IBOM MEDICAL JOURNAL
Vol.15 No.1 January, 2022. Pages 32 - 40
www.ibommedicaljournal.org

Oral hygiene status, oral mucosal lesions and body mass index of children living in internally displaced persons' camps

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Abstract

Introduction: Children are major recipients of the hazards associated with internal displacement.
Objectives: The study assessed the oral hygiene status, oral mucosal lesions (OML) and body mass index (BMI) of children living among internally displaced persons' camps in Plateau state.
Methods: Using a cross-sectional study design, a multi-stage sampling technique was used to select 300 children aged 2 – 13 years with history of ≥2 months IDP camp stay duration from IDPs' camps in Plateau state. An interviewer-administered questionnaire and oral examination was used to collect data. Data was analyzed using SPSS 23. Ethical approval and permissions from relevant authorities were obtained.
Result: A total of 300 questionnaires were distributed and 295 (98.3%) were returned correctly filled. The participants (98.3%) were males (55.6 %) and females (44.4%). Majority (61.3%) had fair oral hygiene status. The mean oral hygiene index (OHI) score was associated with age-group (p=0.001) and camp location (p=0.001) with plaque as main contributor. Oral mucosal lesion prevalence was 2.7%. The mean OHI scores increased with increasing BMI and was significant.
Conclusion: Plaque was the main contributor to the fair oral hygiene status of the children and it was associated with age, camp location and BMI. The prevalence of OML was low.

Key words: Oral hygiene, Oral mucosal lesions, BMI, Internally Displaced Persons

Introduction

Global indices have indicated that over 40.3 million people were internally displaced and 22.5 million refugees as a result of wars, natural disasters, violence due to religious and ethnic/communal conflicts, and nearly 80% were women and children.[1,2] Africa is the continent with the largest number of Internally displaced Persons' (IDPs') in the world.[2] Internal mass displacement of people significantly affects public health and general well-being of affected populations and as well as their host community.[3,4] Children as a vulnerable population are major recipients of the hazards associated with internal displacement, hence, bear greater burdens of health related issues including oral health.[5] The displacement lead to overcrowding, economic and environmental degradation, poverty, poor sanitary and waste management, inadequate safe and fluoridated water, limited accessibility to healthcare, preventable diseases, malnutrition, and unavailability or inadequate supplies of oral healthcare materials among others often take their toll on these vulnerable population.[1,2,6-9] Furthermore, children have unique healthcare needs and they often constitute larger percentage of internally displaced population which further exposes them to wide range of health risks.[1,6,7] Researchers opined that vulnerable groups have less access to preventive and treatment healthcare services including dental

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services, hence, bear disproportionate burden of oral related ailments.[3,6-10] Major environmental changes, such as those caused by natural disasters or conflict situations, are known to create changing impairments, barriers or facilitators in the physical environment to one's activities and participation.[6,12,13] The pattern of livelihood at IDPs' camp is different from that of family lifestyle.[3,6,7,9] Hence, an individual's environment among other things, play huge role on one's functional performance and capacity,[14] as well as maintenance of oral hygiene practices.[13] The recurrent herdsmen-farmers or communal crises, banditry, boko haram insurgency and flooding in villages along River Niger and Benue basins in North-central and North-east geopolitical zones in Nigeria had caused mass movements and resettlement of affected people.[2,8,15] Plateau state has, in recent past, witnessed ethno-religious as well as herders-farmers conflicts with resultant massive displacement and resettlement of people into temporary locations facilitated by state government, religious bodies, Non-Governmental Organization among others. Hence, the internally displaced persons by reason of their environment are influenced by facilitators or barriers in keeping with general and oral hygiene practices which by extension affect their oral health maintenance. More so, each IDP's camp presents its own challenges with varying individual's needs and most energy are often geared towards fulfilling basic physiological needs. Thus, good oral health care is often the least concern to the children and their caregivers whose main worries are where to get food, water and clothing.[3,7,8,16] Hence, when unhealthy eating habits track into later life among these children, it may become predictors of increased/decreased BMI and oral health related problems.[16,17] Although, sub-Saharan Africa countries, which Nigeria belongs to, had witnessed large numbers of internally displaced persons in recent years, there are limited publications on the oral health related problems associated with children living in IDPs' camps on the Plateau. The study assessed the Oral hygiene status, Oral mucosal lesions and Body Mass Index (BMI) of children living among IDPs' camps in Plateau state.

Methods

A descriptive cross-sectional survey was conducted on 300 children aged 2-13 years with history of ≥2 months IDPs' camp stay duration. Study participants were selected from the LGAs of Plateau state where IDPs' camps were located. The two years old represent the age for complete deciduous dentate status for children necessary for assessment of oral hygiene status. Excluded were children aged 2 to 13 years living at the camps that declined to participate and other children that were visitors to the camp. Respondents were selected through a multi-stage sampling technique: IDP camps were present in four (4) LGAs of the state and all the LGAs were selected. A list of IDP camps in each LGA was made and one camp per LGA was selected for the study. Participants from selected camps were determined by stratified sampling method proportionate-to-size. At each camp, every 2nd child was selected by systematic random sampling technique (k = N/n). Data collection was done using the WHO 2013 Oral Health Assessment Form for Children,[18] modified and structured as an interviewer-administered questionnaire to include socio-demographic characteristics, Oral Mucosal Lesions (clinical diagnosis), indices such as OHI-S (Green and Vermilion) and BMI.

Clinical examination

The examination was carried out by two calibrated examiners (dentists) with the respondent sitting on a chair under adequate natural light using sterile mirror, blunt caries explorer/probe or wooden spatula as described in the WHO Oral Health Survey Basic Methods 5th Edition.[18] Pre-test calibration of dentists were conducted by repeated clinical examination using oral hygiene index scores of randomly selected twenty children and inter-examiner reliability of 0.724 kappa's score was achieved. Universal precautions were observed as well. For the deciduous teeth, index teeth recorded was the labial surfaces of the 54, 61, 82 and the lingual surface of 75; for children with mixed dentition we added the buccal surface of 26 and the lingual surface of 46; in the absence of deciduous dentition the buccal surfaces of 16, 26, lingual surfaces of 36, 46 and the labial surfaces of 11, 31 were examined and recorded. In the absence of index teeth, the next adjacent teeth was examined and recorded. Thus, the oral hygiene status for each individual was interpreted and recorded as Good,

Fair or Poor corresponding to scores such as 0.0 - 1.2, 1.3 - 3.0 and 3.1 - 6.0 respectively. Diagnostic criteria for oral mucosal lesions was a breach or ulceration on the oral mucosa and its' location in the oral cavity was recorded also. The BMI were classified as underweight (<5th percentile), Normal (5th - 85th percentile), overweight (>85th <95th percentile) and obese (>95th percentile). Oral hygiene education and tooth brushing technique demonstrations were given to the children and their guardian. The children were also rewarded with free tooth brush and paste after the oral examination.

Data obtained was analyzed using SPSS 23 (IBM Corp., Armonk, NY, USA). The children were divided into 3 dentition age-groups viz; 2 - 5-years (deciduous), 6 - 9-years (early mixed) and 10-13-years (late mixed) for ease of analysis. Quantitative variables were summarized and presented using mean, standard deviation, median and range while frequencies, percentages and charts were used to summarise qualitative variables; gender, ethnicity, educational status, type of care-giver, camp location. Chi-square test and Fisher's exact test (where appropriate) were used to analyse factors associated with respondent's oral hygiene status, oral mucosal lesions and BMI. In all test of significance, p≤ 0.05 was considered statistically significant. Ethical approval and permissions were obtained from relevant authorities; consent was obtained from participant's care-giver while each child gave his/her assent to participate.

Results

A total of 300 participants were interviewed, 295 (98.3%) respondents completed the process while 5 (1.7%) respondents dropped out. The study had males (n=164, 55.6 %) and females (n=131, 44.4%) participants with mean age of 7.67±3.41 years. Among the participants; age-group 10-13 years (n=105, 35.6%), IDPs' camp location 2 (n=105, 35.6%), primary education (n=189, 64.1%) and those with history of >6months camp stay duration (n=258, 87.5%) had the largest representation. Majority (n=181, 61.3%) of the participants had fair oral hygiene status. The highest mean Oral Hygiene Index (OHI) scores were observed among the male participants (1.46±0.50), age group 10-13 years (1.63±0.49), IDPs' camp location 1 (1.64±0.61) and participants with history of 4 - 6 months camp stay duration. The PI-score was the main contributor. However, the mean OHI score was found to be associated with age-group (p=0.001) and IDPs' camp location (p=0.001). Logistic regression analysis revealed significant relationship between mean OHI score with age-group 2-5 years (p=0.001, OR=0.177, 95% C.I=0.092-0.342) and IDPs' camp 3 (p=0.004, OR=0.316, 95% C.I =0.145 – 0.687).

Oral mucosal lesion prevalence was 2.7% (n = 8), higher among females participants. The participants' BMI were categorized as; underweight (<5th percentile, n=62, 21.0%)), Normal (5th - 85th percentile, n=128, 43.4%), overweight (>85th<95th percentile, n=68, 23.1%) and obese (>95th percentile, n=37, 12.5%). Majority of the participants were of the 5th - 85th percentile BMI score and was observed to have more Oral Mucosal Lesions. Furthermore, the mean OHI-scores were observed to increase arithmetically with participants' BMI as underweight (1.23±0.44), normal (1.44±0.45), overweight (1.53±0.48) and obese (1.55±0.49). The BMI score of participants was associated with their mean oral hygiene index scores. (p=0.001, F=5.638) The Post Hoc tests (Duncan) revealed linear increase in mean OHI-Score from normal to obese BMI and with no statistical significance difference observed (p=0.241). (Table 4)

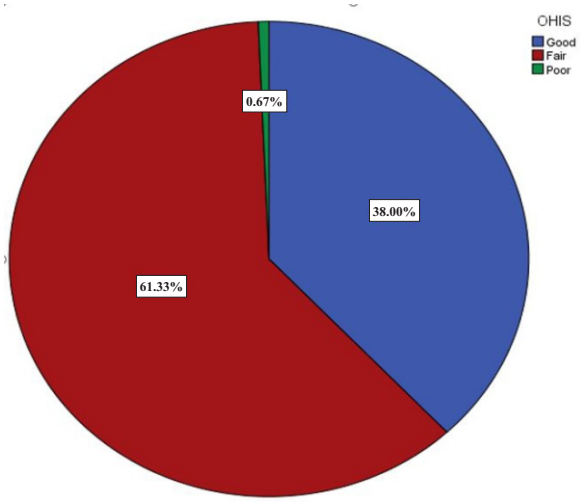

Figure 1: Oral hygiene status of the study participants

The Good, Fair or Poor oral hygiene status of the IDP children correspond to oral hygiene index scores categorized as 0.0 - 1.2, 1.3 - 3.0 and 3.1 - 6.0 respectively.

Table 1: Sociodemographic variables of the study participants

Sociodemographic Variables	Frequency N (295)	Percentage (%)	Mean ± SD
Gender			
Male	164	55.6	
Female	131	44.4	
Total	295	100.0	
Age group			7.67 ± 3.41
2 – 5	90	30.5	
6 – 9	100	33.9	
10 – 13	105	35.6	
Total	295	100.0	
IDPs' Camp location			
Camp 1	53	18.0	
Camp 2	105	35.6	
Camp 3	63	21.3	
Camp 4	74	25.1	
Total	295	100.0	
Level of Education			
Kindergarten/Nursery	68	23.1	
Primary	189	64.1	
Secondary	16	5.4	
Islamic	1	0.3	
None	21	7.1	
Total	295	100.0	
IDPs' camp stay duration			
2 – 4 months	18	6.1	
4 – 6 months	19	6.4	
>6months	258	87.5	
Total	295	100.0	

The males, age-group 10-13 years, IDPs' camp 2, primary level of education and >6months camp stay duration had the largest representation among the study participants.

Table 2: Sociodemographic variables of participants and Oral Hygiene Index scores

	Plaque Index Score Mean ± SD	Calculus Index Score Mean ± SD	OHI Score Mean ± SD
Gender			
Male	1.30 ± 0.33	0.15 ± 0.02	1.46 ± 0.50
Female	1.24 ± 0.28	0.15 ± 0.02	1.40 ± 0.43
T	1.648	0.258	1.060
p-value	0.100	0.797	0.290
Age group (years)			
2 – 5	1.22 ± 0.39	0.03 ± 0.01	1.26 ± 0.43
6 – 9	1.25 ± 0.25	0.12 ± 0.02	1.37 ± 0.40
10 - 13	1.35 ± 0.27	0.28 ± 0.02	1.63 ± 0.49
ANOVA	4.826	38.901	18.260
p-value	0.009*	0.001*	0.001*
IDPs' Camp location			
Camp 1	1.39 ± 0.39	0.25 ± 0.04	1.64 ± 0.61
Camp 2	1.33 ± 0.29	0.10 ± 0.02	1.44 ± 0.41
Camp 3	1.13 ± 0.31	0.10 ± 0.02	1.23 ± 0.43
Camp 4	1.25 ± 0.21	0.19 ± 0.02	1.43 ± 0.38
ANOVA	8.567	7.363	8.006
p-value	0.001*	0.001*	0.001*
Duration of camp stay (months)			
2 – 4	1.21 ± 0.20	0.24 ± 0.17	1.45 ± 0.30
4 – 6	1.29 ± 0.26	0.18 ± 0.18	1.47 ± 0.30
=6	1.28 ± 0.32	0.14 ± 0.23	1.42 ± 0.48
ANOVA	0.517	2.264	0.154
p-value	0.597	0.106	0.857

participants, age group 10 -13 years and IDPs' camp 1 had higher oral hygiene index score than their counterparts with dental plaque as main contributor. This was significant with age-group and IDPs' camp location. *Logistic regression analyses revealed statistical significance with age-groups 2-5 years (p=0.001, OR=0.177, 95% C.I=0.092-0.342) and IDPs' camp 3(p=0.004, OR=0.316, 95% C.I =0.145 – 0.687).

Table 3: Distribution of Oral Mucosa Lesions among participants

Variables	Occurrence of OML n (%) Present	Absent	Total	Test statistics (χ^2)	p-value
Gender				6.186	0.024*
Male	1 (0.3)	163 (55.3)	164 (55.6)		
Female	7 (2.4)	124 (42.0)	131 (44.4)		
Age group (years)				1.511	0.495
2 - 5	1 (0.3)	89 (30.2)	90 (30.5)		
6 - 9	4 (1.4)	96 (32.5)	100 (33.9)		
10 - 13	3 (1.0)	102 (34.6)	105 (35.6)		
Location				5.677	0.136
Camp 1	3 (1.0)	50 (17.0)	53 (18.0)		
Camp 2	0 (0.0)	105 (35.6)	105 (35.6)		
Camp 3	3 (1.0)	60 (20.3)	63 (21.3)		
Camp 4	2 (0.7)	72 (24.4)	74 (25.1)		
IDPs' camp stay duration				12.564	0.014*
2 – 4 months	3 (1.0)	15 (5.1)	18 (6.1)		
4 – 6 months	0 (0.0)	19 (6.4)	19 (6.4)		
>6months	5 (1.7)	253 (85.8)	258 (87.5)		
Total	8 (2.7)	287 (97.3)	295 (100)		

OML was observed to be more among females and participants with history of camp stay duration of >6months. OML was statistically significant with gender and camp stay duration.

Table 4: Participant's BMI, Mean OHI scores and the presence of OML

BMI	Frequency n (%)	Mean OHI score	OML Present n (%)
Underweight (<5th Percentile)	62 (21.0)	1.23±0.44	0 (0.0%)
Normal (5th - 85th Percentile)	128 (43.4)	1.44±0.45	7 (87.5%)
Overweight (>85th - <95th Percentile)	68 (23.1)	1.53±0.48	0 (0.0)
Obese (>95th Percentile)	37 (12.5)	1.55±0.49	1 (12.5%)
Total	295 (100.0)	1.43±0.53	8 (100.0)
Test		F (5.638)	Fisher's exact
P-value		0.001*	0.056

Majority of the participants were of Normal BMI and had most of the Oral Mucosal Lesions. However, those with obese BMI had the worse oral hygiene. The BMI of participants was associated with their mean oral hygiene index scores. Post Hoc Test (Duncan) revealed linear increase of OHI-score with participants' BMI from normal to obese. (p=0.241)

Discussion

Internally Displaced Persons are among the most neglected vulnerable populations in the World.[3,7,9] Their protection and assistance are domesticated with national authorities and it becomes problematic in cases where national authorities were contributory to their displacement.[7] When persons are displacement from their homes and communities, women and children are usually more affected by these crises. These children are expected to thrive without a lot of essential needs, including their oral health care needs.[3,4,7,16] The study observed that majority of the children IDP camp stay duration were greater than 6 months. Also, greater number had fair oral hygiene status of which dental plaque was the main contributor. Although similar findings were reported in Abuja among children living in IDPs' camp (mean OHIS = 2.2 ± 0.5),[4] Benin City (73.7%) among institutionalised children,[10] Iraqi IDPs children[9] and Syrian refugee children in Spain,[19] but they were found with higher values. The mean dental plaque index score was also observed to be higher among male respondents, hence poorer oral hygiene status than their female counterparts. This could be attributed to the natural interest of females to be more concerned about their appearance, hence tends to care more about their health.[10] Furthermore, the mean plaque index score as compared to calculus score was also the major contributor to the overall mean oral hygiene index score recorded in gender, all age-groups and camp locations. Comparable observations were reported from previous studies where higher dental plaque index scores were noticed among children from low socioeconomic status[3,9,13,20,21] attributed to poor oral hygiene practices reported among children of similar age category and environment.[22] The mean calculus index score was also observed to increase with increasing age but vary with IDPs' camp locations in the study environment. This implies that the dental plaque deposits had remained unremoved over a long period of time due to lack of good oral hygiene practice such as regular tooth brushing, scaling and polishing, thus necessitating the plaque to calcify.[13] More so, oral hygiene maintenance at mixed dentition stage is often hampered due to incidences of eruption gingivitis being experienced at this period of development.[24] Oral diseases are known to be progressive if no treatment was sought to arrest the situation.[3,4,24,25] Findings were in consonance with other studies in similar environment and age category which reported increase in calculus deposits with increasing age.[4,10] This indicate the need to reinforce supervised tooth brushing among the younger age groups (mixed dentition stage) so as to improve oral hygiene status among respondents and children among such age groups. Parents are known to exert powerful influence on their children as parents' dental health habits influence their children's oral health practices.[6] Researchers in Japan[26] and South America[27] have opined that oral hygiene practices exhibited by children are often shaped by maternal practices.

The study recorded a low prevalence rate (2.7%) of oral mucosal lesions with higher cases observed among females. This low value may not be unconnected with the availability, accessibility and affordability rich varieties of food crops and fruits that strive round the year in the study environment. However, the above finding contradicted the higher prevalence reported Kano state Nigeria (61.9%),[28] Turkey (31.8%),[19] Brazil (40.7%),[29] Chile (37.6%),[30] and in Italy (28.9%).[31] Although our study observed higher prevalence of lesions among females, other researchers reported higher prevalence of lesions among the male in Pakistan (male=31.8% : female=28.5%)[3] and Chile (male = 36.2% : female = 38.9%).[30] Furthermore, in IDPs' camp, children are relatively without much restrictions as compared to family life, they tend to become more active and independent, hence traumatic ulceration (1.0%) was the most common of the lesions from the study environment. Although higher prevalence was reported among higher age group in Chile.[30]

At bivariate analyses, there were statistical significant differences observed between the occurrence of oral mucosal lesions and gender (χ^2=6.186, p=0.024), and camp stay duration (χ^2=12.564, p=0.014). This observation may be attributed to hormonal changes in females as they approach adolescent age. Systemic physiological or pathological changes that results from hormonal effects are also reflected on the oral cavity.[32] Although, majority of the study respondents were between 5th - 85th percentiles of Body Mass Index score but they were found with most of the oral mucosal lesions. Consequently, the presence of oral

mucosal lesion might have further compromise respondents' ability in keeping with the oral hygiene measures, hence greater percentage of participants were observed to have fair oral hygiene status. Furthermore, significant relationship was observed between BMI score and the mean OHI score in the study environment. Increased BMI score may be an indication for increased plaque accumulation from frequent consumption junk foods.[17] Oral hygiene practices when neglected due to influence from environmental factors, the resultant degrading oral hygiene status were worse especially among those with increased BMI scores.

Conclusion:

The oral hygiene status of children living among Internally Displaced Persons' camps in Plateau State was fair signifying inadequate oral hygiene practices by the children. It was observed to be associated with age, camp location and BMI score. Dental plaque and calculus often build up with increasing age which may result to periodontal diseases and eventual tooth fatality or loss at an early age if no intervention is done. The prevalence of OML was low and was observed to be associated with age, camp location and stay duration. The resultant pain from the lesions, if not treated, may hamper feeding and oral hygiene maintenance, thus further compromising the child's oral health status.

Although it is expected that children living among internally displaced persons' camp will have poor oral health however, findings from this study were not so negative. We therefore recommend frequent and an organized oral hygiene demonstrations (with free distribution of oral healthcare materials), preventive oral and health promotions, and interventions by oral health professionals with support from NGOs and Government at all levels.

Acknowledgements: Department of Public Health and other ICOH for Africa Jos staffs that participated in the data collection, oral health promotion and demonstrations.

Conflict of Interest: None

Funding: None

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