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DOI:

10.4103/jos.jos_181_21

Factors influencing the desire for orthodontic treatment among patients and parents in Saudi Arabia: A cross-sectional study

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Abstract

OBJECTIVES: The decision to pursue orthodontic treatment is influenced by a variety of cosmetic, functional, and social reasons. This study compared the factors that influence adults' decisions before orthodontic treatment versus parents' decisions prior to their children's orthodontic treatment in Jeddah city, Saudi Arabia.

MATERIALS AND METHODS: A cross-sectional survey was distributed to the patients of orthodontic clinics of King Abdulaziz University in addition to a private orthodontic clinic in Jeddah city, Saudi Arabia. The survey consisted of two versions of a questionnaire: one for adults and one for children's parents. The survey inquired about the participants' demographics, factors that led to the necessity of treatment, and considerations before opting for orthodontic treatment. The factors influencing the decision-making process of adults were compared to that of parents using the Chi-square test.

RESULTS: A total of 417 subjects participated, 331 adults and 86 parents. The majority of the respondents in both groups were females. When compared to children, adults were more aware of the necessity for orthodontic treatment (78.5% of adults vs. 41.9% of children). The primary motivation for adults and parents to begin orthodontic treatment was to improve their esthetic appearance (58.6% and 87.2%), whereas functional concerns were less frequently reported (12.1% and 15.1%). Adults relied on less trustworthy sources of information about orthodontic treatment options, whereas parents relied on more dependable sources.

CONCLUSIONS: The main reason for opting for orthodontic treatment in Jeddah city, Saudi Arabia was esthetic for both adults and children.

Keywords:

Esthetical problems, factors influencing orthodontic treatment, functional problems, orthodontic treatment

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Submitted: 10-Oct-2021

Revised: 21-Feb-2022

Accepted: 09-Dec-2021

Published: 04-May-2022

Introduction

The prevalence of dental malocclusion requiring orthodontic treatment among healthy adolescents ranges from 21.0% to 55.4% in Saudi Arabia.^[1-5] Several factors influence the decision of an individual or a parent for his/her child before starting orthodontic treatment. The reasons for

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obtaining orthodontic treatment can be divided into esthetic, functional, or social motives.^[6] The desire to improve facial, dental, and smile appearance is an esthetic concern that motivates people to seek orthodontic treatment.^[7,8] According to a pilot study conducted in Saudi Arabia's Qassim region, 86% of orthodontic patients at private clinics desired orthodontic treatment to improve their facial appearance.^[9] In

How to cite this article: Felemban OM, Alharbi NT, Alamoudi RA, Alturki GA, Helal NM. Factors influencing the desire for orthodontic treatment among patients and parents in Saudi Arabia: A cross-sectional study. J Orthodont Sci 2022;11:25.

addition to malocclusion, other functional concerns that drive people to seek orthodontic treatment include difficulty in chewing and eating, speech difficulties, and temporomandibular joint diseases.^[10,11] Among the social reasons for orthodontic treatment are the desire to improve one's self-confidence, self-esteem, social interactions, social opportunities, popularity, and issues related to one's professional career.^[12,13] Additionally, parental desire,^[14] family or friends,^[12,13] recommendations from general dentists,^[7] advertisements,^[8] celebrities,^[13] and bullying^[15] may contribute to the decision to seek orthodontic treatment. By looking for information from the internet, family, friends, social media, books, or questioning their general dentists and, in some cases, directly asking an orthodontist, the patient comprehends the importance of orthodontic care and its worth. It is vital to gather sufficient information before deciding to seek treatment and opt for the most appropriate treatment with the desired outcomes. As many studies have demonstrated, making the decision to start orthodontic treatment is a complex process involving a combination of physiological, esthetic, functional, social, and economic aspects.^[8,16]

Orthodontists' knowledge of the patient's motivation to seek orthodontic treatment is critical. It assists in developing a treatment plan that is most appropriate for the patient.^[17] Additionally, it provides orthodontists with guidance on how to approach patients effectively and motivate them to cooperate with orthodontic treatment. There is a link between a patient's prior motivation and willingness to cooperate with orthodontist's instructions.^[18] There is a gap in the knowledge of the reasons for seeking orthodontic treatment in the Saudi Arabian population. Hence, this study aimed to determine the factors that influence the decision of adults to initiate orthodontic treatment for themselves in comparison to parents initiating the orthodontic treatment for their children in Jeddah city, Saudi Arabia.

Materials and Methods

A cross-sectional survey was conducted in Jeddah city, Saudi Arabia. The Research Ethics Committee of the Faculty of Dentistry, King Abdulaziz University approved the study protocol (approval no. 03-02-2020). The authors devised two versions of a questionnaire in Arabic based on information from existing literature.^[8,13] The first version, the adult's survey, was designed for adults to evaluate the factors that affected their orthodontic treatment decision, whereas the second version, the children's parents' survey, was designed for parents of children to evaluate the factors that influenced their decision before beginning orthodontic treatment for their children. The two versions were identical in their content and the only difference between them was the language

used to address the query to either the adult (adult survey) or the child (children's parents' survey). The questionnaire was divided into three sections. The first section questioned the participants' demographics (age, sex, education, and family income). The second section comprised four questions regarding the factors that led to the necessity of orthodontic treatment. The final section included three questions about the considerations before opting for the current orthodontic treatment. The questions were in the multiple-choice format. However, participants were able to select multiple responses in the second and third sections because more than one option of the questions could be relevant to the same subject (multiple answers). In addition, in the second and third sections, open-ended comments were allowed at the end of each question to collect data concerning reasons, barriers, and encouraging factors that the authors may not have considered. A pediatric dentist and an orthodontist assessed the questionnaire for face validity.

The data collection period for the sample extended from September 2019 to February 2020. The inclusion criteria were all adult patients (over the age of 18 years) and parents of pediatric patients (from 7 years to less than 18 years of age) in active orthodontic treatment, or seeking orthodontic treatment at the orthodontic specialty clinic at King Abdulaziz University. Same inclusion of participants from a private orthodontic clinic in Jeddah in city were also recruited. The study excluded any participants who were medically compromised or had medical syndromes affecting the orofacial region. In the waiting room of the orthodontic clinics, adult orthodontic patients and parents of children receiving orthodontic treatment were approached and informed about the study's goal. When they agreed to participate in the study, they were given a QR code to scan using their phones, which took them to a Google form where they completed the questionnaire. Before beginning to fill out the survey, the participant read all the instructions, and their acceptance to participate in our study was considered a signature of the informed consent. The survey took 4–5 minutes to complete. In the children's parents' survey, the parents were reminded that their answers should be based on their children's orthodontic treatment.

The data were imported into SPSS software (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). There were no missing data as all items in the electronic questionnaire were required to be answered. The categories of elementary school, middle school, and high school were combined in the education question to form high school or less. Additionally, the categories of university and diploma were combined to form the Diploma/University category. One of the study researchers assessed the open-ended statements qualitatively for

trends or repeated patterns. The Chi-square test was used to compare the questionnaire items between adults and children’s parents. The differences in esthetic and functional reason among adults were assessed using Chi-square or Fisher’s Exact test. Statistical significance was defined as *P* values less than 0.05.

Results

In the patient waiting areas, 520 orthodontic adult patients or parents of orthodontic children’s patients were asked to participate in the study, and 417 agreed, yielding 80.2% response rate. The number of respondents was 331 to the adult and 86 to the children surveys. A power calculation was performed after the data collection and analysis. A two-group Chi-square test with a 5% two-sided significance level will have 70.14% – 97.12% power to detect a difference between groups of 0.15 when the sample sizes are 331 and 86, respectively. Approximately two-thirds of the respondents to the adult survey (65.6%) were aged 18–30 years and 34.4% were aged 31 years or older. The majority of respondents in both surveys was women. The distributions of education and family income are presented in Table 1.

Table 2 shows the reasons why the participants began orthodontic treatment. When asked who brought to the attention the need for orthodontic treatment, adults were significantly more likely to respond “myself” (78.5%) than children’s parents who responded “my child” (41.9%), and the difference was statistically significant (*P* < 0.001). Pediatric dentists were more likely to initiate the discussion about the need for orthodontic treatment with the parents (30.2%) than general dentists who advised adults (17.5%) about the need for orthodontic treatment (*P* = 0.009). The primary reported reason for seeking orthodontic treatments among children’s parents was to enhance the esthetic appearance (87.2%), which was more often than adults (58.6%), with a statistically significant difference (*P* < 0.001). Adults and parents had similar overall functional concerns associated with seeking orthodontic treatment (*P* = 0.452). Half of the children’s parents (50.0%) reported reasons other than esthetics and functional for seeking orthodontic treatment compared to only 3.3% of adults (*P* < 0.001). The reasons

provided in this open-ended question in the children’s parents’ survey included statements such as: “I had braces as a kid, and I thought my children will need it too;” “one of his/her siblings had braces;” “my child wants braces because his/her friends have braces;” and “kids who have braces will have better teeth when they grow up.” The most commonly reported esthetic problem reported by the participants were to enhance the look of the face (26.0% and 45.3%), crowding (27.8% and 33.7%), to get the perfect smile (25.1% and 26.7%), spacing (25.1% and 22.1%), followed by teeth inclination (21.1% and 30.2%). Among the esthetic problems that led to orthodontic treatment, two esthetic conditions were more likely to be reported by adults than children’s parents—enhancing the look of face (6.9% vs. 1.2%, *P* < 0.001) and rotated teeth (6.9% vs. 1.2%, *P* = 0.040). The most commonly reported functional problems were teeth malocclusion (19.0% and 41.9%) and Class II malocclusion (19.6% and 24.4%). Functional problems such as pronunciation (4.2% and 11.6%), eating and chewing (4.2% and 5.8%), breathing (2.7% and 3.5%), and TMJ (4.2% and 11.6%) were less commonly reported. However, when compared to adults, children’s parents were more likely to cite teeth malocclusion (*P* < 0.001), pronunciation (*P* = 0.009), and temporomandibular joint (*P* = 0.009) as functional issues.

Table 3 compares the attributes that influenced orthodontic treatment choices of adults and children. Children’s parents were more likely to acquire knowledge about orthodontic treatment options from pediatric dentists (*P* < 0.001), whereas adults were more likely to get their information from family or friends (*P* < 0.001), or medical/dental websites (*P* = 0.014). The most prevalent hurdles to initiating orthodontic treatment, according to the majority of respondents in both surveys, were orthodontists’ availability (58.6% and 52.3%), followed by cost (44.1% and 41.9%), and finally the duration of treatment (20.2% and 25.6%). Other barriers included insurance coverage and transportation. Reported by more than half of the participants in both surveys, the orthodontist’s reputation and experience were among the strongest factors that positively influenced their decision to choose their current orthodontists. Additionally, when choosing their current orthodontist, approximately one-third of the participants in both surveys considered

Table 1: Participants’ demographic characteristics

Question	Category	Total (n=417) n (%)	Adults (n=331) n (%)	Children’s Parents (n=86) n (%)
Gender of the respondent/parent	Male/Father	86 (20.6)	69 (20.8)	17 (19.8)
	Female/Mother	331 (79.4)	262 (79.2)	69 (80.2)
Education of the respondent/parent	High school or less	89 (21.3)	67 (20.2)	22 (25.6)
	Bachelor/Diploma	254 (60.9)	212 (64.0)	42 (48.8)
	Higher Education	74 (17.7)	52 (15.7)	22 (25.6)
Monthly Family Income	10,000 SR or less	106 (25.4)	91 (27.5)	15 (17.4)
	10,001–18,000 SR	181 (43.4)	150 (45.3)	31 (36.0)
	18,001 SR or more	130 (31.2)	90 (27.2)	40 (46.5)

Table 2: Comparison of factors that influenced the decision to begin orthodontic treatment between adults and children's parents

Question	Answers (Can choose more than one answer)	Total (n=417) n (%)	Adults (n=331) n (%)	Children's Parents (n=86) n (%)	P ⁱ
Who brought to your attention that (you/your child) need orthodontic treatment	Myself/my child	296 (71.0)	260 (78.5)	36 (41.9)	<0.001*
	Family or friends	193 (46.3)	150 (45.3)	43 (50.0)	0.438
	General/pediatric dentist	84 (20.1)	58 (17.5)	26 (30.2)	0.009*
What were the main reasons that made (you/your child) start orthodontic treatment	To enhance esthetic appearance	269 (64.5)	194 (58.6)	75 (87.2)	<0.001*
	Functional Concerns (breathing, eating, or pronunciation)	53 (12.7)	40 (12.1)	13 (15.1)	0.452
	Media (celebrities, advertisement/social media)	12 (2.9)	12 (3.6)	0	0.138
	Others (growth, peers, genetics)	54 (12.9)	11 (3.3)	43 (50.0)	<0.001*
What were the esthetic problems that led (you/your child) to start orthodontic treatment	To enhance the look of my face	125 (30.0)	86 (26.0)	39 (45.3)	<0.001*
	Crowding	121 (29.0)	92 (27.8)	29 (33.7)	0.281
	To get the perfect smile	106 (25.4)	83 (25.1)	23 (26.7)	0.752
	Spacing	102 (24.5)	83 (25.1)	19 (22.1)	0.566
	Teeth inclination	96 (23.0)	70 (21.1)	26 (30.2)	0.075
	Smile shift	47 (11.3)	37 (11.2)	10 (11.6)	0.906
	Rotated teeth	24 (5.8)	23 (6.9)	1 (1.2)	0.040*
	Others	25 (6.0)	19 (5.7)	6 (7.0)	0.667
What were the functional problems that led (you/your child) to start orthodontic treatment	Teeth malocclusion	99 (23.7)	63 (19.0)	36 (41.9)	<0.001*
	Upper jaw protruded and/or lower jaw retruded	86 (20.6)	65 (19.6)	21 (24.4)	0.329
	Lower jaw protruded and/or upper jaw retruded	22 (5.3)	15 (4.5)	7 (8.1)	0.182
	Temporomandibular joint	24 (5.8)	14 (4.2)	10 (11.6)	0.009*
	Pronunciation	24 (5.8)	14 (4.2)	10 (11.6)	0.009*
	Eating and chewing	19 (4.6)	14 (4.2)	5 (5.8)	0.530
	Breathing	12 (2.9)	9 (2.7)	3 (3.5)	0.704
	Others	1 (0.2)	1 (0.3)	0	1.00

ⁱChi-square test *Statistically significant (P<0.05)

Table 3: Comparison of factors influencing adults' and children's parents' choice of current orthodontic treatment

Question	Answers (Can choose more than one answer)	Total (n=417) n (%)	Adults (n=331) n (%)	Children's Parents (n=86) n (%)	P ⁱ
What were your sources of information about orthodontic treatment choices?	Orthodontist	219 (52.5)	166 (50.2)	53 (61.6)	0.058
	General dentist/pediatric dentist	111 (26.6)	75 (22.7)	36 (41.9)	<0.001*
	Family or friends	151 (36.2)	136 (41.1)	15 (17.4)	<0.001*
	Medical/dental websites	83 (19.9)	74 (22.4)	9 (10.5)	0.014*
	Social media	31 (7.4)	28 (8.5)	3 (3.5)	0.165
	Books	7 (1.7)	7 (2.1)	0	0.353
	Others	14 (3.4)	11 (3.3)	3 (3.5)	1.00
What were the barriers before starting orthodontic treatment?	Availability of orthodontist	239 (57.3)	194 (58.6)	45 (52.3)	0.294
	Cost	182 (43.6)	146 (44.1)	36 (41.9)	0.708
	Duration of treatment	89 (21.3)	67 (20.2)	22 (25.6)	0.282
	Orthodontic treatment is not covered by insurance	57 (13.7)	42 (12.7)	15 (17.4)	0.253
	Transportation	46 (11.0)	37 (11.2)	9 (10.5)	0.851
	Others	57 (13.7)	48 (14.5)	9 (10.5)	0.332
What encouraged you to choose your current orthodontist?	Orthodontist reputation	224 (53.7)	168 (50.8)	56 (65.1)	0.017*
	Orthodontist experience	217 (52.0)	170 (51.4)	47 (54.7)	0.586
	Affordability of the treatment cost	128 (30.7)	100 (30.2)	28 (32.6)	0.674
	The location	97 (23.3)	79 (23.9)	18 (20.9)	0.566
	Others	5 (1.2)	5 (1.5)	0	0.588

ⁱChi-square test *Statistically significant (P<0.05)

the affordability of the treatment cost as an influential factor to the decision.

A sub-analysis of the adult's survey was conducted to better understand the differences in esthetic and

functional reasons for seeking orthodontic treatment between adult males and females [Table 4]. Except for the functional reason of eating and chewing, the esthetic and functional reasons did not differ by gender among adults. In comparison to none of the adult males, fourteen

Table 4: Comparison of esthetic and functional factors that influenced the decision to begin orthodontic treatment between males and females in the adult survey

Question	Answers (Can choose more than one answer)	Males	Females	P [†]
		(n=69) n (%)	(n=262) n (%)	
What were the main reasons that made (you/your child) start orthodontic treatment	To enhance esthetic appearance	41 (59.4)	153 (58.4)	0.878 [†]
	Functional Concerns (breathing, eating, or pronunciation)	5 (7.2)	35 (13.4)	0.166 [†]
What were the esthetic problems that led (you/your child) to start orthodontic treatment	To enhance the look of my face	15 (21.7)	71 (27.1)	0.366 [†]
	Crowding	23 (33.3)	69 (26.3)	0.248 [†]
	To get the perfect smile	13 (18.8)	70 (26.7)	0.179 [†]
	Spacing	15 (21.7)	68 (26.0)	0.472 [†]
	Teeth inclination	16 (23.2)	54 (20.6)	0.641 [†]
	Smile shift	8 (11.6)	29 (11.1)	0.902 [†]
	Rotated teeth	3 (4.3)	20 (7.6)	0.433 [‡]
What were the functional problems that led (you/your child) to start orthodontic treatment	Others	5 (7.2)	14 (5.3)	0.545 [†]
	Teeth malocclusion	8 (11.6)	55 (21.0)	0.077 [†]
	Upper jaw protruded and/or lower jaw retruded	11 (15.6)	54 (20.6)	0.385 [†]
	Lower jaw protruded and/or upper jaw retruded	2 (2.9)	13 (5.0)	0.745 [‡]
	Temporomandibular joint	4 (5.8)	10 (3.8)	0.501 [‡]
	Pronunciation	4 (5.8)	10 (3.8)	0.501 [‡]
	Eating and chewing	0	14 (5.3)	0.048 [‡]
	Breathing	1 (1.4)	8 (3.1)	0.691 [‡]
Others	0	1 (0.4)	1.00 [‡]	

[†]Chi-square test [‡]Fisher's Exact test *Statistically significant (P<0.05)

adult females (5.3%) mentioned eating and chewing as a cause for seeking orthodontic treatment (P = 0.048).

Discussion

While Saudi Arabia is still a developing country, it is home to a large and diverse population, residing in unique, cultural, and economic environments. This study examined the aspects that influenced the decision-making before beginning orthodontic treatment. According to the findings of the adult questionnaire, the most commonly reported person that drew their attention to the fact that they needed orthodontic treatment was themselves. However, in the children's parents' survey, the reported persons that drew attention to the need of the children for orthodontic treatment were frequently people other than the child (parents, relatives, and general dentist). This is in line with the findings of Brumini *et al.*^[14] who indicated that parental influence is perhaps the major determinant of a preadolescent child's orthodontic treatment demand. Parents encourage their children to have orthodontic therapy as they believe it will demonstrate them non-negligent. They also believe that it will assist their children to achieve a better career and stable life.^[7,19] This is important as the more motivated the patients were to have braces, the more co-operation during treatment was reported in general. However, parents' motivation was not correlated with their children's actual cooperation.^[20]

The majority of respondents in both surveys stated that the main reason for obtaining orthodontic treatment was

esthetic. An American and a Turkish study also concurred with our findings that the primary motivation for seeking orthodontic treatment was for esthetics.^[7,20] The results of studies examining the importance of esthetics as a primary reason for seeking orthodontic treatment in men and women were mixed. A sub-analysis of the adult survey revealed that improving appearance was equally motivating for men (59.4%) and women (58.4%) seeking orthodontic treatment. In contrast, a Malaysian study discovered that women are more likely to be unhappy with their general dental appearance than men.^[21] In our study, the influence of social media, celebrities, and advertisements as motivators for seeking orthodontic treatment was limited. This is in line with the findings of Laothong and Cheng, who observed among a Thai and a Taiwanese sample that desiring to be like a renowned actor or actress was one of the least common reasons for obtaining orthodontic treatment.^[13]

The enhancement of facial esthetics was mentioned by children's parents more frequently than it was by adults in the survey. Crowding, spacing, teeth inclination, and the desire to achieve a perfect smile were all mentioned as esthetic challenges in both surveys by the study participants. According to Feldens *et al.*,^[11] crowding, diastema, tooth abnormalities, overjet, and a discrepancy of half a cusp or more in molar classification enhance the urge for orthodontic treatment. Marques *et al.*^[19] observed that missing teeth, crowding, maxillary overjet, and a half-cusp difference in molar classification or greater are all associated with a desire for orthodontic treatment. However, the primary determinant factor in the demand for treatment is dentofacial esthetics.

The main functional concern among the study participants was malocclusion. Upper jaw protrusion was a frequent functional concern among children's parents, probably as they were more prone to dental trauma. However, eating and chewing were less frequently mentioned as functional issues. The results of this study were consistent with those of a previous study conducted in Saudi Arabia, where only 1% of respondents reported seeking orthodontic treatment owing to difficulty in mastication^[9]; however, this contradicts other studies in other parts of the world that found eating and chewing to be strong functional reasons for seeking orthodontic treatment.^[7,13]

The majority of the individuals in both surveys relied on information from dental health practitioners, including orthodontists, which is a positive sign. Parents of children were more likely to seek advice from pediatric dentists, whereas adults sought advice from general dentists. This could be since, in Saudi Arabia, most children are examined by pediatric dentists, and most adults by general dentists rather than specialists. The predominant source of knowledge about orthodontic treatment was acquired from the general dentists, according to a study conducted in the United States,^[8] where general dentists, rather than specialists, are commonly consulted by adults and pediatric patients. Adults in our study were more inclined to rely on less trustworthy sources of information such as relatives or friends, medical or dentistry websites, or social media, whereas children's parents were less likely to do so. This could be elucidated by the parents' desire to provide the best for their children; however, when it comes to their own decisions, they are more receptive to advice and exposure to other people's experiences.

According to our survey participants, the major impediment to orthodontic treatment was the lack of orthodontists. This could be owing to a massive demand and supply gap, or the number of individuals with a need for orthodontic treatment versus the number of orthodontists available in Saudi Arabia. As stated by the website of Saudi Arabia's General Authority of Statistics, the country's population exceeded 35 million in 2020. According to the latest published description of the dental workforce in 2017, there were only 1373 orthodontists in Saudi Arabia.^[22] The expense of treatment was the second most-mentioned obstacle to treatment. Many studies have revealed that the cost of orthodontic treatment is the most significant deterrent to starting treatment.^[8,13,19] In contrast, other research indicated that while cost was a consideration before treatment, it was not the deciding factor, particularly for women wanting orthodontic treatment.^[23,24]

As any cross-sectional study, this study has some limitations. The use of a convenience sample in this study

could have negatively impacted the generalizability of the findings. In contrast, the choice of a governmental center that provides free dental healthcare alongside a private clinic may have broadened the desired findings to be representative of a larger spectrum of Saudi population. Possibly, larger sample with multiple locations across the country could improve the study. Moreover, clinical evaluations were not included in this study. Future research could include a clinical evaluation to correlate the severity of malocclusion with the factors that influence whether to seek orthodontic treatment or not. The interrelationships between the major motivations for seeking orthodontic treatment, such as esthetics or functional, and the main barriers against initiating orthodontic treatment could not be evaluated as the questionnaire was constructed in the multiple-response format. This study has also been limited by the time-frame for data collection. Furthermore, pediatric and teen patients' perception about treatment need was not taken into consideration. However, this could be expanded in another study.

Conclusions

Factors that influence a person's decision to seek orthodontic treatment in Jeddah city, Saudi Arabia are generally consistent with findings from other studies conducted in different regions worldwide. The primary reason for orthodontic treatment in Jeddah city, Saudi Arabia was esthetics, whereas functional problems were less of a concern. The most-prevalent, stated, esthetic reasons include facial esthetics, crowding, spacing, inclination of teeth, and having an ideal smile. Availability of orthodontists and cost of treatments were barriers faced by participants before starting orthodontic treatment. The dentist's reputation and experience were crucial in the decision to start orthodontic treatment.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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