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"DENTISTRY'S FIRST SPECIALTY JOURNAL IN SUB SAHARAN AFRICA"

Knowledge of Orthodontics among Medical and Dental Undergraduate Students in the University of Calabar, Nigeria

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Abstract

Background: The knowledge of orthodontics and orthodontic treatment by caregivers is the most important and essential pre-requisite to positioning them to give better treatments to patients, or to make good referrals. The purpose of this study was to assess the knowledge and create awareness of Orthodontics among medical and dental students in a Nigerian (tertiary) institution

Methods: Data collection was via self-administered questionnaires, distributed to 450 medical and dental students at the University of Calabar. Data obtained was analyzed using SPSS (Statistical Package for Social Sciences) version 26. Categorical variables were summarized using proportions and percentages. The main outcome variable, knowledge, was analyzed with the aid of percentages, and tests of association such as chi-square, were used to ascertain and test hypotheses. All statistics and tests were presented at the 95% confidence level.

Results: Most participants (69.0%) had heard of orthodontists. About 67.7% of respondents were aware that orthodontists can properly position teeth. Also73.9% of the respondents were not aware of the aetiological factors of improperly positioned teeth.

Conclusion: This survey recorded a peripheral knowledge and awareness of orthodontics among the respondents. An in-depth knowledge of orthodontics was lacking among them. The dental students demonstrated a higher level of awareness and knowledge, though this was expected. Hence the need to further stress the importance of incorporating basic knowledge of dental specialties in the medical curriculum.

Keywords: Awareness, knowledge, mal-alignment, orthodontic treatment

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ORIGINAL ARTICLE

Introduction

Awareness is the state or quality of being aware of something.[1] It has been well reported that there is a relationship between oral health and systemic/general health[2], so it is not surprising to see many rural patients reporting to medical professionals for their dental and oral problems, this could be due to the lack of awareness or unavailability of the dental services in the near vicinity[3]. Thus, the medical professionals serve as a center for initial oral examination and referring of patients with dental problems to the concerned dental department.[3,4] The awareness and knowledge of orthodontics among medical students has been reported to be grossly inadequate, even among dental students, though more is expected of them. This implies that many patients who should benefit from this knowledge by way of proper referral would be unable to have access to such services due to the poor awareness and knowledge of orthodontics by medical personnel[2]

The dental field has expanded over the years, and this has led to many different sub-specialties. Hence, the need for awareness and knowledge of these sub-specialties among medical and dental students at the undergraduate level.[3] Nagrik et al,[3] reported that many of the respondents in their study, failed to correctly match the procedures done under the

different specialties of dentistry. Many erroneously selected Lasodontics and Odontodontics as the specialties dealing with carious teeth. They attributed this to limited exposure of the respondents to dentistry, hence could not fully understand the variable role of the different subspecialties in this field. Azodo *et al*[5] conducted a similar study and also found a lack of awareness of various specialties of dentistry among the medical doctors. Nagrik et al[3], from their study, reported that many interns had a relatively low level of awareness about oral health and-related specializations of dentistry. They realized that the respondents live under the misbelief that all their oral health-related issues can be solved by a general dentist, and they attributed their behaviour to a lack of sufficient time and training.

There is very limited data on the knowledge of orthodontics in the Nigerian population. The University of Calabar commenced undergraduate training for dental students less than ten years ago. Thus, dentistry is a relatively new medical course offered at the university. Orthodontics is the oldest dental specialty and one of the major subject areas in the dental undergraduate curriculum. Thus, the purpose of this study was to assess the knowledge of orthodontics among a population of undergraduate medical and dental students in the University of Calabar.

Materials and methods

This was a cross-sectional study involving all levels of both medical and dental undergraduates of the University of Calabar. Self-administered questionnaires were distributed to all levels of both medical and dental undergraduates of the University of Calabar, using a random sampling technique. Informed consent was obtained from all the study participants

A total of 450 students were surveyed and 435 questionnaires were returned, which is a response rate of 96.67%. However, only 419 questionnaires were finally analyzed due to incomplete data in 16 questionnaires.

Data was analyzed using SPSS (Statistical Package for Social Sciences) version 26. The socio-demographic variables were summarized using means and standard deviations as well as range for continuous variables. Categorical variables were summarized using proportions and percentages. The main outcome variable, knowledge, was analyzed with the aid of percentages, and tests of association such as chi-square were used to ascertain and test hypotheses. All statistics and tests were presented at the 95% confidence level and the level of significance was set at 5%.

Results

The final study sample comprised 419 students (220 males and 199 females), with a mean age of 21.25±2.84 (Table 1). A total of 154 (36.8%) were dental students and 265 (63%) were medical students. The students were grouped into 6 levels according to their levels of study. The largest percentage of students were 100 level students (33.2%). This is usually the case; this number reduces as they progress into higher levels.

Table 2 revealed that only 28.4% of the students had visited a dentist. About 61.7% (280) of the students had heard about an orthodontist and the same percentage were also aware that orthodontists correct improperly positioned teeth.

When asked if they had any form of mal-alignment, only about 37.9% (159) of respondents were sure they could notice the presence of improperly positioned teeth, 32.9% (138) were certain they noticed the mal-alignment by themselves and 0.03% (11) of them agreed it was noticed by friends.

When asked if they could notice mal-alignment in others, about 96.2% (403) agreed that they could. Almost all the respondents (93,5%) agreed that well aligned teeth give a better facial appearance.

About half of the respondents opted for 8- 10 years as the best time to commence orthodontic treatment.

About 53.7% (225) of the respondents were not aware of the consequences of improperly positioned teeth. However, 84.2% of them claimed to be aware that early orthodontic treatment would improve the facial appearance.

Nearly all the respondents did not have any idea of the cost of orthodontic treatment. When asked if they knew the duration of orthodontic treatment, 34.1% (143) reported that it is less than a year, while 42.5% (178) of them agreed it is between 2-3 years and 23.2% (97) reported that they did not know.

A good number of them (61,9%) were aware that few

teeth could be extracted during orthodontic treatment.

When asked about the different habits/causes of malocclusion, 14% agreed that trauma could be a cause, 0.6% agreed that improperly placed tongue could be a cause, about 73.8% had no idea.

When asked about the different types of braces, 46.1% (193) of them chose metal and ceramic, 22.9% (96) chose all the options, and about 24.6% (103) of the respondents had no idea. (Table 2).

Table 3 shows the results based on the respondents' separate departments. The response by the dental students showed significantly better knowledge only in the knowledge of habits causing malocclusion. Which means they had better knowledge of orthodontics than their counterparts in medicine (Table 3). When their responses were disaggregated by gender, it revealed that there was a female preponderance (Table 4).

There was no statistical significance ($p>0.05$) between the students' levels in both departments and the variables under consideration, except for the variable that considered the habits causing improper positioning of teeth, this was statistically significant (0.005), table 5.

Table 1a: Socio-demographic characteristics of respondents

Variable (n=420)	n(%)
Age(mean ± SD)	21.25 ±2.843
Sex	
Male	220(52.4%)
Female	199(47.4%)
Department	
Dentistry	154(36.8%)
Medicine	265(63.2%)
Level	
100 Level	139(33.2%)
200 Level	80(19.1)
300 Level	111(26.5%)
400 Level	13(3.1%)
500 Level	24(5.7%)
600 Level	52(12.4%)

1b. Percentage of Medical and Dental students in each level

LEVEL	DEPARTMENT	
	MEDICINE n(%)	DENTISTRY n(%)
100	75 (17.9)	64 (15.3)
200	37 (8.8)	43 (10.3)
300	89 (21.2)	22 (5.3)
400	0 (0.0)	13 (3.1)
500	17 (4.1)	7 (1.7)
600	47 (11.2)	5 (1.2)

Table 2: Responses of the participants

variable(n=419)	n(%)
Have you visited a dentist?	
Yes	119(28.4%)
No	300(71.6%)
Have you heard of orthodontists?	
Yes	289(69.0%)
No	130(31.0%)
Are you aware that orthodontist can position teeth properly?	
Aware	281(67.7)
Not aware	108(26.0%)
No answer	26(6.3%)
Have you noticed improperly positioned teeth in self?	
Noticed	159(38.2%)
Not noticed	257(61.8%)
How did you notice it?	
By self	138(32.9%)
By friends	11(2.6%)
By others	23(5.5%)
No improperly positioned teeth	247(58.9%)
Respondent's notice of improperly positioned teeth in others	
Noticed	403(96.2%)
Has not noticed	13(3.1%)
No answer	9(2.2%)
Respondent's thoughts on whether properly positioned teeth make for better facial appearance	
Yes	391(93.5%)
No	18(4.3%)
No answer	9(2.2%)
What is your opinion on the age at which orthodontic treatment should start?	
8-10 years	220(52.6%)
11-13 years	42(10.0%)
14-16 years	33(7.9%)
17 years and above	54(12.9%)
Not aware	69(16.5%)
Respondent's awareness of the side effects of improperly positioned teeth	
Aware	193(46.1%)
Not unaware	225(53.7%)
No answer	1(0.2%)
Respondent's awareness that proper orthodontic treatment at early age would improve facial appearance	
Aware	353(84.2%)
Not aware	66(15.8%)

Respondent's awareness of the cost of orthodontic treatment	
Aware	37(8.8%)
Not aware	382(91.2%)
Respondent's opinion on how much time orthodontic treatment takes	
<1 year	143(34.2%)
2-3 years	178(42.6%)
Not aware	97(23.1%)
Respondent's awareness that few teeth may be removed for proper positioning of irregular teeth	
Aware	258(61.9%)
Not aware	159(38.1%)
Respondent's knowledge of habits that can cause improper positioning of teeth	
Respondent knows	109(26.1%)
Respondent does not know	308(73.9%)
Examples of bad habits listed by respondents	
Abnormal embryonic development	1(0.2%)
Physical violence/ trauma to teeth, mouth, face, infratemporal fossa	59(14.0%)
Sucking of teeth, tongue, thumb	17(4.0%)
Eating sweet items/ constant snacking	14(3.3%)
Eating on one side of the mouth	2(0.4%)
Poor oral hygiene	2(0.4%)
Severe chickenpox	1(0.2%)
Improper placement of the tongue	6(0.6%)
Tumor	1(0.2%)
Smoking	2(0.4%)
Weakening of orbicularis oris	1(0.2%)
Milk teeth refuse to fall out	1(0.2%)
To add better appearance to face	1(0.2%)
Difficulty swallowing	1(0.2%)
Early surgery	1(0.2%)
No idea	310(73.8%)
Respondent's knowledge of orthodontic braces and the types	
Metallic brackets, ceramic brackets	193(47.9%)
Lingual brackets	5(1.2%)
Invisalign	6(1.5%)
Metallic brackets, ceramic brackets, lingual brackets, invisalign	96(23.8%)
Respondent does not know	103(25.6%)

Table 3: Responses of participants in relation to their departments

Variable	Medicine and Surgery	Dentistry	Chi-square value	p-value
Age orthodontic treatment should start			6.782	0.148
8-10	143 (34.2)	77 (18.4)		
11-13	20 (4.8)	22 (5.3)		
14-16	23 (5.5)	10 (2.4)		
17 and above	31 (7.4)	23 (5.5)		
No idea	47 (11.2)	22 (5.3)		
Knowledge of side effect of improperly positioned teeth			3.163	0.206
Yes	114 (27.4)	79 (18.9)		
No	150 (35.8)	75 (17.9)		
Can proper orthodontic treatment at an early age improve facial appearance?			3.030	0.082
Yes	242 (57.9)	150 (35.8)		
No	23 (5.5)	3 (0.8)		
Knowledge of cost of orthodontic treatment			0.735	0.391
Yes	21 (5.0)	16 (3.9)		
No	244 (58.2)	138 (32.9)		
Knowledge of time orthodontic treatment takes			0.953	0.621
< 1 year	87 (20.8)	56 (13.4)		
2-3 years	112 (26.8)	66 (15.8)		
No idea	65 (15.6)	32 (7.6)		
Awareness that a few teeth may be removed for proper positioning of irregular teeth			0.780	0.834
Yes	162 (38.8)	96 (23.0)		
No	102 (24.5)	57 (13.7)		
Knowledge of habits causing improper positioning of teeth			15.990	0.00*
Yes	52 (12.4)	57 (13.7)		
No	213 (51.1)	95 (22.8)		
Knowledge of orthodontic braces and its types			7.290	0.121
Metallic and ceramic braces	133 (33.0)	60 (14.9)		
Lingual braces	2 (0.5)	3 (0.7)		
Invisalign	4 (1.0)	2 (0.5)		
All mentioned	52 (12.9)	44 (10.9)		
No idea	66 (16.4)	37 (9.2)		

Table 4: Disaggregating by Gender

Variable	Male	Female	Chi-square value	p-value
Age orthodontic treatment should start				
8-10	110 (50.0)	110 (50.0)	9.063	0.060
11-13	24 (57.1)	18 (42.9)		
14-16	19 (57.6)	14 (42.4)		
17 and above	37 (68.5)	17 (31.5)		
No idea	30 (43.5)	39 (56.5)		

Knowledge of side effect of improperly positioned teeth			2.310	0.315
Yes	96 (49.7)	97 (50.3)		
No	124 (55.1)	101(44.9)		
Can proper orthodontic treatment at an early age improve facial appearance?			0.397	0.529
Yes	183 (51.8)	170 (48.2)		
No	37 (56.1)	29 (44.9)		
Knowledge of the cost of orthodontic treatment			0.022	1.00
Yes	19 (51.4)	18 (48.6)		
No	201 (52.6)	181 (47.4)		
Knowledge of the time orthodontic treatment takes			5.874	0.053
< 1 year	87 (60.8)	56 (39.2)		
2-3 years	86 (48.3)	92 (51.7)		
No idea	47 (48.5)	50 (51.5)		
Awareness that a few teeth may be removed for proper positioning of irregular teeth			10.272	0.001**
Yes	119 (46.1)	139 (53.9)		
No	99 (62.3)	60 (37.7)		
Knowledge of habits causing improper positioning of teeth			0.077	0.781
Yes	56 (25.6)	53 (26.8)		
No	163 (74.4)	145 (73.2)		
Knowledge of orthodontic braces and its types			3.170	0.530
Metallic and ceramic braces	104 (48.6)	89 (47.1)		
Lingual braces	4 (1.96)	1 (0.5)		
Invisalign	3 (1.4)	3 (1.6)		
All mentioned	54 (25.2)	42 (22.2)		
No idea	49 (22.9)	54 (28.6)		

Table 5: Disaggregating by Level

Variable	Level N(%)						Chi-square value	p-value
	100	200	300	400	500	600		
Age orthodontic treatment should start							26.401	0.153
8-10	63 (28.6)	39 (17.7)	73 (33.2)	8 (3.6)	11 (5.0)	26 (11.8)		
11-13	20 (47.6)	8 (19.0)	7 (16.7)	1 (2.4)	2 (4.8)	4 (9.5)		
14-16	10 (30.3)	6 (18.2)	7 (21.2)	2 (6.1)	4 (12.1)	4 (12.1)		
17 and above	23 (42.6)	12 (22.2)	11 (20.4)	2 (3.7)	2 (3.7)	4 (7.4)		
No idea	23 (33.3)	15 (21.7)	12 (17.4)	0 (0.0)	0 (0.0)	14 (20.3)		
Knowledge of side effects of improperly positioned teeth							5.007	0.891
Yes	64 (33.2)	34 (17.6)	57 (29.5)	7 (3.6)	9 (4.7)	22 (11.4)		
No	74 (32.9)	46 (20.4)	54 (24.0)	6 (2.7)	15 (6.7)	30 (13.3)		

Can proper orthodontic treatment at an early age improve facial appearance?							0.799	0.977
Yes	117 (33.1)	68 (19.3)	93 (26.3)	12 (3.4)	20 (5.7)	43 (12.2)		
No	22 (33.3)	12 (18.2)	18 (27.3)	1 (1.5)	4 (6.1)	9 (13.6)		
Knowledge of cost of orthodontic treatment							4.913	0.427
Yes	9 (24.3)	9 (24.3)	10 (27.0)	3 (8.1)	2 (5.4)	4 (10.8)		
No	130 (34.0)	71 (18.6)	101 (26.4)	10 (2.6)	22 (5.8)	48 (12.6)		
Knowledge of time orthodontic treatment takes							13.553	0.194
<1 year	49 (34.3)	29 (20.3)	38 (26.6)	4 (2.8)	10 (7.0)	13 (9.1)		
2-3 years	61 (34.30	39 (21.9)	46 (25.8)	6 (3.4)	8 (4.5)	18 (10.1)		
No idea	28 (28.9)	12 (12.4)	27 (27.8)	3 (3.1)	6 (6.2)	21 (21.6)		
Awareness that a few teeth may be removed for proper positioning of irregular teeth							4.163	0.526
Yes	85 (32.9)	49 (19.0)	62 (24.0)	8 (3.1)	17 (6.6)	37 (14.3)		
No	54 (34.0)	30 (18.9)	48 (30.2)	5 (3.1)	7 (4.4)	15 (9.4)		
Knowledge of habits causing improper positioning of teeth							16.787	0.005
Yes	27 (24.8)	29 (26.6)	33 (30.3)	7 (6.4)	4 (3.7)	9 (8.3)		
No	111 (36.0)	50 (16.2)	78 (25.3)	6 (1.9)	20 (6.5)	43 (14.0)		
Knowledge of orthodontic braces and its types							22.880	0.295
Metallic and ceramic braces	56 (29.0)	40 (20.7)	50 (25.9)	6 (3.1)	13 (6.7)	28 (14.5)		
Lingual braces	3 (60.0)	0 (0.0)	1 (20.0)	1 (20.0)	0 (0.0)	0 (0.0)		
Invisalign	3 (50.0)	0 (0.0)	3 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)		
All mentioned	36 (37.5)	21 21.9)	18 (18.8)	7 (7.3)	10 (10.4)	10 (10.4)		
No idea	38 (36.9)	13 (12.6)	33 (32.0)	4 (3.9)	13 (12.6)	13 (12.6)		

Discussion

Health personnel often overlook malocclusions that need orthodontic treatment simply because they are not associated with high mortality, but these could affect dental functions and self-esteem in an individual[6].

The role of medical doctors in complimenting the dental surgeons in the delivery of efficient health care cannot be over emphasized, hence the need for this study. The findings of this study show that there is a need for increased awareness about orthodontics among both medical and dental undergraduates of the University of Calabar.

In our study, only 28.4% had previously visited a dentist, unlike the findings by Oyetola et al,[7] who reported that 38% of 204 respondents had visited a dentist. A study by Chandral et al[8] reported 100% of their study population had at least one dental visit in the last one year. Doshi et al[9], whose study was on medical students, reported that 79.4% of the participants had visited a dentist for check-up at one point or the other in their lives. The low records in this present study could be as a result of low level of dental awareness or absence of dental complaints[6]. A large number of the respondents opined that they had heard about orthodontics, this percentage is higher when compared to that reported by Adegbite et al,[10] whose finding was that only 45.9% of the 85 medical trainees had heard about orthodontics. The difference in the findings could be due to the small sample size involved in their study, while in the case of this study, the respondents included dental students, who should have better knowledge than the medical students. More than half of the respondents seemed to know

that orthodontists align teeth (67.7%), and this percentage was relatively high. Adegbite et al[10], Oyetola et al[7] and Nagrik et al[3] reported 54.1%, 49.5% and 38.33% respectively, as levels of awareness that orthodontists align teeth in their studies. This suggests that a good number of the respondents were aware of what orthodontists really do.

Respondents who could notice mal-alignment in themselves were much less in number compared to those who could not. This could either be that they lack the basic knowledge in orthodontics to be able to notice mal-alignment, or they may not have malocclusion. Almost all the respondents agreed that properly aligned teeth give a better facial appearance and a large number of them also affirmed that early orthodontic treatment would improve facial appearance. This report corroborates that of other studies by Adegbite et al,[9] Mane et al[11], Nagrik et al[3] and Salzman[12]. The reason for this could be the observation that the demand for orthodontic treatment is inspired by aesthetic values and the high social excellence placed on well-aligned teeth and facial attractiveness, generally.[10]

More than half of the respondents believed orthodontic treatment should start between age 8 to 10, while about 54 of them believed it should commence from 17 years and above. This clearly shows the low level of knowledge and awareness of orthodontics among the respondents.

Over half of the respondents were not aware of the complications of mal-positioned teeth. This clearly depicts that, when the students graduate as doctors, they may not see any reason to refer patients with malocclusion to the appropriate department. Nearly all the respondents were not aware of the cost of orthodontic treatment in most centers. This further reveals the gross deficiency in their knowledge and awareness of orthodontics.

Less than half of the respondents were able to correctly tell the average duration for orthodontic treatment. They agreed that orthodontic treatment takes a longer time. The same finding was observed by Bailwad et al[13] Sharma[14] and Zakirulla et al[15]. Zakirulla et al[15] reported that about 58% of males and 47% of females respondents agreed that orthodontic treatment takes a long time. This report is the direct opposite to the report from this present study, the females demonstrated a better knowledge of the duration of orthodontic treatment. This finding reveals the fact that respondents are not fully aware of the time-consuming nature of the orthodontic treatment.

About three quarters of them do not have any idea of the aetiological factors of malocclusion. This could be ascribed largely to the little or lack of dental exposure during the course of their training.

About 61.9% of the respondents were aware that few teeth might be removed during the course of orthodontic treatment. Almost half of them were able to identify the different orthodontic fixed appliances, and few of them were able to mention invisalign and lingual brackets as types of orthodontic appliances. This could probably be the responses from some of the dental students among the respondents

Analysis from the disaggregation by department of respondents revealed that most of them had similar knowledge of orthodontics, but the dental students demonstrated better knowledge in the aetiological factors involved in malocclusion. This is not surprising, owing to the fact that they have had better exposure to dentistry and should have better knowledge of the specialties in dentistry. On the knowledge of different types of orthodontic fixed appliances, it is important to note that there was significant difference in the responses of both the medical and dental respondents. It was statistically significant. Table 3 (Same here).

The findings from this study revealed that there was a female preponderance. This report is supported by previous studies[15].

Mane et al, in their studies reported that males have better awareness about orthodontic treatment compared to the females. They attributed it to the fact

that the females are unaware of the advances in the field due to lack of exposure to the developing aspect of the field.[12]

The findings obtained from this study showed that there are lapses in the knowledge of the study population regarding orthodontics as a dental specialty. Their responses only depicted a peripheral knowledge and poor understanding or inadequate information received concerning orthodontics among the study population. Thus, one of the major recommendations of this study is that dental and medical students in the University of Calabar should undergo some basic rotations through the different dental specialties, just to expose them to clinical dentistry. This very short rotation will enhance the knowledge of the medical students of dentistry in general and also expose them to orthodontics. The dental students also need to be exposed early to orthodontics to increase their knowledge of the dental specialty, as there was no significant difference in their knowledge level when compared with the medical students or most of the questions surveyed.

One of the major limitations of this study is that the findings are limited to undergraduate medical and dental students only and do not represent the generality of the students in the University of Calabar, or the people of Cross River state. Thus, there is a need for further studies in this regard, bearing in mind the potential benefits it will have for the planning of oral health services, particularly orthodontic care, for the people of Cross River State.

Conclusion

The dental and medical students investigated had limited knowledge of orthodontics as a specialty on the basis that they lacked the basic knowledge of the aetiological factors of malocclusion. The orthodontic awareness level was unsatisfactory, and the correlation between the awareness level and malocclusion problems was poor. They would benefit from introductory lectures to the dental sub-specialties, especially in orthodontics. This should stimulate the interest of the dental students in the specialty and improve their ability to refer and manage patients appropriately. The medical students would benefit the most, especially from the ability to recognize mal-positioned teeth and dentoalveolar discrepancies, and when and where to refer such patients. This study, we believe, created a level of awareness of orthodontics among the undergraduates of the University of Calabar.

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