Orthodontic Treatment Need and Its Association with the Oral Hygiene Status among Almajiris: A Pilot Study

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ABSTRACT

Objective: The oral hygiene status and orthodontic treatment need among Almajiris have not gotten the attention it deserves. Almajiris suffer the same harsh or worse living conditions just like the internally displaced persons and refugees with difficulty accessing the already scarce health care facilities. The objective of this study was to determine the orthodontic treatment need and its association with the oral hygiene status among Almajiris. To further assess the impact of malocclusion severity on their oral hygiene status.

Methods: The study was a cross sectional pilot study conducted among 42 Almajiris. Orthodontic treatment need and the oral hygiene status were evaluated using the Dental Aesthetic Index (DAI) and the simplified oral hygiene index (OHI-S) respectively. Effect of malocclusion severity on the OHI-S score was evaluated using linear regression model. The level of association between malocclusion using DAI and their oral hygiene status (OHI-S) was also conducted using Pearson correlation coefficient. The level of significance was set at <0.05.

Results: Increased overjet (>3mm) had the highest presentation of 85.7% while missing teeth and anterior crossbite had the least presentation of 4% each. Orthodontic treatment was highly desirable and mandatory among 14.3% of Almajiris in each category. Only a 4% variation of the OHI-S was explainable by the level of malocclusion severity, (p=0.207). There was poor correlation (r=0.199, p=0.207) between the DAI and the OHI-S.

Conclusion: This present study shows that a large number of Almajiris have poor oral hygiene and increasing number of them requiring orthodontic treatment. Their level of malocclusion severity does not necessarily influence the oral hygiene status.

Keywords: Almajiris, Orthodontic Treatment Need, Oral hygiene status

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CLINICAL IMPLICATIONS

Despite the difficulty that may be encountered reaching out to the Almajiris, clinicians should be aware of the increasing incidence of malocclusion traits and a large number of them requiring orthodontic treatment. This study further raises the

alarm of the increasing poor oral hygiene status among Almajiris that would require the attention of periodontists. It is important for clinicians to advocate for a better and inclusive health care where this individual can easily for reached for improved oral health care.

INTRODUCTION

Almajiri is derived from an Islamic word "Al-Muharijum, which refers to someone who has migrated in search of Islamic education. Under the Almajiri system, most boys aged 4-12 years are sent by their parents for Quranic education.[1] Female children are not usually part of the Almajiris system because they are usually married off at an early age under the Islamic law.[2] Majority of the Almajiris may never have the opportunity of getting a formal education as they are left in the street fending for themselves.[3] The Almajiri system has refused to be incorporated into the normal educational program even when researchers have advocated for such.[4] They have become a threat to themselves and the society because they do not have access to good health care and they are constantly at risk of been raped, kidnapped or recruited by terrorist organisation like Boko Haram.[5, 6]

Parental care, educational influence and socioeconomic factors affect the ability to maintain general health care[7]. Although Almajiris can hardly be classified as internally displaced individuals as they fall short of the criteria of internally displaced individuals as defined by the United Nations Guiding Principles[8], they however suffer the same harsh living conditions like the internally displaced persons and refugees.[9] A study conducted among Ugandan internally displaced persons revealed a high level of deprivation of basic goods and services with the persons suffering from traumatic psychological experiences like rape.[10]

Malocclusion is considered a handicapping dentofacial anomaly, which causes disfigurement, disturbs function and would require treatment[11]. DaCosta was the first to evaluate prevalence of malocclusion traits among regular Northern Nigeria school children[12]. Although the author[11] reported that the prevalence of malocclusion traits was similar to observations made in other regions of the country and other black nations but did not ascertain the orthodontic treatment need of the out of school children and Almajiris. A similar study was conducted among a different population of regular Northern Nigerian school children and a significant number (14.5%) had severe handicapping malocclusion that would require mandatory treatment[13]. It is important to note that these studies[12, 13] were carried out among regular Northern school children who ordinary should be able to access the health care facility. Studies on the malocclusion status and orthodontic treatment need among Almajiris appear scarce. Every child deserves a right to quality health care.

The oral health of the Almajiris have also not gotten the attention it deserves[14]. Poor oral hygiene has been reported among a significant percentage (49.5%) of Almajiris[14]. In a follow-up comparative study conducted by the same author, the oral hygiene scores were 4.42 and 1.90 for Almajiris and regular school children respectively[15]. The high score recorded among the Almajiris was attributed to their poor oral hygiene practices and inability to access health care[15], which re-emphasis the level of poor attention given to the Almajiri children.

This present study was conducted to determine the malocclusion status and orthodontic treatment need of a group of Almajiris using the Dental Aesthetic Index, DAI[16] while Simplified Oral Hygiene Index, (SOHI) was used to evaluate their oral hygiene status[17]. The effect of malocclusion severity on the oral hygiene status was also assessed. This present study will serve as a pilot survey that will help draw the attention of clinicians and relevant agencies to this group of individuals.

MATERIALS AND METHODS

Ethical consideration

Ethical approval (FMC/KF/HREC/2570/21) was obtained from the Ethics and Research Committee of the institution of Federal Medical Centre, Keffi. Nigeria.

Study population

The study participants were made up of 42 Almajiris all males. The dentition status was used to classify their developmental status because neither the participants nor their guardian could give their accurate date of birth. Participants were majorly at the permanent dentition stage.

Study participants recruitment

The study participants were made up of forty-two (42) male Almajiris teenagers recruited from the Almajiri School. Convenience sampling method was used to recruit the study. An interpreter was translated the information from English language to

Hausa for effective communication. Informed consent was obtained from the guardian (Mallams) while verbal assent was obtained from the children themselves.

Assessment tools

A single investigator carried out the Dental Aesthetic Index (DAI) evaluation and the Simplified Oral Hygiene Index score for the participants. Five individuals had initially been randomly selected for the assessment of DIA and OHI-S by the investigator. Two sessions of assessment were conducted to ascertain intra-examiner reliability using the kappa scale with 0.95 and 0.87 for DAI and OHI-S respectively.

The malocclusion severity and treatment need were determined based on the DAI score as minor/normal (<25), definitive (26-30), severe (31-35) and very severe malocclusion (>36), while the OHI-S was graded as good (0.1-1.2), fair (1.3-3.0) and poor (3.1-6.0) [16, 17].

Data analysis

IBM® SPSS version 22 was used to analyse the data. The average means of the numerical variables (DAI and SOHI) were obtained from the descriptive analysis. Linear regression was used to determine the effect of DAI on the OHI-S. Pearson's correlation (r) was then used to determine the level of association between DAI and the oral hygiene scores. The level of statistical significance for the study was set at <0.05.

RESULTS

Crowding and spacing in one or more segments were recorded in 52.4% and 47.6% respectively. Increased overjet (>3mm) had the highest presentation with about 85.7% frequency of occurrence while missing teeth and anterior cross bite had the least presentation with 4% each as shown in Figure 1.

Table 1 also shows that 50% of the Almajiris had poor oral hygiene status while only 14.3% had good oral hygiene. Majority of the Almajiris (50%) had minor malocclusion that required no orthodontic treatment while orthodontic treatment was highly desirable and mandatory in 14.3% in each category, see table 2. This result showed that the malocclusion status (DAI) poorly explained the variations in the oral hygiene status among the Almajiris (r^2=0.04, p=0.207), as shown in table 3. Figure 2 shows poor Pearson's correlation coefficient (r=0.199), p=0.207) between the DAI and the OHI-S scores among the Almajiris.

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Table 1: Socio-demographic data of the subjects

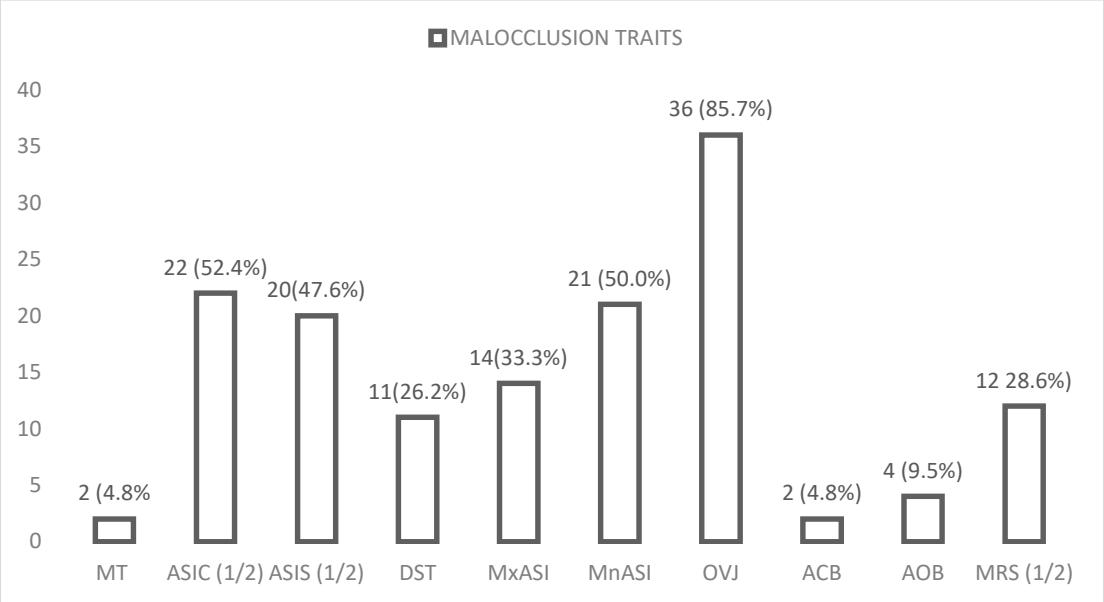


Figure 1: Percentage distribution of malocclusion traits according to Dental Aesthetic Index (DAI).

Key: MT (Missing permanent teeth (incisors, canine, premolars); ASIC 1/2 (Anterior incisor segment crowding, grade 1 and 2), ; ASIS 1/2 (Anterior incisor segment crowding, grade 1 and 2); DST (Diastema); MxASI (Maxillary anterior segment irregularity, mm); MnASI (Maxillary anterior segment irregularity, mm); OVJ (overjet, maxillary anterior overjet); ACB (Anterior crossbite or anterior mandibular overjet), AOB (vertical anterior open bite), MRS grade1/2(sagittal moral relationship, grade 1 and 2).

Table 1: Descriptive analysis of the OHI-S with mean values

OHI-S	n (%)	Mean	SD	SEM	Min	Max	95% Confidence interval for mean	
							Lower	Upper
Good	6 (14.3)	0.997	0.261	0.107	0.49	1.17	0.788	1.136
Fair	15 (35.7)	2.221	0.518	0.134	1.33	3.00	1.950	2.477
Poor	21 (50.0)	3.699	0.566	0.124	3.00	5.00	3.942	3.942
Total	42(100.0)	2.785	1.126	0.174	0.49	5.00	2.475	3.107

Table 2: Descriptive analysis of the DAI with mean values.

DAI	N (%)	Mean	SD	SEM	Min	Max	95% Confidence interval for mean	
							Lower	Upper
Minor	21 (50.0)	20.548	3.232	0.705	14.00	25.00	19.193	21.833
Definitive	9 (21.4)	27.889	1.900	0.633	26.00	30.00	26.667	29.166
Severe	6 (14.3)	33.500	1.537	0.619	31.00	35.00	32.199	34.668
Very severe	6 (14.3)	44.500	9.006	3.677	37.00	62.00	39.250	52.250
Total	42 (100.0)	27.393	9.397	1.450	14.00	62.00	24.848	30.403

Table 3: Linear regression model to determine the effect of malocclusion (DAI) on oral hygiene (OHI-S).

Variables	R	R^2	B Coefficient	Adjusted R^2	P value
DAI/OHI-S	0.199	0.04	0.199	0.016	0.207

P value > 0.05.

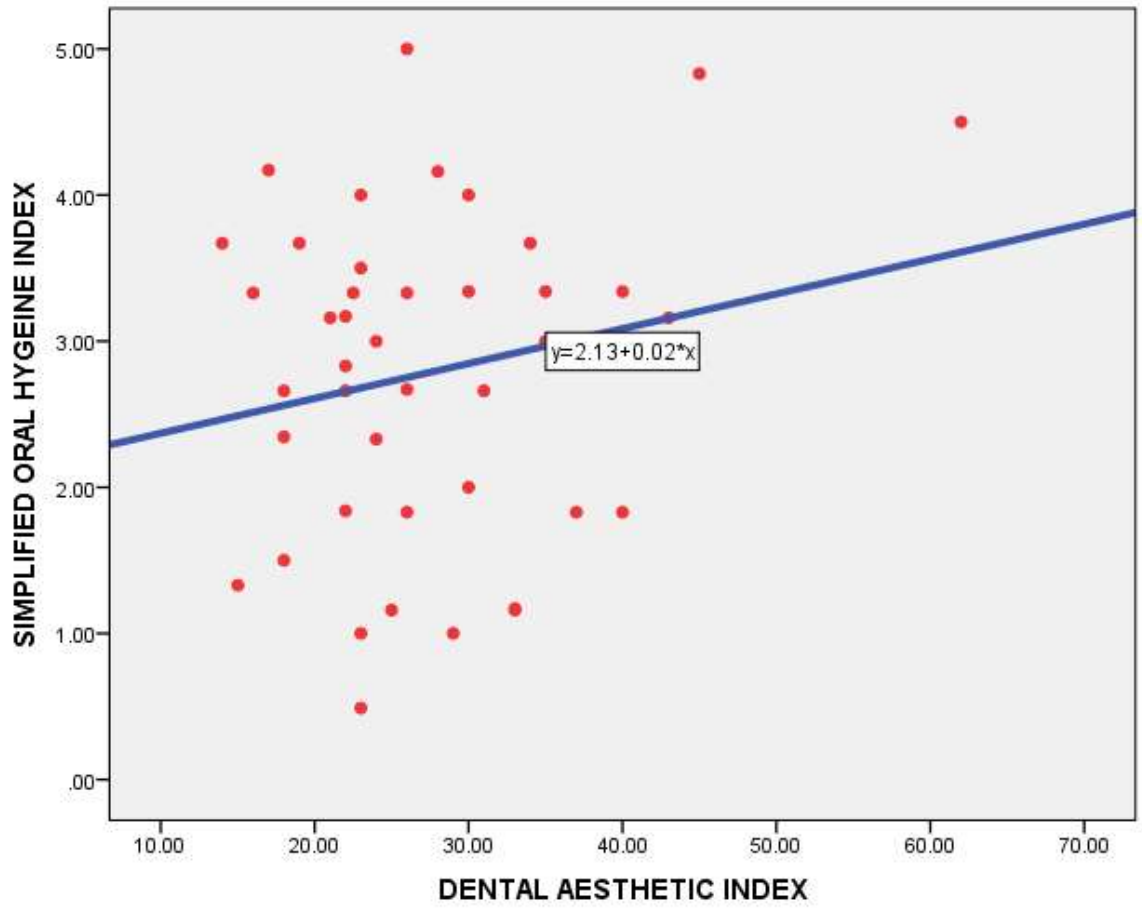


Figure 2: Pearson's correlation between DAI and OHI-S among Almajiris.

DISCUSSION

Researches on the malocclusion status, orthodontic treatment[12,13,18-20] and oral health status[14,21,22] have majorly been conducted among regular Northern Nigeria school children. No previous studies have documented the prevalence, severity of malocclusion and treatment need among Almajiris. Findings from this present study therefore provide a base for Almajiris. The use of Dental aesthetic index among Africans have been validated in a previous study without modification.[23]

In this present study, overjet greater than 3mm accounted for majority (85.7%) of the malocclusion traits among the participants. This is comparable to the findings reported in a study conducted among regular Northern Nigerian school children[13]. Increased overjet was not categorically classified as increased when it is greater than 3mm in a previous study[12]. The study however showed that 70.8% of the participants had overjet between 2-4mm while 8.3% had overjet greater than 5mm.[12] The difference in the frequency of occurrence of increased overjet as reported by the author[12] when compared with what was observed in this present study could be attributed to the difference in the grading of increased overjet. The frequency of increased overjet appears lower among children from South-West (14.1%) and South-South 24.7% Nigeria.[18,19] Bimaxillary proclination is an important factor to consider in the presentation of overjet. Bimaxillary proclination tend to occur less among a certain population of Northern Nigerian children[12] which favours a more presentation of increased overjet as observed in this present study. This is in contrast to the high frequency of bimaxillary proclination in South-West Nigeria[24] favouring normal overjet. This confirms ethnic variation in malocclusion traits as observed in a precious study[25]. This present study also recorded a high percentage of anterior segment crowding which corroborates the observations made by daCosta[12]. Missing teeth (4.8%) and reverse overjet (4.8%) were the least occurring occlusal

traits, which is comparable with findings made by other authors[13,17,18]. Anterior segment spacing (44.2%) has been recorded as most occurring among a different population of South –West Nigerian[26].

Fifty percent (50%) of participants in this present study had minor malocclusion that didn't require orthodontic treatment while 77.4%, 67% and 68.5% respectively were reported by different authors to have minor malocclusion[13,26,27]. Severe and very severe malocclusion with treatments highly desirable and mandatory respectively were present in a total 28.6% among study participants in this current study. Disa et al.[13] observed that 14.3% out of the 339 participants among a certain population of regular Northern Nigerian children had highly desirable and mandatory orthodontic treatment need. Considering the size of the participants (42) recruited for this present pilot study and that conducted by previous authors[13,26], it shows that orthodontic treatment need among Almajiris is a source of concern. This is because a significant number of Almajiris require one form of orthodontic treatment or the other despite the reduced number of participants available for this present study. The total percentage (50%) of Almajiris that required orthodontic treatment (elective, definitive and mandatory) observed in this current study can be said to be comparable to the 48.1% observed among 347 Ethiopian children using the index of orthodontic treatment need[28].

Studies on the oral hygiene of Almajiris have also been rarely reported. Before the study conducted among 12–14-years-old Almajiris by Idowu and colleagues, the authors observed that no previous study on the oral health of Almajiris was ever documented[14]. This present study showed that a large population of Almajiris had a high level of poor oral hygiene (50%) which corroborates observations made in a previous study[14]. The duo of Almajiris and orphans have one thing in common, inadequate access to good oral health care facility. This would make it impossible for them to have preventive dental care. The percentage of poor oral hygiene (50%) in this present study is relatively higher than the oral hygiene status of regular school children in different studies conducted in various regions of Nigeria; 6.6% in South West and 1.7% in South East.[21,29] Poor oral health practices, lack of Western education coupled with the poor socio-economic status may have persistently contributed to the poor oral hygiene observed among the Almajiris[14,15]. Although, this preset study did not evaluate the oral hygiene practices among the Almajiris, this could have contributed to the poor oral hygiene status observed among the participants[14].

This present study shows that malocclusion severity had no statistically significant effect on the oral hygiene status of the Almajiris. A poor correlation between the malocclusion severity and the oral hygiene status of the Almajiris was observed in this present study. This observation is comparable with the findings made by another author who reported that the DAI score had no significant difference ($p = 0.349$) on the mean value of the oral hygiene status among 6-12 years old regular household children in Nigeria[30]. It was observed that despite the presence of several untreated malocclusion traits, participants in a study conducted among urban children in South-South, Nigeria had good oral hygiene, which was attributed to the good oral hygiene practices[31]. Findings from this present study further establish the disparity and inequality in oral health status of the Almajiris.

The finding of this study is limited by the fact that gender difference could not be determined because female children are statutory not part of the Almajiri Islamic schooling system and that the Almajiris who participated could not exactly state their dates of birth. That made it difficult to state the chronological age of the study participants. This was expected as most of the Almajiri are obviously not with their parents and their guardians (mallams) usually don't have records of their date of birth.

CONCLUSION

This current study on the malocclusion status and oral hygiene status among Almajiris showed that 50% of Almajiris require one level of orthodontic treatment or the other (elective 21.4%; definite 14.3%; and mandatory orthodontic treatment 14.3%). Secondly, 50% of Almajiris had poor oral hygiene with a mean value of 3.70 ± 0.57.

The level of malocclusion severity among the Almajiris has no statistically significant impact ($r^2 = 0.04$, $p=0.207$) on their oral hygiene status. Also, a poor correlation ($r=0.199$, $p=0.207$) was observed between the level of malocclusion severity and the oral hygiene status Almajiris.

RECOMMENDATION

I. A large scale study will be worthwhile to further determine validity of the observations made in this present study.

II. While the international community and the previous government of Nigeria may have shown interest in the Almajiri educational system, this present study has revealed that a lot is yet to be done with regards to the dental health of this individuals.

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Conflict of Interest-

None declared

REFERENCES

1. Geoffrey Njoku, Communication specialist, UNICEF, Nigeria. September, 2020.
2. Mobolaji, JW, Fatusi AO, Adedini.SA. Ethnicity, religious affiliation and girl-child marriage: a cross-sectional study of nationally representative sample of female adolescents in Nigeria. BMC Public Health 2020; 20:583-582.
3. Sarkingobir Y, Sahabi M, Saadu A, Bello MM, Bakwai MS. Assessment of Food Insecurity among Almajiri in Sokoto Metropolis and Selected Environs (Gwadabawa and Kware), Sokoto State, Nigeria. J. Appl. Sci. Environ. Manage. 2019; 23 (9):1625-1629.
4. Shittu AB, Olaofe MA. Situations of The Al-Majiri system of education in contemporary nigeria: matters arising. Ilorin J Religious Stud 2015; 5(2):37-46 37.
5. Aghedo, I; Eke, J.S. (2013). From alms to arms: the Almajiri phenomenon and internal security in northern Nigeria. Korean J. Policy Stud 2013; 28 (3):97-123.
6. Agbo, CM. The health and educational consequences of child labour in Nigeria. Health. Sci J 2017; 11(1): 1-9.
7. Poutanen R, Lahti S, Tolvanen M, Hausen H. Parental influence on children's oral health-related behavior. Acta Odontol Scand. 2006; 64(5):286-292.
8. Guiding Principles on Internal Displacement. United Nation, 1998.
9. Umeizudike KA, Dedeke AA, Nzomiwu CL, Ekowmenhenhen UI. Oral health status and treatment needs of internally displaced persons. Sahel Med J 2019; 22:207-213.
10. Roberts B, Ocaka, KF, Browne J, Oyok T, Sondorp, E. Factors associated with the health status of internally displaced persons in northern Uganda. J Epidemiol Community Health 2009; 63(3), 227-232
11. World Health Organization. Standardization of reporting dental diseases and conditions. The assessment of handicapping dentofacial anomalies. Technical report series. 1962; 242.
12. daCosta OO. The prevalence of malocclusion among a population of northern Nigerian school-children. West Afr J Med. 1999; 18:91-96.
13. Disa HA, Modu MA, Sukai SS, Ligali TO, Otuyemi OD. malocclusion and orthodontic treatment needs of public and private secondary school students in North-Eastern Nigeria using the Dental Aesthetic Index (DAI). West Afr J Orthod; 2012; 1(2):35-39
14. Idowu EA, Afolabi AO, Nwhator SO. Oral health knowledge and practice of 12 to 14-year-old Almajaris in Nigeria: A problem of definition and a call to action. J Public Health Policy. 2016; 37(2):226-43.
15. Idowu EA, Nwhator SO, Afolabi AO. Nigeria's street children, epitome of oral health disparity and inequality. Pan Afr Med J 2020; 36(77). 0.11604/pamj.2020.36.77.20404
16. Cons NC, Jenny J, Kohout FJ. DAI: The dental aesthetic index College of Dentistry. Iowa City, IA: University of Iowa; 1986.
17. Green JC, Vermillion RC. Simplified Oral hygiene Index. J Am Dent Assoc 1964; 68:25-31
18. Onyeaso CO. Prevalence of Malocclusion among adolescents in Ibadan, Nigeria. Am J Orthod Dentofacial Orthop 2004; 126(5):604-607
19. Ajayi EO. Prevalence of malocclusion among school children in Benin City, Nigeria. J Biomed Sci 2008; 7(2):58-65.
20. Alkins EA, Onyeaso CO. Prevalence if malocclusion and occlusal traits among adolescents and young adults in River state, Nigeria. Odontostomatol Trop 2014; 37(145):5-12.
21. Osadolor OO, Iwuoha CE. Oral Hygiene Status of Primary School Children. Int J Dent Res 2019; 4(3): 104-107.
22. Folayan MO, Tantawi ME, Oginni O, Oziegbe E, Mapayi B, Arowolo O, et al. Oral health practices and oral hygiene status as indicators of suicidal

ideation among adolescents in Southwest Nigeria. PLoS ONE 16(2): (2021). e0247073.
23. Otuyemi, OD, Oguyinka A, Dosumu O, *et al.* Perceptions of dental aesthetics in the United States and Nigeria. Community Dent Oral Epidemiol 1998 26:418-420.
24. Isiekwe M. C. Distribution of overjet values in Negro population in Nigeria. Comm Dent Health 1986; 3:61-64.
25. Alhammadi MS, Halboub E, Fayed MS, Labib A, El-Saaidi C. Global distribution of malocclusion traits: A systematic review. Dental Press J Orthod 2018; 23(6):40.e1-10
26. Otuyemi OD, Ogunyinka A, Dosumu O, Cons NC, Jenny J. Malocclusion and orthodontic treatment need of secondary school students in Nigeria according to the dental aesthetic index (DAI). Int Dent J 1999; 49:203-210.
27. Etim SS, Aikins EA, and Onyeaso CO. Normative Orthodontic Treatment Need of Nigerian Adolescents – A Comparative Study of Three Major Ethnic Groups. J Advanc Med Med Res 2020; 32(3):78-87.
28. Tolessa M, Singel AT, Merga H. Epidemiology of orthodontic treatment need in southwestern Ethiopian children: a cross sectional study using the index of orthodontic treatment need. BMC Oral Health 2020; 20:210-215.
29. Ogunsile SE, Ojo L. Oral hygiene status of adolescents in a Local Government Area of Oyo State Nigeria. J Sci Tech 2010; 30(3): 81-86
30. Kolawole KA, Folayan MO. Association between malocclusion, caries and oral hygiene in children 6 to 12 years old resident in suburban Nigeria. BMC Oral Health 2019; 19:262-271
31. Aikins EA, Soroye MO. Untreated malocclusions and oral health status of an urban population in South-South Nigeria. Nig J Dent Res 2021; 6(2):177-183