

Parental Knowledge and Practice Regarding their Children's Malocclusion and Orthodontic Care in Al-Madinah, Saudi Arabia: A Cross-sectional Study

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ABSTRACT

Objective: This article aims to measure parental knowledge and practice regarding their children's malocclusion and orthodontic treatment need.

Materials and methods: A cross-sectional survey was distributed in the Al-Madinah region, Saudi Arabia. Parental demographic data, knowledge, and practice were collected. The maximum possible mean score was 1.0 for both knowledge and practice.

Results: Three-hundred and fifteen participants completed the survey. The overall mean scores for parental knowledge and practice were 0.44 and 0.49, respectively. No statistically significant difference was detected between sexes, age, parental history of orthodontic treatment, education, and income levels. Females were more aware than males regarding the impact of malocclusion on their children's self-esteem ($p = 0.004$). Lower- and middle-income groups were less aware of increased risk of trauma with prominent incisors ($p = 0.001$) and various types of orthodontic appliances ($p = 0.004$). Although, 80% of parents stated that they were willing to convince their children toward orthodontic treatment based on professional advice. However, 40.5 and 34% of the lower- and middle-income groups would rather wait for public-funded services even if their child is in high need for treatment ($p < 0.000$), compared to 18% of the higher-income group stating the same.

Conclusion: Moderate to high parental knowledge and practice was demonstrated. Females and higher socioeconomic status parents were more aware and proactive than their counterparts. Public health services should consider parental socioeconomic status when allocating care for children's and adolescent's orthodontic treatment need.

Keywords: Children, Orthodontics, Parental knowledge, Practice, Saudi Arabia.

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INTRODUCTION

Malocclusion is defined as malposition of the teeth and/or the dental arches beyond the range of what is accepted as normal.¹ According to World Health Organization (WHO), malocclusion is the third most prevalent abnormal dental condition after caries and gingival disease.² The prevalence of children under 16-years old with malocclusion ranged between 75 and 60% in British and North American populations.³⁻⁶ In Saudi Arabia, 88% of children had one or more features of malocclusion.^{7,8}

Malocclusion stands out among the main problems that affect oral health-related quality of life due to its impact on appearance, function, social interactions, and psychological well-being.⁹ In case of children and adolescents, these effects will be even more potent. Moreover, they represent the greatest proportion of orthodontic referrals.¹⁰⁻¹²

Whether orthodontic treatment is being sought due to professional assessment, self-perception or parents' demand, the aesthetic, psychological, and functional benefits gained from treatment is well documented in the literature.¹³⁻¹⁶ Optimum timing plays a key role in the success of the orthodontic treatment in children and adolescents. Early treatment would reduce the risk of traumatic injuries to incisors in children.¹⁷ Developing malocclusion in primary or mixed dentition could be addressed by a relatively simple interceptive treatment, which when combined with the benefits of their growth potential, reduces or eliminates the severity of malocclusion and the need for complex treatment later in life.^{14,15}

Adolescents are twice as likely to be self-aware about their dental appearance than their parents.¹⁸ On the contrary, seeking

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treatment is mostly driven by parents' perceived concerns, desire, and motivations when the issue involves a child.¹⁹ Since children and adolescents are still dependent on their parents and caregivers financially and decisively, the final decision lies with the parents.²⁰ Several studies suggested that parental perception is directly proportional to child's dental health and treatment need, but mostly in Europe and North America.²¹⁻²³ In Saudi Arabia, there are limited studies on parental perception on their children's dental health, mostly regarding general dental health and oral habits.²⁴⁻²⁶ It is crucial that parental perception regarding their children's orthodontic treatment need is explored.

The primary aim of this study is to measure parental knowledge and practice toward the malocclusion and orthodontic treatment need of their children. The secondary aim is to explore various

demographic factors that may be associated with the level of parental knowledge and practice.

MATERIALS AND METHODS

Study Design

A cross-sectional descriptive study was conducted and distributed to the population of the Al-Madinah region of Saudi Arabia using an anonymous, self-administered, electronic questionnaire from May 2020 to September 2020.

Ethical approval was gained from the Research Ethics Committee, College of Dentistry, Taibah University (approval no. TUCDREC/20200316/MSMAIHarbi).

Sample size was calculated by OpenEpi StatCalc version 3.01. Confidence level was set at 95%, power of 80 and 50% anticipated frequency. A convenient random sample of 384 participants was determined.

Inclusion criteria were parents of an at least 7-year-old child, residents of Al-Madinah administrative area (the capital and the provinces within), with no official dental or orthodontic qualifications. Exclusion criteria were nonparent adults, residents outside Al-Madinah area, and qualified dentists or orthodontists. Informed consent was signed by all participating parents.

Questionnaire Characteristics

A structured self-administered with close-ended-answer questionnaire was tailored specifically for this study by one orthodontic consultant (prime investigator) and the co-investigators. Plain and simple Arabic language was used. All dental and orthodontic terms were translated into an understandable Arabic format. Face validity was evaluated by an epidemiologist, two general dentists, and 20 participants of the targeted population regarding the clarity and understanding of the questions. Feedback and comments were addressed prior to questionnaire distribution. Intra- and interrater reliability was 0.76 and 0.77 analyzed by intraclass correlation coefficient and Cronbach's alpha, respectively.

The questionnaire was composed of three sections. Section 1 included demographic data: sex, age, education, income levels, and history of orthodontic treatment for the parents. Section 2 measured parental knowledge regarding their children's malocclusion and treatment needs using 11 questions with three-option answers ("Yes", "no", "I do not know"). The correct answer was always "Yes" and was scored as 1. "I do not know" was scored as 0, and "No" was always the wrong answer and was scored as -1. Section 3 consisted of six questions evaluating parental attitudes when their child needs orthodontic treatment.

Statistical Analysis

Data were processed via SPSS, version 26.0 (IBM Corp. New York, USA). Descriptive and analytical statistical tests were conducted. Chi-square with Bonferroni adjustment and Fisher's exact tests were used for nominal data and subgroup analysis. ANOVA and student's *t*-test were used for quantitative data and subgroup comparisons. Statistical significance was set at *p* value <0.05.

RESULTS

The total number of participants was 315 (response rate 82%), of which 171 were females (54.3%) and 144 were males (45.7%). The mean age was 36.5 years old. Forty-one participants did not report their age and therefore were excluded from the age subgroup analysis. Full descriptive statistics is found in Table 1.

Table 1: Descriptive demographic data of participating parents

Variable	Number (%)
Total sample	315 (100%)
Mean age	36.5 years (SD ± 11)
Gender	
Female	171 (54.3%)
Male	144 (45.7%)
Age-group	
≤35 years old	134 (42.5%)
≥36 years old	140 (44.4%)
No age reported	41 (13.1%)
Education level	
Middle school or less	20 (06.3%)
High school diploma	49 (15.6%)
Undergraduate level	220 (69.8%)
Postgraduate level	26 (08.3%)
Monthly income	
Low income	84 (26.7%)
Middle income	97 (30.8%)
High income	134 (42.5%)
Previous orthodontic treatment	
No	230 (73.0%)
Yes	85 (27.0%)

The mean scores for the overall parental knowledge and practice were 0.44 and 0.49, respectively. Subgroup analysis showed no significant statistical difference regarding gender, age, parental history of orthodontic treatment, education, and income levels for the overall knowledge and practice (Tables 2 and 3).

Knowledge per-question analysis showed that 75.2% of parents agree that early interceptive treatment reduces the severity and need for surgical orthodontics later in life; 64.8% were not aware that malocclusion is an inherited condition. Females were more aware than males regarding the impact of malocclusion on their children's self-esteem ($p = 0.004$). Lower- and middle-income groups were less aware of increased risk of trauma with prominent incisors ($p = 0.001$) and various types of orthodontic appliances ($p = 0.001$) (Table 4).

In the practice section, 80% of parents stated they were willing to convince their children to uptake orthodontic treatment based on professional advice. However, 40.5 and 34% of the lower- and middle-income groups would rather wait for free public orthodontic treatment than to pay for immediate treatment in private care when compared to higher income group (18%) even if their child is in high need of treatment ($p < 0.000$). Mothers are more willing than fathers to seek orthodontic consultation when their child turns 7 years old ($p = 0.003$), the same applies for parents with previous orthodontic treatment ($p = 0.017$) (Table 5).

DISCUSSION

Our study aimed to assess parental awareness and attitudes toward their children's orthodontic problems and treatment need in Saudi Arabia. To the best of our knowledge, this is the first study of this kind on Saudi population.

Adequate knowledge and positive attitude were found in 55.6 and 68.4% of the participants, respectively (Figs 1 and 2), which is higher than similar studies elsewhere.^{27,28}

Low knowledge was observed in the difference of treatment starting times between girls and boys (Question 6). The pubertal

Table 2: Per-question and overall knowledge mean scores, 95% confidence intervals (CI) and interpretation for the total sample

Question	Mean score	95% CI	Interpretation
01 Malocclusion could lead to lower child self-esteem	0.62	[0.55 to 0.69]	High
02 Malocclusion is normally inherited from parents	0.07	[-0.02 to 0.16]	Moderate
03 Malocclusion is a discrepancy of upper and lower jaws	0.26	[0.18 to 0.34]	Moderate to high
04 Sticky-out teeth increase the risk for trauma	0.71	[0.65 to 0.77]	High
05 Orthodontic treatment differs from young to adults	0.70	[0.64 to 0.76]	High
06 Girls should start treatment earlier than boys because they reach puberty first	0.19	[0.11 to 0.27]	Moderate
07 Upper incisors spacing up to 12-year-old does not require orthodontic intervention	0.24	[0.15 to 0.33]	Moderate to high
08 Early interceptive treatment could reduce the need for further treatment later in life	0.50	[0.43 to 0.57]	Moderate to high
09 There are orthodontic appliances used for treatment other than fixed metal braces	0.26	[0.19 to 0.33]	Moderate to high
10 Orthodontic treatment may require correction of upper or lower jaw position by orthodontic appliances	0.53	[0.46 to 0.60]	Moderate to high
11 Early orthodontic treatment reduces the need for surgical orthodontic correction later in life	0.72	[0.66 to 0.78]	High
Overall knowledge	0.44	[0.36 to 0.51]	Moderate to high

Table 3: Per-question and overall practice mean scores, 95% confidence intervals (CI) and interpretation for the total sample

Question	Mean score	95% CI	Interpretation
01 I always seek orthodontic consultation when my child turns 7-year-old	0.41	[0.32–0.50]	Moderate to high
02 I regularly notice the alignment of my child’s teeth	0.53	[0.44–0.62]	Moderate to high
03 Based on professional treatment need advice, I convince my child into treatment even if they do not want to	0.69	[0.62–0.76]	High
04 I know if my child has jaw problem (like prominence of upper or lower jaw)	0.59	[0.51–0.67]	Moderate to high
05 I will only start orthodontic treatment for my child after the eruption of all permanent teeth	0.37	[0.28–0.46]	Moderate to high
06 If my child is in high need for orthodontic treatment, I would rather wait for free public treatment than to pay for private care, even if the waiting time is more than a year	0.33	[0.23–0.43]	Moderate to high
Overall practice	0.49	[0.43–0.60]	Moderate to high

Table 4: Per-question knowledge Chi-square analysis for comparison within subgroups

Knowledge	Gender	Age-group	Education level	Income level	Parental previous orthodontics
Q-01	0.004	—	—	—	—
Q-02	—	—	—	—	—
Q-03	—	—	—	—	—
Q-04	—	—	—	0.001	—
Q-05	—	—	—	—	0.007
Q-06	—	—	—	—	—
Q-07	—	—	—	0.002	0.049
Q-08	—	—	—	—	—
Q-09	—	—	—	0.001	—
Q-10	0.015	—	—	—	—
Q-11	—	—	—	—	—

p value >0.05 is reported as (–) which indicates no significant statistical difference

growth spurt is a critical factor in the success of functional orthodontic management of skeletal discrepancies.²⁹ Girls reach puberty on average 2 years earlier than boys; therefore, failure to correct malocclusion problems in girls at their optimum age poses

Table 5: Per-question practice Chi-square analysis for comparison within subgroups

Practice	Gender	Age-group	Education level	Income level	Parental previous orthodontics
Q-01	0.002	0.028	—	—	0.017
Q-02	—	—	—	—	—
Q-03	—	—	—	—	—
Q-04	0.020	—	—	—	—
Q-05	—	—	—	—	—
Q-06	—	—	—	0.000	—

p value >0.05 is reported as (–) which indicates no significant statistical difference

the risk of increasing the severity of skeletal discrepancy which necessitates more costly and invasive treatment approaches later in life.³⁰

The lowest knowledge scores were observed in the genetic influence of malocclusion (Question 2) and the normal developmental spaces “ugly duckling stage” during child growth (Question 7). According to Mossey, evidence of genetic influence on malocclusion is compelling and irrefutable.³¹



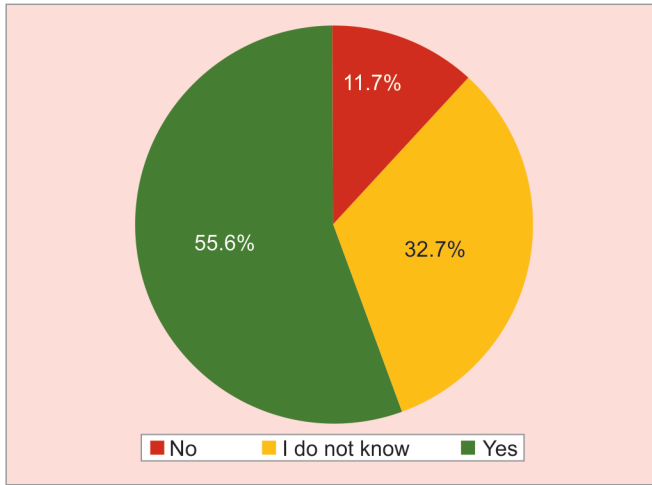


Fig. 1: Overall knowledge response distribution for the total sample

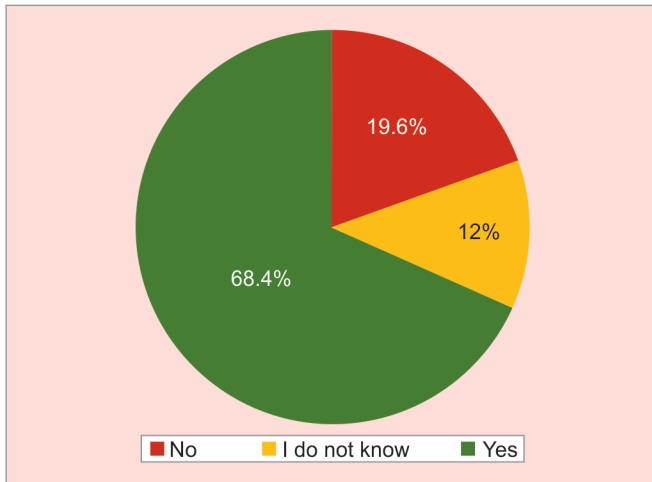


Fig. 2: Overall practice response distribution for the total sample

Mothers were more sensitive toward their children’s aesthetic appearance and psychosocial well-being, which is reflected by their increased awareness and motivation compared to fathers. Treatment uptake was influenced by the motivation of the mother in most of the cases according to Baldwin.³² In Saudi adolescents, it was found that self-esteem is negatively affected by the severity of malocclusion.^{33,34} It could be assumed that children are emotionally closer to their mothers than fathers, hence the difference. There is a potential risk for a child’s need for treatment based on aesthetic, psychologic, or functional reasons being underestimated or neglected by fathers. However, this has not been explored before.

Both awareness and attitude were in concordance with each other, which supports the claim that increased knowledge is positively associated with demand for orthodontic treatment.³⁵ Moreover, parental attitude was even higher than knowledge, suggesting that parents exhibited high motivation to monitor and seek to improve the aesthetic dental appearance of their children regardless of the knowledge. This could be attributed to parental desire of their children to become more “pretty” and socially acceptable as reported previously.³⁶

Despite a child’s pressing need for orthodontic intervention, a significant proportion of low- and middle-income class parents

would rather wait for state-funded public services such as Ministry of Health dental centers and university dental hospitals over private-sector clinics. The percentage of Saudi children and adolescents who were in great/extreme need for orthodontic treatment assessed by Index of Orthodontic Treatment Need (IOTN) ranged between 25 and 75% according to several reports irrespective of their gender and socioeconomic status.⁷ However, demand for treatment was greater in children with relatively higher socioeconomic status, living in urban areas with ease of access to treatment facilities irrespective of their objective need.³⁷ State-funded institutions provide free orthodontic treatment to the public without national regulations or rationing of care according to the severity of need. Consequently, this will potentially allow public with little treatment need to have easy free access to the system leaving others with extreme and mandatory need left waiting on an ever-growing waiting list. Therefore, we recommend public services treatment prioritize not only according to the objective treatment need but also on other factors such as the state of psychosocial well-being of the child and the socioeconomic status of the parents. Also, the implementation of subsidies from third-party bodies like insurance companies and charity programs could help fund treatment for those who are in urgent need.

Every effort was taken to minimize bias, such as including subjects from various public areas with no formal dental qualifications and the use of clear well-structured questionnaire in Arabic language format. However, the total response was below required, some participants did not report their age. Also, the study was conducted only on residents of Al-Madinah region, Saudi Arabia. Therefore, the results cannot be generalized to the whole Saudi Population. Further studies involving different regions are required.

CONCLUSION

Parents demonstrated moderate to high knowledge and practice regarding their children’s malocclusion problems and orthodontic need. Females and higher socioeconomic status parents were more aware and proactive than males and lower socioeconomic status parents. Public health services should consider parental socioeconomic status when allocating care for children’s and adolescent’s orthodontic treatment needs.

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