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Personality traits and compliance with fixed appliance therapy

Orthodontic patients seen in a Nigerian Military hospital

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Original Articles

Impact of Personality Traits and Motivation on Compliance to Fixed Orthodontic Appliance Therapy among Nigerian Adolescents

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Abstract

Background: This study determined the influence of patients' personality traits and motivation on compliance to fixed orthodontic appliance therapy among Nigerian orthodontic patients.

Methods: The sample comprised 123 patients aged 10-19 years seeking orthodontic treatment for the first time in three Nigerian Teaching Hospitals. A self-administered questionnaire was used to assess patients' socio-demographics, personality traits, and factors influencing fixed orthodontic therapy. Data was analyzed using Statistical Package for Social Sciences, (SPSS version 16.0 for windows, SPSS inc, Chicago). Descriptive statistics and multivariate linear regression were used and the significance level was set at $p<0.05$.

Results: The most predominant personality trait was agreeableness at 49.6%, while the least was extraversion at 8.9%. There was no significant gender difference in motivation and personality trait scores among the patients. Empathy, friendliness/politeness, and commendation by orthodontists positively affected compliance with treatment ($p<0.05$). Delay in attending to patients by orthodontists was the most discouraging factor to treatment. Whilst the conscientious personality trait showed a significant negative association with motivation ($p<0.05$), the openness trait demonstrated a significant positive association with the general desire to improve patients' oral health related quality of life ($p<0.05$).

Conclusion: The most exhibited personality trait among the patients was agreeableness. Empathy, friendliness/politeness and commendation by orthodontists positively affected compliance ($p<0.05$). Whilst the conscientiousness trait showed a significant negative relationship with motivation, openness had a significant positive association with the general desire to improve patients' oral health and quality of life. Prolonged waiting time was the most discouraging factor to treatment.

Keywords: Personality traits, Motivation and compliance, Orthodontic treatment, Nigerian Adolescents

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ORIGINAL ARTICLE

Introduction

Fixed orthodontic appliance therapies are commonly used in the management of malocclusion, especially when complex cases and bodily movement of teeth are involved. From the professional point of view, orthodontic treatment, which should normally last about 2 years, is unnecessarily prolonged, thus leading to frustration on the part of the orthodontist.[1] Some of the factors that may delay treatment outcomes include patients' personality traits and motivation, which have been identified as important determinants of compliance in patients undergoing fixed orthodontic appliance therapy.[2,3]

Personality trait as a distinguishing characteristic feature has been shown to affect individual response to different events and social activities, including orthodontic treatment outcome.[4] Fixed orthodontic appliance therapy, on the other hand, is a time-demanding treatment procedure that requires the significant cooperation of patients.[5] It has been suggested that an effective way of predicting a patient's willingness to undergo certain orthodontic treatment is by the use of personality indexing.[6]

The personality characteristics of individuals are usually classified into five different groups,

including; openness, conscientiousness, extraversion, agreeableness, and neuroticism.[7] These characteristic traits are said to influence an individual's perception of treatment modality as well as a patient's response to clinical instructions during treatment.

A patient's motivation for treatment can either be intrinsic or extrinsic, resulting in self- motivation or motivation by the external environment. Psychological development during the pre-adolescent and adolescent stages may also influence a child's motivation, understanding, and adherence to orthodontic treatment procedures.[8] Similarly, extrinsic factors such as social stereotypes, family, educational background, and gender, as well as intrinsic factors like personality traits and temperament, are important factors in determining the level of cooperation during orthodontic treatment.[9] Furthermore, pressure from parents, peer groups, and interpersonal factors are also assumed to be important contributory factors to motivation for treatment.[10]

The personality of each individual patient as an intrinsic factor can influence motivation for orthodontic treatment.[11] Patients' personality characteristics and their relationship with family, peers, and orthodontists, as well as performance at school are closely linked with compliance.[3] They may also serve as valuable sources of information in predicting treatment outcomes and monitoring compliance.[3]

Indeed, very little is known about the effect of the personality traits of Nigerian orthodontic patients on their motivation towards, and compliance with, orthodontic treatment. This study was designed to determine the relationship between orthodontic patients' personality traits, motivation, and their compliance with fixed orthodontic appliance therapy.

Materials and methods

Ethical approval for the study was obtained from the Institute of Public Health, Obafemi Awolowo University Ile-Ife, with reference number IPH/OAU/12/822. The study was a descriptive cross-sectional survey conducted among adolescent patients undergoing fixed orthodontic appliance treatment at Obafemi Awolowo University Teaching Hospitals Complex, (OAUTHC) Ile-Ife, Lagos University Teaching Hospital (LUTH) Lagos and University College Hospital (UCH) Ibadan, all in the southwestern part of Nigeria, within six months period. The sample population comprised 123 randomly selected adolescent patients between the ages of 10 and 19 years and visiting the orthodontic clinic for the first time.

A pre-structured self-administered questionnaire (appendix A) consisting of fifty-seven questions in three domains was used to assess the level of compliance with professional etiquette and motivation for treatment. The first domain assessed the motivation of the patients to fixed orthodontic appliance treatment; the second domain consisted of questions assessing their compliance to instructions during treatment. Compliance was said to exist when a patient attended the clinic regularly at appointed times and dates without being scolded by the orthodontist but praised for good performance or conduct during treatment. On the other hand, non-compliance was referred to when a patient failed to attend the clinic regularly at appointed times and dates, or was often scolded by the orthodontist for bad behaviour. The third domain consisted of questions for assessing the personality traits of patients which comprised one of the most commonly used personality taxonomies often referred to as the Big Five.[12] The five identified groups are openness, conscientiousness, neuroticism, extraversion, and agreeableness. 'Openness' is the willingness to experience new things, being imaginative; 'neuroticism' indicates emotional instability; 'conscientiousness' indicates that the individual evaluates consequences before acting; 'agreeableness' shows the ability to get along with others and to be trustworthy, and 'extraversion' is an indication that the individual thrives in social situations.[13,14] The computation, assessment, and interpretation of personality traits was based on a 5-

point Likert's scale from strongly disagree [1] to strongly agree [5] according to John et al.[12]

Data was entered into a personal computer and analyzed using the statistical package for social sciences (SPSS version 16.0 for windows, SPSS inc, Chicago). The analysis was based on simple descriptive and analytical statistics, including chi-squared analysis and multivariate linear regression for patients' personality traits as well as the motivating or discouraging factors. The significant level was set at $p<0.05$.

Results

Table 1 shows the distribution of patients according to their socio-demographic characteristics in their hospitals. There was an almost equal distribution of patients across Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), University College Hospital (UCH) and Lagos University Teaching Hospital (LUTH) at 30.1%, 31.7% and 38.2% respectively. Females constituted about two-third (61.0%) of the patients. Most of the patients had secondary education (63.3%); 28.5% attained tertiary educational level while only 3.3% had primary school level education. Whilst the mean age of patients was 14.7±2.4 years (±SD), the mean duration of treatment was 18.2±15.5 months, with treatment duration ranging from one to 84 months.

Table 2 indicates the personality traits of patients according to gender, treatment compliance, and orthodontic treatment duration. The most common personality trait observed in both male and female genders was agreeableness at 56.3% and 45.3% respectively. The least expressed personality traits in male patients were extraversion and neuroticism (4.2%), while extraversion was the least found trait (12.0%) in the female orthodontic patients. There was no statistically significant difference in gender ($p>0.05$)

Majority of the compliant and non-compliant patients had agreeableness personality trait at 51.9% and 33.1% respectively. The least reported personality trait expressed in the compliance group was neuroticism (7.4%), while conscientiousness (6.7%) was the least expressed trait in the non-compliant group. No significant differences were observed between patients' personality traits and compliance ($p>0.05$).

Within the treatment duration periods, the agreeableness trait was very predominant in both 'normal' and 'long-term' treatment periods at 44.5% and 60.0% respectively. However, no significant difference was observed between the two treatment duration periods ($p>0.05$).

Table 3 shows the perceived motivating factors for patients' attendance at the orthodontic clinic according to gender and treatment compliance. Over three-quarters of male (93.8%) and female (82.7%) orthodontic patients were dissatisfied with their dental appearance, which was the primary reason for seeking orthodontic treatment. However, no significant gender difference was reported in the level of satisfaction with dental appearance among the patients. Also, there was no significant difference in the level of compliance between the compliance and non-compliance groups

The study showed that about two-thirds of the patients were motivated by the adaptability or satisfaction of the fixed appliance designs and techniques used. However, no statistically significant differences were observed between gender ($p>0.05$). There was effective communication between the orthodontists and gender as well as different compliance groups.

With regards to factors influencing compliance to treatment, the findings showed that empathy, commendation for good attitude or behaviour towards treatment and friendly disposition of the orthodontist significantly affected compliance to orthodontic treatment by patients ($p<0.05$).

Figure 1 shows the perceived personality figure or role model influencing patients towards seeking orthodontic treatment according to gender. Majority of the male and female orthodontic patients were motivated by their parents to seek orthodontic treatment (70.0%) while their peer group surprisingly

had the least impact (1.6%) in influencing treatment.

The discouraging factors against compliance to orthodontic treatment as perceived by patients are shown in Figure 2. The greatest discouraging factor militating against compliance is the delay in attending to patients by the orthodontists during appointments (47.2%), while the least factor was the poor condition of the clinic environment (7.3%).

Table 4 shows the regression model of patients' personalities according to motivational or discouraging factors to treatment. Conscientiousness was the only personality trait that had a significant negative association with personality or modeling figures in motivating orthodontic patients for treatment ($p<0.05$). Similarly, the openness dimension was significant in predicting compliance with orthodontic treatment ($p<0.05$). Other individuals' personality traits were not found to have a significant impact on motivation to fixed appliance therapy in this study.

Table 1: Distribution of patients according to socio-demographic characteristics

Variables	Frequency n(%)
Nigerian Teaching Hospital	
OAUTHC, Ile-Ife	37(30.1)
UCH, Ibadan	39(31.7)
LUTH, Lagos	47(38.2)
Gender	
Male	48(39.0)
Female	75(61.0)
Educational background	
Primary	4(3.3)
Secondary	84(63.3)
Tertiary	35(28.5)
Age (years)	
Mean+SD)	14.7±2.415
Median	15
Mode	12
Range	10-19
Treatment duration (months)	
Mean±SD	18.2±15.5
Median	15
Mode	12

Table 2: Distribution of patients' personality traits according to gender, treatment compliance and orthodontic treatment duration

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness
Male					
n(%)	2 (4.2)	27 (56.3)	7 (14.6)	2 (4.2)	11(20.8)
Female					
n(%)	9 (12.0)	34 (45.3)	11(14.7)	10 (13.3)	11(14.7)
p- value			0.21		
Compliance					
n(%)	9 (8.3)	56 (51.9)	17 (15.7)	8 (7.4)	18 (16.7)
Non- compliance					
n(%)	2 (13.3)	5 (33.3)	1(6.7)	4 (26.7)	3 (20.0)
p- value			0.13		
Treatment Duration					
≤ 18 months (normal)					
n(%)	9 (10.8)	37 (44.5)	11 (13.3)	9 (10.8)	17 (20.5)
>18 months (long)					
n(%)	2 (5.0)	24 (60.0)	7 (17.5)	3 (7.5)	4 (10.0)
p-value			0.32		

Table 3: Perceived motivating factors for treatment according to gender and compliance with treatment

Factors	Male n(%)	Female n(%)	p-value	Compliance n(%)	Non-compliance n(%)	p- value
Satisfaction with dental appearance						
Yes	3(6.2)	13(17.3)	0.075	14(13.0)	2(13.3)	0.97
No	45(93.8)	62(82.7)		94(87.0)	13(86.7)	
Effective communication on treatment progress						
Yes	47(97.9)	74(98.7)	0.75	106(98.1)	15(100.0)	0.60
No	1(2.1)	1(1.3)		2(1.9)	0(0.0)	
Empathy by the Orthodontist						
Yes	43(89.6)	73(97.3)	0.07	104(96.3)	12(80.0)	0.01
No	5(10.4)	2(2.7)		4(3.7)	3(20.0)	
Comfortability of treatment technique						
Yes	31(64.6)	59(78.7)	0.09	80(74.0)	10(66.7)	0.54
No	17 (35.4)	16(21.3)		28(26.0)	5(33.3)	

Commendation for showing positive attitude						
Yes	42(87.5)	68(90.7)	0.58	99(91.7)	11(73.3)	0.03*
No	6(12.5)	7(9.3)		9(8.3)	4(26.7)	
Friendly/polite disposition by the Orthodontist						
Yes	48(100.0)	74(98.7)	0.42	108(100)	14(93.3)	0.0075*
No	0(0.0)	1(1.3)		0(0.0)	1(6.7)	
TOTAL (%)	**48(100)**	**75(100)**		**108(100)**	**15(100)**	

*** p<0.05; significant**
Chi square

Table 4: Multivariate linear regression of personality traits of patients according to motivating or discouraging factors/

	Beta	SE	p-value
Satisfaction with dental appearance			
Intercept	2.044	0.13	0.000
Extraversion	-0.016	0.02	0.466
Agreeableness	-0.017	0.01	0.124
Conscientiousness	-0.017	0.02	0.274
Neuroticism	-0.027	0.03	0.316
Openness	-0.011	0.03	0.709
Motivational personality			
Intercept	4.737	0.48	0.000
Extraversion	-0.060	0.08	0.469
Agreeableness	0.002	0.04	0.955
Conscientiousness	-0.132	0.06	0.027
Neuroticism	0.080	0.10	*0.438
Openness	-0.001	0.11	0.996
Effective communication on treatment progress			
Intercept	1.050	0.05	0.000
Extraversion	-0.007	0.01	0.411
Agreeableness	0.000	0.00	0.961
Conscientiousness	0.004	0.01	0.553
Neuroticism	-0.001	0.01	0.923
Openness	-0.013	0.01	0.230
Friendly/polite disposition of the Orthodontist			
Intercept	1.015	0.03	0.000
Extraversion	-0.005	0.01	0.410
Agreeableness	0.000	0.00	0.945
Conscientiousness	-0.001	0.00	0.739
Neuroticism	-0.002	0.01	0.771
Openness	0.002	0.01	0.801

Empathy by the Orthodontist			
Intercept	1.081	0.09	0.000
Extraversion	-0.012	0.02	0.433
Agreeableness	-0.004	0.01	0.611
Conscientiousness	0.001	0.01	0.908
Neuroticism	0.007	0.02	0.711
Openness	0.004	0.02	0.859
Commendation for showing positive attitude			
Intercept	1.112	0.12	0.000
Extraversion	-0.013	0.02	0.509
Agreeableness	-0.003	0.01	0.796
Conscientiousness	-0.010	0.01	0.726
Neuroticism	0.017	0.02	0.501
Openness	0.010	0.03	0.848
Comfortability of treatment technique (appliance)			
Intercept	1.037	0.17	0.000
Extraversion	-0.007	0.03	0.804
Agreeableness	0.011	0.01	0.419
Conscientiousness	0.011	0.02	0.603
Neuroticism	0.065	0.04	0.068
Openness	0.043	0.04	0.264
General motivator seeking orthodontic treatment			
Intercept	1.371	0.16	0.000
Extraversion	0.024	0.03	0.374
Agreeableness	-0.004	0.01	0.786
Conscientiousness	-0.006	0.02	0.758
Neuroticism	-0.050	0.03	0.132
Openness	0.078	0.04	0.032*
Discouraging factors by patients			
Intercept	1.921	0.48	0.000
Extraversion	0.107	0.081	0.189
Agreeableness	-0.030	0.039	0.452
Conscientiousness	0.047	0.06	0.418
Neuroticism	0.040	0.10	0.690
Openness	0.034	0.11	0.756

* $p<0.05$; significant

Discussion

Several authors [15-17] have attempted to establish the important role of patients' cooperation, including motivation and compliance in the overall treatment outcome of orthodontic appliance therapy. However, only a few studies have investigated the relationship between the personality characteristics of patients and their potential adherence to orthodontic treatment procedures.[9,11] This study was set out to elucidate the association, if any, between personality traits, motivating and discouraging factors, as well as compliance to instructions during fixed orthodontic appliance therapy.

The study group was within the age group in which most orthodontic treatments are carried out by orthodontists. This is consistent with previous reports that the prevalence of malocclusion tends to increase between the ages of 11-16 years making the adolescent population the highest, regarding orthodontic consultation rate.[18,19] Also, the majority of these patients were females, which constituted about two-thirds of all patients in the study population. This pattern is also in agreement with previous studies [20-22] that showed the female gender as the highest seekers of orthodontic treatment. Roberts et al [23] reported that girls were more frequently treated than boys, while Holmes[24] in a related study, observed that girls perceived themselves as less attractive than boys, hence, seeking more treatment than their male counterparts.

The findings of this present study showed that though agreeableness was the most common personality characteristic reported in this group of patients, treatment compliance was hardly influenced by their personality traits. This outcome agrees with previous investigations which showed that the use of personality traits alone may not suffice for predicting compliance in orthodontic treatment.[9,25] Bos et al.[25] reported that a patient's personality traits alone cannot be used to predict compliance during orthodontic treatment. Furthermore, Amado and Sierra [9] found no significant differences in any of the five personality traits related to treatment compliance, though the authors reported that introverted patients were more inclined to comply with instructions during orthodontic treatment.

Normally, non-compliance with orthodontic instructions as a result of differences in personality characteristics by patients may affect orthodontic treatment outcomes concerning treatment duration. In the current study, the personality traits of the patients were neither significantly affected by gender, nor influenced by treatment duration. However, this is contrary to the work of Hansen et al[6] which showed that neuroticism was negatively associated with willingness to comply with certain orthodontic instructions, and by implication, may prolong orthodontic treatment duration. This is also consistent with observations of Umaki et al, [26] which showed that patients with high scores in neuroticism were more likely to demonstrate poor compliance.

In this present investigation, the majority of the male and female patients were not satisfied with their dental appearance, which may suggest their reason for seeking orthodontic treatment. This agrees with previous studies that demonstrated an improvement in dentofacial appearance as the major motivating factor for seeking orthodontic treatment. [27,28]

This study clearly demonstrates that empathy for the patient during treatment, including a commendation for right behavior and the friendly disposition of the orthodontist, positively affected compliance to orthodontic treatment. These findings are consistent with the suggestion by Mehra et al [2] that verbally praising patients for compliant behaviour was the best way to improve compliance to treatment. In addition, communication and education of patients on the consequences of poor compliance, including discussion on orthodontic treatment goals, were found to be popular ways of improving compliance. The authors further reported that negative methods such as ridiculing and scolding for poor compliance were the worst methods for improving patient compliance.

Studies have shown that extrinsic factors such as parental influences often affect a patient's decision to undergo fixed orthodontic treatment.[22,29] This current study reported that the most dominant personality figure or role model influencing patients' decision to seek orthodontic treatment was mainly the parents, while the patients' peer group surprisingly had the least influence on their decision. An earlier Nigerian study also reported that parental pressure especially that of mothers, tends to have a great impact on the children to accept orthodontic treatment.[27] Balwin[30] showed that the severity of malocclusion, actual disfigurement, and impairment of function frequently

motivated parents to seek orthodontic treatment for their children. This is consistent with other reported studies by Mehra et al[2] and Daniels et al.[31] Wedrychowska-Szulc and Syrynska[32] found that between 63-67 per cent of parents reported pressurizing their children to seek orthodontic treatment to avoid possible future claims of neglect. Furthermore, Pratelli and Gelbier[33] found that parents who desired orthodontic treatment for themselves or who were former orthodontic patients were more likely to approve of orthodontic care for their children.

In this current report, the most discouraging factor to orthodontic treatment was the delay in attending to patients by the practitioners. The waiting time could possibly affect future appointments in terms of general compliance and cooperation by the patients. Normally, orthodontic treatment is a lengthy clinical procedure and the first appointment takes about two hours to set up, subsequent review appointments usually take 15-20 minutes depending on the complexity of the case. Orthodontic practitioners are encouraged to organize and plan their appointment schedules in such a way that adequate time is allowed in-between patients' appointments, to prevent unnecessary treatment delays which may consequently have a negative impact on compliance. Another important discouraging factor during treatment in this study was pain and discomfort, which could affect orthodontic treatment outcomes. These are not common symptoms in orthodontic procedures. The presence of these symptoms, however, are consistent with reports by Utomi[34] and Gamhir et al [35] which found that pain and discomfort constituted the main discouraging factor for treatment, especially in the first four weeks of treatment.

When the multivariate linear regression model of a patient's personality trait was related to motivational or discouraging factors, the conscientiousness trait was the only personality characteristic that had a significant negative association with role modelling figures for motivating patients for orthodontic treatment. No obvious explanation could be advanced for this observation but this may be related to the fact that patients with conscientious personality traits tend to diligently evaluate and rationalize the consequences of orthodontic treatment before deciding to embark on treatment. Such individual patients may be difficult to convince because of the lengthy treatment time and demanding nature of the orthodontic treatment. In the same vein, Hansen et al [6] reported that conscientiousness and neuroticism exhibited a negative association with a single treatment modality.

With regards to the openness personality trait, there was a positive and significant relationship between the trait and compliance to treatment in this study. This is not surprising because the trait reflects the concept of open-mindedness which means the willingness of patients to experience new things, especially with regards to orthodontic treatment. Such patients are curious, creative, imaginative and likely to comply with orthodontic instructions. Hansen et al [6] however reported that openness is one of the few traits that failed to demonstrate an association with any of the orthodontic treatment modalities.

Conclusion

The most exhibited personality trait among the patients was agreeableness. Empathy, friendliness/politeness as well as commendation by orthodontists positively affected compliance ($p<0.05$).

Whilst the conscientiousness trait showed a significant negative relationship with motivation to treatment, openness had a significant positive association with the general desire to improve patient's oral health and quality of life. The most perceived discouraging factor to treatment was a delay in attending to patients by orthodontic practitioners.

Contribution to authorship :

OOD developed the concept of the research, OOD and OOE designed the study and participated in data collection and write-up. SOO and TOT contributed to data collection. All the authors approved the paper for publication.

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Conflicts of interest

There are no conflicts of interest to be declared

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APPENDIX A

QUESTIONNAIRE

AGE RANGE (10-19YRS) ☐

AGE ☐ SEX ☐ DURATION OF TREATMENT (MONTHS) ☐

EDUCATIONAL LEVEL – TERTIARY ☐ SECONDARY ☐ PRIMARY ☐

SECTION A (1-10)

1. Were you happy with the appearance of your teeth before the treatment?
   Yes ☐ No ☐
2. Who initiated the appointment with the orthodontist?
   a) General dentist
   b) Peer group
   c) Medical doctor
   d) Patient
   e) Parents
   f) Others ----------
3. Is your orthodontist friendly? Yes ☐ No ☐
4. Is your orthodontist polite to you? Yes ☐ No ☐
5. Does your orthodontist communicate effectively about the treatment progress with you?
   Yes ☐ No ☐
6. Does your orthodontist show empathy i.e understands you and how you feel about the treatment?
   Yes ☐ No ☐
7. Are you always praised by your orthodontist for positive attitudes during the treatment?
   Yes ☐ No ☐
8. Is the appliance comfortable? Yes ☐ No ☐
9. Generally, what motivates you towards orthodontic treatment?

---

10. What discourages you from attending the clinic?

a) Time wasting
b) I dislike the clinic environment
c) Pain during treatment
d) Others ----------

SECTION B (11-13)

11. Do you attend clinics at an appointed date and time? Yes ☐ No ☐

12. Has your orthodontist scolded you or ever charged you additional fee for poor compliance

Yes ☐ No ☐

13. Has your orthodontist praised you for excellent compliance?

Yes ☐ No ☐

SECTION C (14-57)

Here are a number of characteristics that may or may not apply to you. Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree Strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree Strongly
1	2	3	4	5

I see myself as someone who...

____ 14. Is talkative
____ 15. Tends to find fault with others
____ 16. Does a thorough job
____ 17. Is depressed, blue
____ 18. Is original, comes up with new ideas
____ 19. Is reserved
____ 20. Is helpful and unselfish with others
____ 21. Can be somewhat careless
____ 22. Is relaxed, handles stress well
____ 23. Is curious about many different things
____ 24. Is full of energy
____ 25. Starts quarrels with others
____ 26. Is a reliable worker
____ 27. Can be tense
____ 28. Is ingenious, a deep thinker
____ 29. Generates a lot of enthusiasm
____ 30. Has a forgiving nature
____ 31. Tends to be disorganized
____ 32. Worries a lot
____ 33. Has an active imagination
____ 34. Tends to be quiet
____ 35. Is generally trusting
____ 36. Tends to be lazy
____ 37. Is emotionally stable, not easily upset
____ 38. Is inventive
____ 39. Has an assertive personality
____ 40. Can be cold and aloof
____ 41. Perseveres until the task is finished
____ 42. Can be moody
____ 43. Values artistic, aesthetic experiences
____ 44. Is sometimes shy, inhibited
____ 45. Is considerate and kind to almost everyone
____ 46. Does things efficiently
____ 47. Remains calm in tense situations
____ 48. Prefers work that is routine
____ 49. Is outgoing, sociable
____ 50. Is sometimes rude to others
____ 51. Makes plans and follows through with them
____ 52. Gets nervous easily
____ 53. Likes to reflect, play with ideas
____ 54. Has few artistic interests
____ 55. Likes to cooperate with others
____ 56. Is easily distracted
____ 57. Is sophisticated in art, music, or literature

Pattern of Attendance of Patients in Orthodontic Clinic of A Nigerian Military Reference Hospital

Adesina BA, Onwochei JJ

Abstract

Background: Poor aesthetics, dysfunction and discomfort are the key reasons for seeking orthodontic treatment across the world. Patients' expectation of orthodontic treatment depends on the perception of their own dentofacial aesthetics and on the continuous feedback they receive from peers to a large extent.

Methods: This was a retrospective study in which data was extrapolated from the orthodontics record book of the dental clinic at a Nigerian Military Reference Hospital.

Results: A hundred and three subjects with a male : female ratio of 1:3, majority (64.1%) of participants are less than 18 years with overall mean age of 18.29±6.7. Ninety five (92.2%) are single while more than four-fifth 85(82.5%) of patients are students. Class 1 malocclusion was the most common 58(56.3%) while 19(18.4%) and 26(25.2%) have class II and class III respectively with no significant association between malocclusion and gender (p=0.0018). The most common treatment plan was fixed upper and lower 77(74.8%) while 11(10.7%) had upper removable appliances.

Conclusion: The most common maloclusion seen was Angle's Class I and most of the patients were treated with comprehensive fixed appliance therapy.

Keywords: Pattern, Attendance, Psychosocial, Malocclusion

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ORIGINAL ARTICLE

Introduction

Malocclusions constitute a misalignment of dental arches related to changes in the growth and development of the craniofacial system that affects both function and aesthetics and therefore exerts an influence on quality of life and social interactions.[1,2] Poor aesthetics, dysfunction and discomfort are the key reasons for seeking orthodontic treatment across the world as reported by many researchers.[3]

It has been estimated that about 80% of orthodontic patients seek treatment out of aesthetic concerns rather than health and function[4]. To a large extent, patients' expectation of orthodontic treatment depends on the perception of their own dentofacial aesthetics and on the continuous feedback they receive from peers.[5] Gender, age, and income have also been reported as associated factors with regular dental attendance.[6] In recent decades, demand for adult orthodontic treatment has grown rapidly worldwide, with several authors remarking on the increase in adults seeking orthodontic treatment.[7,8] The increased demand for orthodontic treatment by adults has increased the scope of orthodontics and widened the upper age limit for orthodontic intervention. The main reason for this demand is the increasing patient awareness and the desire to improve facial aesthetics.[9]

Orthodontic therapy has been a frequent therapeutic practice with socioeconomic development.[10] Factors such as gender, age, and income are difficult to control. However, factors such as work environment,

lifestyle and oral hygiene behaviour could be controlled. In addition, it has been reported that health behaviours were associated with job characteristics[11]. Therefore, the decision to seek orthodontic treatment appears to be motivated by social norms and culture in their reference group and society in order to enhance facial esthetics, self-confidence and social acceptability[12]. There is a dearth of information on the attendance pattern and the various reasons why patients present at the orthodontic clinic of the Military Reference Hospital, which is what this article seeks to provide.

Materials and Methods

This was a retrospective study in which data was extrapolated from the orthodontics record book of the dental clinic at a Nigerian Military Reference Hospital. The study center is one of the Army reference hospitals with a well-established orthodontic unit in Lagos metropolis. The hospital does not limit its services to military personnel but extends them to civilians alike.

Having obtained ethical approval from the hospital ethical Committee, a proforma was developed to record the retrieved data of all patients who attended the orthodontics clinic within the official working hours of the clinic for the study period. Biodata, diagnosis and treatment plan of the study participants who attended the clinic were extrapolated from the record book by the researchers. Data on age, sex, occupation, diagnosis and treatment plan of the study participants were recorded. All incomplete records were omitted from the study while those with complete records were included. Data was kept confidential by numbering the participants' case record form instead of using names.

Data were entered, cleaned and analyzed using IBM Statistical package for social Science (SPSS IBM Chicago Illinois version 27 software) Categorical variables were presented using frequency and percentage while numerical data e.g. age was presented using mean and standard deviation because it was skewed. Association between variables were assessed using the chi square test. P-value 0.005.

Results

Table 1 shows that majority (64.1%) of participants were less than 18 years with overall mean age of 18.29±6.7 years. A slightly higher proportion 59(57.3%) are female with male female ratio of 1:3. Forty-seven (45.6%) were of the Yoruba tribe while 95(92.2%) were single. More than four-fifth 85(82.5%) of the patients were students. Figure 1 shows that class 1 malocclusion 58(56.3%) was the most prevalent malocclusion in this present study. Class 1 malocclusion was also the most occurring malocclusion in both males 21(47.7%) and females 37(62.7%), as shown in table 3. There was no statistical significant level of association between class of malocclusion and gender, p=0.184. Participants <18 years had class 1 malocclusion 32(48.5%) as the most occurring malocclusion while class II malocclusion 15(22.7) was the least recorded. Class I malocclusion was also the most occurring among participants greater than 18 years, see table 4. The level of association between malocclusion and the age group in the study was not statistically significant, p=0.094. The most common treatment plan was upper and lower fixed orthodontic appliance therapy 77(74.8%) while 11(10.7%) had only upper removable appliance therapy, as shown in table 5.

Table 1: Socio-demographic characteristics of patients

Variable	Frequency (n=103)	Percentage
Age group (Years)		
<18	66	64.1
≥18	37	35.9
Mean±SD	18.29±6.7	
Sex		
Male	44	42.7
Female	59	57.3
Ethnic group		
Yoruba	47	45.6
Igbo	33	32.0
Hausa	6	5.8
Niger-Delta	15	14.6
Others	2	1.9
Marital status		
Single	95	92.2
Married	8	7.8
Occupation		
Student	85	82.5
Civil servant	7	6.8
Business	8	7.8
Teacher	3	2.9

Table 2: Association between age and gender

Age group (Years)	Male n(%)	Female n(%)
<18	35(79.5)	31(52.5)
≥18	9(20.5)	28(47.5)

p=0.005*

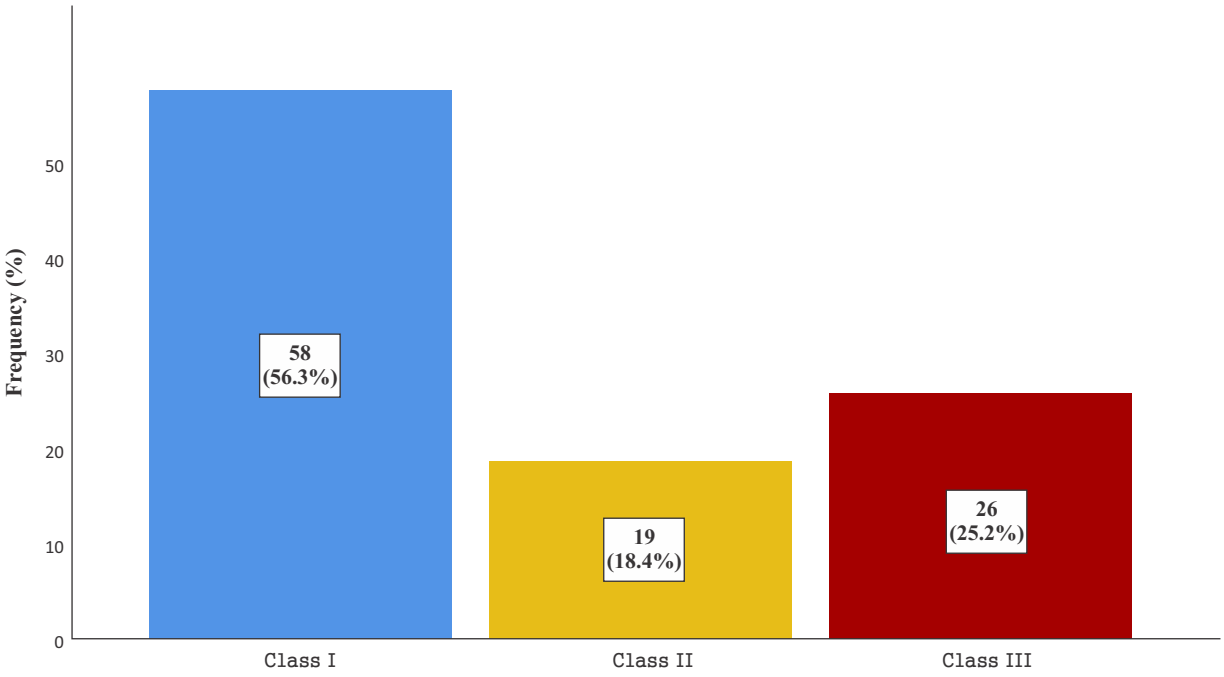

Figure 1: Type of malocclusion

Table 3: Association between malocclusion and gender

Class of malocclusion	Male n(%)	Female n(%)
Class 1	21(47.7)	37(62.7)
Class II	8(18.2)	11(18.6)
Class III	15(34.1)	11(18.6)
p=0.0184		

Table 4: Association between malocclusion and Age group

Class of malocclusion	<18 Years n(%)	≥18 Years n(%)
Class 1	32(48.5)	26(56.3)
Class II	15(22.7)	4(10.8)
Class III	19(28.8)	7(18.9)

Table 5: Treatment plan according to gender among patients

Variable	Male n(%)	Female n(%)	Total
Fixed U&L	30(68.2)	47(79.7)	77(74.8)
Upper removable appliances	6(13.6)	5(8.3)	11(10.7)
Functional twin block	4(9.1)	3(5.1)	7(6.8)
Interceptive orthodontics	1(2.3)	1(1.7)	2(1.9)
Lip bumper	0(0.0)	1(1.7)	1(1.0)
Orthognathic surgery	0(0.0)	1(1.7)	1(1.0)
Palatal expander	1(2.3)	0(0.0)	1(1.0)
Tongue rake	0(0.0)	1(1.7)	1(1.0)
Arch expander in mandible	1(2.3)	0(0.0)	1(1.0)
Fixed upper only	1(2.3)	0(0.0)	1(1.0)

KEY: U=Upper; L= Lower

Discussion

In this study, the majority (64.1%) of participants were less than 18 years with an overall mean age of 18.29±6.7 years. This is in conformity with previous studies and may be attributed to the fact that younger age groups are more conscious of their appearance [13,14,15]. It has been reported that adolescent period between the ages of 11–14 years when children undergo major physical changes, their facial and dental esthetics play a substantial role in self-perceived appearance [15.] The lack of a beautiful smile and good facial look often result in low self-esteem which can influence social interaction. Many studies concluded that people in the age group between 11 years and 18 years showed a significant association between psychological impact and malocclusion[15,16,17]. Meanwhile, almost an equal number of females were presented before and after 18 years old while the bulk of male were less than 18 years. This association is significant (p=0.005)

It was also discovered that a slightly higher proportion 59(57.3%) of patients attending orthodontic clinics during the study period were female with male-female ratio of 1:3. This is consistent with prior studies which showed that girls were more frequently (and more intensely) dissatisfied with their dental appearance than boys. However, girls tend to rank their need for orthodontic treatment higher than boys and female students aged 16 years and above recorded higher psychological and social impact compared to male students in terms of dental aesthetics [14,17,18].

Greater percentage of the participants in this study were single 95(92,2%) and students 85(82.5%). Improving the appearance especially for females at this period is critical for search for future partners and for the job market.

The commonest type of malocclusion was Angle's class 1 seen in 58(56.3%) while Class 3 and Class 2 accounted for 26(25.2%) and 19(18.4%) respectively. This differed from a similar study at a teaching hospital within the same metropolitan area where though Angle class 1 was the commonest reported, class 2 was found to be more than class 3.[19] Meanwhile, there was no significant association between malocclusion and gender (p=0.184).

Majority 77(74.8%) of the subjects in the study were treated with fixed appliances. This shows that fixed appliances are in high demand compared with simple removable and functional orthodontic appliances as supported by Poornima et al[20]. This could be attributed to increasing orthodontic awareness and increasing number of orthodontists delivering good services in the country.

Conclusion

This study revealed that female patients sought orthodontic treatment the most. Most of the students were single and within the adolescent age group. The most common malocclusion seen was Angles Class I malocclusion, with most of the patients being female adolescents and comprehensive fixed appliance therapy was the most common treatment provided.

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Malocclusion and Occlusal Traits of Trainee Dental Surgery Technicians in a Nigerian Teaching Hospital

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Abstract

Background: An individual's occlusal status is generally described by two major characteristics; intra-arch and inter-arch relationship. The purpose of this study was to determine the prevalence of normal occlusal traits and different types of malocclusions among trainee dental surgery technicians undergoing clinical posting at the Orthodontic unit of the University of Benin Teaching Hospital, Benin City, Nigeria.

Methods: This cross-sectional study was carried out among trainee dental surgery technicians undergoing clinical posting at the orthodontic unit of the University of Benin Teaching Hospital, Benin City. 100 (One hundred) constituted the study population. The study participants were assessed by one examiner (JON) at the orthodontic clinic of the Hospital. Intra-examiner reliability (kappa score) was 0.80, indicating a good agreement. Assessment of the antero-posterior relationship of the arches was based on Angle's classification. Data was computed and analyzed using SPSS version 21.0 software. Statistical significance was set at $P<0.05$.

Results: There were 11 (11%) males and 89 (89%) females. The mean age of the participants was 21.87±3.17 years. The prevalence of normal occlusal traits was 22.0 % and class I malocclusion was 51.0 % among the study participants. Prevalence of Class II div 1 malocclusion was 17.0 %, Class II div 2 was 4.0 % and Class III was 6.0 %. There was crowding in 26.0 % of the population while 44.0 % had spacing.

Conclusion: Class I malocclusion was most prevalent, followed by Class II division 1 and Class III. Class II Div 2 malocclusion showed the least prevalence.

Key words: Malocclusion, occlusal traits, Trainee Dental Surgery Technicians

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ORIGINAL ARTICLE

Introduction

An individual's occlusal status is generally described by two major characteristics; intra-arch relationship and inter-arch relationship.[1] A physiologic occlusion differs from a pathological occlusion in which the components function efficiently and without pain, and remains in a good state of health.[2]

Malocclusion is defined as any mal-relationship of dental arches with or without an irregularity of the teeth.[3] A large number of epidemiological studies have been carried out to determine the prevalence of malocclusion in different racial and ethnic groups and the outcome was different for several populations.[4-8]

Research publications on the distribution of malocclusion in Nigeria were by Richardson and Ana[9] and Isiekwe and Logan,[10] which were clinical studies. Several epidemiological surveys were further carried out to determine prevalence of malocclusion among Nigerian children and adolescents.[11-13]

In a study[14] conducted among 441 school children, aged 11-18 years old in Benin City, Nigeria to assess the prevalence of malocclusion among school children in Benin City, Nigeria. Results showed that Angle's Class I malocclusion had the highest frequency of 80.7 %, while other classes were rare. Normal overbite and overjet were frequent findings, while nearly a quarter had increased overjet. A normal dentoalveolar relationship was found in the

upper and lower arches with frequencies of 60.0 % and 77.3 % respectively. The frequency of crowding in both arches were similar while 29.9 % had spacing of the upper anterior segment and 10.7 % had spacing in the lower anterior segment. Anterior open bite was present in 4.1 % while anterior and posterior crossbite was found in 7 % and 4.5 % of the subjects. 19.5 % had midline diastema, 2.7 % had malformed teeth and there was missing teeth in 1.1 %.[14]

A study[15] was carried out in Ibadan among students in the junior and senior secondary classes (age range, 12–17 years). The aim of the study was to determine the prevalence of malocclusion among adolescents in Ibadan and compare the results with findings of other authors. Results showed that normal occlusions were found in 24.5 % of subjects, and 50.3 % had class I malocclusions. Normal overbite and overjet values were the most common. Anterior open bite was found in 7.1 % of the subjects. Anterior crowding was found in 20 % of the subjects, and midline diastema was found in 63.2 %.[15]

A study[16] was carried out in the North East of India among 432 students aged 18 – 25 years studying in the Dental College and College of Nursing at a tertiary care medical institute. The aim of the study was to find out the prevalence of normal occlusal traits and different types of malocclusion among dental and nursing students of these institutions. Results showed that the prevalence of normal occlusal traits was 48.4 % and that of malocclusion was 51.6 %. Among these occlusal traits with malocclusion (51.6 %), Angle's Class I malocclusion was found in 36.8 %, Class II in 10.4 % and Class III in 4.4 %. Among those with Angle's Class II malocclusion (10.4 %), 9.0 % were Class II div 1 and 1.4 % were Class II div 2.[16]

The purpose of this study was to determine the prevalence of normal occlusal traits and different types of malocclusions among trainee Dental Surgery Technicians undergoing clinical posting at the University of Benin Teaching Hospital, Benin City, Nigeria.

Materials and Methods

This cross-sectional study was carried out between March and May 2023. Trainee dental surgery technicians undergoing clinical posting at the Dental Centre of the University of Benin Teaching Hospital, Benin City, Nigeria constituted the study population. The students were from the Institute of Health (63 trainees), University of Benin Teaching Hospital, Benin City, South South of Nigeria, School of Health, Ado-Ekiti (6 trainees), South West of Nigeria, School of Health, Akure (12 trainees), South West of Nigeria and Pogil School (19 trainees) of Health Ogun State, South West Nigeria. The total number of participants was 100 (hundred). Their minimum age was 17 years, and maximum age was 37 years and mean age was 21.87±3.17 years. One Orthodontist (JNO) examined the students after obtaining informed consent from the participants. This research was approved by the Research Ethics Committee of the University of Benin Teaching Hospital. Participants in this study experienced no direct benefit and no compensation was paid to them. The students were examined at the Orthodontic clinic of the University of Benin Teaching Hospital, Benin City. Each participant was seated on a dental chair with chair light, and were examined with a dental mouth mirror, a sterile wooden spatula, and a metal ruler. In assessing the occlusal classification, overjet and overbite, the teeth were in centric occlusion. This was achieved by asking the subject to swallow and then to bite his or her teeth together.

Assessment of the antero-posterior relationship of the dental arches was based on Angle's Classification.[3] Inclusion criteria included consent of each participant, no previous orthodontic treatment. Exclusion criteria included those with loss of anterior teeth due to trauma, extraction, previous orthodontic treatment and lack of consent. The intra examiner reproducibility was assessed by re-examination of 10 randomly selected final year trainee dental technicians two weeks apart. The kappa score was 0.80, indicating a good agreement. The horizontal relationship of the upper and lower incisors with the teeth in centric occlusion was measured from the labial surface of the lower incisor, to the labial surface of the upper incisor. The distance is measured in mm as the overjet using a metre rule. Any value above 3 mm was taken as increased overjet and less than 1 mm as reduced overjet.[17]

The overbite is the relationship between the upper and lower incisors in centric occlusion and was measured using the degree of upper incisal coverage of the lower incisors.[18] It was regarded as reduced if the coverage was less than one third of the crown of the lower incisors and increased if it was more than one half. It was regarded as open bite if there was an actual vertical gap between the upper and lower incisors.[18]

An edge to edge incisor relationship was recorded when the maxillary and mandibular incisors occluded on their incisal edges. Posterior crossbite was considered lingual when the buccal cusp of the upper tooth occluded lingual to the maximum height of the buccal cusp of the opposing lower tooth. Buccal posterior crossbite (scissors bite) was recorded when the lingual cusp of the upper tooth occluded buccal to the maximum height of the buccal cusp of the opposing lower tooth.

Crowding was defined as overlapping of erupted teeth as a result of insufficient space or lack of space for teeth to erupt in a segment. Spacing was recorded to be present when there was no approximal contact between teeth in a range of 1 mm or more within a segment. Maxillary median diastema was recorded when a space of 2 mm or more existed between the maxillary central incisor. Missing permanent teeth was recorded when a permanent tooth that should have been erupted considering the subject's dental development was missing in the mouth.

Data entry and analysis was carried out using Statistical Package for the Social Sciences (SPSS) version 21.0. Frequency distribution was generated for all variables, measures of central tendency and dispersion was generated for numerical variables. P values ($P < 0.05$) were regarded as significant.

Results

This was a cross-sectional study among trainee dental surgery technicians undergoing clinical posting at the University of Benin Teaching Hospital, Benin City, Nigeria. The total population of participants was 100 (hundred). There were 11 (11.0%) males and 89 (89.0%) females. The mean age was 21.87±3.17 years. There was no statistically significant difference between occlusal characteristics and sex/age ($P>0.05$).

Table 1 showed the occlusal classification of the participants. Normal occlusion was recorded among 22(22%) , 51(51%) had Class I malocclusion, 17(17%) had Class II div 1 malocclusion, 4(4%) had Class II div 2 malocclusion and 6(6%) had Class III malocclusion. Table 2 showed the distribution of overjet among the participants. 65(65%) had normal overjet, 18(18.0%) had increased overjet, 16(16.0%) had reduced overjet and 1(1%) had reversed overjet.

Table 3 showed the distribution of overbite among the participants. 70(70%) had normal overbite and 2(2.0%) had anterior open bite. Table 4 showed the distribution of spacing and crowding among the participants. 30(30.0%) had normal dentoalveolar relationship (no space, no crowding), 26(26%) had crowding and 44(44%) had spacing.

Table 5 showed the distribution of midline diastema, missing teeth and posterior crossbite among the participants. 12(12.0%) had midline diastema, 3(3.0%) had missing teeth which were maxillary canines and 3(3.0%) had posterior crossbite.

Table 1: Occlusal Classification of study Population

Occlusal classification	n	%
Normal occlusion	22	22.0
Class I	51	51.0
Class II Division 1	17	17.0
Class II Division 2	4	4.0
Class III	6	6.0
Total	100	100.0

Table 2: Distribution of Overjet among the study population

Overjet	n	%
Normal	65	65.0
Increased	18	18.0
Reduced	16	16.0
Reversed	1	1.0
Total	100	100

Table 3: Distribution of Overbite among the study population

Overbite	n	%
Normal	70	70.0
Increased	10	10.0
Reduced	7	7.0
Edge to Edge	10	10.0
Reversed	1	1.0
Anterior Open bite (AOB)	2	2.0
Total	100	100.0

Table 4: Distribution of Spacing and Crowding among the study population

	n	%
Normal	30	30.0
Crowding	26	26.0
Spacing	44	44.0
Total	100	100.0

Table 5: Distribution of Midline diastema, Missing teeth and Posterior Crossbite among the study population

	Midline Diastema		Missing Teeth		Posterior Crossbite	
	n	%	n	%	n	%
Present	12	12.0	3	3.0	3	3.0
Absent	88	88.0	97	97.0	97	97.0
Total	100	100.0	100	100.0	100	100.0

Discussion

An individual's occlusal status is generally described by two major characteristics; intra-arch relationship and inter-arch relationship.[1] A physiologic occlusion differs from a pathologic one in which the components function efficiently and without pain, and remains in a good state of health (Ross, 1970).

In this study, the prevalence of normal occlusion was 22%, this was lower than values recorded in previous studies,[15,16] but higher than results obtained by other authors.[14,19]

This study recorded a prevalence of 51% of Class I malocclusion, this was lower than the values recorded in previous studies,[14,19] and higher than values recorded by other authors.[15,16] This study recorded higher prevalence values for Class II malocclusion when compared to previous studies,[14-16] and lower values when compared to a previous study.[20]

There was a reduction in the prevalence of Class III malocclusion in this study when compared to previous studies,[15] and higher than values recorded in other studies.[14,20-23]

Normal overjet values were recorded in the majority of the participants in this study (65%). This was a similar finding in previous studies.[14,15,17] There was increased overjet among 18% of the participants. Previous studies[14,15] recorded 24.7%, and 15.7% respectively.

This study recorded a high prevalence of normal overbite. This was a similar finding in previous studies.[11,15,24-26] In this study, the occurrence of reduced overbite was 7.0%, 10.0% for deep overbite, 10.0% for edge to edge, reversed overbite of 1.0% and anterior open bite was 2.0%. Previous study[14] recorded 9.8% for increased overbite, 8.4% for reduced overbite, and 2.0% for edge to edge, anterior open bite of 4%, and 7.0% for reverse overbite. In another study[15], the prevalence of increased overbite was 14.1%, reduced overbite was 9.1%, edge to edge, 3.2%, and anterior open bite was 7.1%.

Thirty (30.0%) participants in this study had normal dentoalveolar relationships in the upper and lower arches (no crowding and spacing), 26(26.0%) had crowding and 44(44.0%) had spacing. A previous study[15] recorded 79.9% normal dentoalveolar relationship (no crowding and spacing), 7.2% crowding while another study[14] recorded a normal dentoalveolar relationship of 77.3%, 12.0% crowding, and 10.7% spacing.

Prevalence of midline diastema in this study was 12.0%, which was lower than values recorded in previous studies[11,14,15] was 19.5%, 17.0% and 36.8% respectively. Prevalence of missing teeth and posterior crossbite in this study was 3.0%, and the maxillary canines were the frequently missing teeth. Previous study[14] recorded 1.1% for missing teeth and 4.5% for posterior crossbite, the maxillary lateral formed the majority of the missing teeth.

Conclusion

The prevalence of normal occlusal traits was 22% and Class I malocclusion was 51.0% among trainee dental surgery technicians in a Nigerian Teaching Hospital. Prevalence of Class II div 1 malocclusion was 17.0%, Class II div 2 was 4.0% and Class III was 6.0%. There was crowding in 26.0% of the participants and spacing occurred in 44.0%.

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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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Acknowledgements

In acknowledgements section, it is suitable to list all contributors who do not meet the criteria for authorship, such as a person who provided purely technical help, writing assistance, or a department head who provided only general support. Financial and material support should also be acknowledged.

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