



# Oral Disease Burden amongst Residents of an Internally Displaced Persons Camp in Nigeria

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## ABSTRACT

**Objective:** To assess the prevalence of oral diseases and conditions amongst residents of an isolated camp that caters for internally displaced persons to define their oral health need in order to facilitate surveillance and planning of interventional programmes.

**Methods:** A cross-sectional study carried out among randomly selected residents of a camp at Uhogua village forest reserve, Edo State, Nigeria. Socio-demographic data was obtained using an interviewer-administered questionnaire. Oral examination was carried out under natural illumination using mouth mirror, wooden spatula and blunt dental explorer. Oral hygiene was graded using Simplified Oral Hygiene Index. Diagnoses of caries and periodontal disease were according to the World Health Organization criteria. Clinical diagnosis of oral lesions/conditions was by visual inspection. IBM SPSS version 25.0 was used for descriptive and inferential analysis at 95% confidence interval with p set at < 0.05 significance.

**Results:** The mean age of the 437 study participants was 15.81 ± 8.42 with a range of 4 - 71 years. Males (43.0%), females (57.0%) and participants with primary education (78.7%). Only 3.4% of the study participants had good oral hygiene and 11.9% of the group had periodontal pockets. Dental caries prevalence was 19.7%. The DMFT/dmft index value was 0.33/0.13 with PUFA/pufa score of 0.06/0.02. However, 35.0% of permanent teeth and 79.0% of deciduous teeth had evidence of dento-oral infection and ulceration. The prevalence of oral ulcers (1.8%), leukoplakia (2.1%), erythroplakia (0.5%), oral candidiasis (5.3%), cleft palate (0.2%) and traumatic dental injury (4.3%) were noted. Lower educational attainment was associated with presence of periodontal pockets (p=0.029) and dental caries (p=0.004).

**Conclusion:** Poor oral hygiene was prevalent in this group. Although the prevalence of oral diseases and conditions were low in comparison with previous local studies, many of the carious lesions had signs of dento-oral infections. Improved access to education with a significant oral health education content and preventive oral health services are recommended strategies in reducing the oral health challenges of this group.

**Key words:** Oral diseases and conditions, internally displaced persons.

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## INTRODUCTION

Oral diseases are usually progressive without intervention, causing an adverse impact on the quality of life through impairment of oral functions like chewing, speech and smiling.<sup>1</sup> In acknowledgement of this and its common

manifestation in human population,<sup>2</sup> several oral diseases such as dental caries, periodontal disease, oral mucosal lesions, oro-pharyngeal cancers and dental trauma pose a major public health problem worldwide.<sup>3</sup> Dental caries affects over two-thirds of school-aged children globally.<sup>4</sup> However, dental

caries experience in children using the Decayed Missing and Filled Teeth index (DMFT) is relatively high in the Americas (DMFT=3.0) and in the European region (DMFT=2.6) whereas its value is lower in most African countries (DMFT = 1.7).<sup>2,3</sup>

Untreated dental caries can cause pain, swelling and facial infections, which can lead to respiratory distress, shock or even death.<sup>5</sup> A useful index that captures the consequences of untreated dental caries is the PUFA/pufa index. This index stands for **P**ulpal involvement; **U**lceration from injury by sharp tooth edges; **F**istula from a pus discharging sinus tract associated with a carious tooth and **A**bscess containing swelling related to a tooth with pulpal involvement.<sup>6</sup> The PUFA index gives an idea about that proportion of carious teeth that has progressed to dento-oral infections and ulceration in a population.<sup>6</sup> This index is an indirect marker for uptake or availability of oral health services.<sup>6</sup> Periodontal pocket is a clinical marker of periodontal disease severity.<sup>7</sup> Dental caries and periodontal disease, whose common risk factor is poor oral hygiene,<sup>8</sup> affect the vast majority of adults and are the major cause of tooth loss globally.<sup>2</sup>

Traumatic Dental Injury (TDI) and facial clefts can affect speech, facial aesthetics and self-esteem.<sup>2,9</sup> Leukoplakia and candidiasis as oral lesions are potential markers of early malignant lesions and compromised immunity respectively.<sup>10</sup> They appear as a white patch typically in the oral mucosa, lateral borders of the tongue and floor of the mouth.<sup>10</sup> However, the white patch associated with leukoplakia cannot be scrapped off from the oral mucosa.<sup>10,11</sup> Erythroplakia share similar characteristics with leukoplakia but appear as a red patch.<sup>11</sup>

Chidzonga et al.<sup>12</sup> noted that occurrence of oral diseases is affected by poverty and poor oral health service delivery systems aside biomedical factors and demographic factors like age and education in Africa. Poverty creates stressful living conditions for individuals as they struggle to satisfy needs with severely limited resources.<sup>13</sup> This can lead to inability to acquire appropriate oral hygiene products and tools.<sup>12</sup> A possible consequence of this inability may be adoption of suboptimal oral hygiene practices.<sup>12</sup> Furthermore, poverty increases the risk of poor dietary choices and weakened immunity impairing oral and general health.<sup>12,13</sup> Low educational attainment is positively correlated with poor oral health awareness.<sup>14</sup> Poverty and low educational attainment are more likely to predispose individuals to oral health-compromising behaviours like poor uptake of preventive oral health care.<sup>12,14</sup> A consequence of poor oral health

service delivery systems is restricted access to oral health care especially preventive oral health care.<sup>12</sup> Hence, populations characterized by poverty and poor oral health service delivery systems are vulnerable to suboptimal oral health.<sup>12,14</sup>

Persons affected by conflicts or human right violations may suffer displacements from their place of residence, thereby becoming displaced.<sup>15</sup> Persons who are displaced within the borders of a state are referred to as internally displaced persons (IDP).<sup>15</sup> Nigeria has witnessed conflicts in form of insurgencies, herdsman-farmers clashes in recent times especially in the Northern part of the country.<sup>16</sup> This has resulted in a rapid swell of the population of IDP with a count of over 2.5 million people living in nearly 298 IDP camps in Nigeria.<sup>17</sup> These camps are often isolated from their host communities with a near absence of basic amenities, oral health services and gainful employment for its residents.<sup>16</sup> Consequently, the IDP in these camps are vulnerable to oral diseases.<sup>12,14,16</sup>

Despite the vulnerability of the IDP to suboptimal oral health, little information exists in literature about their oral health status.<sup>16</sup> Acquisition of such information will help to define their oral health, establish a baseline data for surveillance and planning of interventional programs to promote oral health for this vulnerable group. This study therefore was aimed at assessing the prevalence of oral diseases and conditions amongst residents of an isolated camp in Edo State that caters for internally displaced persons (IDP) to define their oral health as well as facilitate the establishment of a baseline data for oral health program planning and surveillance.

## MATERIAL AND METHODS

The study was conducted in the IDP camp, Uhogua village forest reserve. Uhogua is located in Ovia North East Local Government (6° 43' 11" N and 5° 57' 10" E) of Edo State, Southern Nigeria from October, 2019 - January, 2020. It is about 30 Kilometres from Benin-City, Edo State capital. The camp was opened in 2014 to cater for internally displaced persons and is managed by a non-governmental organisation. The camp has four dormitories with separate housing for staff. It has a population of 1,922 residents. The camp has a small clinic manned by a nurse including a small primary and secondary school.

The study was descriptive and cross-sectional in design. The minimum sample size (n) of 331 was derived from the population size (N) of the IDP camp using the Yamane formular,<sup>18</sup>  $n = N / [1 + N(e)^2]$  where e (the acceptable sampling error at 95% confidence interval) is 0.05. The sample

population was recruited by simple random sampling through balloting from the IDP camp's register which contained information of each camp resident's name, gender, age and state of origin. Information on socio-demographic characteristics of age, gender, place of residence before displacement and level of acquired education was obtained from each participant, parent or guardian using interviewer-administered structured questionnaires. Thereafter, oral examination was carried out inside the cubicle (to ensure privacy) on the camp clinic's grounds by the examiner in the presence of a chaperone under natural light.

Oral examination was carried out by two calibrated examiners with inter-examiner reliability of 0.86. Oral hygiene was graded using Simplified Oral Hygiene Index.<sup>19</sup> Diagnosis of oral diseases/conditions was done according to the World Health Organization (WHO) oral health survey criteria.<sup>20</sup> For diagnosis of caries, this involved recognition of a frank cavity using the visual method or a blunt dental explorer. Caries experience and its untreated consequences were recorded using the DMFT and PUFA index. The dmft/pufa index is used to record caries experience and its untreated consequences in deciduous teeth. The WHO probe was used to gauge gingiva sulcus depth using the 'walking' technique with a force sufficient to blanch the finger nail bed in study participants  $\geq 15$  years. Gingiva sulcus depth  $> 3.5$ mm were classified as periodontal pockets. Diagnosis of oral candidiasis is by visualisation of creamy white deposits on the tongue and oral mucosa whose removal reveals an erythematous base. The diagnosis of other oral lesions/conditions was by visual inspection and a collaboratory history where appropriate.

Ethical approval for the study was obtained from the University of Medical Sciences Ethical Review Committee. Informed consent was obtained from the camp coordinator. Verbal consent was obtained from adult study participants, parents or guardians where appropriate. Assent was obtained from all study participants  $\leq 16$  years. Prior visits to the camp were carried out to conduct a pilot study of 45 participants (who were not incorporated in the study). Observations from the pilot study led to setting up cubicles in the camp clinic's grounds to utilize daylight as well as ensure privacy on oral examination. This was due to the poor illumination inside the camp clinic as there was no electricity supply.

IBM SPSS version 25.0 was used for descriptive and inferential statistical analysis. The age of study participants was regrouped into 0-14 years as children, 15-34 years as young adults, 35-44 years

as middle aged adults and  $\geq 45$  years as elderly for ease of statistical analysis. Chi-square test, Fishers Exact and multinomial logistic regression were used to test for relationships at 95% confidence interval with level of significance ( $p$ ) set at  $< 0.05$ .

## RESULTS

The mean age of the 437 study participants was  $15.81 \pm 8.42$ . The age ranged from 4-71 years. Children (0-14 years) formed 54.7% of the sample. Males (43.0%) were lower than females (57.0%). Over 75% of the participants had primary education only. In addition, 83.8% of the study participants were from Northern Nigeria. The socio-demographic characteristics of the study participants are shown in Table 1.

Concerning oral hygiene, 3.4%, 47.8% and 48.7% of the study participants had good, fair and poor oral hygiene respectively. Periodontal pockets were recorded in 13.1% of the 198 study participants examined. Dental caries prevalence was 19.7%. The Decayed, Missing and Filled Teeth (DMFT)/decayed, missing and filled teeth (dmft) index value was 0.33/0.13. No tooth was missing or filled on account of caries. The PUFA/pufa score was 0.06/0.02. However, 35.0% of permanent teeth and 79.0% of deciduous teeth had evidence of dento-oral infection and ulceration. Other prevalence includes oral ulcers (1.8%), leukoplakia (2.1%), erythroplakia (0.5%) and oral candidiasis (5.3%), cleft palate (0.2%) and TDI (4.3%). The anterior tooth fracture and tooth discolouration were the types of TDI observed. The anterior tooth fracture and tooth discolouration contribution to TDI were 36.8% and 63.2% respectively.

The prevalence of some oral diseases/conditions with age group is shown in table 2. About 60.0% of the study participants with poor oral hygiene were in the 0-14 years age group while 80.8% of the periodontal pockets were found in the age group of 15-44 years. Also, 54.7% of the participants with caries were in the 0-14 years age group. The association between age group and presence of caries was significant ( $p = 0.031$ ).

Only one study participant among those who did not obtain any formal education had good oral hygiene. Also, 38.5% and 70.9% of those who had periodontal pockets and caries respectively reported having primary education as their highest level of attainment (Table 3). The association between the two oral diseases and educational attainment was significant ( $p < 0.05$ ).

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Table 1: Sociodemographic characteristics of the study participants

Characteristics	n	%
<b>Age group</b>		
Children (0-14 years)	239	54.7
Young adults (15-34 years)	171	39.1
Middle-aged adults (35-44 years)	18	4.1
Elderly ( $\geq 45$ years)	9	2.1
<b>Gender</b>		
Male	188	43.0
Female	249	57.0
<b>Educational level</b>		
No formal education	17	3.9
Primary education	344	78.7
Secondary education	57	13.0
Tertiary education	19	4.3
<b>Region</b>		
Northern Nigeria	366	83.8
Southern Nigeria	71	16.2
Total	437	100.0

Table 2: Prevalence of oral diseases/conditions with age group

OD/C	Age group (years)					X <sup>2</sup>	P-value
	0-14 n (%)	15-34 n (%)	35-44 n (%)	$\geq 45$ n (%)	Total n (%)		
<b>Oral hygiene</b>							
Poor	124 (58.2)	78 (36.6)	8 (3.8)	3 (1.4)	213 (48.7)	5.871	0.384
Fair	110 (52.6)	84 (40.2)	9 (4.3)	6 (2.9)	209 (47.8)		
Good	5 (33.3)	9 (60.0)	1 (6.7)	0 (0.0)	15 (3.4)		
Total	239 (54.7)	171 (39.1)	18 (4.1)	9 (2.1)	437 (100.0)		
<b>Periodontal pockets</b>							
Present	-	21 (80.8)	4 (15.4)	1 (3.8)	26 (13.1)	1.682	0.340
Absent	-	150 (87.2)	14 (8.1)	8 (4.7)	172 (86.9)		
Total		171 (86.4)	18 (9.1)	9 (4.5)	198 (100.0)		
<b>Dental caries</b>							
Present	47 (54.7)	28 (32.6)	7 (8.1)	4 (4.7)	86 (19.7)	8.876	0.031
Absent	192 (54.7)	143 (40.7)	11 (3.1)	5 (1.4)	351 (80.3)		
Total	239 (54.7)	171 (39.1)	18 (4.1)	9 (2.1)	437 (100.0)		

OD/C = Oral diseases/ conditions

### DISCUSSION

There is a need to give attention to groups displaced by conflicts as their living conditions and quality of life are affected negatively.<sup>15,16,22</sup> Oral health contribution to general health and quality of life cannot be over-emphasised.<sup>22</sup> Hence, promotion of oral health in this group is highly advantageous in improving their quality of life.<sup>16,22</sup> Majority of the study participants were from the northern part of Nigeria. This is not surprising as the northern part of the country has higher reported cases of conflicts.<sup>16,23</sup> Children and females also constituted the bulk of the sample. Akseer et al.<sup>24</sup> opined that during conflicts, women and children were more likely to be displaced from their homes as men were major actors in conflicts as combatants and more likely to be killed.

Very few study participants (3.4%) had good oral hygiene. In addition, over three-quarter of participants with poor oral hygiene were children. This calls for concern considering the prime role of plaque and calculus in the aetiology of the two most common oral diseases; dental caries and periodontal disease.<sup>8</sup> Children are vulnerable to dental caries.<sup>4</sup> Also poor periodontal health which is more common in adults, is mainly the result of cumulative effect of poor oral hygiene through the promotion of inflammation, action of microbial toxins in dental plaque and immune response on the periodontium from earlier years of life.<sup>25</sup> Oral health programs designed to improve oral hygiene with special attention to children can be helpful to reduce the group risk to dental caries and periodontal disease. There was no significant

association between poor oral hygiene and educational level of the study participants. This is not consistent with prior studies which reported improved oral hygiene with increase in educational level.<sup>26,27</sup> Reason for this finding may be the

neglect of oral hygiene practice teaching in the formal education participants were exposed to<sup>8</sup> However, this study did not evaluate the scale of oral health education in the formal education obtained by the participants.

Table 3: Prevalence of oral diseases/conditions with educational level

OD/C	Educational level					X <sup>2</sup>	P
	NFE n (%)	PE n (%)	SE n (%)	TE n (%)	Total n (%)		
<b>Oral hygiene</b>							
Poor	9 (4.2)	171 (80.3)	24 (11.3)	9 (4.2)	213 (48.7)	11.219	0.088
Fair	7 (3.3)	164 (78.5)	31 (14.8)	7 (3.3)	209 (47.8)		
Good	1 (6.7)	9 (60.0)	2 (13.3)	3 (20.0)	15 (3.4)		
Total	17 (3.9)	344 (78.7)	57 (13.0)	19 (4.3)	437 (100.0)		
<b>Periodontal pockets</b>							
Present	2 (7.7)	10 (38.5)	12 (46.2)	2 (7.7)	26 (13.1)	9.002	0.029
Absent	10 (5.8)	110 (64.0)	35 (20.3)	17 (9.9)	172 (86.9)		
Total	12 (6.1)	120 (60.6)	47 (23.7)	19 (9.6)	198 (100.0)		
<b>Dental caries</b>							
Present	9 (10.5)	61 (70.9)	11 (12.8)	5 (5.8)	86 (19.7)	13.258	0.004
Absent	8 (2.3)	283 (80.6)	46 (13.1)	14 (4.0)	351 (80.3)		
Total	17 (3.9)	344 (78.7)	57 (13.0)	19 (4.3)	437 (100.0)		

OD/C = Oral diseases/ conditions, No formal education, PE= Primary education, SE= Secondary education, TE=Tertiary education

The prevalence of oral ulcers, leukoplakia, oral candidiasis, cleft palate and TDI were below 6%. The prevalence of these oral diseases and conditions were below reported values in previous studies in Nigeria.<sup>9,28,29</sup> A probable reason for this observation may be the difference in study design. The referenced studies were clinic-based and among groups with higher risks to these oral diseases and conditions than the general population. This may be contributory to the relative lower prevalence observed in this study.

The prevalence of periodontal pockets was slightly below the reported Nigerian range of 15-58%.<sup>30</sup> This may be as a result of the reduction in sample size as a proportion in the study sample who were excluded from periodontal examination because they were children. As reported in previous studies,<sup>31,32</sup> the presence of periodontal pockets had a positive relationship to the level of educational attainment in this study. Participants with higher level of educational attainment had better periodontal health. Alwaeli and Al-Jundi<sup>31</sup> attributed this finding to higher level of periodontal health awareness as an individual educational attainment rises. However, it should be noted that poor oral hygiene is dominant in this group regardless of the level of education. Periodontal pockets are indirect marker for periodontal health care over the years.<sup>25,33</sup> Higher education

attainment is positively associated with better standards of living, oral health behaviour and access to preventive oral health care.<sup>12</sup> The IDP with higher levels of educational attainment loses this advantage on living in IDP camps because of grossly insufficient gainful employment, poor availability of basic amenities and oral health services.<sup>12,13,15</sup> Hence, this group of IDP have less coping mechanisms in activities of daily living and poor access to preventive oral health services.<sup>12,13,16</sup> This can induce IDP with higher levels of educational attainment to engage in irregular oral hygiene practices.<sup>12,13,16</sup> This may explain the poor oral hygiene common in all levels of educational attainment but with better periodontal health in participants with higher levels of educational attainment. However, persistence of poor oral hygiene in this subgroup will most likely result to poor periodontal health in the long run.<sup>12,26</sup>

The dental caries prevalence falls within reported prevalence range of 4-40% in Nigeria.<sup>30</sup> In the same vein, the DMFT/dmft and PUFA/pufa scores were in concord with reported local values.<sup>30,34</sup> However, the proportion of carious deciduous teeth associated with dento-oral infections and ulceration was very high in comparison with a local study which reported a value of 28.2%.<sup>34</sup> This may be a reflection of the poor access to oral health services in this group. In addition, the presence of

odontogenic infections as a consequence of untreated dental caries will adversely affect the quality of life of this vulnerable group.<sup>1,16,22</sup> Dental caries was associated with lower levels of education and increasing age. This finding enjoys support from previous Nigerian studies.<sup>35</sup> Reasons for this observation include suboptimal awareness of oral health leading to poor oral health behaviour and longer exposure of the teeth to often unfavourable oral environment.<sup>8,27,35</sup>

In this study, carious deciduous teeth are associated with relatively high dento-oral infections and ulceration. Also, there is skewed distribution of dental caries with respect to educational attainment and age. This represents inequality in dental caries experience in this group. The global push in oral health among other priorities, seeks reduction in inequalities in oral health experience among groups.<sup>3,4,36</sup> This is because common oral diseases are preventable and its higher presence among groups can be a strong marker of poor quality of life and socio-economic deprivation.<sup>36</sup> Hence, oral health interventional programs with special focus on children, IDP of higher age-groups and lower educational attainment is desirable in this group. Health promotion with major attention on oral health education and improved access to preventive oral health services may be a viable strategy to address the oral health challenges of this group.<sup>3,12</sup>

#### CONCLUSION

Poor oral hygiene is dominant in this group. The prevalence of oral diseases and conditions were lower or within reported prevalence range in prior local studies. Dental caries was untreated with a skewed distribution towards lower educational attainment and increasing age. Many of the carious lesions have signs of dento-oral infections especially in children. Health promotion is prescribed in reducing this group oral health challenges. Recommended strategies include improved access to preventive oral health services and education with significant oral health content.

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#### Conflict of Interest

None declared

#### REFERENCES

1. Gilani SI, Tanwir F, Afridi S. Oral health assessment and barriers to seek care in internally displaced persons from bajaur agency, Pakistan. *Pak Oral Dent J* 2012; 32:115-119.
2. Petersen P, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. *Bulletin of the World Health Organization*. 2005; 83:661-669.
3. Petersen P. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century-the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol* 2003; 31:3-24.
4. Petersen P. Strengthening of Oral Health Systems: Oral Health through Primary Health Care. *Med Princ Pract* 2014; 23:3-9.
5. Uluibau I, Jaunay T, Goss A. Severe odontogenic infections. *Aust Dent J*. 2005; 50:74-81.
6. Monse B, Heinrich-Weltzien R, Benzian H, Holmgren C, van Palenstein Helder W. PUFA – An index of clinical consequences of untreated dental caries. *Community Dent Oral Epidemiol* 2010; 38:77-82.
7. Khongkhunthian S, Kongtawelert P, Ongchai S, Pothacharoen P, Sastraruji T, Jotikasthira D et al. Comparisons between two biochemical markers in evaluating periodontal disease severity: a cross-sectional study. *BMC Oral Health* 2014; 14, 107. doi.org/10.1186/1472-6831-14-10.
8. Nnawuihe U, Okeigbemen S. An assessment of dental caries and periodontal disease burden in selected primary and secondary school children in Edo State, Southern – Nigeria. *Nig J Dent Res* 2016; 1:28-33.
9. Enabulele JE, Oginni AO, Sede MA, Oginni FO. Pattern of traumatised anterior teeth among adult Nigerians and complications from late presentation. *BMC Res Notes*. 2016; 9:70. doi: 10.1186/s13104-016-1871-3.
10. Ikeda N, Henda Y, Khim S, Durward C, Axell T, Mizuno T et al. Prevalence study of oral mucosal lesions in a selected Cambodian population. *Community Dent Oral Epidemiol* 1995; 23:49-54.
11. Warnakulasuriya S. Clinical features and presentation of oral potentially malignant disorders. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2018; 125:582-590.
12. Chidzonga M, Carneiro L, Kalyanyama B, Kwamin F, Oginni F. Determinants of Oral Diseases in the African and Middle East Region. *Adv Dent Res* 2015; 27(1):26-31.

13. Singh A, Singh S. Diseases of poverty and lifestyle, well-being and human development. *Mens Sana Monogr* 2008; 6:187-225.
14. Assari S, Bazargan M. Educational Attainment and Self-Rated Oral Health among American Older Adults: Hispanics' Diminished Returns. *Dent J (Basel)*. 2019; 7:97.
15. Mooney E. The concept of internal displacement and the case for internally displaced persons as a category of concern. *Refugee survey quarterly*. 2005; 24:9-26.
16. Umeizudike K, Dedeké A, Nzomiwu C, Ekowmenhenhen U. Oral health status and treatment needs of internally displaced persons. *Sahel Med J* 2019; 22:207-213
17. Internal Displacement Monitoring Centre - Nigeria. Available from: <https://www.internal-displacement.org/countries/nigeria>. (Accessed on 13th January, 2020).
18. Yamane T. *Statistics: An Introductory Analysis*. 2nd ed. New York: Harper and Row; 1967. p 54
19. Greene J, Vermillion J. The simplified oral hygiene index. *J Am Dent Assoc* 1964; 68:7-13.
20. World Health Organization, *Oral Health Surveys-Basic Methods*. 5th ed. Geneva, Switzerland: World Health Organization; 2013. Available from: [www.who.int/oral\\_health](http://www.who.int/oral_health) (Accessed on 16th November, 2020).
21. IBM SPSS Statistics for Windows, Version 25.0. IBM Corp., Armonk, N.Y., USA: Released 2017.
22. Sischo L, Broder H. Oral health-related quality of life: what, why, how, and future implications. *J Dent Res* 2011; 90:1264-1270.
23. Alimba C. Probing the dynamic of communal conflict in Northern Nigeria. *Afr Res Rev* 2014; 8:177-204.
24. Akseer N, Wright J, Tasic H, Everett K, Scudder E, Amsalu R et al. Women, children and adolescents in conflict countries: an assessment of inequalities in intervention coverage and survival. *BMJ Global Health* 2020; 5:e002214. Available from: <https://gh.bmj.com/content/5/1/e002214.citation-tools> (Accessed 29th October, 2020).
25. Lopez R, Smith P, Gostemeyer G, Schwendicke F. Ageing, dental caries and periodontal diseases. *J Clin Periodontol* 2017; 44:145-152.
26. Vano M, Gennai S, Karapetsa D, Miceli M, Giuca M, Gabriele M et al. The influence of educational level and oral hygiene behaviours on DMFT index and CPITN index in an adult Italian population: an epidemiological study. *Int J Dent Hyg*. 2015; 13:151-157.
27. Olatosi O, Oyapero A, Onyejaka N, Boyede G. Maternal knowledge, dental service utilization and self-reported oral hygiene practices in relation to oral health of preschool children in Lagos, Nigeria. *PAMJ - One Health* 2020; 2:10. doi: 10.11604/pamj-oh.2020.2.10.22850
28. Arotiba J, Adebola R, Iliyasu Z, Babashani M, Shokunbi W, Ladipo M et al. Oral manifestations of HIV/AIDS infection in Nigerian patients seen in Kano. *Nig J Surg Res* 2005; 7: 176-181.
29. Butali A, Adeyemo W, Mossey P, Olosoji H, Onah I, Adebola A et al. Prevalence of orofacial clefts in Nigeria. *Cleft Palate Craniofac J* 2014; 51:320-325.
30. Braimoh O, Umanah A, Illochonwu N. Caries distribution, prevalence, and treatment needs among 12–15-year-old secondary school students in Port Harcourt, Rivers State, Nigeria. *J Dent Surg* 2014. doi.org/10.1155/2014/483760
31. Alwaeli H, Al-Jundi S. Periodontal disease awareness among pregnant women and its relationship with socio-demographic variables. *Int J Dent Hyg*. 2005; 3:74-82.
32. Boillot A, El Halabi B, Batty GD, Rangé H, Czernichow S, Bouchard P. Education as a predictor of chronic periodontitis: a systematic review with meta-analysis population-based studies. *PLoS One* 2011; 6(7):e21508. doi: 10.1371/journal.pone.0021508.
33. Armitage G. Diagnosis of periodontal diseases. *J Periodontol* 2003; 74:1237-1247.
34. Oziegbe E, Esan T. Prevalence and clinical consequences of untreated dental caries using PUFA index in suburban Nigerian school children. *Eur Arch Paediatr Dent* 2013; 14:227-231.
35. Lawal F, Alade O. Dental caries experience and treatment needs of an adult female population in Nigeria. *Afri Health Sci* 2017; 17:905-911
36. Silva Junior MF, Sousa MDLR, Batista MJ. Reducing social inequalities in the oral health of an adult population. *Braz Oral Res* 2020; 33:e102. doi: 10.1590/1807-3107bor-2019.vol33.0102