

Factors Influencing Demand for Orthodontic Treatment in a Group of Secondary School Students in Bangkok

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Abstract

Demand or self-perceived need for Orthodontic Treatment (OT) is increasing in Thailand as in many other countries especially in adolescents, on which most OT is carried out. Planning of OT for adolescents requires information on factors influencing the demand for OT; in Bangkok, these factors have not yet been adequately studied. The objectives of this study were to assess the factors that influenced demand for OT in a group of secondary school students in Bangkok as well as to compare the demand for OT between genders. A cross-sectional study was conducted of 450 students aged 12 - 14 years in three government secondary schools in Bangkok, Thailand. A constructed questionnaire was used to assess demand for OT and factors influencing that demand. Most of the students (74.0 %) requested OT. Females demanded OT more than males (male 66.1 % and female 78.7 %, $p = 0.003$). Genders, regular dental check-ups, awareness of malocclusion and aesthetic reasons were factors influencing the demand for OT.

Key words: Demand for OT; Factors influencing demand for OT; Orthodontic treatment (OT)

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Introduction

Interest in Orthodontic Treatment (OT) and the provision of orthodontic care for dental patients has increased considerably in recent years, and demand or self-perceived need for OT is also growing especially in adolescents, who think that wearing colourful orthodontic appliance makes them look fashionable.^{1,2} Some people who desire to have OT are unaware of the basic risks and problems. That could occur such as, discomfort, dislike of their appliances, dental caries and periodontal disease. Patient cooperation is an essential factor in the timely successful outcome of orthodontic treatment.^{2,3} Most OTs are carried out on adolescents because the prevalence of malocclusions increases between the ages of 11 and 16 years, and adolescence is a period in which important physical, social, and emotional changes occur.⁴ Linn⁵ indicated that this was the period in which children paid more attention to dental alignment. They were able to answer questionnaires and make decisions independently on aesthetic improvement and self-perception of the demand for OT.^{6,7} The major factors determining demand for OT may be broadly described as aesthetic, functional, financial, and social etiological factors.^{8,9} Many previous studies have suggested that sociopsychological factors play a major role in motivating people to undergo OT, and it is obvious that teenagers, desiring to be like their peers or wishing to be a part of the same reference group, are striving for similarity and closeness with other group members.¹⁰⁻¹² A questionnaire study by Fox *et al*¹³ found that aesthetics and dissatisfaction with dental appearance were of greater concern to children seeking OT than to other children. There have been many studies examining demand, but few researches have been carried out in Thailand. Sunthornlohanakul and Thitasomakul studied the demand and knowledge in a group of patients and their parents in Hat Yai, Songkla,¹⁴ and found that demand from the patients mostly arose from suggestions of dentists or from the patients themselves. Pruetiworanun¹⁵ studied 12 - 14 year old students

in Chiang Mai and Utaradit and found that demand for OT was higher from the students in Chiang Mai than from those in Utaradit, and found that there was a relationship between demand and need for OT, but his findings were not in agreement with the study by Sukthawee *et al* of 12-to-14-year-old students in Hat Yai, Songkla.¹⁶ These studies were carried out in rural areas where there were orthodontists working only in the developing parts; in fact, there was no orthodontist working in Utaradit at the time of these studies.¹⁷ Factors related to higher demand for orthodontic treatment include sex, desire to wear orthodontic appliances in order to be fashionable, a wish to be like their peers, and aesthetic reasons. Palanuparph and Sirichompun² found in their study of a group of Thai patients that factors associated with the patients' demand for OT included satisfaction with tooth alignment, an understanding of normal dental alignment, a perception of maxillary dental protrusion, and experiences of being teased which detracted from their self-confidence and satisfaction with their tooth alignment. In the past, OT was limited to people who had moderate to high socio-economic status; currently, however, orthodontists are more numerous, and the general public can easily get knowledge and information about OT from many sources. Hence, the influencing factors that affect demand for OT may be very different from those of previous times.

The purposes of this present study were 1) to assess some of the factors influencing demand for OT and 2) to compare the demand for OT between genders.

Materials and Methods

This cross-sectional study was approved by the Research Ethics Committee, Rajavithi Hospital, Bangkok, Thailand. It was conducted in three government secondary schools with permission from the principals and the educational authorities. Purposive sampling technique was used because these schools have equally

educational standard and students have similar socio-economic status. Sample size was calculated using estimated single proportion formula. This study used 46.7 % of demand for OT,¹⁶ and the 5 % precision of estimation was indicated. Minimally required samples were 383 students, 20 % dropping out were added. Totally 450 students were recruited. In this study, samples consisted of 450 subjects (168 males, 282 females), all of whom were between 12 and 14 years old. They were randomly selected in the cluster sampling manner by school teachers according to the following criteria: all permanent teeth were erupted except third molars; no history of OT; and no history of extractions for OT. All students were given permission by their parents or guardians, and written informed consent was obtained. Questionnaires were distributed to the students based on the subjects' demographic background, dental history, factors that indicated dental health and aesthetic matters, and demand for OT. The questionnaires were divided into multiple choices, yes/no, and open-ended questions. Some questionnaires were constructed by the author and some were derived from previous studies.^{13-16,18} They were revised, and their reliability was tested by using them with a group of thirty dental patients of the same age group from Rajavithi Hospital, a private hospital, and some dental clinics. Cronbach's alpha coefficient of the questionnaires was 0.89. The questionnaires were answered in the school meeting room by the subjects in attendance on that day. Two dental assistants were available to clarify any questions.

The critical statistic for this research was the determination of the factors influencing demand for OT shown as their relationships to demand for OT. All statistical analyses were carried out using Statistical Package for Social Science program for Windows version 16 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics such as frequency, mean and percentage were used to describe demographic information such as gender, age, GPA, family income, regular dental check-ups, awareness of malocclusion, treatment suggestion, dental trauma from accident, and functional and aesthetic factors that

were associated with demand for OT. Univariate comparisons of the variables and demand for OT were made using the Pearson Chi-square test. Multivariate regression was used to assess the association between factors and the demand for OT. To minimize nonassociated factors in this analysis, more than five functional and aesthetic factors were included in the analysis. Odds ratio and 95 % confidence interval (95 % CI) were presented. Statistical significance was set at *p*-value less than 0.05.

Results

Four hundred and fifty-two students participated in this study, but 2 were excluded because one had had previous OT, and the other was over 15 years old. Therefore, 450 children (282 females, 168 males) were recruited, between the ages of 12 and 14 years old with a modal age of 13 years 11 months. The students' demographic information and their relationship with demand for OT are given in Table 1.

As it can be seen in the statistical analysis in Table 1, the demand for OT was significantly associated with demographic information including gender, GPA, regular dental check-ups, awareness of malocclusion, and treatment suggestion. With regard to gender as a factor influencing the demand for OT, there was a significantly higher demand among females than among males (male 66.1 % and female 78.7 %, *p* = 0.003). The students, who had GPA 2.5 - 2.9, had more demand than the other groups. Concerning regular dental check-ups demands among the students, who never went to see a dentist, showed highly significant difference in demand for OT more than the other two groups (never 80 %, every 6 months 61.1 %, and when a problem occurred 77.4 %, *p* = 0.002). Regarding "awareness of malocclusion" which referred to students who had been aware of the deviation of their teeth or malocclusion before the dentist pointed it out, it was found that there was a highly significant difference in demand for OT between the group which answered "yes" and the one which answered "no" (the students who were aware of

malocclusion had demand for OT 84.0 %, the students who were not aware of malocclusion had demand for OT 44.2 %, $p < 0.001$).

The students who were aware of their malocclusion were more likely to request OT than those who were not. With respect to “treatment suggestion” which referred to patients who were informed of problems, more demand was found in students who did not have treatment suggestion compared to those in the group who did, and this difference was significant (Students who had treatment suggestion, had demand for OT 57.5 % whereas students who did not have it, had demand for

OT 86.2 %, $p < 0.001$). In view of “dental trauma from accident” which referred to history of trauma to the permanent teeth from falling, playing or sporting. Protruded incisors as in Class II Division 1 malocclusion, can make the patients more prone to trauma than well-aligned incisors. Accident trauma might cause incisor trauma, involving the maxillary and mandibular permanent incisors were crack or fracture. There was no significant difference in demand for OT between the students who had dental trauma from accident and the students who did not.

Table 1 Demographic information of 450 students and their relationships to demand for OT

Factors	Total (N = 450)	Demand		<i>p</i>
		No N = 117 (26.0)	Yes N = 333 (74.0)	
Gender				0.003*
Male	168	57 (33.9)	111 (66.1)	
Female	282	60 (21.3)	222 (78.7)	
Age (years)	13.11 ± 0.80	13.13 ± 0.80	13.10 ± 0.80	0.793
GPA				0.005*
< 2.5	30	10 (33.3)	20 (66.7)	
2.5 - 2.9	52	9 (17.3)	43 (82.7)	
3.0 - 3.49	110	22 (20.0)	88 (80.0)	
≥ 3.5	230	69 (30.0)	161 (70.0)	
Missing data	28			
Family income/month				0.123
< 20,000	135	27 (20.0)	108 (80.0)	
20,000 - 49,999	158	45 (28.5)	113 (71.5)	
50,000 - 100,000	106	34 (32.1)	72 (67.9)	
> 100,000	44	9 (20.5)	35 (79.5)	
Missing data	7			
Regular dental check-up				0.002*
Never	80	16 (20.0)	64 (80.0)	
Every 6 month	108	42 (38.9)	66 (61.1)	
When problems occurred	261	59 (22.6)	202 (77.4)	
Missing data	1			

Table 1 (Continued)

Factors	Total (N = 450)	Demand		<i>p</i>
		No N = 117 (26.0)	Yes N = 333 (74.0)	
Awareness of malocclusion				< 0.001*
Yes	337	54 (16.0)	283 (84.0)	
No	107	61 (57.0)	46 (43.0)	
Missing data	6			
Treatment suggestion				< 0.001*
Yes	179	76 (42.5)	103 (57.5)	
No	261	36 (13.8)	225 (86.2)	
Missing data	10			
Dental trauma from accident				0.472
Yes	78	19 (24.4)	59 (75.6)	
No	363	93 (25.6)	270 (74.4)	
Missing data	9			

Data were represented as number (%)

*Significance at $p < 0.05$

An association between functional and aesthetic factors and demand for OT was observed. Students were asked about the functional and aesthetic factors indicating demand for OT. The comparison between the functional, aesthetic factors and the demand for OT was assessed, and the findings are shown in Tables 2 and 3. Most of the 10 functional factors had a strong relationship with demand for OT with the exception of lower front teeth bite on palate. Eighty-seven students (26.1 %) gave more than five factors, and this was strongly related to demand for OT. All 10 aesthetic factors had strong relationships with demand for OT. Two hundred and thirteen students (64.6 %) gave more than five factors, and this was strongly related to demand for OT.

Multivariate regression analysis was used to test the association between functional and aesthetic factors and the demand for OT, and the regression model is

shown in Table 4. Associated factors influencing demand for OT were gender, regular dental check-ups, awareness of malocclusion and having more than five aesthetic factors.

Discussion

Demand for OT in adolescents appears to have increased in recent years. More patients are seeking OT, and some of them are on waiting lists of as long as 2 - 4 years especially in government hospitals. In this study in which questionnaires were used to assess some factors influencing demand for OT, 450 students from three secondary government schools were recruited with mean ages of 13.10 ± 0.80 years old. Results from questionnaires indicated that most of the students requested OT and this was higher than the findings of Suktawee *et al.*¹⁶ The present study was done in Bangkok

where there are more OT services. Students were familiar with people wearing colourful braces, which made some of them desiring to put on braces to be like other people or for fashionable reasons. No statistically significant differences were found between ages of students who had demand for OT and who did not.

In univariate analysis, the demand for OT was significantly associated with demographic information including gender, GPA, regular dental check-ups, awareness of malocclusion and treatment suggestion, and these findings are in keeping with those of previous studies.^{2,4,6,8,14,20,24-26}

Table 2 Functional factors associated with demand for OT

Functional factors	N1	N2	Demand	No Demand	p
1. Upper front teeth bite on lower gum	333	115	67 (20.1)	13 (11.3)	0.033*
2. Lower front teeth bite on palate	333	116	27 (8.1)	7 (6.0)	0.467
3. Difficult to clean the teeth, food impaction	332	116	287 (86.4)	78 (67.2)	< 0.001*
4. Lip and/or cheek biting	331	116	274 (82.8)	84 (72.4)	0.016*
5. Front teeth cannot bite	332	116	92 (27.7)	16 (13.8)	0.003*
6. Can chew only one side	333	116	142 (42.6)	26 (22.4)	< 0.001*
7. Usually have inflamed and swollen gums	332	116	168 (50.6)	37 (31.9)	< 0.001*
8. Pain in front of ear area during opening and shutting the mouth or chewing	333	116	134 (40.2)	30 (25.9)	0.006*
9. Clicking joint sound/locked jaw	333	116	42 (12.6)	5 (4.3)	0.012*
10. Pronunciation problem	332	117	201 (60.5)	39 (33.3)	< 0.001*
11. Students who had > 5 functional factors	333	117	87 (26.1)	9 (7.7)	< 0.001*

Data were represented as number (%)

*Significance at $p < 0.05$

N1 = Number of students, who had demand for OT, answered the questionnaires.

N2 = Number of students, who did not have demand for OT, answered the questionnaires.

Table 3 Aesthetic factors associated with the demand for OT

Functional factors	N1	N2	Demand	No Demand	p
1. Protruded anterior teeth	332	116	228 (68.7)	31 (26.7)	< 0.001*
2. Crooked, crowded or spacing teeth	333	116	286 (85.9)	50 (43.1)	< 0.001*
3. Feeling worried when speaking or smiling	333	116	286 (85.9)	49 (42.2)	< 0.001*
4. Friend noticed	332	116	99 (29.8)	6 (5.2)	< 0.001*
5. Teasing from others	333	117	127 (38.1)	17 (14.5)	< 0.001*
6. Feeling they had asymmetrical face	333	117	36 (10.8)	2 (1.7)	0.002*

Table 3 (Continued)

Functional factors	N1	N2	Demand	No Demand	<i>p</i>
7. Having suggestion of orthodontic treatment	332	117	232 (69.7)	28 (23.9)	< 0.001*
8. Breath smell and halitosis because of food impaction from crowded teeth	333	116	190 (57.1)	41 (35.3)	< 0.001*
9. Desiring teeth in good and beautiful condition	332	116	324 (97.6)	89 (76.7)	< 0.001*
10. Desiring to put on braces for being like someone else or for fashion	333	117	247 (74.2)	30 (25.6)	< 0.001*
11. Students who had > 5 aesthetic factors	333	117	213 (64.0)	12 (10.3)	< 0.001*

Data were represented as number (%)

*Significance at $p < 0.05$

N1 = Number of students, who had demand for OT, answered the questionnaires.

N2 = Number of students, who did not have demand for OT, answered the questionnaires.

Table 4 Multivariate analyses examining the association between adjusted factors and demand for OT

Characteristics	Crude OR (95 % CI)	<i>p</i>	Adjusted OR (95 % CI)	<i>p</i>
Gender (Female)	1.90 (1.24 - 2.92)	0.003*	2.20 (1.05 - 4.63)	0.038*
GPA				
3.0 - 3.49	1		1	
< 2.5	2.64 (1.40 - 4.97)	0.003*	0.30 (0.08 - 1.08)	0.065
2.5 - 2.99	1.32 (0.55 - 3.16)	0.531	1.29 (0.43 - 3.96)	0.653
≥ 3.5	3.16 (1.37 - 7.28)	0.007*	0.46 (0.19 - 1.09)	0.076
Family income/month				
20,000 - 49,999	1		1	
< 20,000	1.84 (0.80 - 4.25)	0.155	1.26 (0.33 - 4.79)	0.737
50,000 - 100,000	1.19 (0.70 - 2.02)	0.532	1.16 (0.45 - 2.99)	0.763
> 100,000	1.89 (1.05 - 3.40)	0.034*	0.77 (0.26 - 2.27)	0.640
Regular dental check-up				
Every 6 months	1		1	
Never	2.55 (1.30 - 4.98)	0.006*	3.50 (1.03 - 11.93)	0.045*
When problems occurred	2.18 (1.34 - 3.53)	0.002*	1.82 (0.76 - 4.34)	0.178
Awareness of malocclusion	6.95 (4.30 - 11.24)	< 0.001*	2.22 (1.04 - 4.77)	0.040*
Treatment suggestion	4.33 (2.75 - 6.82)	< 0.001*	1.83 (0.86 - 3.90)	0.116

Table 4 (Continued)

Characteristics	Crude OR (95 % CI)	<i>p</i>	Adjusted OR (95 % CI)	<i>p</i>
Students who had > 5 functional factors	4.24 (2.06 - 8.74)	< 0.001*	1.23 (0.41 - 3.70)	0.710
Students who had > 5 aesthetic factors	15.53 (8.21 - 29.39)	< 0.001*	15.45 (5.40 - 44.22)	< 0.001*

Data were represented as number (%) OR = Odd Ratio

*Significance at $p < 0.05$

Differences in demand for OT between sexes have been documented in some studies. In the present study, significantly more females than males had a self-perceived need for OT, and this is consistent with the findings of previous reports.^{2,3,7,8} These studies had shown that females were more likely to have a self-perceived demand for OT than males, generally valuing dental appearance more highly than males. This study also supported the observation of previous studies,^{6,20,24} which reported that girls were more aware of malocclusion than boys and prepared to accept treatment. But this study did not agree with the studies of Feu *et al*^{25,26} which found no sex difference in demand for OT and sex did not affected the adolescents' esthetic self-perceptions. These conflicting findings may have occurred due to different methods employed, different study designs, different variables selected, and different sample sizes as well as the cultural and social characteristics of the studied population. When considering demand for OT and GPA of the students, there was a high significant difference between demands for OT in the students with the GPA 2.5 - 2.9 and demand for OT of the other groups. This student group, who had GPA 2.5 - 2.9, might pay more attention or focus on the mouth more than other groups. In this present study, family income/month did not have any influences on demand for OT. The absence of differences in the distribution of OT according to socio-economic status is in

agreement with the study of Kerosou *et al*.²⁷

At the regular dental check-ups by general dentists which are very important for maintaining a good oral hygiene. It was found that students, who never had dental health examination, had more demand for OT than other groups. The students, who had every six month dental health examination, might be informed about problems of their teeth had to be improved by OT or had no need for OT. They could explicitly ask their dentists for information about orthodontic correction. Regular dental check-ups will provide advice, guidance, early detection and timely treatment. This finding indicates that general dentists and orthodontists play an important role in passing on information about malocclusion and OT, resulting in people opting for OT based on their recommendations.

Depending on the severity of the dental irregularity, in terms of "awareness of malocclusion" some patients had themselves been aware of the deviation of their teeth or malocclusion before the dentist pointed it out. This finding corresponded with the study of Shaw *et al*.⁶ A high statistical significant relationship between demand and awareness of malocclusion was observed. This result reported that the students, who considered their teeth to be unattractiveness, had high demand for OT. The result was corresponded with the studies of Shaw *et al*⁶ and Salonen *et al*²¹ which reported that the awareness of malocclusion was high among younger

than older patients. However, studies had shown that dissatisfaction with dental appearance was generally related to the severity of the occlusal irregularities.^{21,22,23}

The initial recognition of the dental anomaly by other persons in the suggestion for OT, or treatment suggestion, had a high significant relationship with demand for OT. It was a major factor in motivation to have treatment. Teenager had reflected considerably on their dentition after other persons had mentioned their occlusion which made attention became focused on their mouth. This might be the primary psychological impact of malocclusion from the individual's own reaction to the anomaly as reported by previous studies.^{28,29} It was probable that once a child had been made aware of a defect by someone such as parents, friends, or dentists, attention would be focused increasingly on it and concerned about the defect developed.

Most of the functional factors had strong relationships with demand for OT with the exception of the data on lower front teeth bite on palate, as shown in Table 3, and this finding contrasts with the results of the study of Sukthawee *et al*¹⁶ which reported no relationships between functional factors and demand for OT. The ten functional factors were the affects from malocclusion. The extreme vertical overlap or deep traumatic overbite of the upper and lower anterior teeth can lead them contacting the lower gum and the roof of the palate as was described in functional factors one and two. This will cause significant tissue damage. In some patients, this can contribute to excessive tooth wear and early tooth loss in adulthood. Fewer students had problems with the lower front teeth bite on palate because it could not be seen from frontal face except it caused pain or inflammation. This finding was agreed with the study of Shaw *et al*⁶ which had observed a positive relationship between visible irregularity of teeth and the desire for orthodontic treatment. A poorly aligned teeth reduces the potential for natural tooth cleansing and increases the risk of tooth decay and periodontal disease due to food impaction. Mal-aligned teeth may have more plaque retention than straight

teeth. It will damage the long term health of the teeth and gums as it makes it harder for the students to take care of their teeth properly.³⁰ Teeth which erupt out of alignment will increase the risk of trauma or injury to soft tissue. Quite possibly some misalignment or malalignment of the teeth and/or jaws can result in the accidental biting of the lip and cheek. The most common problem is that teeth don't meet properly when biting down. Crowding of teeth may cause poor biting relationships. Some can chew only one side or on one or two posterior teeth. Alignment of upper teeth is needed to prevent the cheeks and lips from being bitten, while alignment of lower teeth is needed to protect the tongue. An open bite results when the upper and lower front teeth do not touch together. It may also make the biting less efficient and chewing difficulties especially at meal times. However, if there is no contact between front teeth, this may contribute to pronunciation problem. There is a high significant relationship between signs and symptoms of Temporomandibular Disorders (TMD). The most common signs of TMD were joint sounds and restricted mouth opening. The prevalence of signs and symptoms of TMD in infants, children, adolescents and adult varies widely in the literature was recorded in many studies. In general, the prevalence of signs and symptoms of TMD is lower in children compared to adults and is even less for the younger children but increases with increasing age.³¹⁻³⁴ There is a relatively low association of occlusal factors and the development of TMD. However, several features characterize malocclusions associated with TMD: skeletal anterior open bite; overjet greater than six to seven mm; unilateral lingual crossbite; unilateral crossbite and Class III malocclusion.³⁴⁻³⁶ In this study, statistically significant associations have been found between signs and symptoms of TMD and demand for OT.

When aesthetic factors were assessed, they were all strongly related to demand for OT, in keeping the results of previous studies^{6-8,10-15} which describe the power of social processes such as aesthetic and social norms resulting in the demand for OT and the decision to

undergo it. Self-perception of anterior teeth protrusion told that they had malocclusion and teasing from their peers had a strong effect on demand for OT, and this corresponds with the study of Gosney.¹⁹ One of the most significant effects of a malocclusion is its psychosocial impact on the individual student. A poor dental appearance can have a profound psycho-social on children. Shaw *et al*³⁷ found that children were teased more about their teeth than anything else e.g. clothes, weight and ears. A person's dental appearance can have a significant effect on how they feel about themselves.³⁷ Crooked or crowded teeth and spacing also have a greater adverse effect on quality of life. Some of teenagers had difficulty in smiling or talking to other people without feeling ashamed of their teeth. Depending on the severity of the dental irregularity, some patients had themselves been aware of the deviation of their teeth or malocclusion and facial asymmetry. This finding corresponded with the study of Shaw *et al*.⁶ Importantly, the participants whose dentists identified and informed them of malocclusion had a strong demand for OT showing a highly significant relationship, and these findings are consistent with those of the study by Shaw *et al*⁶ and Sunthornlohanakul and Thitasomakul.¹⁴ Crooked teeth trap food particles more easily, no matter how often the mouth was gargled or how teeth were brushed thoroughly. Bad breath (halitosis) is caused by bacteria that naturally occurs inside of the mouth. These bacteria (which also causes cavities and gum diseases) feeds on food particles in different parts of the mouth. In the process of feeding, the bacteria produces the odours most associated with bad breath (halitosis) which can cause embarrassment and create social and psychological barriers. Severe malocclusion is likely to be a social handicap. Well-aligned teeth and pleasing smile carry positive status to all social levels. Some people seek OT to minimize psychosocial problems related to their dental and facial appearance. Several studies have demonstrated the detrimental effects of altered dental aesthetics on the emotional state of an individual.^{38,39} In the category 'Desire to put on braces

for being like someone else or for fashion' was related to be approved in the reference group. The students had demand for OT to be liked their peer or to be within such a group which considered 'absolutely normal' to have OT as a teenager and it was something unavoidable that most of them had to do.

In multivariate regression analysis, associated factors influencing demand for OT were gender, regular dental check-up, awareness of malocclusion and students who indicated more than five aesthetic factors which corresponded with univariate analysis except in the area of functional factors. It was found that students considered the need for aesthetic factors was very important. This finding is supported by many studies showing the importance of facial attractiveness to the lives of all people. It seems reasonable that psychosocial and aesthetic considerations play an important role in demand for OT; this is a sign of the times. Youths without stable identities may find it difficult to resist the influence of professionals, media, and reference groups in deciding whether to have OT.

Most of the students in this study requested OT. The possible reasons might be that there were more distribution of orthodontists in Bangkok. The students were familiar with orthodontic patients wearing colourful orthodontic appliances that made them look fashionable. Some of them thought that it was normal to have OT during adolescence period. In interpreting the findings of the present study, it is important to acknowledge the possible limitations. First, the sample size was small and therefore the results cannot be generalized to all adolescents in Bangkok. In addition, cross-sectional studies are often limited by respondent bias, but can serve as impetus for further studies in this area. There is a limited research conducted in this area, therefore, it was difficult to make comparisons. Despite these limitations, the results have important implications, as the findings prompt for an educational initiative to improve the orthodontic knowledge of secondary school students. This study was done in a group of school students, which could not provide a clear picture of

malocclusion and demand for OT of the adolescents in the Bangkok because of limitation of labour and time.

Orthodontic service is still given low priority in oral health care system in Thailand and cannot meet the demand of the population. Although there is a public health system, the lack of resources, high cost of treatment and shortage of orthodontists, makes OT not readily available and accessible to the general population. It has to identify individuals who would benefit from OT and would be given treatment priority. The current findings could be useful to plan orthodontic services for this specific population in order to serve as a guideline for orthodontists during planning and executing their clinical treatment focusing on the satisfaction of this group of patients, minimizing their discomfort, and establishing special procedure protocols for such patients. A good relationship between the orthodontist, the general practitioner and other professionals can be considered in making adolescents understand the demand and need for OT. Further studies are required to improve our understanding of the demand for OT, especially in developing countries where there is low frequency of orthodontic care.

Conclusion

The findings of the present study indicate that genders, regular dental check-ups, awareness of malocclusion and aesthetic reasons are the four main factors influencing demand for OT.

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