Archives of Orofacial Sciences
The Journal of the School of Dental Sciences
Universiti Sains Malaysia

Arch Orofac Sci (2014), **9**(1): 17-24.

Original Article

Medical students' awareness of orthodontics: a cross sectional study in King Khalid University, Abha, Saudi Arabia

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Revised edition: 31/03/2014. Accepted: 07/05/2014. Published online: 07/05/2014.

Abstract Medical doctors are the primary caregivers for a vast majority of health-related complaints. If they are unaware of the impact of malocclusion and orthodontics on the health and general well-being of the patient, they may not identify, educate, motivate and refer patients for orthodontic care. Considering that the present-day medical students are the future medical doctors; we sought to assess their level of orthodontic awareness. This cross sectional survey was conducted in King Khalid University College of Medicine. The sample included 375 male and female medical students selected by simple random sampling technique. A pre-piloted self-administered questionnaire was used and the collected data was subjected to statistical analysis using SPSS package. Response rate was 70.4% (n=264). Males were 49.2% (n=130) and the rest were females. Half of the respondents (50.1%, (n=131) were familiar with the term 'orthodontics'. 31.4% (n=81) knew that orthodontics involved correcting malocclusion. 40.1% (n=106) had received orthodontic treatment. Around half of the respondents (54.5%, (n=144) have relatives undergoing orthodontic treatment and 47.4% (n=125) felt aesthetics is most affected by malocclusion. Similarly, 56% (n=148) would make referrals and 38.6% (n=102) cited treatment duration as a discouraging factor. The medical students surveyed had limited awareness of orthodontics as a specialty. The female students showed a higher level of awareness towards oral health and orthodontics as compared to male students. Basic introduction to the dental sub-specialties, especially orthodontics would enable them to identify malocclusions, educate the patients and make informed referrals appropriately. Incorporating oral health education into the medical curriculum is a natural way to make a positive impact on patients' health and well being.

Keywords: Malocclusion, medical students, orthodontics.

Introduction

The term 'malocclusion' refers to mal-alignment of teeth and incorrect relationship between the upper and lower arches (Gruenbaum, 2010). Malocclusion is the third most common oral health problem in the world, and is often associated with inadequate oral hygiene, periodontal disease, temporo-mandibular joint disease, speech problems, mouth breathing and many more complications (Glans *et al*., 2003). Orthodontic treatment often can correct these complications or at least prevent them from progressing; by ensuring proper alignment of the teeth and achieving harmonious occlusal and jaw relationships (Lara-Carrillo *et al*., 2010).

Orthodontic problems are generally not associated with high mortality or morbidity; hence, they are often overlooked by most health professionals as less important. However, studies indicate that malocclusion has significant impact on the psychosocial health of the affected person (Shaw, 1981; Onyeaso, 2004). General practitioners and physicians are the primary care givers and their role in oral healthcare delivery is very important due to the lack of awareness of patients concerning the treatment of oral health problems. Prevention of oral diseases is expected to be effective if the physicians who have more regular contact with individuals in developing countries are actively involved in screening and

prevention of oral diseases (Adeghe *et al*., 2012).

Ethnic, genetic and environmental factors are major contributors to malocclusion and its prevalence has increased in recent decades (Ahangar Atashi, 2007). The prevalence of malocclusion has been ranging from 20 to 43% in India (Sureshbabu *et al*., 2005; Shivakumar *et al*., 2009), 20 to 35% in the United States (Proffit *et al*., 1998), 88.1% in Colombia (Thilander *et al*., 2001) and 76 to 87.7% in Nigeria (Dacosta, 1999; Onyeaso, 2004; Ajayi, 2008). A prevalence rate ranging from 46.4% to 69.3% (Jones, 1987; Al-Balkhi and Zahrani, 1994; Alkawari, 1998) was reported in the Kingdom of Saudi Arabia (KSA).

Oral health awareness is very low in KSA, despite the availability of free dental care at the public health centres (Al-Otaibi and Angmar-Månsson, 2004). Furthermore, prevention of oral diseases is not a high priority in the region and majority of the individuals visit dental clinics only when they experience toothache (Alkawari, 1998).

Knowledge imbibed at undergraduate level from the curriculum influences the style and orientation of medical practice after graduation (Adeghe *et al*., 2012). Considering that the present-day medical students are the future medical doctors, the present study sought to assess their level of orthodontic awareness.

Materials and methods

This cross sectional survey was conducted in King Khalid University College of Medicine. Taking the role of sum of awareness of 50% and an absolute precision of 5% and a confidence interval of 95% the sample size needed for the present study was calculated to be 375 male and female students. The sample was selected from second to final year of the medical program by simple random sampling technique. A pre-piloted validated self-administered questionnaire (Table 1) was designed to collect information, and was distributed to students during class-breaks in April 2013.

Verbal and written consent were obtained from the participants after informing them the objective of the study. Implied coercion was eliminated as none of the researchers were directly involved in either classroom teaching or clinical assessment of the students. The students were instructed to return the completed questionnaire.

Participation was voluntary and the overall response rate was 70.4%. The statistical software package SPSS, version 19.0 for Windows (SPSS Inc., Chicago, IL) was used for the analysis of data. If the questionnaire was not filled completely, it was not excluded as a whole, but only the answered questions were taken into consideration in statistical analysis. Pearson's Chi square test was used and a *p* value less than 0.05 was considered statistically significant.

Results

Completed questionnaires were returned by 264 participants, giving a response rate of 70.4%. 49.2% (n=130) were males and 51.8% (n=134) were females. The respondents' age range was 18-25 years with mean (SD) of 22 (7.7). The demographic characteristics of respondents are summarized in Table 2.

73.8% of the respondents (n=195) had visited a dentist in the past six months. Concerning the reason for visiting the dentist, 76.4% (n=149) of them had visited with tooth pain, 11.2% (n=22) for a routine checkup, 12.3% (n=24) for other reasons, in which only 3% (n=6) consulted the dentist for orthodontic treatment (Fig. 1).

Only 50.1% (n=131) were familiar with the term 'orthodontics' and only 31.4% (n=81) correctly answered that orthodontics involves correcting malocclusion. 40.1% (n=106) of respondents have received orthodontic treatment and 54.5% (n=144) of them had relatives who have received orthodontic treatment either in past or at present. Majority (47.4%, n=125) felt aesthetics is most affected by malocclusion, followed by mastication (30.6%, n=81) and speech (22%, n=58) (Fig. 2). 38.6% (n=102) of them felt treatment duration discourages them from either undergoing or advising orthodontic treatment (Fig. 3). 56% (n=148) of them would refer close relatives

with malocclusion for orthodontic treatment and 48.1% (n=127) would suggest orthodontics as a career choice to their close relatives.

Pearson's Chi square test was used and a *p* value less than 0.05 was considered statistically significant. There was a statistically significant difference between female and male students' awareness of orthodontics. Gender differences among the respondents' *p* values are summarized in Table 3.

Table 1 Pre-piloted validated self-administered questionnaire

Age: **Gender:** ☐ M ☐ F

1. Have you visited a dentist in the last 6 months? ☐ Yes ☐ No

2. What was your reason for visiting the dentist? ☐ Pain ☐ Routine Checkup ☐ other (---------)

3. Are you familiar with term Orthodontics? ☐ Yes ☐ No

4. Do you know which type of treatment is done in the Orthodontic specialty?

☐ Dentures ☐ Fillings ☐ Correcting crooked teeth

5. Are you receiving orthodontic treatment at present or underwent orthodontic treatment previously?

☐ Yes ☐ No

6. Are any of your relatives receiving orthodontic treatment presently or have undergone orthodontic treatment previously? ☐ Yes ☐ No

7. In your opinion, which daily function would be most affected by maligned and crooked teeth?

☐ Aesthetics ☐ Mastication ☐ Speech

8. Will you refer your close relatives to dentists in case you notice maligned teeth? ☐ Yes ☐ No

9. Of the following what would deter you from advising or personally undergoing orthodontic treatment?

☐ Cost ☐ Time required ☐ Treatment discomfort

10. Would you suggest Orthodontics as a career to any of your close relatives? ☐ Yes ☐ No

Table 2 Demographic characteristics of the respondents

Characteristics	Frequency	Percent
Age (Years)		
18-19	56	21.3
20-21	102	38.6
22-23	67	25.3
24-25	39	14.8
Gender		
Females	134	49.2
Males	130	51.8

Table 3 Gender differences among the respondents

Questions	Gender		Total	Chi	*p* value
	Male n (%)	Female n (%)	n (%)	square	
Visited a dentist in the last six months (n=264)					
Yes	83 (31.4%)	112 (42.4%)	195 (73.8%)	13.3	0.001
No	47 (17.8%)	22 (8.4%)	69 (26.2%)		
Reason for visiting the dentist (n=195)					
Pain	79 (40.5%)	70 (36%)	149 (76.5%)	23.4	0.001
Routine check up	10(5.1%)	12 (6.1%)	22 (11.2%)		
Any other	0 (0%)	24 (12.3%)	24 (12.3%)		
Familiar with term 'orthodontics' (n= 261)					
Yes	46 (16.6%)	88 (33.6%)	131 (50.2%)	24.2	0.001
No	84 (32.2%)	46 (17.7%)	130 (49.9%)		
Perception of treatment by orthodontists (n= 258)					
Dentures	46 (17.8%)	24(9.3%)	70 (27.1%)	34.3	0.001
Fillings	69 (26.7%)	48 (18.7%)	117 (45.4%)		
Correcting crooked teeth	15 (5.8%)	56 (21.7%)	71 (27.5%)		
Receipt of orthodontic treatment at present / in past (n= 264)					
Yes	55 (20.8%)	51 (19.3%)	106 (40.1%)	0.496	0.481
No	75 (28.4%)	83 (31.5%)	158 (59.9%)		
Receipt of orthodontic treatment at present/ in past by relatives (n= 264)					
Yes	57 (21.5%)	87 (33%)	144 (54.5%)	11.82	0.001
No	73 (27.7%)	47 (17.8%)	120 (45.5%)		
Functions most affected by malaligned teeth (n= 264)					
Aesthetics	57 (21.6%)	68 (25.8%)	125 (47.4%)	30.1	0.001
Mastication	56 (21.2%)	25 (9.4%)	81 (30.6%)		
Speech	13 (4.9%)	45 (17.1%)	58 (22%)		
Refer close relatives with malaligned teeth (n= 264)					
Yes	50 (18.9%)	98 (37.1%)	148 (56%)	32.2	0.001
No	80(30.3%)	36 (13.7%)	116 (44%)		
Factor that would deter them from undergoing/ advising orthodontic treatment (n= 264)					
Cost	55 (20.9%)	40(15.1%)	95 (36%)	10.3	0.006
Time required	53(20.1%)	49 (18.5%)	102 (38.6%)		
Treatment discomfort	22 (8.3%)	45(17.1%)	67 (25.4%)		
Would suggest orthodontics as a career choice (n=264)					
Yes	48 (18.1%)	79 (30%)	127 (48.1%)	12.8	0.001
No	82 (31%)	55 (20.9%)	137 (51.9%)		

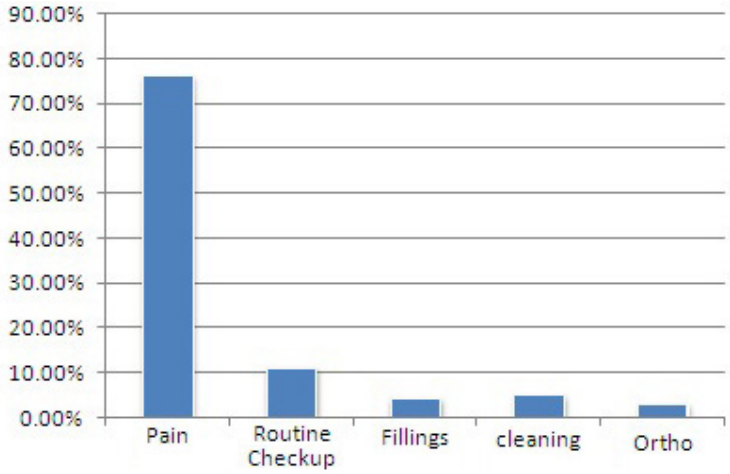

Fig. 1 Respondents' reasons for visiting the dentist.

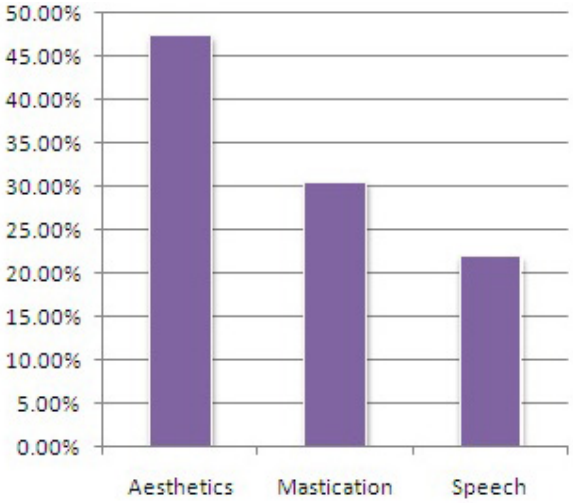

Fig. 2 Daily functions to be most affected by malaligned teeth.

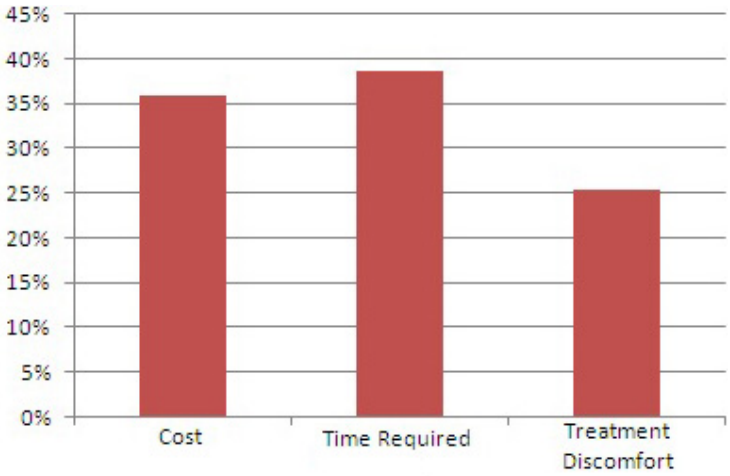

Fig. 3 Factors that would deter the respondents from undergoing or advising orthodontic treatment.

Discussion

The purpose of this study was to assess the level of orthodontic awareness among the undergraduate medical students in King Khalid University, KSA. Although malocclusion in itself is neither a disease nor a life-threatening condition, it has a significant impact on the physical, emotional and psychosocial health of the affected person (Adegbite *et al*., 2012). People with pronounced malocclusions have more severe periodontal diseases, temporo-mandibular joint disorders and decreased masticatory efficiency (Lux, 2009). The many benefits of orthodontic treatment include improved self-esteem, self-confidence and physical attractiveness, improvement of masticatory function and occlusion, better oral hygiene, reduced dental caries and gum disease relatively (Hunt *et al*., 2001).

Globally there has been an increase in the awareness of orthodontics as a dental specialty among children as well as adults (Anita and Asiya, 2010). Medical students in King Khalid University receive oral health education through continuing education programmes, health camps and scientific research days of College of Dentistry. At the outset, this study was conducted in an attempt to assess the medical students' level of knowledge and awareness in orthodontics.

76.5% (n=149) of the study population visited a dentist in the last six months with dental pain and only 11.2% (n=22), for a routine checkup. This finding supported previous research findings in which the oral health awareness was very low in KSA and that the majority of the individuals visit dental clinics only when they experience toothache (Al-Otaibi and Angmar-Månsson, 2004).

The fact that only 50.2% (n=106) were familiar with the term 'orthodontics', indicates a sub optimal level of awareness of orthodontics among the study population. This is further highlighted by their inability to correctly identify the procedures carried out by an orthodontist. Many erroneously selected dentures and fillings as components of the orthodontist's treatment schedule and only 27.5% (n=71) could correctly identify the type of treatment offered by orthodontists. This may be because many of the respondents have had little exposure to dentistry, and therefore do not fully understand the differing roles of the various sub-specialties in the profession. This finding was similar to recent studies, where the medical students displayed limited knowledge of dental sub-specialties including orthodontics (Adeghe *et al*., 2012; Adegbite *et al*., 2012). Female students, in comparison to males, showed significantly greater awareness in their familiarity with orthodontics, correct perception of the treatment offered by orthodontists and visits to dentist for routine dental checkups (p=0.001).

In a society with a high prevalence of malocclusion (Jones, 1987; Al-Balkhi and Zahrani, 1994; Alkawari, 1998), it was not surprising to find 40% (n=106) of them by themselves and 54.5% (n=144) have relatives receiving orthodontic care. Despite this, their perception of orthodontics was largely incorrect, a finding confirmed by research suggesting that the public awareness of malocclusion differs widely from that of the dental professional (Coote, 1973). Only 56% of the respondents (n=148) considered referring their close relatives with malocclusion for orthodontic treatment. This number justifies the need for more educational opportunities to create more orthodontic awareness amongst medical students in order to ensure appropriate referral patterns in their future careers as medical doctors. There was no significant difference between male and female students' in receiving orthodontic treatment either at present or in the past (p=0.481).

Majority (47.4%, n=125) felt aesthetics is most affected by malocclusion (Fig. 2). This is in agreement with a recent study (Adegbite *et al*., 2012).This may be due to the fact that the demand for orthodontic treatment is motivated primarily by esthetic values and the high social premium placed on well-aligned teeth and attractiveness in general (Shaw, 1981). 38.6% (n=102) of them felt treatment duration discourages them from either undergoing or advising

orthodontic treatment (Fig. 3). 56% (n=148) of them would refer close relatives with malocclusion for orthodontic treatment and 48.1% (n=127) would suggest orthodontics as a career choice to their close relatives. There was significant difference between males and females regarding their suggestion of orthodontics as a career choice and referring close relatives with malocclusion (p=0.001).

Chi square tests revealed significant gender differences, with female students showing a higher level of awareness towards oral health and orthodontics as compared to male students, as evidenced in Table 3. Similar finding was observed in a recent Nigerian study, which detected a higher level of knowledge in female students towards dental sub- specialties (Adeghe *et al*., 2012).

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 medical students. In addition, cross-sectional studies are often limited by respondent bias, but can serve as impetus for further studies in this area. There is limited research conducted in this area; therefore, it was difficult to make comparisons. Despite these limitations, our results have important implications, as the findings prompt for an educational initiative to improve the orthodontic knowledge of medical students.

Conclusion

The medical students surveyed had limited awareness of orthodontics as a specialty. A basic introduction to the dental sub-specialties, especially orthodontics would improve their ability to identify malocclusions, educate the patients and make informed referrals appropriately. Incorporating oral health education into the medical curriculum is a natural way to make a positive impact on patients' health and well-being.

Based on the results of present study, the authors would like to recommend for a review of curriculum in the College of Medicine by incorporating the growing body of evidence demonstrating the vital connections between oral health and overall body health. Formal training opportunities have to be offered to the students; thus helping they understand the concepts of oral health, orthodontics and health-related quality of life.

Acknowledgement

The authors would like to thank all the King Khalid University medical students for their participation and valuable contribution to the study.

References

Adegbite KO, Ogunbanjo BO, Ajisafe OA, Adeniyi AA (2012). Knowledge of orthodontics as a dental specialty: a preliminary survey among LASUCOM students. *Ann Med Health Sci Res*, **2**(1): 14-18.

Adeghe HA, Ehigiator O, Azodo CC, Ehizele AO (2012). Nigerian clinical level medical students' knowledge of dental specialty. *Ann Med Health Sci Res*, **2**(2): 157-160.

Ahangar Atashi MH (2007). Prevalence of malocclusion in 13-15 year old adolescents in Tabriz. *J Dent Res Dent Clin Dent Prospects*, **1**(1): 13-18.

Ajayi EO (2008). Prevalence of malocclusion among school children in Benin City, Nigeria. *J Med Biomed Res*, **7**(1): 58-65.

Al-Balkhi KM, Zahrani AA (1994). The pattern of malocclusions in Saudi Arabian patients attending for orthodontic treatment at the College of Dentistry, King Saud University, Riyadh. *Saudi Dent J*, **6**(3): 138-144.

Alkawari H (1998). Malocclusion, complexity and treatment urgency among Saudi patients seeking orthodontic treatment. *Cairo Dental Journal*, **14**(3): 377-382.

Al-Otaibi M, Angmar-Månsson B (2004). Oral hygiene habits and oral health awareness among urban Saudi Arabians. *Oral Health Prev Dent*, **2**(4): 389-396.

Anita G, Asiya B (2010). Adult orthodontics. *Indian J Dent Adv*, **2**(1): 96-99.

Coote JD (1973). Removable appliance therapy. Patient cooperation and assessment. *Br Dent J,* **134**(3): 91-94.

Dacosta OO (1999). The prevalence of malocclusion among a population of northern Nigerian school children. *West Afr J Med*, **18**(2): 91-96.

Glans R, Larsson E, Øgaard B (2003). Longitudinal changes in gingival condition in crowded and noncrowded dentitions subjected to fixed orthodontic treatment. *Am J Orthod Dentofacial Orthop*, **124**(6): 679-682.

Gruenbaum T (2010). Famous figures in dentistry. *Mouth* (ASDA), **30**(1): 18.

Hunt O, Hepper P, Johnston C, Stevenson M, Burden D (2001). Professional perceptions of the benefits of orthodontic treatment. *Eur J Orthod*, **23**(3): 315-323.

Jones WB (1987). Malocclusion and facial types in a group of Saudi Arabian patients referred for orthodontic treatment: a preliminary study. *Br J Orthod*, **14**(3): 143-146.

Lara-Carrillo E, Montiel-Bastida NM, Sánchez-Pérez L, Alanís-Tavira J (2010). Effect of orthodontic treatment on saliva, plaque and the levels of *Streptococcus mutans* and *Lactobacillus*. *Med Oral Patol Oral Cir Bucal*, **15**(6): e924-e929.

Lux CJ (2009). The objective and subjective sides of malocclusions – more justification for orthodontics? *J Orthod*, **36**(4): 213-214.

Onyeaso CO (2004). Prevalence of malocclusion among adolescents in Ibadan, Nigeria. *Am J Orthod Dentofacial Orthop*, **126**(5): 604-607.

Proffit WR, Fields HW Jr, Moray LJ (1998). Prevalence of malocclusion and orthodontic treatment needs in the United States: estimates from NHANES III survey. *Int J Adult Orthodon Orthognath Surg*, **13**(2): 97-106.

Shivakumar KM, Chandu GN, Subba Reddy VV, Shafiulla MD (2009). Prevalence of malocclusion and orthodontic treatment needs among middle and high school children of Davangere city, India by using dental aesthetic index. *J Indian Soc Pedod Prev Dent*, **27**(4): 211-218.

Sureshbabu KM, Chandu GM, Shafiulla MD (2005). Prevalence of malocclusion and orthodontic treatment needs among 13-15 year old school children of Davangere city Karnataka, India. *J India Assoc Public Health Dent*, **6**(1): 32-35.

Shaw WC (1981). Factors influencing the desire for orthodontic treatment. *Eur J Orthod*, **3**(3): 151-162.

Thilander B, Pena L, Infante C, Parada SS, de Mayorga C (2001). Prevalence of malocclusion and orthodontic treatment need in children and adolescents in Bogota, Colombia. An epidemiological study related to different stages of dental development. *Eur J Orthod*, **23**(2): 153-167.