

Awareness of Orthodontic Treatment among Public Adults in Saudi Arabia

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Received: October 30, 2021; **Published:** November 25, 2021

Abstract

Background: One of the most common oral health problems globally is malocclusion. Orthodontic treatment has different options for correcting this issue.

Objective: To assess the levels of awareness of orthodontic treatment among public adults in Saudi Arabia.

Materials and Methods: A cross-sectional study recruited 235 subjects older than 18 years who live in Saudi using a self-structured questionnaire consisting of 29 questions to evaluate the levels of knowledge, opinions, and attitudes towards orthodontic treatment and ideas about treatment costs. SPSS was used to analyze the data.

Results: The mean (M) of correct answers was 12.12 out of 18, with a standard deviation (SD) of 3.64. The total knowledge score was not significantly different when examined against gender, job status, region, or nationality. The total knowledge was significantly different in relation to academic degree ($p < 0.001$); participants with less than a high school degree ($m = 9.12$, $SD = 5.37$) had significantly less knowledge than participants with a high school ($m = 11.18$, $SD = 3.56$), bachelor's degree ($m = 12.77$, $SD = 3.11$), or higher education level ($m = 14.20$, $SD = 3.04$). A total of 74% of the population think of receiving orthodontic treatment. More than half of the participants (61.3%) consider the cost of treatments to be between 5,000 and 10,000 Saudi riyals.

Conclusion: The majority of the population in Saudi Arabia has a moderate level of awareness of orthodontic treatment. We recommend that a larger study sample be investigated and confirmed by clinical assessments to measure and raise public awareness.

Keywords: Orthodontic Treatment; Malocclusion; Saudi Arabia; Dental Practitioners; Dental Students

Abbreviations

M: Mean; SD: Standard Deviation

Introduction

Oral health can affect an individual's overall well-being, so it is an integral and essential part of general health [1]. One of the most common oral health problems globally is malocclusion [2]. In fact, due to its high prevalence and different treatment modalities, malocclusion is considered a public health problem [3]. In dentistry, malocclusion can be defined as "an occlusion with mal-relationship between the

arches in any of the planes or anomalies in tooth position beyond the normal limits" [4]. The etiology of malocclusion has been widely controversial and attributed to a variety of causes, including both genetic and environmental factors [5,6]. Examples of environmental factors include a prolonged thumb sucking habit, which can be strongly associated with anterior open bite in children [7], and mouth breathing, which is also closely related to increased open bite and anterior or posterior crossbite [8]. Malocclusion can negatively affect quality of life in many aspects, such as causing psychological and social problems related to impaired esthetics, increased dental caries, periodontal disease, and temporomandibular joint problems [4].

Malocclusion can be corrected by orthodontic treatment, which not only improves function and esthetics but also enhances self-esteem and improves the quality of a person's life [9]. It has been found that dissatisfaction with dental appearance is the main reason for undergoing orthodontic treatment [10].

Different populations in many countries have been assessed for their awareness levels regarding the need for orthodontic care and different treatment modalities [9,11,12]. It has been found that objective and subjective factors can equally influence awareness about orthodontic treatments [13] and in recent decades, adults' awareness about the orthodontic dental specialty has increased worldwide [11]. However, it has been seen that people in rural areas still lack relative awareness of orthodontics, which makes them fail to approach an orthodontist despite caring about their facial appearance [14]. Moreover, a recent study conducted by the Dental Institute of North India showed that more than half of the population was unaware of the scope of orthodontics [9]. Consequently, 71% of the participants in the Indian study never thought of receiving orthodontic care, and among those who considered it, most believed that braces would compromise their looks [9]. A study in Indonesia showed that early adolescents had a moderate level of awareness about orthodontic treatments [15].

In Saudi Arabia, awareness and knowledge levels were revealed to be relatively high, according to studies conducted in several cities, although there was a presence of some misconceptions among participants [12,16,17]. For example, more than half of the participants in a study conducted in Jazan city did not think of thumb sucking, early milk teeth extraction, or genetic factors as causes of teeth misalignment [16]. When it comes to knowledge of treatment types, a study investigating the preferred orthodontic appliance among Saudi participants and their awareness of common treatment modalities found that there were moderate to high awareness levels of stainless steel and ceramic brackets, and clear aligners were reportedly used by Saudis [12]. This was in contrast to low recognition levels of early treatment tools, such as expanders, headgear, and functional appliances [12]. It has been shown in a more recent study that treatment modalities and treatment costs are the topics most researched by orthodontic patients in Saudi Arabia [18].

Studies conducted in Riyadh and Jeddah cities found that 77% and 74% of participants, respectively, are in need of orthodontic care [19,20]. Also, about half of the participants in the study done in Jazan, and a higher percentage in Al-Madinah city, considered having braces [16,17].

Owing to the increased awareness of the orthodontic specialty and the high need of the Saudi population for orthodontic treatment, according to the previously mentioned studies [19,20], it is currently necessary for Saudi adults to have a certain level of awareness of basic orthodontic problems and concepts of malocclusion.

Aim of the Study

Therefore, our study aimed to investigate the levels of awareness about orthodontic treatment among public adults in Saudi Arabia.

Materials and Methods

This cross-sectional study investigated awareness levels about orthodontic treatment among public adults in Saudi Arabia. Participants were recruited using a convenience sampling method. The inclusion criteria were adults 18 years or older who lived in Saudi Arabia. Participants who did not sign the study’s informed consent form or did not meet the inclusion criteria were excluded from the study.

The study questionnaire was based on a previously published survey, with modifications [9]. The questionnaire was self-reported and distributed in both the English and Arabic languages. An electronic form of the survey was constructed using Google Forms to be shared online via social media platforms (Snapchat, Twitter, Instagram, Facebook, Telegram and WhatsApp). Furthermore, hard copies were handed to patients attending dental clinics. All data were collected without revealing any personal information. The questionnaire took approximately two to three minutes to complete. Participation was voluntary and strongly encouraged.

The questionnaire was composed of 29 questions arranged into four categories. The first category collected demographic data, including gender, age, occupational status, educational attainment, region of residence, and nationality. In addition, a question about the frequency of oral health checkups was added to assess the participants’ levels of oral hygiene. The second category contained 18 questions answered with true, false, or I do not know and were designed to evaluate the levels of knowledge about orthodontic treatments. Each question had only one correct answer. Every correct answer received one point, and the total for correct answers was the sum of correct points. The third category consisted of three questions concerning participants’ opinions and attitudes about orthodontic treatment, with answer options of yes, no, or neutral. The last category had only one question measuring participants’ ideas about treatment costs. The range of answers for this question were: less than 5,000, between 5,000 and 10,000, between 10,000 and 20,000, or more than 20,000 Saudi riyals. The study was waived from the ethical committee of scientific research.

SPSS software version 25 (IBM, Inc., Armonk, NY, USA) and Excel software (Microsoft Corporation, Redmond, WA, USA) were used for statistical analyses. Frequency tables were used to generate statistics, including the mean (M), standard deviation (SD), count, and percentage. Chi-square, t-test, ANOVA, and linear regression were used for data analysis. A p-value of 0.05 was considered statistically significant.

Results

Data were collected from a total of 235 participants. The mean (M) age of the participants in this study was 26.49, with an SD of 8.60. Table 1 shows the demographic information of the study participants and the frequency of their dental visits.

Variable		No.	%
Gender	Male	49	20.9%
	Female	186	79.1%
Job	Student	116	49.4%
	Employed	70	29.8%
	Retired	49	20.9%
Degree	Less than high school	16	6.8%
	High school	113	48.1%
	Bachelor’s degree	96	40.9%
	Higher education	10	4.3%

Region	Western	123	52.3%
	Central	24	10.2%
	Southern	37	15.7%
	Eastern	15	6.4%
	Northern	36	15.3%
Nationality	Saudi	203	86.4%
	Non-Saudi	32	13.6%
How frequently do you go for oral health checkups?	Twice a year	45	19.1%
	Once a year	26	11.1%
	When needed	164	69.8%

Table 1: Participant demographic data and frequency of dental visits.

Participants had different knowledge scores regarding the various aspects of orthodontic treatment, illustrated in table 2. For the knowledge questions, the mean of correct answers was 12.12 out of 18, with an SD of 3.64. The total knowledge score analyzed by t-test and ANOVA revealed they were not significantly different when examined against gender, job status, region, or nationality. However, the ANOVA and Tukey post hoc tests revealed that total knowledge was significantly different by academic degree ($p < 0.001$), with participants who had less than a high school degree ($m = 9.12, SD = 5.37$) showing significantly lower knowledge levels than participants with education attainment of high school ($m = 11.18, SD = 3.56$), bachelor’s degree ($m = 12.77, SD = 3.11$), or higher education levels ($m = 14.20, SD = 3.04$). However, participants in the last three categories were not significantly different from each other.

Question	Answer	No.	%
Problems in the arrangement of teeth can be corrected by a dentist.	Yes*	202	86.0%
	No	26	11.1%
	I don’t know	7	3.0%
Orthodontists are specialized for correction of irregularly placed teeth.	Yes*	207	88.1%
	No	15	6.4%
	I don’t know	13	5.5%
Irregularly placed teeth can affect appearance.	Yes*	220	93.6%
	No	8	3.4%
	I don’t know	7	3.0%
Irregularly placed teeth can affect speech.	Yes*	170	72.3%
	No	33	14.0%
	I don’t know	32	13.6%

Irregularly placed teeth can affect the chewing of food.	Yes*	171	72.8%
	No	32	13.6%
	I don't know	32	13.6%
Irregularly placed teeth can cause gum problems.	Yes*	156	66.4%
	No	25	10.6%
	I don't know	54	23.0%
Irregularly placed teeth can cause cavities.	Yes*	121	51.5%
	No	43	18.3%
	I don't know	71	30.2%
Irregularly placed teeth can cause pain in the jaw.	Yes*	169	71.9%
	No	20	8.5%
	I don't know	46	19.6%
Abnormal habits like thumb sucking, mouth breathing, and placing the tongue between teeth can affect the arrangement of teeth.	Yes*	186	79.1%
	No	10	4.3%
	I don't know	39	16.6%
Habits like thumb sucking and mouth breathing can be prevented by orthodontic treatment.	Yes*	133	56.6%
	No	32	13.6%
	I don't know	70	29.8%
The habit of biting objects (nails, lips, pen) can affect the position of teeth.	Yes*	145	61.7%
	No	33	14.0%
	I don't know	57	24.3%
Lip protrusion/inability to close lips can be corrected by orthodontic treatment.	Yes*	171	72.8%
	No	21	8.9%
	I don't know	43	18.3%
Orthodontic treatments can help in relieving certain breathing and ear problems.	Yes*	102	43.4%
	No	36	15.3%
	I don't know	97	41.3%
There are different types of braces (metal/tooth colored).	Yes*	185	78.7%
	No	13	5.5%
	I don't know	37	15.7%

There are invisible braces available.	Yes*	205	87.2%
	No	9	3.8%
	I don't know	21	8.9%
Braces will weaken/damage your teeth.	Yes	59	25.1%
	No*	120	51.1%
	I don't know	56	23.8%
All orthodontic treatments or wearing braces require removal of teeth.	Yes	53	22.6%
	No*	124	52.8%
	I don't know	58	24.7%
There is an age limit for orthodontic treatment.	Yes	115	48.9%
	No*	62	26.4%
	I don't know	58	24.7%
*Correct answers.			

Table 2: Participants' knowledge regarding orthodontic treatments.

Table 3 presents participants' opinions about orthodontic treatment. This study's participants had different views regarding the costs of orthodontic treatment in Saudi Arabia. More than half of the participants (61.3%) considered the cost of such treatments to be between 5,000 and 10,000 Saudi riyals.

Question		No.	%
Did you ever think of receiving orthodontic treatment?	Yes	174	74%
	Neutral	20	8.5%
	No	41	17.4%
Do you think wearing braces would compromise your looks?	Yes	105	44.7 %
	Neutral	38	16.2%
	No	92	39.1%
Orthodontic treatment is expensive.	Yes	164	69.8%
	Neutral	55	23.4%
	No	16	6.8%
How much do you think orthodontic treatment costs on average in Saudi riyals?	Less than 5,000	38	16.2%
	5,000 - 10,000	144	61.3%
	10,000 - 20,000	42	17.9%
	More than 20,000	11	4.7%

Table 3: Participants' opinions about orthodontic treatment.

Discussion

Awareness about orthodontic treatments is a crucial factor for patients to get an optimal treatment outcome [21]. This study was designed to explore the levels of awareness about orthodontic treatments among public adults in Saudi Arabia. The results indicated that participants had a relatively moderate level of awareness and knowledge about orthodontic care (12.12/18). This is in alignment with other studies conducted in Saudi Arabia, in Jazan [16] and Al-Madinah [17], which both showed high levels of awareness among participants [16,17]. The total score of knowledge did not present a significant relationship related to gender, job status, region, or nationality. However, a significant difference was seen in participants with an educational attainment of less than high school, where the participants were found to have less knowledge than participants with higher degrees.

In regard to participants' knowledge about orthodontic treatments, the majority of the subjects (88.1%) agreed with the fact that orthodontists are specialized for correction of irregularly placed teeth, whereas a study conducted in India showed that 40.5% of the population did not know this fact [9]. This difference might be due to the low socioeconomic status and low educational levels of the bulk of the population in India.

The majority of participants in the present study identified the presence of different types of braces (metal/tooth colored) along with invisible braces (78.7% and 87.2%, respectively). Similarly, participants in Bindayel's Saudi Arabian study scored a high level of awareness of stainless steel and ceramic brackets and clear aligners [12].

When assessing their knowledge about different orthodontic questions, a high proportion of our participants correctly answered for most of the consequences of irregularly placed teeth and bad habits. About half of the study participants wrongfully believed that there is an age limit for orthodontic treatment. In the same vein, only half of the participants correctly identified that not all orthodontic treatments require removal of teeth (52.8%). A lower percentage was found in a study done in Jazan city (48%) [16]. This could be rationalized by the broadly distributed sample in our study, which included various education levels and regions of residence among the participants.

Although there was no statistically significant difference in gender for the total knowledge score, it is interesting that females had higher levels of knowledge in identifying that not all orthodontic treatments require the removal of teeth and that wearing braces will not damage the teeth. This could be attributed to the fact that females are more concerned about facial appearance, and therefore, they tend to seek dental care more than males [22]. However, our findings actually contradict Mishra, *et al.*'s [9] results finding that more females than males thought that braces would damage their teeth.

Around three-quarters of our study's participants had thought of receiving orthodontic treatment, which is comparable to the Al-Madinah study (62.8%) [17] and higher than the Jazan study (47.8%) [16]. Conversely, much lower percentages than these results were shown in two studies conducted in India (22% and 29%) [9,14]. These differences are related to multiple factors that differentiate the Indian and Saudi populations, including different socioeconomic status and different levels of education. Despite the relatively good perception of orthodontic need in our study's results, another study conducted in Saudi Arabia reported that the total need for orthodontic care among Saudis living in Jeddah city was not matched with their levels of perception [23].

In terms of treatment costs, 69.8% of the participants in the present study agreed that orthodontic treatment is expensive. This is consistent with the opinions of participants in a study from the Aseer region (83%) [24]. In fact, the high cost has proven to be the most marked barrier against receiving orthodontic and dental services [17,25,26]. For this reason, awareness is an essential element for the anticipation of malocclusion problems in order to prevent them before the need for much more extensive, and surely costly, treatment.

There have been studies previously performed about levels of awareness in different regions of Saudi Arabia among specific different populations, but this study might be the first to investigate the general awareness of orthodontic treatment among public adults at the

level of all regions of Saudi Arabia. However, this study used a self-reported questionnaire and convenience sampling method, which are considered limitations of the current study. Moreover, the small sample size and data could have affected the interpretations of the results. Accordingly, it is advised that a larger and well-distributed sample be studied in conjunction with suitable clinical assessments to better establish study results.

Conclusion

The majority of the population in Saudi Arabia had a moderate level of awareness about orthodontic treatments. A high level of knowledge was recorded regarding irregularly placed teeth and bad habits. However, about half of the participants wrongfully believed that there is an age limit for orthodontic treatment. In addition, only half of the participants correctly identified that not all orthodontic treatments require removal of teeth. Around three-quarters of the study participants had thought of receiving an orthodontic treatment, and less than half of them thought wearing braces would compromise their looks. Also, more than half of the participants believed orthodontic treatment is expensive. We recommend that a larger study sample be investigated and confirmed by clinical assessments in order to better measure and raise public awareness.

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Volume 10 Issue 12 December 2021

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