

Knowledge and Perception of Medical Students about Orthodontic Appliance

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ABSTRACT

Background: A study on knowledge and perception of medical students on orthodontic appliance can influence the decision of the medical student to seek orthodontic treatment, to ascertain if there is a difference in the knowledge and perception of orthodontic appliance between preclinical and clinical medical student and to assess if the medical student have sufficient knowledge to effect adequate referral.

Methods: This study was a descriptive cross-sectional study conducted among preclinical and clinical medical students in the School of Medicine, College of Medical Sciences, University of Benin, Benin city with a sample size of four hundred and four (404). Data were collected using a self-administered questionnaire.

Results: The highest proportion of respondents in this study 195(48.3%) were within the age range of 15-20 years. Males constituted the higher proportion of respondents 239(59.2%).

A total of 127(31.4%) had heard of malocclusion before. One hundred and fifty-two (37.6%) know that it can be treated. One hundred and eight (26.7%) know the specialty that manage malocclusion. One hundred and fifteen (28.5%) know that the orthodontist manages malocclusion. Eighty-one respondents (20.0%) opined fixed appliance(braces) was used for the treatment of malocclusion 14(3.5%) opined surgery as the treatment of malocclusion and 7 (1.7%) opined fixed and removable appliance as the treatment for malocclusion. 158 preclinical students compared to 108 clinical students had the perception that will recommend it and this relationship was statistically significant $p < 0.001$.

Conclusion: The medical students had some form of knowledge about orthodontic appliances and malocclusion including managing specialty, their knowledge was not sufficient enough to adequately refer patients.

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INTRODUCTION

Perception is defined as a unique way an individual or group of persons visualizes an event, state or situation (McDonald *et al.*, 2012). It is from the latin word *perceptio* is the way in which something is regarded, understood or interpreted. Fixed orthodontic appliances are orthodontic devices which have attachments that are fixed to the surfaces of the teeth and commonly used for the treatment of malocclusion (Stirrups *et al.*, 1991).

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The fixed orthodontic appliances are made up of components which are categorized into active and passive components (McNamara *et al.*, 1986). The active components are capable of generating tooth movement and it includes separators, arch wires, elastics, elastomers, springs and magnets. The passive components are those which are not capable of

generating tooth moving forces but help in providing attachment for other auxiliaries to the tooth or retaining other active component of the appliances which includes bands, brackets, buccal tubes, lingual attachments, lock pins, ligature wire (McNamara et al., 1986).

Malocclusion is defined as an irregularity of the teeth or a mal-relationship of the dental arches beyond the range of what is accepted as normal (Walther et al., 1994). Its prevalence rate differs for different races and ethnicity, ranging from 76 to 87.7% among Nigerians (Dacosta et al., 1999; Onyeaso et al., 2004; Ajayi et al., 2008), to 88.1% in Colombia (Thilander et al., 2001), 20 to 43% in India (Sureshbabu et al., 2005, Shivakumar et al., 2009) and 20 to 35% in United States of America (Proffit et al., 1998).

The greatest influence in undertaking an orthodontic treatment is an ardent desire to improve self-esteem, look attractive and heighten self-perception of dental appearance (Mandeep et al., 2012). However, the knowledge and perception of the availability of the treatment would influence the search for treatment.

Medical doctors in Nigeria are said to be primary caregivers of majority health related problems, yet very few patients have presented to the orthodontic clinic with referrals from medical practitioners which may be attributed to low awareness and knowledge of dentistry by the health care providers (Diu & Gelbier, 1987; Wu et al., 2006; Sofola et al., 2010; Patil et al., 2010; Jain et al., 2012).

The limited access to dentist by the public coupled with the low awareness status and lack of oral healthcare facility and manpower make the presentation of orofacial conditions to medical doctors in the accident and emergency department and general medical practice common (Sa'adu et al., 2003).

A low oral health literacy has been reported to be a silent health epidemic (Rudd et al., 1998), as a result a significant number of young, aged groups are not informed about the causes, occurrence and prevention of most oral diseases (Siddegowda et al., 2013).

Some authors have observed that the knowledge and perception of malocclusion, fixed orthodontic appliance and dentistry among the medical doctors/students (Adegbite et al., 2012; Umeizudike et al., 2015; Oyetola et al., 2016; Nagrik et al., 2019), with resultant poor referral knowledge among medical personnel (Azodo et al., 2010). Hence, some researchers have proposed inclusion of oral and dental health course in medical curriculum to address this deficiency (Retna Kumari et al., 2006). Essamet & Darout however reported that the awareness and attitude of Saudi students to orthodontic treatment to be high (Essamet & Darout, 2016).

Limited knowledge of orthodontics as a specialty in Dentistry has been reported among a group of medical students in Nigeria (Adegbite et al., 2012). Similar trend

was observed among medical doctors and students in life, Nigeria even though they claimed to be aware of dentistry (Oyetola et al., 2016). This gap in knowledge among medical personnel has reportedly resulted in inadequate referrals from medical doctors to the orthodontist as the specialist to manage malocclusion (Azodo et al., 2010). This would ultimately mean denying the populace that may be seeking help from medical personnel to attend to their mal-aligned dentition. In order to preserve and improve physical well-being, quality of life relating to appearance, socializing, self-esteem, interpersonal relationships and psychological well-being, malocclusion has to be treated by the specialist (Masood et al., 2014) so as to improve the physical function, prevent further tissue damage and ensure aesthetic correction (Kaur et al., 2009). This study would determine the knowledge and perception of medical student about orthodontic appliance and thereafter make recommendation based on the findings.

The aim of this study evaluates the knowledge and perception of medical student about orthodontic appliance.

MATERIALS AND METHODS

Ethical consideration

This cross-sectional descriptive study was carried out amongst undergraduates of the School of Medicine, University of Benin. Benin City, Edo state, Nigeria between February 2019- September 2019. Medical students (100 level – 600 level) in University of Benin.

Medical students in University of Benin who refused to give consent for the study. A non-probability convenience sampling method was used to recruit the study participants. Questionnaires were distributed to 440 students who were either in the medical hostel or in their classes as at the time of questionnaire distribution.

Of the 440 questionnaires distributed, 420 were returned. Four hundred and four (404) of the 420 respondents who met the inclusion criteria and filled the questionnaires were assessed in this study. Those amongst the 420 who had not filled the questionnaire or did not meet all criteria for inclusion in this study were excluded. One hundred and seventy-five of the respondents were from the pre-clinical classes (100 to 300 level) while 229 were from the clinical classes (400-600 level).

Data was collected by sharing the questionnaire to available medical students across all the levels. Data collected from questionnaire was entered in IBM SPSS 25. The results were subjected to descriptive analysis. A 95% confidence interval was set to confirm if relationship truly existed between variables with the level of statistical significance set at $P < 0.05$.

RESULTS

Demographic characteristics of the respondents

The highest proportion of respondents in this study 195(48.3%) were within the age range of 15-20 years. Males constituted the higher proportion of respondents 239(59.2%). Students in preclinical classes constituted a higher proportion of respondents 264(65.3%) (Table 1)

Knowledge of Respondents about Malocclusion

This shows that 127(31.4%) had heard of malocclusion before. Ninety-one (22.6%) believed that malocclusion was a good idea. One hundred and fifty-two (37.6%)

know that it can be treated. One hundred and eight (26.7%) know the specialty that manage malocclusion. One hundred and fifteen (28.5%) know that the orthodontist manages malocclusion. (Table 2).

Knowledge about orthodontic appliance

Result shows that the highest proportion 238(58.9%) opined that orthodontic appliance were used to correct malocclusion, 43(10.6%) opined that it was used to replace missing teeth and 72(17.8%) had no idea of the use of orthodontic appliance. (Figure 1).

Table 1: Demographic characteristics of the respondents

Variables	Frequency (n)	Percentages (%)
Age (years)		
15-20	195	48.3
21-25	174	43.1
26-30	30	7.4
31-35	4	1.0
36-40	1	0.2
Gender		
Male	239	59.2
Female	165	40.8
Level		
Preclinical	264	65.3
Clinical	140	34.7
Total	404	100

Sources of respondent's knowledge about orthodontic appliance

This is showing that 33(8.2%) had their knowledge from their secondary schools, 236(58.4%) had their knowledge through a friend, 121(30.0%) had their knowledge through an online search, 24(5.9%) had their knowledge from parents, 79(19.6%) had their knowledge through a medical doctor while 169(41.8%) had knowledge of orthodontic appliances from their lecturer. (Figure 2).

Knowledge about appliance used in the management of malocclusion

It shows that 110(27.2%) of respondents were familiar with materials used in treatment of malocclusion. Eighty-one respondents (20.0%) opined fixed appliance (braces) was used for the treatment of malocclusion 14(3.5%) opined surgery as the treatment of malocclusion and 7 (1.7%) opined fixed and removable appliance as the treatment for malocclusion. (Table 3)

Table 2: Knowledge of Respondents about Malocclusion

Variables	Frequency (n)	Percentages (%)
Heard of Malocclusion		
Yes	127	31.4
No	277	68.6
Malocclusion		
Good Idea	91	22.6
No Idea	312	77.4
Know it can be treated		
Yes	152	37.6
No	252	62.4
Know specialty that manage malocclusion		
Yes	108	26.7
No	296	73.3

Specialist that specifically manage it		
Oral and Maxillofacial Surgeon	41	10.1
Prosthodontists	38	9.4
Orthodontist	115	28.5
Periodontist	8	2.0
Conservative Dentist	3	.7
Oral Medicine Specialist	10	2.5
Paedodontist	3	.7
No Idea	186	46.0

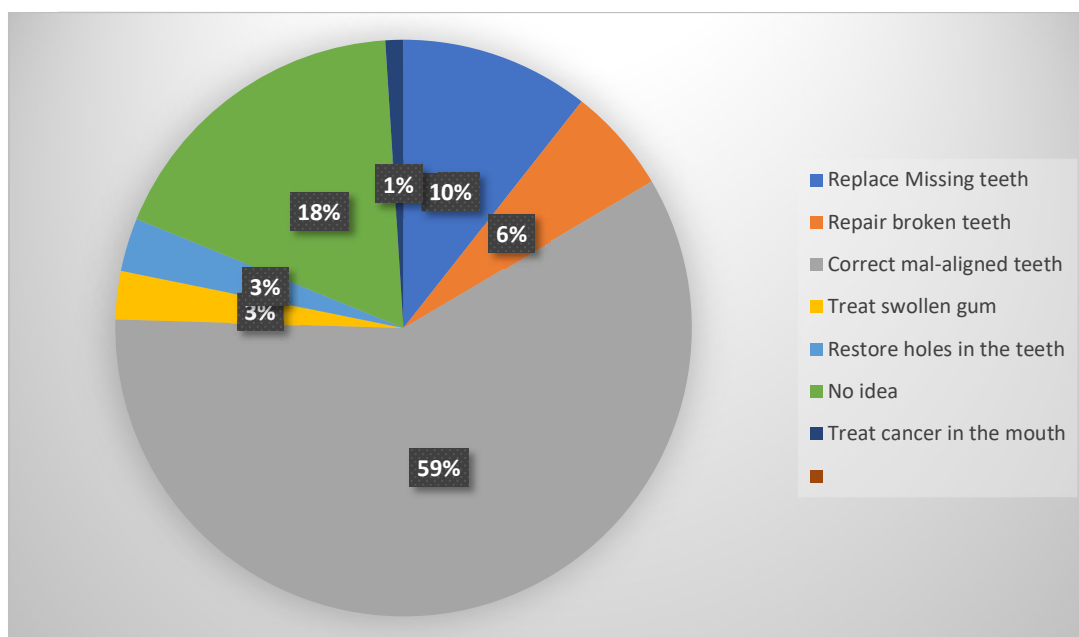


Figure 1: Knowledge about orthodontic appliance

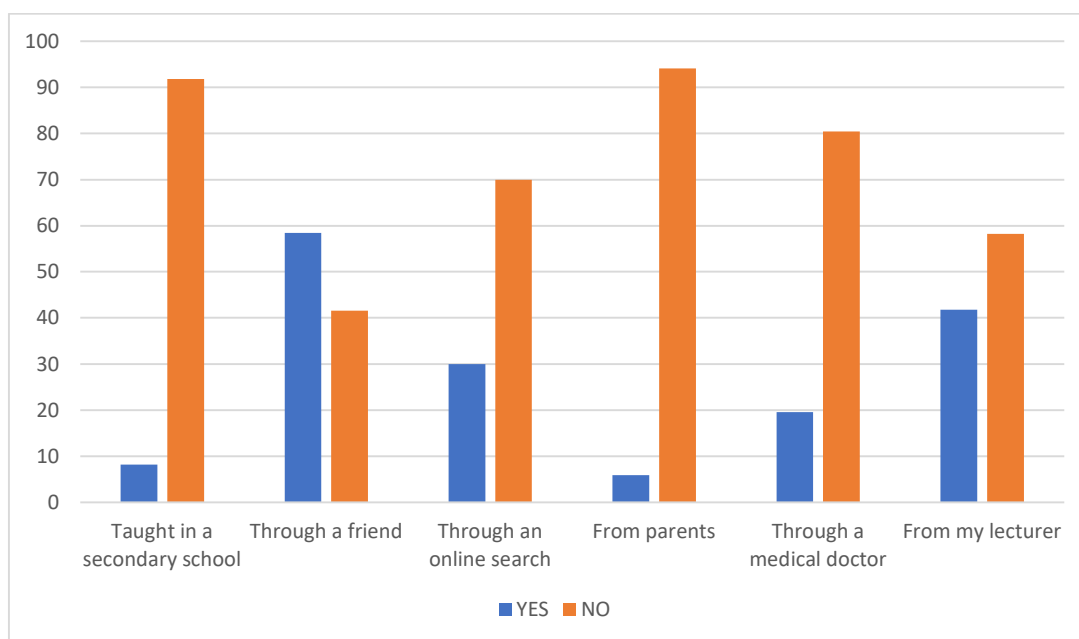


Figure 2: Sources of respondent's knowledge about orthodontic appliance

Table 3: Knowledge about appliance used in the management of malocclusion

Variables	Frequency (n)	Percentages (%)
Familiar with materials used in treatment		
Yes	110	27.2
No	293	72.5
Missing	1	.2
If yes		
Fixed appliance (Braces)	81	20.0
Removable appliance	5	1.2
Surgery	14	3.5
Prosthetic appliance	6	1.5
Functional appliance	4	1.0
Fixed and removable appliance	7	1.7
Fixed and functional Appliance	5	1.2
Fixed and prosthetic appliance	1	.2
Missing	281	69.6

DISCUSSION

The field of orthodontics comprises the development and growth of the face, the jaws, and the bite. Diagnostics, preventive, and definitive treatment of congenital or acquired malocclusions are included. The straightening of irregular teeth, or orthodontic treatment, require the use of fixed or removable orthodontic appliances to affect the jaws and their growth and to move teeth that are incorrectly positioned so that the dental arch better agrees with the "ideal" or "normal" occlusion (Walther *et al.*, 1994). The general practitioners and physicians are the primary care givers, their role in oral healthcare delivery is very important due to the lack of awareness of patients concerning the treatment of oral health problems (Adeghe *et al.*, 2012). Appropriate dental referrals rest on good knowledge of the dental specialties and the conditions they manage by the health care professionals. Emphasis must be made on medical students' knowledge of oral conditions as they eventually become health care professionals.

This study was a descriptive cross-sectional survey which assessed the knowledge and perception of medical students about orthodontic appliances. Four hundred and four medical students of the University of Benin consisting of 264(65.3%) preclinical students and 140(34.7%) clinical students were surveyed. Males constituted a higher proportion of the respondents (59.2%). This is lower than that of a similar study conducted in Khalid University Arabia where males constituted 49.2%. It is also higher than similar studies carried out by Adegbite *et al* 2012 at Lasucom where males constituted a higher proportion of respondents. This finding could have been attributed to the more males being admitted into the school of medicine. Two thirds (65.3%) were in the preclinical class while one third (34.7) were in the clinical class. This is not in agreement with the findings of survey in Lasucom where 24.7% were in preclinical years while 75.3% were in their clinical years. Majority of the students (91.4%)

were in the age range of 15-25 years. Half of the students had never visited the dentist. This is slightly lower than similar studies conducted by Adeghe *et al* where 54.5% had previous dental visit. Reasons adduced for visiting the dentist included scaling and polishing having the largest proportion (28.0%) and tooth alignment with the least (5.8%). Similar studies done in King Khalid University showed that orthodontic reasons were the least for visiting, while pain was the commonest reason. This finding is likely due to the low value for dental aesthetics amongst the medical students at the University of Benin.

With regards to the knowledge of malocclusion, one third (31.4%) of the students had ever heard of the term malocclusion. Above one fifth (22.6%) of them believed that malocclusion was a good idea and 77.4% have no idea of malocclusion. This explains the reason for visiting dental clinic was least for orthodontic reasons. Malocclusion is a term which refers to malalignment of teeth and incorrect relationship between the upper and lower arches (Gruenbaum., 2010). Patients with malocclusion have no specific signs and symptoms, but may complain about aesthetics, difficulty with speech, and mastication (Adegbite *et al.*, 2012). Thus, we could deduce that it is poor perception on the part of the respondents who opine that Malocclusion is a good idea as they fail to take into consideration the impact of malocclusion on the physical and psychological health of the individual with this condition.

The survey also shows that only 28.5% of respondents knew correctly that malocclusion was managed by an orthodontist. Similar low findings were recorded in study conducted Amongst Lasucom medical students where only 20% knew that malocclusion was managed by the orthodontist. This raises cause for concern as this poor knowledge amongst these students may eventually translate into poor knowledge as medical practitioners with inadequate and inappropriate dental referrals. Orthodontic appliances are used in managing occlusal defects. These include specific orthodontic

appliances either fixed or removable. Surgical approach in the form of orthognathic may also be employed in cases of severe malocclusion

This study showed that just one fifth (20%) of the respondents knew that braces was a treatment option for malocclusion, 1.2% and 3.5% knew removable and functional appliances as treatment of malocclusion respectively while 69.6% had no knowledge of orthodontic appliances used in the treatment of the condition. This contrasts with findings by Adegbite et al where 49.4% selected dentures, 40% selected removable appliances, and 57.7% selected braces as orthodontic appliances for treatment of malocclusion. Our findings also showed that closed to two third (58.9%) knew that orthodontic appliances could be used in the treatment of misaligned teeth. This contrasts studies in Saudi Arabia by Shahrani and Kandyala where only 31.4% knew that malocclusion was treated by orthodontic appliances.

Highest source of respondent's knowledge where through friends and lowest source was from parents. This finding could be attributed to the fact that dental seeking behavior for malocclusion is most likely amongst this population as they are more likely to seek this for aesthetic purpose. Thus, interaction with their peers who have sought these dental procedures and use these orthodontic appliances will most likely be the source of knowledge.

Two thirds of the students believed that the procedure was too expensive, and half believed that the procedure was time consuming. Two fifths (41.8%), about half (49.0%) and above one third (37.1%) believed that the procedure was too cumbersome, disturbed oral function and was painful respectively. This perception could be substantiated by grade 2 evidence from the Swedish council on technology assessment in health care reports which suggests that orthodontic treatment with fixed appliances, as well as the application of separators and new arch wires, is painful in the beginning.

Above one third (36.4%) believed that it improved self-esteem. Greater than two thirds believed that the benefits outweighed the challenges (61.4%) and an even greater proportion (65.8%) will recommend use of the appliances and procedure. These statistics demonstrates good perception to orthodontic appliances and procedure amongst the study population with implications that they were more likely to utilize and make referral for orthodontic procedures. Difference in perception of the clinical to the preclinical classes demonstrated a statistically significant higher proportion of the clinical students rated the financial cost too expensive than the preclinical students. The clinical students also felt that the procedure was too cumbersome, and the appliances disturbed oral function. In terms of benefit, the clinical students had better views to orthodontic appliances opining that it

gave a better social smile, and benefits outweighed challenges. They also are more likely than the preclinical students to recommend orthodontic appliances and procedures. This finding could be explained by the fact that the clinical students likely had better knowledge of clinical dental practice than their preclinical counterparts. This likely had influence in them having a better perception.

Conclusively, students in this study showed positive perception. The clinical classes had a more positive perception to orthodontic appliances than the preclinical. Their knowledge level of orthodontic appliances is poor. This implies that they would refer patients who require orthodontic interventions but are not likely to refer them directly or appropriately to the orthodontist. This study therefore demonstrates the need for basic knowledge on dental specialties and their roles including basic conditions they manage be included into the training of the medical's students.

CONCLUSION

The students demonstrated a fair knowledge and positive perception to orthodontic appliances. This is necessary to influence their decision to seek treatment. Though, the medical students had some form of knowledge about orthodontic appliances and malocclusion including managing specialty, their knowledge was not sufficient enough to adequately refer patients.

RECOMMENDATIONS

1. There is need for a joint preclinical lecture on Introduction to Orthodontics for both dental and medical students so that they can have enough knowledge of malocclusion and orthodontic therapy.
2. Medical students should undergo clinical postings in dentistry to allow them have enough knowledge of dental specialty and orthodontics in particular for adequate referral.

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