

An Analysis of Correlation between Demand and Need for Orthodontic Treatment among Patients in Prince Sattam Bin Abdulaziz University Dental College Clinic, Kingdom of Saudi Arabia

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How to cite the article:

Sam G, Seehan S, Al-Shayea M. An analysis of correlation between demand and need for orthodontic treatment among patients in Prince Sattam Bin Abdulaziz University Dental College Clinic, Kingdom of Saudi Arabia. J Int Oral Health 2015;7(Suppl 2):40-44.

Abstract:

Background: The objective of the study is to determine whether there is any correlation between demand and need for orthodontic treatment among patients in Sattam Bin Abdulaziz University (SAU) Dental College Clinic. This study also provides a baseline data on the demand and need for orthodontic treatment among a Saudi population, which is important for planning public orthodontic dental services in the Kingdom.

Materials and Methods: An epidemiological descriptive survey was conducted using two sets of questionnaire in the orthodontic clinic of Prince SAU, Al-Kharj among Saudi subjects with angle's Class I, Class II, and Class III malocclusions, between the ages of 10 and 30 years for a period of 6 months with purposive sampling method.

Results: Using Spearman's rank correlation coefficient a significant correlation (0.482) was observed in male and female patients respectively with orthodontic demand (2) and treatment need (1) at 0.05 level of significance. A significant correlation (0.326) was observed for the study subjects (both males and females) with orthodontic demand (4) and treatment need (1) at 0.05 level of significance. A significant correlation (0.325) was observed in male patients with orthodontic demand (4) and treatment need (5) at 0.05 level of significance.

Conclusions: Patients with the higher orthodontic demand required high treatment needs and *vice versa*.

Key Words: Demand, malocclusion, need, orthodontic treatment

Introduction

Facial esthetics and dental health improvements is the prime concern of orthodontic treatment. Orthodontics is a specialty that relies heavily on patient's cooperation for a successful end result.¹ Personal perception of the need for orthodontic

treatment may be influenced by variety of social, economical, and cultural factors.² During the last 25 years, the Kingdom of Saudi Arabia has had a marked increase in population and a massive development in various aspects of life.³ Consequently an increase in the demand for health services including oral health became evident.³ As growing public interest in oral health increased the demand for orthodontic treatment also became more noticeable in dental practices.⁴ Demand for orthodontic therapy may be influenced by the patient's perceived need for treatment and the anticipated improvement in self-image.^{5,6} Lew has stated that the practitioners should focus their attention beyond orthodontic mechanotherapy to the most subjective aspects of patient's discomfort, and attitude toward treatment.⁷ Several studies have concentrated on clarifying the role of malocclusion on an individual's perception and satisfaction with dental or facial appearance.⁸⁻¹⁰ Enhancing appearance and improving psychological status have been identified as an important motivating factors behind the decision to initiate orthodontic treatment.^{5,11-15} Traditional methods of estimating orthodontic treatment need are mainly based on normative need assessed by professionals using occlusal or cephalometric measurements. This shortcoming is serious because there are considerable difference between professional and patient's perceptions of dental appearance and need for the treatment.^{16,17} While the orthodontist prioritizes the function and occlusion in consultation, the patient might perceive other factors to be equally important to initiate the treatment.¹⁸ As the ultimate goal of a health service is to meet the public needs, professional measurements can be supplemented band related to individual's self-perception of occlusion and need for treatment.¹⁹

The objective of the study is to determine whether there is any correlation between demand and need for orthodontic treatment among patients in Sattam Bin Abdulaziz University (SAU) Dental College Clinic. This study also provides a baseline data on the demand and need for orthodontic treatment among a Saudi population, which is important for planning public orthodontic dental services in the Kingdom.

Materials and Methods

For the first time in the history of Prince SAU Dental College specialty clinic, a cross-sectional survey was carried out to determine whether there is any correlation between demand

and need for orthodontic treatment at the university dental college orthodontic specialty clinic. In total 107 subjects were given to the questionnaire of orthodontic demand and only 100 (94%) eventually responded out of which 75 (75%) were males and the rest 25 (25%) were females. The research instrument was a self-administered questionnaire for the demand part and index of orthodontic treatment need (IOTN) to assess the orthodontic treatment need. This survey was completed during regular orthodontic specialty clinical sessions, with an average time of 10 min. The questionnaire was carefully designed to maximize the response rate and minimize the missing data, the attitudes to malocclusion, and orthodontic treatment demand were determined from the response to fixed choice questionnaire with six open questions to know the orthodontic treatment need. The questions on demand were selected from a previous similar study,²⁹ and adapted to the Prince SAU Dental College context. The IOTN is one of the most widely used occlusal indices worldwide.²⁰ Data were analyzed using the statistical software program, predictive analytics software Statistics version 22.0 (SPSS Inc., Chicago, IL, USA). Samples included in the study were Saudi nationals with angle's Class I, Class II, and Class III malocclusions, with the age limit of 10-30. The subjects excluded were non Saudi Arabian nationals, and subjects below the age of 10 years, and above the age of 30 years, subjects with vertical and horizontal periodontal bone loss, mentally retarded, and behavior disorder that reduced their ability for self-determination, as well as those who disagree to participate or whose legal representatives did not authorize the participation in the study. Ethical clearance was obtained from the college ethical clearance committee 2 weeks prior to the beginning of the study.

Results

Tables 1-3 and Graphs 1-4 shows the distribution of response obtained to the first questionnaire (The questionnaire on demand) on the attitude of subjects to malocclusion between males and females. As shown in Table 1 and Graph 1, 21.3% of males and 48% of females expressed the satisfaction with the arrangement of their teeth mean while 64% of males and 52% of females expressed dissatisfaction with the arrangement of their teeth and 14.6% of males and none of the females expressed that they are not sure regarding the arrangement of their teeth. As shown in Table 2 and Graph 2, 82.66% of males and 84% of females expressed that their teeth needed to be straightened while 4% of males and females expressed that their teeth needed not be straightened, and 13.33% of males and 12% of females expressed that they are not sure whether to straighten their teeth. As shown in Table 3 and Graph 3, 86.66% of males and 92% of females expressed that well aligned teeth are important for overall facial appearance while 2.66% of males and 4% females expressed that well aligned teeth are not important for overall facial appearance, while 8% of males and 4% of females expressed that they have no opinion regarding this matter. As shown in Graph 4, 74.66% of males and 84% females expressed

Table 1: Demand to orthodontic treatment: Are you satisfied with the arrangement of your teeth?

Response	n (%)		
	Females (25)	Males (75)	Total (100)
Yes	12 (48)	16 (21.3)	28 (28)
No	13 (52)	48 (64)	61 (61)
Don't know	0 (0)	11 (14.6)	11 (11)

$\chi^2=8.871, P=0.012$

Table 2: Demand to orthodontic treatment: Do you want to get your teeth straightened?

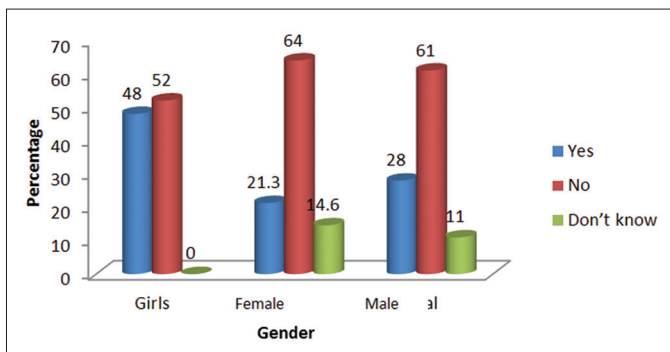
Response	n (%)		
	Females (25)	Males (75)	Total (100)
Yes	21 (84)	62 (82.66)	83 (83)
No	1 (4)	3 (4)	4 (4)
Don't know	3 (12)	10 (13.33)	13 (13)

$\chi^2=0.030, P=0.985$

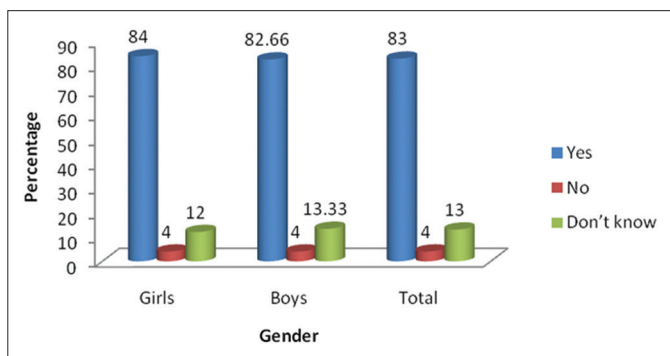
Table 3: Demand for orthodontic treatment: Do you consider well aligned teeth important for an overall facial appearance?

Response	n (%)		
	Females (25)	Males (75)	Total (100)
Yes	23 (92)	65 (86.66)	88 (88)
No	1 (4)	2 (2.66)	3 (3)
Don't know	1 (4)	8 (10.66)	9 (9)

$\chi^2=1.098, P=0.578$

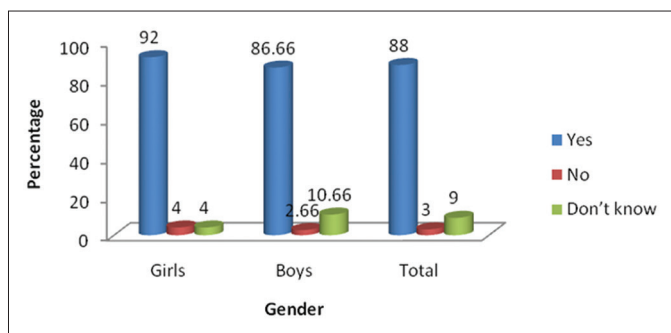


Graph 1: Are you satisfied with the arrangement of your teeth.

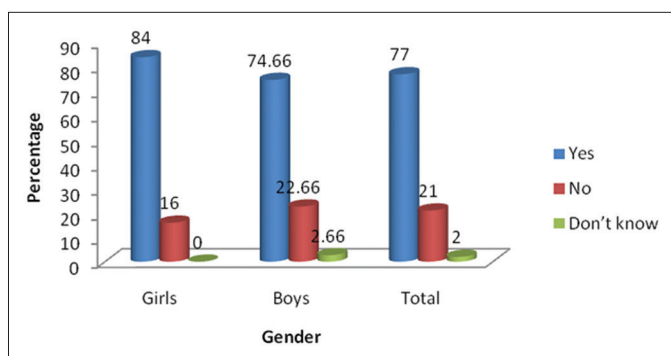


Graph 2: Do you want to get your teeth straightened?.

that they came to the clinic at their own wish, while 22.66% of males and 16% of females expressed that they had come to the clinic at the opinion of their parents and 2.66% of males and none of the females expressed that they had come to the clinic



Graph 3: Do you consider well aligned teeth important for an overall facial appearance?



Graph 4: Did you come to the clinic at your own wish?

at the opinion of their relatives and friends. Using Spearman’s rank correlation coefficient (Tables 4-6) the following results are obtained regarding the correlation between demand and need for orthodontic treatment among patients in SAU Dental College Clinic.

- A significant correlation (0.482) was observed for female patients with orthodontic demand (2) and treatment need (1) at 0.05 level of significance
- A significant correlation (0.268) was observed in male patients with orthodontic demand (2) and treatment need (1) at 0.05 level of significance
- A significant correlation (0.325) was observed in male patients with orthodontic demand (4) and treatment need (5) at 0.05 level of significance
- A significant correlation (0.326) was observed for study subjects (both males and females) with orthodontic demand (2) and treatment need (1) at 0.05 level of significance
- A significant correlation (0.240) was observed for study subjects (both males and females) with orthodontic demand (2) and treatment need (2) at 0.05 level of significance
- A significant correlation (0.292) was observed for study subjects (both males and females) with orthodontic demand (4) and treatment need (5) at 0.05 level of significance

Our results clearly show that patients with high orthodontic demand are at a high priority for orthodontic treatment.

Table 4: Correlations using Spearman’s rho for demand and need among females.

Demand among females	Need 1	Need 2	Need 3	Need 4	Need 5
Demand 1					
Correlation coefficient	0.384	-0.144	-0.201	-0.108	0.114
Sig. (2-tailed)	0.058	0.492	0.336	0.606	0.587
N	25	25	25	25	25
Demand 2					
Correlation coefficient	-0.482*	0.299	-0.119	-0.187	0.271
Sig. (2-tailed)	0.015	0.147	0.572	0.369	0.189
N	25	25	25	25	25
Demand 3					
Correlation coefficient	0.109	-0.101	0.129	0.109	-0.157
Sig. (2-tailed)	0.605	0.631	0.540	0.605	0.452
N	25	25	25	25	25
Demand 4					
Correlation coefficient	-0.175	0.299	-0.107	0.161	-0.214
Sig. (2-tailed)	0.404	0.146	0.610	0.442	0.305
N	25	25	25	25	25
Need 1					
Correlation coefficient	1.000	-0.253	-0.161	-0.136	-0.230
Sig. (2-tailed)	-	0.222	0.442	0.516	0.268
N	25	25	25	25	25

*Correlation is significant at the 0.05 level (2-tailed)

Table 5: Correlations using Spearman’s rho for demand and need among males.

Demand among males	Need 1	Need 2	Need 3	Need 4	Need 5
Demand 1					
Correlation coefficient	-0.036	0.173	-0.038	-0.046	-0.056
Sig. (2-tailed)	0.758	0.139	0.745	0.695	0.632
N	75	75	75	75	75
Demand 2					
Correlation coefficient	-0.268*	0.219	0.138	-0.120	-0.102
Sig. (2-tailed)	0.020	0.059	0.236	0.303	0.385
N	75	75	75	75	75
Demand 3					
Correlation coefficient	-0.036	0.188	-0.019	0.049	-0.172
Sig. (2-tailed)	0.762	0.107	0.869	0.678	0.140
N	75	75	75	75	75
Demand 4					
Correlation coefficient	0.155	0.029	0.186	-0.012	-0.325**
Sig. (2-tailed)	0.184	0.803	0.110	0.922	0.004
N	75	75	75	75	75

**Correlation is highly significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed)

Discussion

There was a gender difference in the subjective assessment of dental appearance in this sample of Saudi Arabian patients with 48% females, and 21.3% of males expressed satisfaction with the arrangement of their teeth. This frequency is not consistent with satisfaction of 61.9% and 63% reported in Polish and Latvian children by Grzywacz,²¹ and Liepa *et al.*²² respectively. 52% of the female subjects and 64% of the male subjects felt their teeth arrangement was unsatisfactory while none of the female subjects and 14.6% of the male subjects were undecided, but Graber and Lucker,²³ reported that

Table 6: Correlations using spearman's rho for demand and need among study subjects.

Correlation	Need 1	Need 2	Need 3	Need 4	Need 5
Demand 1					
Correlation coefficient	0.097	0.120	-0.120	-0.066	0.007
Sig. (2-tailed)	0.339	0.233	0.232	0.512	0.941
Demand 2					
Correlation coefficient	-0.326**	0.240*	0.082	-0.136	-0.005
Sig. (2-tailed)	0.001	0.016	0.415	0.177	0.961
Demand 3					
Correlation coefficient	0.006	0.128	-0.011	0.058	-0.163
Sig. (2-tailed)	0.955	0.203	0.917	0.569	0.104
Demand 4					
Correlation coefficient	0.075	0.108	0.113	0.019	-0.292**
Sig. (2-tailed)	0.458	0.284	0.262	0.850	0.003

**Correlation is highly significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed)

small percentage of American children who considered their teeth to be unattractive. A statistical significant correlation was determined for female patients with orthodontic demand (2) as they were in significant requirement of treatment needs (1) (less demand shows less need), and a significant correlation was determined for male patients with orthodontic demand (2) as they were in significant requirement of treatment needs (1) (less demand shows less need), and significant correlation was determined for male patients with orthodontic demand (4) as they were in significant requirement of treatment needs (5) (more demand shows more need), a significant correlation was determined for patients with orthodontic demand (2) as they were in significant requirement of treatment needs (1). Patients with demand need 2 require minor or no orthodontic treatment, and a significant correlation (-0.292) was determined for the patients with orthodontic demand (4) as they were in significant requirement of treatment needs (5). Salonen *et al.*,²⁴ had reported that the awareness of malocclusion was higher among younger than older subjects and among those who had severe malocclusion. However, studies have shown that dissatisfaction with dental appearance was generally related to the severity of the occlusal irregularities. 92% of female subjects and 82.66% of male subjects expressed desire to straighten their teeth whereas 4% of female and male subjects were not interested in orthodontic treatment and 12% of female subjects and 13.33% of the male subjects were uncertain. This study supported the observation of Gravelly,²⁵ who reported that girls were more aware of malocclusion than boys and were prepared to accept treatment. Shaw²⁶ and Pietilä and Pietilä,²⁷ also reported that dissatisfaction with dental appearance was more common among females than males. Holmes,²⁸ in his study of English children also reported that a greater proportion of females perceived themselves as having less attractive dentitions and greater treatment need despite any objective evidence to support this view. 92% of female subjects and 82.66% of male subjects considered well-aligned teeth to be important for overall facial appearance

which suggested the high awareness of dental esthetics among females than among males.

Conclusions

Patients with higher orthodontic demand required high treatment needs and vice versa. The present study was conducted on a limited sample size. Further studies are awaited with wider sample size in the future to validate the results.

Acknowledgments

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