



## Physical inactivity among internally displaced persons in Nigeria

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### ABSTRACT

**Background:** Physical inactivity may complicate physical and mental health problems among internally displaced persons (IDPs). This study aimed to assess the prevalence of physical inactivity and its sociodemographic correlates among IDPs in Northeastern Nigeria.

**Methods:** A total of 363 participants recruited from four IDP camps were categorized into physically inactive and active using International Physical Activity Questionnaire. Multiple logistic regression was used to explore the association between physical inactivity and sociodemographic correlates.

**Results:** The prevalence of physical inactivity was 36.2%. Those who were males (Odd Ratio (OR) = 4.52, 95% Confidence Interval (CI) = 2.33 to 8.78) and Kanuri (OR = 2.53, 95% CI = 1.44 to 4.45) were more likely to be physically inactive. Younger participants were less likely to be physically inactive than those who were aged >49 years old.

**Conclusion:** There is a high prevalence of physical inactivity among IDPs in Nigeria, and we found important sociodemographic factors associated with physical inactivity.

### Introduction

Currently, there are about 55 million internally displaced persons (IDPs) globally (Internally Displacement Monitoring Centre (IDMC), 2020). Over 11.1 million (27.4%) of the global IDPs are domicile in sub-Saharan Africa due to perennial conflicts and disasters in the region (IDMC, 2020). While the population of IDPs worldwide exceeds that of refugees in 2018 (55 million vs. 26 million), research and resources have mostly concentrated on refugees rather than IDPs (IDMC, 2020). The United Nations Guiding Principles on Internal Displacement defines IDPs as “persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular 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 state border.” (United Nations Refugee Agency, 1998, p. 1). It is usually challenging to support IDPs due to being geographically dispersed and bureaucratic bottlenecks (United Nations Refugee Agency, 2021), making them a highly vulnerable group.

Nigeria has one of the highest numbers of IDPs in sub-Saharan Africa with over 2.7 million IDPs (IDMC, 2020). The increasing number of IDPs was mostly due to conflict and violence such as communal crisis, militancy, banditry, farmer-herder clashes, and the Boko Haram terrorism in the Northeastern part of the country (Eweka and Olusegun, 2016). About 40% of the Nigerian IDPs are settled in camps or camp-like settings with makeshift shelters usually without basic needs and amenities such as potable water, food, clothing, healthcare, education, and security (International Organization on Migration (IOM) 2018). Borno, a

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Northeastern state is the most affected state, hosting over 1.4 million individuals (IOM, 2018). These IDPs, upon arriving at their new locations are either settled within the host communities or camps.

Most IDPs are plagued with poverty, malnutrition, overcrowding, poor living conditions, and inadequate health care (IOM, 2018; Sheikh et al., 2014), therefore, they are susceptible to infectious diseases such as malaria, diarrhea, and acute respiratory disorders, and non-communicable diseases such as diabetes and cardiovascular disorders (Owoaje et al., 2016; Roberts et al., 2009). Furthermore, IDPs face mental health problems such as post-traumatic stress disorder, depression, and anxiety (Roberts et al., 2009; Sheikh et al., 2014). For example, Sheikh et al. (2014) explored the prevalence of post-traumatic stress disorder among IDPs in Northwestern Nigeria and found that more than one-third (42.2%) had a diagnosis of post-traumatic stress disorder. This is likely due to psychological trauma caused by forceful ejection from their homes and the uncertainties they faced in their host communities and IDP camps.

Although physical inactivity is recognized as a global issue with the level of physical inactivity rising in many countries (WHO, 2018), this could even be a more serious issue for a vulnerable population such as the IDPs. Physical inactivity is a major cause of chronic diseases including type II diabetes, cardiovascular diseases, obesity, and stroke which account for more than 5.3 million deaths worldwide (Lee et al., 2012). Physical inactivity may compound the physical and mental health challenges of the IDPs (Elshahat and Newbold, 2021). Most IDP camps are often congested with a lack of space for recreation and physical activity (IOM, 2018).

Currently, there is very little evidence on the prevalence of physical inactivity among IDPs in sub-Saharan Africa, and many existing studies around the world have been conducted among refugees and asylum seekers. Assessing the prevalence of physical inactivity among IDPs in developing countries like Nigeria is important to highlight public health challenges that may have been overlooked by the government and not-for-profit agencies working to improve the living conditions and quality of life of IDPs. To date, there is no evidence of the prevalence of physical inactivity among IDPs in Nigeria. Therefore, this study assessed the prevalence of physical inactivity and its sociodemographic correlates among IDPs in Northeastern Nigeria.

## Methods

### Setting

Maiduguri is the capital of Borno state and the largest city in the Northeastern part of Nigeria. In 2020, the population of the city is estimated to be around 786,485 and consists of three major ethnic groups; Kanuri, Hausa, and Shuwa Arabs (United Nations, 2018). There are 224 IDP camps or camp-like settings spread across Borno towns and villages (IOM, 2018). Currently, there are 32 registered IDP camps in Maiduguri city, that serve as temporary shelters made to host people from communities and villages ravaged by the Boko Haram insurgency. The IDP camps are located on the outskirts of Maiduguri city and managed by the city government, armed forces, and private or not-for-profit organizations (IOM, 2018).

### Participants and design

Participants aged 18 to 65 years were invited to participate in this study. Participants who resided in any of the camps for at least one month were included in this study. The purpose and aim of the study were explained to the participants and those who agreed to participate, written informed consent was obtained. Four IDP camps within Maiduguri city were selected using a sample of convenience due to the security risk in some of the IDP camps. We could not access other IDP camps because of the escalating violence in the region. Since July, 2009, the Nigerian military and international forces have sustained air and

land combat with the Boko Haram terrorists who occupied parts of the region (Ojo, 2020). Within the four sampled IDP camps, tents were naturally numbered and we started from “tent number 1” and every odd-numbered tent was approached. All the eligible occupants of each of the selected tents were invited to participate in this study. If there were no eligible participants or empty tents, we proceeded to the next odd-numbered tent. Recruitment took place between June 2018 and July 2019. Ethics approval was sought and obtained from the Borno State Emergency Management Agency and the University of Maiduguri Research and Ethics Board.

### Measures

All measures were conducted within the camps, and participants were asked to identify a convenient place where the assessment was carried out. Participants who provided written informed consent were asked to complete sociodemographic information including age, gender, tribe, and religion.

*Hausa version of the International Physical Activity Questionnaire (IPAQ):* The physical activity level, walking, and sedentary behaviour of the participants were assessed using the short form of the Hausa version of the IPAQ. The Hausa version of the IPAQ is a valid and reliable measure of physical activity level with an intraclass correlation value ranging from 0.73 to 0.61 (Oyeyemi et al., 2011a). The questionnaire measures vigorous, moderate, and walking activities. The questionnaire asks the number of days participants engaged in a certain physical activity in the last one week and then the number of hours and minutes they engaged in the activity in one of the days. To reduce burden to recall on the participants, the IPAQ was designed to ask participants their physical activity level in the last one week. To estimate the total minutes per week of physical activity, the vigorous-intensity, moderate-intensity, and walking were multiplied by the corresponding MET value per week and summed to produce the overall physical activity ([www.ipaq.ki.se](http://www.ipaq.ki.se)). Sufficient physical activity was computed by summing the minutes per week of moderate-vigorous intensity physical activity and dichotomized to those who meet the 150 min per week of physical activity and those who did not meet the recommended physical activity (Haskell et al., 2007). Those who did not meet the recommended physical activity of 150 min per week were considered as physically inactive in this study.

*Weight and height:* Participants' weight were measured using a digital weighing scale. Participants were asked to stand upright and look forward while on the weighing scale before a reading was taken. A stadiometer was used to measure the height of the participants in metres. The participants were asked to stand erect with their hands by their side and face forward.

### Sample size calculation

The estimated population of the IDPs in Maiduguri city is 252,217 (IOM, 2018). With the 95% confidence level, p-value set at 0.05 and expected ratio of physical inactive of 50%, a sample size of 384 was required for this study. The sample size calculator can be found at: [http://www.raosoft.com/sample\\_size.html](http://www.raosoft.com/sample_size.html). However, the estimated sample size was not met as participant recruitment was suspended due to the increasing security issues in the IDP camps. A total of 363 participants were recruited for this study.

### Statistical analysis

Descriptive statistics included frequencies, percentages, mean and standard deviations of the participants' sociodemographic characteristics. The prevalence of physical inactivity and sufficient physical activity were presented in percentages. Chi-square test was used to examine the association between physical activity categories (physically active and inactive) and sociodemographic variables. For variables with an expected

count of less than five, Fisher’s exact test was reported. Binary logistic regression was used to determine the association between physical inactivity and sociodemographic variables. Model entry was simultaneous and assumptions for binary logistic regressions were checked and tested prior to statistical analysis. For example, 99.7% of the participants identified as Muslims, therefore, we excluded religion from the regression model to avoid singularity problems. Type 1 error level of 0.05 was used to determine statistical significance and all analyses were conducted using the statistical package SPSS software version 26 (IBM Corp., Armonk, NY).

**Results**

A total of 363 participants out of 390 met the eligibility criteria, consented, and provide usable data, resulting in a response rate of 93% (363/390). Table 1 shows the demographic characteristics of the 363 participants and comprised of 259 females and 104 males. The mean age was 42.8 ± 15.4 years with more participants (38%) aged >49 years. Most of the participants were married (67.5%) and more than a quarter was Kanuri by tribe (32%). The majority of the participants were practicing Islam (99.7%), and never attended school (76.1%). Two hundred and twenty participants (60.5%) had normal BMI, 18.5 to 24.9 kg/m<sup>2</sup>.

A total of 123 (36.2%) were physically inactive and 217 (63.8%) participants were physically active (Table 2). The prevalence of physical inactivity was significant among the gender and age groups. More males (54.9%) than females (28.3%) were physically inactive. The prevalence of physical inactivity was significant among the age group with those who are >49 years with the highest level of physical inactivity (45.9%). Although it was not statistically significant, the highest prevalence of physical inactivity in other categories was single (45.2%), Kanuri (43.4%), those that never attended school (43.4%), and those with BMI < 18.5 kg/m<sup>2</sup> (41.4%).

Table 3 reports result of the multiple logistic regression, adjusted odd ratios (OR) and 95% confidence interval (CI) for the association between physical inactivity and sociodemographic correlates. Three of the covariates showed a statistically significant association. Participants

**Table 1**  
Demographic Characteristics (N= 363)

Variable	Male (N=104)	Female (N=259)	Total (N=363)	P-value <sup>a</sup>
<b>Age group N (%)</b>				0.008
<30	29 (27.9)	41 (15.8)	70 (19.3)	
30-39	13 (12.5)	65 (25.1)	78 (21.5)	
40-49	25 (24.0)	52 (20.1)	77 (21.1)	
>49	37 (35.6)	101 (39.0)	138 (38.0)	
<b>Marital status N (%)</b>				<0.001
Single/never married	26 (25.0)	5 (1.9)	31 (8.5)	
Married	75 (72.1)	170 (65.9)	245 (67.5)	
Divorced	3 (2.9)	84 (32.4)	87 (24.0)	
<b>Ethnic group N (%)</b>				0.084
Hausa	1 (1.0)	9 (3.5)	10 (2.8)	
Kanuri	41 (39.4)	75 (29.0)	116 (32.0)	
Others	62 (59.6)	175 (67.6)	237 (65.3)	
<b>Religion N (%) (N=362)</b>				1.00
Islam	104 (100%)	257 (99.6)	361 (99.7)	
Christianity	0 (0%)	1 (0.4)	1 (0.3)	
<b>Education N (%) (N=360)</b>				<0.001
Secondary/higher	24 (23.8)	12 (4.6)	36 (9.9)	
Less than Secondary	23 (22.8)	27 (10.4)	50 (13.8)	
Never attended	54 (53.5)	220 (84.9)	274 (75.5)	
<b>Body Mass Index N (%) (BMI) kg/m<sup>2</sup></b>				0.009
<18.5	21 (20.2)	53 (20.5)	74 (20.4)	
18.5–24.9	74 (71.2)	146 (56.4)	220 (60.6)	
25.0–29.9	6 (5.8)	50 (19.3)	56 (15.4)	
>30.0	3 (2.9)	10 (3.9)	13 (3.6)	

<sup>a</sup> P-value based on Chi-square test with significance at *p* < 0.05

**Table 2**  
Prevalence of Physical inactivity by socio-demographic

Variable	Prevalence of achieving sufficient physical activity (150min/week)		p-value
	Physically active N (%)	Physically inactive N (%)	
<b>Total population</b>	217 (63.8)	123 (36.2)	
<b>Gender</b>			< 0.001
Female	171 (71.8)	67 (28.2)	
Male	46 (45.1)	56 (54.9)	
<b>Age group</b>			<0.001
<30	50 (73.5)	18 (26.5)	
30-39	55 (74.3)	19 (25.7)	
40-49	52 (73.2)	19 (26.8)	
>49	60 (47.2)	67 (45.9)	
<b>Marital Status</b>			0.54
Single/never married	17 (54.8)	14 (45.2)	
Married	149 (65.1)	80 (34.9)	
Divorced	51 (63.7)	29 (36.3)	
<b>Ethnic group</b>			0.15
Hausa	7 (70.0)	3 (30.0)	
Kanuri	64 (56.6)	49 (43.4)	
Others	146 (67.3)	71 (32.7)	
<b>Religion<sup>1</sup></b>			0.36
Islam	216 (63.9)	122 (36.1)	
Christianity	0 (0)	1 (100)	
<b>Education</b>			0.23
Secondary/higher	21 (63.6)	12 (36.4)	
Less than Secondary	36 (75.0)	12 (25)	
Never attended	159 (62.1)	97 (37.9)	
<b>BMI</b>			0.74
<18.5	41 (58.6)	29 (41.4)	
18.5–24.9	133 (64.9)	72 (35.1)	
25.0–29.9	35 (67.3)	17 (32.7)	
>30.0	8 (61.5)	5 (38.5)	

Note. statistical measure was Chi-square test with significance at *p* < 0.05

<sup>1</sup> Fisher’s Exact test was reported due to more than 20% of the cells have expected count less than 5

**Table 3**  
Association between sociodemographic variables and physical inactivity

Variable	OR	95% CI
<b>Gender</b>		
Male	4.52	(2.33 to 8.78)**
Female	1.00	
<b>Age group</b>		
<30	0.15	(0.06 to 0.42)**
30-39	0.30	(0.15 to 0.63)*
40-49	0.26	(0.13 to 0.52)**
>49	1.00	
<b>Marital Status</b>		
Single/never married	1.78	(0.44 to 7.25)
Married	0.82	(0.43 to 1.54)
Divorced	1.00	
<b>Ethnic group</b>		
Hausa	1.16	(0.26 to 5.05)
Kanuri	2.53	(1.44 to 4.45)*
Others	1.00	
<b>Education</b>		
Secondary/higher	0.51	(0.18 to 1.40)
Less than Secondary	0.47	(0.21 to 1.07)
Never attended	1.00	
<b>BMI</b>		
<18.5	1.26	(0.33 to 4.74)
18.5–24.9	0.83	(0.24 to 2.89)
25.0–29.9	1.07	(0.28 to 4.12)
>30.0	1.00	

Note. OR: odds ratio, the provided coefficients are the adjusted odds ratio and 95% confidence interval. \*\**P* < 0.001; \**P* < 0.01

who were males (OR = 4.52, 95% CI = 2.33 to 8.78) and Kanuri (OR = 2.53, 95% CI = 1.44 to 4.45) were more likely to be physically inactive. Individuals who were younger: <30 (OR = 0.15, 95% CI = 0.06 to 0.42), 30-39 (OR = 0.30, 95% CI = 0.15 to 0.63), 40-49 (OR = 0.26, 95% CI = 0.13 to 0.52) were less likely to be physically inactive than >49 years old.

## Discussion

To our knowledge, this is the first study to determine the prevalence of physical inactivity and its sociodemographic correlates among IDPs in Nigeria and sub-Saharan Africa region. The findings showed that 36.2% of the participants were physically inactive with males and those aged >49 years more likely to be physically inactive.

Our results showed that more than one-third of the participants were physically inactive. The prevalence of physical inactivity among IDPs in this study (36.2%) was higher compared to a sample of Nigerian adults (32%) living in the community (Oyeyemi et al., 2013). Similarly, the prevalence was higher compared to another Nigerian study where 19.2% were reported to be physically inactive (Aliyu et al., 2015). Interestingly, our study and these two Nigerian studies (Aliyu et al., 2015; Oyeyemi et al., 2013) were conducted in the same city. However, our study participants were IDPs living in the camps within or on the outskirts of the city. It is not surprising that a higher prevalence of physical inactivity was found in our study compared to these previous studies (Aliyu et al., 2015; Oyeyemi et al., 2013). IDPs often live in confined, small, and crowded camps with a regimented communal lifestyle that does not support optimum physical activity participation. However, a recent study by Andersen et al. (2021) found a higher prevalence of physical inactivity (43%) among Sahrawi adults living in a refugee setting. Unlike IDPs, refugees are individuals that fled their country due to conflict, war, or violence (United Nations Refugee Agency, 2021). One explanation for this higher prevalence of physical inactivity compared to the IDPs in our study is that refugees often live in an entirely alien, harsh, and debilitating environment, and are sometimes not welcomed by the host community.

Contrary to previous community surveys on physical inactivity (Aliyu et al., 2015; Guthold et al., 2018; Hallal et al., 2012; A. Oyeyemi et al., 2011b), we found that males were four-folds more likely to be physically inactive after adjusting for other variables. For example, data pooling from 358 surveys across 168 countries with 1.9 million participants suggest that females are more likely to be physically inactive (Guthold et al., 2018). However, our finding is consistent with that of Andersen et al. (2021) who reported that male refugees were more physically inactive. Loss of job, unemployment, lack of economic activities, and domestic confinement within the IDPs are some possible reasons for the higher prevalence of physical inactivity among men. While females maintained their traditional household chores and food processing roles that are equally available in the IDP camps.

The prevalence of physical inactivity varied by age group with those who were older than 49 years more physically inactive. Even with different measures and definitions of sufficient physical activity, the evidence that supports the association between increasing age and decreasing physical activity is overwhelming (Aliyu et al., 2015; Colley et al., 2011; Hall et al., 2017; Koyanagi et al., 2017; Milanović et al., 2013). The association found between physical inactivity, age, and gender after controlling for other variables showed the importance of these variables as it relates to physical inactivity among IDPs.

Ethnicity appears to be partially associated with physical inactivity. In our study, participants who were from the Kanuri ethnic group reported a higher prevalence of physical inactivity than 'other' ethnic groups. This resonates with a previous finding from Oyeyemi et al. (2011b) which reported that Nigerian young adults of the Hausa ethnic group origin were more likely to be physically inactive. Ethnicity might be an important factor that could influence physical activity behaviour, especially in Africa, however, it is often difficult to explain this

association. Our findings point to the importance of further exploring the role of ethnicity on physical inactivity.

## Recommendation

This study found that more than one-third of the participants were physically inactive with males and those who were older than 49 years more likely to be physically inactive. The findings of this study have implications for government agencies and not-for-profit organizations that manage these IDP camps to ensure that physical activity is promoted. There is a need for inter-organization collaboration to ensure proper planning and utilization of space to minimize overcrowding within the IDP camps. Ensuring proper layout of the tents or temporary shelters to increase life-space and promote physical activity engagement. Traditional outdoor games such as rope-skipping, wrestling, and football, and physical activity promoting occupations such as gardening, carpentry, and food processing should be encouraged within the IDP camps. Also, improvement of security and reduction in crime within and around the IDP camps could help to promote physical activity participation. Finally, given the limited numbers of research among IDPs, particularly in health promotion, future research could focus on the objective assessment of physical activity, change in physical activity, and its association with physical and mental health.

## Study strengths and limitations

Whilst this may be the first study to assess the level of physical inactivity among IDPs in Nigeria and sub-Saharan Africa region, some limitations should be considered when interpreting the findings of this study. First, the estimated sample size was not attained, therefore, the sample may not be a true representation of the population. Second, only four IDP camps were conveniently sampled due to security challenges; and tents where there are ineligible participants or empty tents, we proceeded to the next tents. This could result into selection bias. However, IOM (2020) reported that there are more females and Kanuri in the IDP camps in Borno State, which is similar with the distribution of our study sample. Finally, a self-reported measure of physical activity was used and there is a possibility that participants could over-reported their physical activity level due to recall bias.

## Conclusion

More than one-third of the participants were physically inactive with gender and age being strong correlates of physical inactivity. The high prevalence of physical inactivity and its associated sociodemographic correlates found among IDPs in Nigeria could provide preliminary evidence on the level of physical inactivity among IDPs. Providing opportunities for IDPs to attain recommended levels of physical activity will help in the prevention and ameliorating of the disease burden of chronic diseases which may potentially contribute to an increase in life expectancy.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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