daily oral hygiene practice, treatment expenses, and dental health insurance, need to be investigated.

CONCLUSION

The findings in this study indicate that fixed orthodontic appliance still become the main preference for malocclusion treatment among undergraduate students in West Jakarta. Besides that, qualification of orthodontic treatment provider affecting the preference of orthodontic appliances among undergraduate students in West Jakarta.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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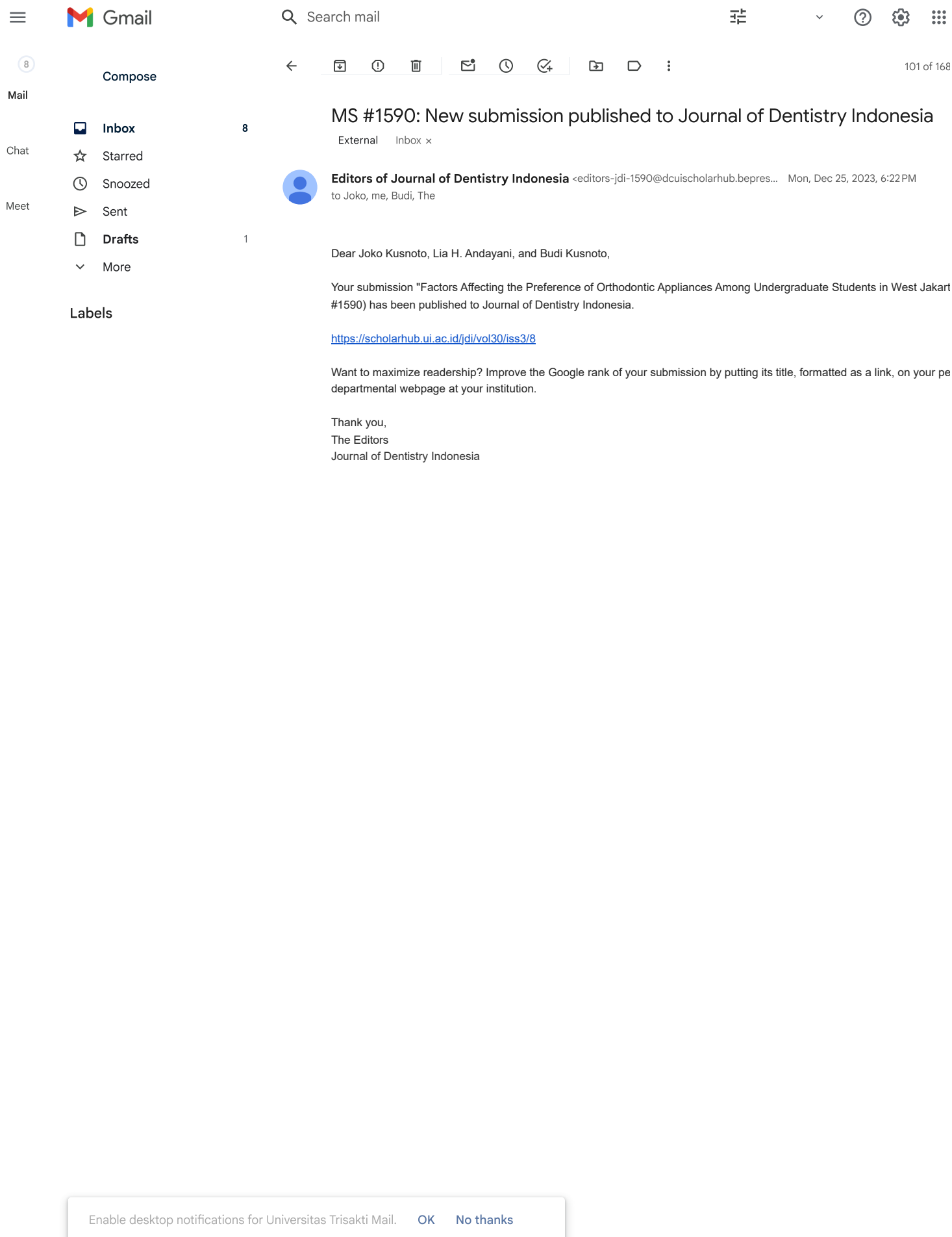
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