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*Research Article*

# Oral Health Status among Internally Displaced Persons in Maiduguri, Borno State, Nigeria

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## ABSTRACT

**Introduction:** Oral health is defined as a standard of health of the oral cavity and related tissues, which enable an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well- being of the peoples.

The most prevalent oral health diseases is dental caries and periodontal disease which is also the most frequent and are considered a public health problem affecting both children and adults worldwide and often lead to a significant reduction in the quality of life of individuals and communities. The study aims to assess oral health status among internally displaced persons in Maiduguri, Borno State Nigeria.

**Methodology:** A descriptive cross-sectional study was employed using a semi- structured questionnaire to 399 participants among Internally Displaced Persons (IDPs) in Maiduguri, Borno State. A multi-stage sampling technique was adopted and data analysis was done using SPSS version 20.0 and test of significance was set at 0.05.

**Results:** out of 399 participants, majority, 115(28.8%), are within the age range of 18-27years, while least age group of the participant representing 7(1.8%) were 68-77 years. From the data, there were more males participants over the females representing 232(58.1%) and 167(41.9%) respectively. Majority of the participants, 353(88.5%) were unmarried, while 46(11.5%) made up the married group. Majority of the respondents were observed to be unemployed 350(87.7%). Also, 291(72.9%) participants had formal education while 108(27.1%) had informal education.

Majority 327(82.0%) of the participants were observed to have poor oral hygiene using Green and Vermillion oral hygiene index, while 72(18.0%) had fair oral hygiene and none of the participants was noticed to have good oral hygiene. The Mean DMFT among the participants was (3.29 ± 3.46) and its components were; decayed teeth, DT (2.17±2.76), missing teeth, MT (1.09±2.03) and filled teeth, FT (0.03±0.26).

The was no significant relationship between level of oral hygiene practices with factors such as age group, gender, marital status, educational and occupational statuses. A significant relationship between oral health status (using oral hygiene index and DMFT), with age group and gender.

**Conclusion:** Majority of the participants in this study were found to have poor oral health status. There was a positive association between gender and age with oral hygiene among the participants.

## KEYWORDS

Oral status, Oral health, Oral hygiene, IDPs, Maiduguri.

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## Introduction

Internally Displaced Persons (IDPs) are "persons or groups of persons who have been forced to flee or to leave their homes or places of habitual residence, as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized border" [1]. The total number of internally displaced persons has continued to increase worldwide from about 26.4 million in 2011, to about 40.8 million in 2015 [2]. As at the end of 2015, Syria had the largest number of IDPs in the world with about 6.6million IDPs. This is closely followed by Columbia and then Iraq [2,3]. While Yemen has the highest number of new displacements in 2015 [4], the comprehensive figure of IDPs in Nigeria is not yet documented. About three-quarter of the world's internally displaced people live in just 10 countries [4,5]. Syria, Colombia, Iraq, Sudan, Yemen, Nigeria, South Sudan, Ukraine, Democratic Republic of Congo and Pakistan [3-5]. Yemen and Ukraine were not part of the list in 2014, but have now displaced Somalia, and Turkey. Sub-Saharan Africa has about 30% of the total global IDPs with Nigeria, Democratic Republic of Congo and Sudan contributing the largest share [3].

Since 2011, in Nigeria there has been an emergence of an insurgency from an armed group called "Boko Haram" in the Northern parts of the country [5]. Boko Haram as the group is called was coined from Hausa words which literally mean 'Western education is forbidden'. This insurgent group have been involved in the killing and abduction of civilians and law enforcement personnel with destruction of social and economic infrastructure in Nigeria [5]. Majority of the civilians abducted or killed are often those who are opposed to their ideologies and refused to join them. This results in more people fleeing the affected States to seek for protection and other means of survival in the surrounding States with some of them crossing the border to seek for refuge in the neighbouring countries of Cameroun, Chad and Niger [5].

According to the World Health Organization (WHO), oral disease is one of the most prevalent health care problems world-wide [6]. Oral health may be defined as a standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well- being of the people [2].

The WHO regularly monitors the health status of the many age groups, with the intention of promoting better oral health. Recently studies have shown that immigrant populations are more affected by dental caries than native populations [6]. Many systemic diseases are related to oral conditions and thus general health requires efforts of both medical and dental health professionals to control it [6]. Health is one of the most valuable assets one can possess; Oral health is now recognized as equally important part of general health. Data from a population is the outlook of its people toward their dentition [8].

Despite great achievements in oral health of populations globally, problems of poor oral health status still remain in many communities all over the world, particularly among IDPs which are classified as less-privileged groups in developed and developing countries. Presently the distribution and severity of oral diseases vary among different parts of the world and within the same country or region. The significant role of socio-behavioural and environmental factors in oral disease and health is evidenced in an extensive number of epidemiological surveys [9]. Dental caries and periodontal diseases have historically been considered the most important global oral health burdens lead to a significant reduction in the quality of life of individuals and communities [3]. Dental caries is still a major oral health problem in most industrialized countries, affecting 60-90% of schoolchildren and the vast majority of adults. It is also a most prevalent oral disease in several Asian and Latin-American countries, while it appears to be less common and less severe in most African countries [10]. Consequently, the disease level is documented to be high in the Americans but relatively low in Africa [10]. In light of changing living conditions, however, it is expected that the incidence of dental caries will increase in many developing countries in Africa, particularly due to a change in diet (consumption of refined carbohydrate) and inadequate exposure to fluorides. In many developing countries, access to oral health services is limited and teeth are often left untreated or are extracted because of pain or discomfort [6]. in Nigeria and some part of the world, losing teeth is still been considered as a natural consequence of ageing. While in some industrialized countries there are positive trend of reduction in tooth loss among adults in recent years [6], although the proportion of edentulous adults aged 65 years and above are still high in some countries. Periodontal disease also significantly contributes to global oral disease, affecting all age groups [6].

In dental caries, cavities may develop following bacteria invasion and process such as demineralization. If demineralisation of tooth structure continues unabated, there may be a permanent damage to tooth structure with formation of obvious cavities. The presence of cavity on a tooth gives room to more interactions between food particle and bacteria on the tooth. More destruction of enamel structure by the increasing interaction of food particles and bacteria and cavity depth may lead to the spread dental caries to dentinal structures. The exposure of dentine to oral cavity may generate dentinal hypersensitivity. Also plaque build up on teeth surfaces without removal as a result of lack or poor brushing and flossing habits may lead to irritation of gums thereby causing gingivitis. Gingivitis which is an inflammation of the gum may present as gums swelling and bleeding spontaneously or when brushing or flossing. Gingivitis progresses to periodontitis when not treated. Periodontal infection can spread to the basal bones of the jaws. Gingival inflammation and loss of periodontal attachment due to periodontitis may lead to gum recession [11]. The value of good oral hygiene practices has increased over the years and studies indicate that the removal of bacteria plaque is essential for the prevention of the two most common dental conditions which are dental caries and periodontal disease.[12] It has been consistently

reported that over 70% of adults in Nigeria have periodontal disease [12], a condition strongly associated with oral hygiene status. Although the prevalence of dental caries is low in Nigeria, between 10% and 20%; it remains a disease of public health interest because most carious lesions remain untreated [12]. Therefore, to achieve and maintain good oral hygiene, and prevent dental caries and periodontal disease, regular tooth brushing using fluoride-containing toothpaste at least twice a day is recommended [12]. The use of dental floss and other oral hygiene aids items for the cleaning of contact surfaces is also important for effective plaque removal [13].

Dental caries and periodontal diseases are the most important global oral health burdens among many communities. Other burdens include oral cancer, oral mucosal lesions, maxillofacial and dental trauma, developmental disorders and teeth wear lesions. Poor oral health besides causing pain, difficulty in chewing and eating, aesthetic problem due to missing, broken or damaged teeth may have a profound effect on general health, quality of life and well-being among the IDPs [14]. Poor oral health predisposes the people to oral diseases which cause loss of teeth if not managed properly. Loss of teeth is detrimental to the quality of life: physically, socially as well as psychologically. Despite the importance of knowledge of good oral care, very little is known about the state of oral health among Internally Displaced Persons originating from conflict zones. This therefore, necessitates more investigations among many communities of different socioeconomic strata including IDPs. Relevant information is necessary as it will indicate how much needs to be done for intervention measures to be instituted. Consequently; they will put into practice whatever they will have learnt and improve their oral health.

The report from this study among the IDPs may be used to address the comprehensive health challenges among these groups of people, and may also assist in direct and proper planning of oral health care service delivery to these vulnerable populations. The finding of this study may also help to identify the main type of treatments needs among the IDPs in order to set priorities and plan the different preventive and curative strategies among the entire population of Nigerians [6].

The aim of this study was to determine the oral hygiene status among IDPs in Maiduguri, Borno State.

## Methodology

### Study area

The study was carried out in Maiduguri, the capital of Borno State, in the North eastern part of Nigeria. Borno State has a coordinate of 11° 50N 13°09E which occupies 70, 8982KM$^2$ and shares borders with the Republics of Niger to the North, Chad to the North East and Cameroun to the East. Within Nigeria Borno State shares borders with Adamawa State to the south, Gombe State to the west and Yobe State to the North West. There are 27 local Government areas in Borno State. It has an estimated population of about 5,860,183 [15]. The University of Maiduguri attracts foreign students from neighbouring countries of Chad, Cameroon and Niger. Other higher institutions include Ramat polytechnic, College of Agriculture and College of education, Muhammad Goni College of Legal and Islamic Studies, College of Nursing and Midwifery, College of Health Technology and El- Kanemi College of Islamic Theology.

Although many IDP camps in Maiduguri metropolis have been collapsed to a manageable number, Maiduguri metropolis houses the following IDP camps at the peak of the major boko haram crisis; Madinatu camp, Bale Galtimari primary school, National Youth Service Corp (NYSC) camp Borno, Bakasi camp, Eclisan 'yanuwa (EYN) camp, Mohammed Goni college of Legal and Islamic studies (MOGOCOLIS) camp, Teachers village camp, farm centre camp among others [16].

### Study site

The IDP camps that were included were within Maiduguri and Jere Local Government Areas of Borno State [16].

### Study design

A descriptive cross-sectional design was employed from September to December, 2020.

### Study population

The participants comprised of adults aged 18 years and above whom were living in IDP camps within Maiduguri Metropolis and Jere LGAs for at least six months were included and those that were not around during the study were excluded.

### Sample size estimation

The sample size was determined using the Fisher's formula for estimating minimum sample size for cross sectional study [17] i.e. $n = z^2pq/d^2$

Where: n= minimum sample size, z= 1.96, is the standard normal deviate corresponding to 95% confidence interval on the normal distribution curve obtained from Z-table and 10% non-response was added to the estimated sample size 374.

### Sampling technique

A multi-stage sampling technique was employed with three stages.

**Stage I: Selection of LGAs**; One LGA was selected from each senatorial zones (Borno North, Central and South) using simple random sampling by balloting.

**Stage II: Selection of Camp:** All IDP camps and their populations in the selected LGAs were then identified. The following IDP camps were selected by simple random sampling by balloting; Bakassi camp, Dalori camp, Gubio camp, Muna camp, NYSC camp, Teachers village camp.

**Stage III: Selection of eligible respondents:** Respondents were proportionately allocated based on total number of IDPs in the selected camps.

Proportionate allocation was done by dividing total number of IDPs in each camp by the overall total number of the IDPs in the selected camps and multiplied by the calculated sample size. Therefore the number of allocation was; NYSC camp (40), Bakkasi (153), Teachers village (57), Dallori (120) and Muna (4).

Pieces of same coloured and equal sized papers were used, with number of proportionately allocated sample size in each of the selected camps bearing "yes'' while the remaining bearing "no", they were squeezed and placed in a jar with a lid, they were then shaken thoroughly and placed on a flat table from which eligible respondents were asked to pick one. All those who picked "yes" were then recruited and averages of 15 patients were recruited for the study per week until required sample size was obtained.

### Data Collection Method

Data was collected using interviewer-administered questionnaire adopted from the WHO oral health form 2013 [18]. The questionnaire was translated to two major local languages (Kanuri and Hausa) by a lecturer from the department of languages and linguistics, University of Maiduguri, Borno State. The filled questionnaire was back translated to English by another independent lecturer from same institution.

The questionnaire included the following sections: Socio-demographic Variables and Oral health status. Oral health status domain: Oral hygiene index score was assessed by combining the debris score with calculus score as explained in detailed. The oral hygiene score has 6 score and was graded as thus 0 to 6 and was interpreted as good when the respondents score (0–1.2), fair (1.3–3.0), and poor (3.1–6.0).

The questionnaire was pre-tested in IDPs camp in Damaturu, Yobe State using 10% of the study population immediately after ethical approval was obtained following which some identified ambiguous questions, and unclear parameters were modified accordingly to enhance its validity and precision.

## Study protocol

### Camp entry

An introductory letter was obtained from Aminu Kano Teaching Hospital, Kano and delivered to the Borno State Emergency Management Agency. This letter introduced the candidate as a resident doctor from Aminu Kano Teaching Hospital, Kano. During the visit the purpose of the study was explained and permission to carry out the study was sought and granted.

### Procedure

The mode of data collection was a questionnaire based type, with the candidate supervising the data collection. There were two research assistants who were dental health technicians; they were trained for four hours per day regarding filling the questionnaire for five days before the commencement of the study. The research assistants then administered the questionnaire to the participants; details of the procedures were explained to the participants using their local language where applicable. The questionnaire was interpreted to the local language (Hausa/Kanuri languages) for better understanding by the participants who do not have better understanding of English language. All the participants passed through simple clinical oral examination conducted by a single examiner who is the candidate and the lead researcher where oral health status of each participant was determined.

The participants were made to sit comfortably on a mobile dental chair under natural light. The examiner wore a face mask; a pair of sterile hand gloves and other non-pharmaceutical COVID 19 prevention protocol were strictly adhered to. Complete detailed oral examination was done using dental mirror and dental probe. Oral hygiene index (Green and Vermillion) and DMFT were assessed. Subjects with very poor oral hygiene or high DMFT score were counselled and referred to a dental clinic.

WHO guidelines for DMFT, oral hygiene index and gingival index were used. Gingival index was evaluated with the index of Silnes &Löe, for which a periodontal probe was passed along the gingival margin. Hygiene score (extent of plaque) was evaluated on the vestibular surfaces of 6 teeth (2 upper molars, 2 lower molars, 1 upper incisor and 1 lower incisor).

### DMFT Caries Assessment Index [19]

DMFT is an acronym for D= decayed, M= missing as a result of decayed tooth, F= filled, T= Teeth. If there is a decayed tooth a score of 1 is awarded i.e. D=1. Likewise, for the other parameters, example D=1, M=3, F=2, now the score is D+M+F+T= 5. So the total number of all the parameters was summed up and a score was awarded, and documented.

A tooth was marked as "decayed" when any of the following was observed: Unmistakable cavitations on the occlusal, buccal or lingual walls of the tooth, a detectable softened floor, wall or remaining carious roots, and filled tooth due to dental caries. All the teeth that were in doubt were recorded as sound. A tooth extracted due to caries was marked "missing."

### Simplified oral hygiene index (OHI-S) [20]

A composite index that scores debris and calculus deposition on selected tooth surfaces was adopted because of simplicity, validity and reproducibility. The index teeth are 11,16,26,31, 36 and 46. This index is widely used for assessing oral hygiene status. Six surfaces of the six index teeth was examined, the buccal surfaces of the upper right and left first permanent molars, the lingual surfaces of the lower right and left first permanent molars, and the labial surfaces of the upper right and lower left permanent central incisors.

Score 0 = when there is no debris or stain observed.
Score 1 = food debris covering not more than one third of the tooth surface or presence of extrinsic stains without other debris regardless of surface area covered.
Score 2 = food debris covering more than one third, but not more than two thirds, of the exposed tooth surface.

Score 3= food debris covering more than two thirds of the exposed tooth surface.

Calculus component
Score 0= the absence of calculus
Score1= supra gingival calculus covering not more than one third of the exposed tooth surface,

Score 2= supra gingival calculus covering more than one-third but not more than two-thirds of the exposed tooth surfaces or the presence of individual flecks of sub gingival calculus around the cervical portion of the tooth

Score 3= supra gingival calculus covering more than two-thirds of the exposed tooth surface or a continuous heavy band of sub gingival calculus around the cervical portion of the tooth. Scores for both debris and calculus were added to get the OHI-S whose values range from 0 to 6. This was interpreted as;
Good (0–1.2),
Fair (1.3–3.0),
Poor (3.1–6.0).

### Gingival index of Löe and Silnes [20]

Gingival Index (GI) is scored based on a 0–3 scale that combined an assessment of tissue colour and form with bleeding on stimulation.

Where;
Score 0 = represented healthy gingiva
Score 1 = mild inflammation observed as a slight change in colour, slight oedema, and no bleeding on probing;
Score 2 = moderate inflammation: Redness, oedema and glazing, bleeding on probing
Score 3 = severe inflammation: Marked redness and oedema, ulceration, and tendency toward spontaneous bleeding.

Buccal surfaces of all the teeth present in the mouth were examined. When in doubt between scoring 0 or 1, the score 1 was given.

### Data Analysis

The data collected using the questionnaires were entered into Microsoft Excel Spread Sheet for data cleaning. The data was then transferred to Statistical Package for Social Sciences IBM (SPSS) version 20.0 for analysis. The data was summarized and presented as quantitative and qualitative variables. Qualitative or categorical variables was summarised as frequencies and percentages, presented in tables and charts. While quantitative variables was summarised as mean, standard deviations, median and range as appropriate. Chi square test and the Fisher's exact test was used to test association between categorical variables while the student t test as appropriate were used to test association at bivariate levels. In all test of associations a p value of $<0.05$ was considered statistically significant.

Factors that were found to be significantly associated ($p < 0.05$) at bivariate level were subjected further to logistic regression analysis to adjust for possible confounders where applicable.

### Ethical consideration

Ethical approval to carry out the study was obtained from the Health Research Ethics committee of the Aminu Kano Teaching Hospital, Kano with the approval number NHREC/21/08/2008/AKTH/EC/2527. Additionally, permission was obtained from Borno State Government and informed consent from the participants.

## Results

A total of 399 subjects participated and the response rate of 100% was recorded. The socio-demographics of the respondents (Table 1) shows the age range of the participants were 18-77 years (Table 1), out of which majority of the respondents, 115 (28.8%), were within the age range of 18-27years, while those between 68-77 years had the lowest representation with only 7 (1.8%) subjects. The data also showed higher male response, 232(58.1%), over females, 167 (41.9%). Majority of the participants were unmarried, 353(88.5%) (Table 1), while 46(11.5%) made up the married group. The Dalori and Bakassi IDP camps had more respondents with 99 (24.8%) and 96 (24.1%) respectively (Table 1), compared to the rest of the camps. Majority of the respondents were observed to be unemployed 350 (87.7%) with only 49 (12.3%) being employed. Those from Gwoza local government area constituted the highest respondents with 257 (64.4%). As for the education status of the respondents, 291 (72.9%) had formal education while 108 (27.1%) had informal education (Table 1).

## Oral health status amongst IDPs

### Debris index

The debris index score of the respondents was observed that majority (ranging between 41.1% - 42.1%) of the respondents had no debris on the index teeth (Table 2); however amongst those with debris deposits, majority (ranging between 37.6% - 40.4%) had them on not more than one-third of the surfaces of the index teeth.

### Calculus index

The calculus index score of the respondents revealed that majority of the respondents have calculus deposits on the examined teeth, with those having it deposited on not more than one-third of the teeth surfaces ranging between 32.6% - 50.4%; more than two-third of the teeth surface (29.6% - 36.6%) and those between one-third and two-third tooth deposits ranging between 7.3% - 27.3%.

### Oral hygiene index score (Greene and Vermilion)

The frequency and percentages of the oral hygiene index of the participants were higher than two-third (82.0%) had poor oral hygiene; with a 72 (18.0%) having fair oral hygiene and none had good oral hygiene (Table 2).

**Table 1:** Socio-demographic Characteristics of IDPs.

| S/NO | | | Frequency | Percentage |
|---|---|---|---|---|
| 1 | AGE GROUP | 18-27 | 115 | 28.8 |
| | | 28-37 | 89 | 22.3 |
| | | 38-47 | 91 | 22.8 |
| | | 48-57 | 55 | 13.8 |
| | | 58-67 | 42 | 10.5 |
| | | 68-77 | 7 | 1.8 |
| | | **Total** | **399** | **100** |
| 2 | GENDER | Male | 232 | 58.1 |
| | | Female | 167 | 41.9 |
| | | **Total** | **399** | **100** |
| 3 | MARITAL STATUS | Married | 46 | 11.5 |
| | | Unmarried | 353 | 88.5 |
| | | **Total** | **399** | **100** |
| 4 | IDP CAMP LOCATION | Bakassi | 96 | 24.1 |
| | | Dalori | 99 | 24.8 |
| | | Gubio | 32 | 8 |
| | | Muna | 81 | 20.3 |
| | | NYSC camp | 53 | 13.3 |
| | | Teachers' village | 38 | 9.5 |
| | | **Total** | **399** | **100** |
| 5 | OCCUPATION | Employed | 49 | 12.3 |
| | | Unemployed | 350 | 87.7 |
| | | **Total** | **399** | **100** |
| 6 | LOCAL GOVERNTMENT AREA | Kukawa | 64 | 16 |
| | | Gwoza | 257 | 64.4 |
| | | Kaga | 78 | 19.5 |
| | | Total | 399 | 100 |
| 7 | RELIGION | Islam | 397 | 99.5 |
| | | Christianity | 2 | 0.5 |
| | | **Total** | **399** | **100** |
| 8 | EDUCATIONAL STATUS | Formal Education | 291 | 72.9 |
| | | Informal Education | 108 | 27.1 |
| | | **Total** | **399** | **100** |

**Table 2:** Frequency and percentage of oral hygiene index according to Greene and Vermilion.

| **OHI-S GRADE** | | |
|---|---|---|
| | Frequency | Percentage |
| **Good** | 0 | 0 |
| **Fair** | 72 | 18 |
| **Poor** | 327 | 82 |
| **Total** | **399** | **100** |

## Decayed, missing and filled teeth index (DMFT) [19]

### Decayed teeth (DT)

The decayed teeth component of DMFT. Among the participants 165 (41.4%) presented with no dental caries while 66 (16.5%) had one decayed teeth while 43 (10.8%) had two decayed teeth each. The mean decayed tooth among the study population was 2.17± 2.76 (Table 3).

### Missing Teeth due to Caries (MT)

The missing teeth, due to caries observed that many participants 236 (59.1%) had no missing teeth, while 69 (17.3%) presented with only one missing tooth and others with missing teeth have lost more than one teeth. The mean missing teeth is 1.09 ±2.03 (Table 3).

### Filled teeth due to Caries (FT)

The filled teeth, due to carries among the participants observed that Majority 392 (98.2%) among the participants had no filled teeth. A small fraction of the participants 4 (1%) had one or more teeth filled. The mean filled teeth are 0.03± 0.26 (Table 3).

### DMFT Score

The summary of DMFT component among the study participants shows a total of 98 (24.6%) had no decayed, missing or filled teeth. While amongst those with either decayed, missing or filled teeth, 65 (16.3%), 49 (12.3%), 36 (9%) and 34 (8.5%) had a DMFT score of 1, 2, 4 and 3, respectively. The mean DMFT score is 3.29± 3.46 (Table 3).

**Table 3:** DMFT Score.

| **DMFT (Mean ± s.d) 3.29 ± 3.46** | **Frequency** | **Percentage** |
|---|---|---|
| **0** | 98 | 24.6 |
| **1** | 65 | 16.3 |
| **2** | 49 | 12.3 |
| **3** | 34 | 8.5 |
| **4** | 36 | 9 |
| **5** | 27 | 6.8 |
| **6** | 22 | 5.5 |
| **7** | 19 | 4.8 |
| **8** | 13 | 3.3 |
| **9** | 11 | 2.8 |
| **10** | 8 | 2 |
| **11** | 6 | 1.5 |
| **12** | 6 | 1.5 |
| **13** | 1 | 0.3 |
| **15** | 3 | 0.8 |
| **24** | 1 | 0.3 |
| **Total** | **399** | **100** |

### Gingival Bleeding index of LÖE and SILNES

The frequency and percentages of the gingival bleeding index of the respondents shows that majority which ranges from 41.1% - 42.1% presented with healthy gingiva according to LÖE **and SILNES index**. Among those that presented with unhealthy gingiva, 37.6% - 40.4% had erythematous gingiva while 17.5% - 19.5% presented with gingival bleed on probing (Table 4).

**Table 4:** Gingival Bleeding index of LÖE and SILNES.

| S/NO | GINGIVAL BLEEDING INDEX OF LÖE AND SILNES | | |
|---|---|---|---|
| **1** | **GINGIVAL INDEX UR2** | **Frequency** | **Percentage** |
| | Normal | 168 | 42.1 |
| | erythromatous | 150 | 37.6 |
| | bleeding on probing | 78 | 19.5 |
| | spontaneous bleeding | 3 | 0.8 |
| | **Total** | **399** | **100** |
| **2** | **GINGIVAL INDEX UR6** | | |
| | Normal | 164 | 41.1 |
| | erythromatous | 156 | 39.1 |
| | bleeding on probing | 78 | 19.5 |
| | spontaneous bleeding | 1 | 0.3 |
| | **Total** | **399** | **100** |
| **3** | **GINGIVAL INDEX UL4** | | |
| | Normal | 166 | 41.6 |
| | erythromatous | 161 | 40.4 |
| | bleeding on probing | 71 | 17.8 |
| | spontaneous bleeding | 1 | 0.3 |
| | **Total** | **399** | **100** |
| **4** | **GINGIVAL INDEX LR2** | | |
| | Normal | 168 | 42.1 |
| | erythromatous | 158 | 39.6 |
| | bleeding on probing | 72 | 18 |
| | spontaneous bleeding | 1 | 0.3 |
| | **Total** | **399** | **100** |
| **5** | **GINGIVAL INDEX LR6** | | |
| | Normal | 166 | 41.6 |
| | erythromatous | 157 | 39.3 |
| | bleeding on probing | 75 | 18.8 |
| | spontaneous bleeding | 1 | 0.3 |
| | **Total** | **399** | **100** |
| **6** | **GINGIVAL INDEX LL4** | | |
| | Normal | 167 | 41.9 |
| | erythromatous | 160 | 40.1 |
| | bleeding on probing | 70 | 17.5 |
| | spontaneous bleeding | 2 | 0.5 |
| | **Total** | **399** | **100** |
| | No debris | **166** | **41.6** |
| | debris not more than 1/3 | **157** | **39.3** |
| | debris more than 2/3 | **75** | **18.8** |
| | debris btw 1/3 and 2/3 | **1** | **0.3** |
| **6** | **LOWER RIGHT 6** | | |
| | No debris | **167** | **41.9** |
| | debris not more than 1/3 | **160** | **40.1** |
| | debris more than 2/3 | **70** | **17.5** |
| | debris btw 1/3 and 2/3 | **2** | **0.5** |
| | **TOTAL** | **399** | **100** |

### Fractured Teeth

The frequency and percentages for fractured teeth in the mouth of the participants shows that majority 373 (93.5%) had no fractured teeth in their mouth, with 13 (3.3%) having one fractured tooth, as well as 4 (1.0%) having two and three fractured teeth respectively, with the rest having more than four and up to fifteen teeth fractured. The mean fractured teeth are 0.21 with a standard deviation of 1.30.

### Dean's Fluorosis Index

The frequency and percentage of the fluorosis index of the participants shows that the first majority forming those with normal teeth appearance, ranging between 46.6% - 49.4%, and the second majority jointly formed by those with questionable and mild fluorosis, 13.3% - 15.3%, and 13.3% - 14.3%, respectively.

### Factors associated with Oral Hygiene Index

The relationship between level of oral health status (using oral hygiene index and DMFT) with age group, gender, marital status, educational status and occupational status shows that, majority 327 (82.0%) of the participants were observed to have poor oral hygiene (Table 5). The data revealed that almost all the age group showed high level of poor oral hygiene; with those between 18-27yrs leading this category and the least being 68-77years. Males 182 (45.6%) represented the gender group with the highest level of poor oral hygiene. The unmarried, formally educated and unemployed groups constituted the respective representative of those with highest level of poor oral hygiene (Table 5).

And following Pearson's chi-square test analysis, (with p=0.05), it was observed that there was statistical significance between level of oral hygiene when cross tabulated with age group (p=0.008) and gender (p=0.032) only, while other factors revealed no statistical significant relationships (Table 5).

### Factors associated with DMFT

The second factor considered for oral health assessment, DMFT. It showed the relationship between DMFT with age group, gender, and marital status, level of educational and occupational status. Among the study population analysis of the data obtained revealed that majority of the participants 394 (98.7%) had 0-12 DMFT score, of which those who fell in the age groups of 18-27years constituted the highest representative 112 (28.1%). Among male 230(57.6%) participants, average DMFT score was 0-12 and it was considered to be higher than among the female participants (Table 6).

The Pearson's chi-square test for the DMFT scores' relationship with the selected socio-demographics (with p=0.05), was observed to reveal no statistical significance for all the associated demographic factors (Table 6).

## Discussion

There are not many Nigerian studies in the literature to compare with findings of the present studies. With the objectives centred

**Table 5:** Factors associated with Oral Hygiene Index.

| | | ORAL HYGIENE INDEX | | | | |
|---|---|---|---|---|---|---|
| | | POOR | FAIR | GOOD | $X^2$ | P-VALUE |
| **AGE GROUP** | 18-27 | 86 (21.6%) | 29 (7.3%) | 0 (0.0%) | *15.540 | **0.008** |
| | 28-37 | 82 (20.6%) | 7 (1.8%) | 0 (0.0%) | | |
| | 38-47 | 70 (17.5%) | 21 (5.3%) | 0 (0.0%) | | |
| | 48-57 | 44 (11.0%) | 11 (2.8%) | 0 (0.0%) | | |
| | 58-67 | 38 (9.5%) | 4 (1.0%) | 0 (0.0%) | | |
| | 68-77 | 7 (1.8%) | 0 (0.0%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 327 (82.0%) | 72 (18.0%) | 0 (0.0%) | | |
| **GENDER** | Male | 182 (45.6%) | 50 (12.5%) | 0 (0.0%) | 4.609 | **0.032** |
| | Female | 145 (36.3%) | 22 (5.5%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 327 (82.0%) | 72 (18.0%) | 0 (0.0%) | | |
| **MARITAL STATUS** | Married | 39 (9.8%) | 7 (1.8%) | 0 (0.0%) | 0.281 | **0.596** |
| | Unmarried | 288 (72.2%) | 65 (16.3%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 327 (82.0%) | 72 (18.0%) | 0 (0.0%) | | |
| **EDUCATIONAL STATUS** | Formal Education | 243 (60.9%) | 48 (12.0%) | 0 (0.0%) | 1.747 | **0.186** |
| | Informal Education | 84 (21.1%) | 24 (6.0%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 327 (82.0%) | 72 (18.0%) | 0 (0.0%) | | |
| **OCCUPATIONAL STATUS** | Employed | 40 (10.0%) | 9 (2.3%) | 0 (0.0%) | 0.004 | **0.950** |
| | Unemployed | 287 (71.9%) | 63 (15.8%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 327 (82.0%) | 72 (18.0%) | 0 (0.0%) | | |

*Fisher's exact test.

**Table 6:** Factors associated with DMFT.

| | | DMFT | | | | |
|---|---|---|---|---|---|---|
| | | 0-12 | 13-20 | 21-28 | $X^2$ | P-VALUE |
| **AGE GROUP** | 18-27 | 112 (28.1%) | 3 (0.8%) | 0 (0.0%) | *12.49 | **0.253** |
| | 28-37 | 89 (22.3%) | 0 (0.0%) | 0 (0.0%) | | |
| | 38-47 | 91 (22.8%) | 0 (0.0%) | 0 (0.0%) | | |
| | 48-57 | 54 (13.5%) | 0 (0.0%) | 1 (0.3%) | | |
| | 58-67 | 41 (10.3%) | 1 (0.3%) | 0 (0.0%) | | |
| | 68-77 | 7 (1.8%) | 0 (0.0%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 394 (98.7%) | 4 (1.0%) | 1 (0.3%) | | |
| **GENDER** | Male | 230 (57.6%) | 1 (0.3%) | 1(0.3%) | 2.534 | **0.282** |
| | Female | 164 (41.1%) | 3 (0.8%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 394 (98.7%) | 4 (1.0%) | 1 (0.3%) | | |
| **MARITAL STATUS** | Married | 44 (11.0%) | 2 (0.5%) | 0 (0.0%) | 5.985 | **0.050** |
| | Unmarried | 350 (87.7%) | 2 (.5%) | 1 (0.3%) | | |
| | TOTAL= 399(100%) | 394 (98.7%) | 4 (1.0%) | 1 (0.3%) | | |
| **EDUCATIONAL STATUS** | Formal Education | 287 (71.9%) | 3 (0.8%) | 1 (0.3%) | 0.381 | **0.826** |
| | Informal Education | 107 (26.8%) | 1 (0.3%) | 0 (0.0%) | | |
| | TOTAL= 399(100%) | 394 (98.7%) | 4 (1.0%) | 1 (0.3%) | | |
| **OCCUPATIONAL STATUS** | Employed | 49 (12.3%) | 0 (0.0%) | 0 (0.0%) | 0.709 | **0.702** |
| | Unemployed | 345 (86.5%) | 4 (1.0%) | 1 (0.3%) | | |
| | TOTAL= 399(100%) | 394 (98.7%) | 4 (1.0%) | 1 (0.3%) | | |

*Fisher's exact test

on assessing the oral health status and hygiene amongst IDPs in Maiduguri and to determine the factors associated with oral health status and hygiene amongst IDPs in Maiduguri.

This study involved 399 respondents, with the majority of the respondents falling within the age range of 18-27 years, while those between 68-77 years had the lowest representation (Table 1). These is probably because, the insurgency had led to some older age group trapped in their hometown or were part of the mass casualty that was experienced over the time of the on-going insurgency, in addition the elderly may choose to stay in their localities because they are less likely to be recruited or killed by the insurgents. Also a higher male response was observed in the study, (58.1%), over females, (41.9%) Table 1. This may have been as a result of easier persuasion for males to partake in the research and also may be due to a cultural barrier where the male gender doesn't want a non-

relative to interact with the female gender. It is also not in tandem with the National population commission's report in which 80% of the 3.3 million IDPs in Nigeria were females [21]. Participants who were unmarried were more than the married group. And majority of the respondents were observed to be unemployed (87.7%) with only (12.3%) being employed. Majority (72.9%) have formal education while (27.1%) have informal education (Table 1). Out of the five camps selected, Dalori and Bakassi IDP camps had more respondents with 99(24.8%) and 96(24.1%) respectively, compared to the rest of the camps. Two-third of the respondents (64.4%) were from Gwoza local government area, this could be because it is one of the most populated local government area and worst hit by the ongoing insurgency. Similarly, majority of all the respondents were Muslims 397(99.5%). These could be related to the camps located in Maiduguri where majority were IDPs of Kukawa and Gwoza local governments.

In the assessment for level of oral health status, many parameters were incorporated like the oral hygiene index; decayed, missing and filled teeth (DMFT), gingival bleeding index, tooth fracture and fluorosis. However, during analysis only two were selected in the assessment for oral hygiene status, which was the oral hygiene and DMFT. From this, on oral hygiene index, it was observed that majority (between 41.1% - 42.1%) of the respondents had no debris on the examined teeth; while between 37.6% - 40.4% had debris deposited on not more than one-third of the examined teeth surfaces. Also, on calculus, it was observed that majority had calculus deposits on the examined teeth as opposed to a smaller proportion with no deposits. In the end, the participants were discovered to have poor oral hygiene index by majority (82.0%) while 18.0% had fair oral hygiene and none having good oral hygiene (Table 2), this is in agreement with a similar study done in an IDP camp in Iraq [24]. DMFT scores for the participants showed that, majority (24.6%), had no decayed, missing or filled teeth; this is however in contrast with a similar study in an IDP in Iraq [22]. Reason might be because they had stayed longer in the IDP camp than their Nigerian counterparts. While amongst those with decayed, missing or filled, 16.3%, 12.3%, 9% and 8.5% have a DMFT score of 1, 2, 4 and 3, respectively. The rest, although had a higher DMFT score, formed smaller representative of the participants (Table 3). The high prevalence of untreated caries among IDPs may be attributed to pre-arrival conditions, as well as to limited access to oral health care after arrival to the host community. Studies have suggested various factors contributing to the limited access to oral health care among which, inability to afford treatment cost, lack of orientation within the new health system, being socially isolated, facing language barriers and a general low emphasis on oral health and promotion during the resettlement period, this study is also in agreement with similar studies [25].

The Mean ± standard deviation of DMFT was (3.29 ± 3.46) and for its individual components; decayed teeth, DT (2.17±2.76), missing teeth, MT (1.09±2.03) and filled teeth, FT (0.03±0.26). These observations were expected reason being that majority of the respondents were known to have poor oral hygiene due to the unfavourable conditions they found themselves. These findings is also in keeping with a research done in Germany on oral health status among newly arrived refugees, their results showed that the mean DMFT score was 6.38 with DT, MT and FT showing mean scores of 4.00, 1.46 and 0.92 respectively. And in the same study, only two participants were fully edentulous and the dentate had presence of bacterial plaque and calculus in abundance with almost 80 % of the participants having plaque in all six sextants and almost 60 % having calculus in at least three sextants [23].

Lastly, the relationship between level of oral health status (using oral hygiene index and DMFT) with age group, gender, and marital status, educational and occupational statuses was carried out. It was observed that there was statistically significance between level of oral hygiene with age group ($p=0.008$) and gender ($p=0.032$) only, while other factors revealed no statistically significant relationships. The Pearson's chi-square test for the DMFT scores relationship with the selected socio-demographics (with $p=0.05$), was observed to reveal no statistical significance for all the associated factors (Table 4 & 5).

## Conclusion

This study has revealed that majority of IDPs in Maiduguri do not have good oral health status and hygiene. The study also found out that, gender and age group are associated with oral hygiene.

Stress and some psychological conditions are two of many consequences of internal displacement. These may have dramatically affected the access to dental care and the oral health habits of the IDPs. The government and NGOs should provide regular and free oral health-care services to IDPs who represent a vulnerable group through community outreaches to mitigate their high, unmet treatment needs and improve their oral health quality of life. However, the observed decreased utilization of oral health care clearly concludes the shortage in attempts to help IDPs with oral health level in Maiduguri.


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