



Dietary Diversity, Health and Nutritional Status of Inmates in Ilesha and Ife Correctional Centers of Osun state Nigeria

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ABSTRACT

This study investigates the dietary diversity, health, and nutritional status of inmates in Ilesha and Ife Correctional Centers in Osun State, Nigeria. Prisons in Nigeria are total institutions where inmates face strict regulations, limited activities, and constrained personal freedoms. Nutritionally, prisoners in developing countries are at risk of deficiencies due to neglect and economic constraints. The general objective is to investigate the health and nutritional status of inmates in Osun State Correctional Centers. Specific objectives include determining dietary diversity, identifying prevalent diseases, and assessing the nutritional status of inmates. A descriptive cross-sectional study design was adopted. Inmates aged 18 to 65, with more than 3 months of incarceration, were included (n=288). Health status and disease prevalence, anthropometric measurements, and 24-hour dietary recall were collected using a semi-structured questionnaire. BMI categories were calculated, and dietary diversity was analysed using the FAO food groups classification. The majority (87.2%) of inmates had a normal BMI, with mean BMI of 22.30±2.72. Dietary diversity revealed that 49.0% had a low score, 49.7% had an average score, and only 1.4% had a high score. Health status indicated 59.7% apparently healthy inmates, while 40.3% had at least one condition or disease. Common conditions included cracked lips (9.3%) and skin infections (7.2%), while the prevalent disease was ulcer (8.6%). Despite a normal BMI, inmates exhibited low dietary diversity, emphasizing micronutrient deficiencies. The study suggests interventions to improve the quality of prison diets and periodic assessments of nutrient intake. While most inmates have a normal BMI, the study highlights the need for enhanced dietary diversity to address micronutrient deficiencies. Future studies should quantitatively evaluate nutrient intake, leading to targeted interventions for improved dietary quality in prisons.

Introduction:

Prisons in Nigeria are total institutions (Popoola et al, 2023). Inmates locked within their walls are segregated from the outside world, kept under constant scrutiny and surveillance, and forced to obey a strict code of official rules to avoid facing formal sanctions; their personal possessions are taken from them and they must conform to institutional dress and personal appearance norms. Many human functions are strictly curtailed heterosexual activity, friendship, family relationships, society, education, and participation in groups become seriously restricted or cut-off (Alarape et al, 2016). It is an institution designed to warehouse people who have been convicted of crimes, these individuals, known as prisoners or inmates, are kept in continuous custody on a long-term basis (Jones and Fowles, 2023). Individuals who commit the most serious crimes are sent to prison for one or more years; the more serious the offense, the longer the prison term imposed (Mauer 2016). For certain crimes, such as murder, offenders may be sentenced to prison for the remainder of their lifetime (Van Zyl Smit et al, 2014).

Prison is not just a mechanism for inflicting punishment on the prisoner, but also a centre of rehabilitation (Cloud et al, 2023). Prisoners are therefore not freely living people as their life is restricted from the types of physical work they do and control of the quality and quantity of meals they consume (Feyissa 2023).

Prisoners are more susceptible to develop nutritional deficiencies especially micronutrients required for optimum health and prevention of chronic heart diseases and their complications. As such, Prisoners in developing countries are more prone to develop diseases due to dietary deficiencies (Tripathy et al, 2023). Governments and institutions in developing countries usually ignore prisoners regarding their dietary and social requirements because of economic difficulties and also because prisoners are generally disliked and not considered to have any human rights.

Studies have reported that health status of inmates in Nigerian correction centers is associated with unhygienic environment (Abrifor et al, 2023). Coupled with inadequate dietary intake may throw prisoners into the malnutrition infection lifecycle and directly predispose them to nutritional assaults or malnutrition (Lynch 2014). This study therefore poses to measure dietary diversity and investigate the health and nutritional status of inmates in Osun state correctional centers in Nigeria.

Objectives:

General Objective: The general objective of this study is to investigate the health and nutritional status of inmates in Osun State Correctional centers in Nigeria.

Specific Objectives: The specific objectives of this study are to:

- determine the dietary diversity of inmates using a 24hr dietary recall and a 3 days institutional menu
 - identify prevalent diseases and conditions among inmates in
 - determine the nutritional status of inmates
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Methodology:

Study Design

This study is a descriptive cross-sectional was adopted to investigate the health and nutritional status of inmates in Osun State Correctional centers in Nigeria.

Study Location

This study was carried out in the Ilesha and Ife prisons of Osun State, Nigeria. Ilesha and Ife are cities in Osun State, South-west Nigeria. Ilesha prison.

Study Participants

Inmates in Osun State correctional centers who by definition have fouled the Law and are being prosecuted by the Law of the Federal republic of Nigeria.

Sample Size Determination

Sample size for this study will be determined using the Yamane (1967) (Sarmah and Hazarika 2012) sample size determination formula below

$$n = N/1+N(e)^2$$

Average number of inmates in the correctional centres of Osun state in a year is estimated to be = 740.

(Nigeria Correctional service, (Osun state command)

$$n = 259$$

Adjusting the sample size for 10% non-response

$$nf = N/1-f$$

$$nf = 259/ 1- 10\% = 288.$$

A total of 288 respondents were employed for this study.

Inclusion Criteria

Inmates within the age 18 and 65 and have spent more than 3 months and have volunteered to partake in the study will be included

Exclusion Criteria

Inmates facing death sentence and those whose duration is less than 3 months were excluded from the study.

Sampling Technique

Purposive Sampling was used to select of Ilesha and Ife correctional centres while stage 2 is the sampling by proportion used to determine the number of respondents from each correctional centres in Osun state (Ilesha and Ife) Stage 3 involves the simple random sampling technique used to select respondents (male and female) in the individual prisons.

Data Collection

A semi- structured interviewer-administered questionnaire was used to obtain data from the prison inmates on the following.

- a. socio-demographic characteristics
- b. health status, common disease and conditions prevalent in the correctional centres
- c. anthropometric measurement
- d. 24hour dietary recall

Anthropometry of respondents

Anthropometric measurement of inmates was taken and recorded to estimate inmates BMI category.

a. weight

Equipment: A sensitive and portable weighing scale

Weight was taken without shoes and in light clothing, the scale was checked to return to zero after every weighing and the weight was recorded in kilograms.

b. height

Equipment: A graduated scale calibrated on a tie rod.

The calibrated tie-rod was placed against the wall and respondents are asked to stand without shoes backing the wall ensuring that their buttock and head touch the wall before taking the reading; height was recorded in centimeters, and later converted to meters.

Body Mass Index (BMI)

BMI = $\frac{\text{weight(kg)}}{\text{Height (m}^2\text{)}}$

Height (m²)

The BMI value was calculated using the above formula and the result was used to categorize respondents into underweight, normal weight, over weight and obsessed BMI categories.

Data Representation and Analysis

Univariate analysis was presented using descriptive statistics like tables and charts to summarize results. Mean and standard deviations (SD) are calculated for continuous variables. Statistical analysis was carried out using the SPSS version 22.0. 24hr dietary recall and was analyzed for dietary diversity using the FAO food groups classification.

Ethical Consideration

Ethical approval for the study was obtained from the Institute of medical research and training (IAMRAT), University College Hospital; Ibadan as well as the Oyo State Ministry of Health. In addition, permission was obtained from the Nigerian Correctional Service (Osun state secretariat) before data collection at the various correctional centers

Result and Discussion

BMI (Body Mass Index) Distributions of Inmates

Table 1.0 below showed that majority (87.2%) of the respondent are of normal BMI, while 4.1% are underweight, 6.9% are overweight and only 1.7% are suffering from obesity. Mean BMI is 22.30 ± 2.72 ; Mean BMI for male is 22.07 ± 2.53 while mean BMI for female is 24.26 ± 3.89

Table 1.0 BMI (Body Mass Index) Distributions of Inmates

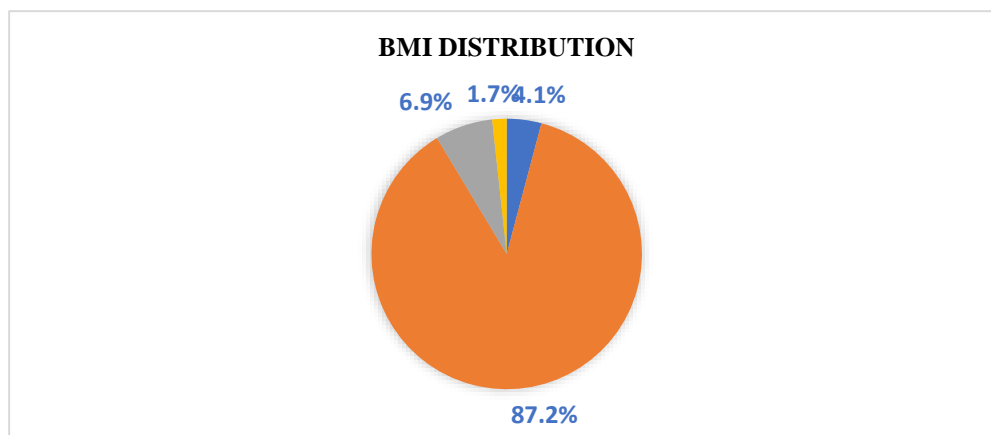


Table 2.0 showing the dietary diversity score of respondents. The result reveals that about half (49.0%) of the inmates have low dietary diversity score, while about half (49.7%) has average dietary diversity score. However, only 1.4% has a high dietary diversity score. Mean dietary diversity score of inmates is 3.61 ± 1.02 .

Table 2.0 Dietary Diversity Score of Inmates

Dietary Diversity score	Frequency	Percentage	Mean \pm SD
Low (0-3 food groups)	142	49.0	3.61 \pm 1.02
Medium (4-6 food groups)	144	49.7	
High (7-9 food groups)	4	1.4	

Table 3.0 shows that 59.7% of the respondents have neither condition nor disease while 40.3% of the respondents have at least one condition or disease. 17.6% of the respondents have one condition and 26 of them have more than one condition. 12.9% of the respondents have one disease while 6.2% of respondents have more than one disease.

Table 3.0 Health status of Inmates

Characteristic	Frequency	(%)
Apparently healthy (No disease nor condition)	173	59.7
At least one condition or disease	117	40.3
One condition	51	17.6
More than one condition	26	9.0
One disease	37	12.9
More than one disease	18	6.2

Table 4.0 below shows the common conditions or diseases found among the respondents. Result revealed that Fever (6.6%), short sightedness (6.6%), Skin dermatoses (7.2%), and Cracked lips (9.3%) are the most common conditions identified among the respondents while the most common disease is Ulcer (8.6%).

Table 4.0 Prevalence of Diseases and Conditions Among Inmates

Conditions	Frequency	(%)	Diseases	Frequency	(%)
Short sightedness	19	6.6	Hypertension	5	1.7
Back-pain	10	3.4	Diabetes	1	0.3
Bloody stool	2	0.7	Malaria	3	1.0
Blurry Vision	9	3.1	Ulcer	25	8.6
Chest pain	2	0.7	Tuberculosis	2	0.7
Cold	4	1.4	Brain damage	1	0.3
Eye pain	5	1.7	Epilepsy	1	0.3
Fever	19	6.6	Asthma	2	0.7
Cracked lips	27	9.3	Anaemia	3	1.0
Mouth sore	7	2.4			
Skin dermatoses	21	7.2			

Discussion

The result obtained showed that the Inmates have a normal BMI. Overall Mean BMI is 22.30 \pm 2.72; Mean BMI for male is 22.07 \pm 2.53 while mean BMI for female is 24.26 \pm 3.89. This suggest that most inmates have a normal weight. Where weight it an important indicator of health it may not totally be applicable to inmates who are in confinement and have reported to not engage in recreational activity, leading to moderate or sedentary physical activity. This is consistent with complain et al (2019) on physical activity on men who are incarcerated where approximately 73% of participants reported sometimes or never engaging in recreation-time physical activity.

It is also revealed that half of the inmates have low dietary diversity score. Among the nine food groups in the FAO measurement for Individual dietary diversity; starch, legumes and nuts with Fats and oils are food groups mostly consumed by inmates while Vitamin A rich fruits and vegetables, other fruits, other vegetables, Milk and Egg are poorly consumed. The 24 hour recall shows that the major foods consumed by inmates was majorly Beans, cassava flakes (garri), eba and soup called shapa. This soup (shapa) is a soup peculiar to the prison environment. Also, about half (49%) of the inmates have a low dietary diversity score which is an indicator of micronutrient deficiency among respondents.

Beans porridge is popularly called good morning, Nigeria by most inmates, because it is served as their everyday breakfast. The served is described to be with a lot of water, tastes bland and looks unappealing. A ration of beans in the correctional centre is estimated to be about 238g.

The health status of inmates revealed that while more than half (59.7%) of inmates look apparently healthy (have neither a disease nor condition), 40.3% of the inmates have at least one condition or disease. The most prevalent condition is cracked lips (9.3%), followed by skin infections (7.2%), short sightedness (6.6%) and fever (6.6%). Previous studies have also associated low serum vitamin D to the onset of Myopia (short sightedness) in young adults. Yazar et al found an association between low serum 25 hydroxyvitamin D₃ (25(OH)D₃) and Myopia among young adults in western Australia

(Yazar et al, 2014). More recently, a systematic review by Tang et al 2019, also found the same association and concluded that lower levels of 25 hydroxyvitamin D₃ (25(OH)D₃) is associated with increased risk of Myopia. However, the most prevalent disease is ulcer (8.6%).

Conclusion

The study revealed that most inmates, despite having a normal weight or BMI have low dietary diversity, eating from only a few groups of food. Inmates are also experiencing some conditions which are related to micronutrient deficiency. This suggests existing deficiency of certain vitamins and minerals. Further studies should quantitatively evaluate nutrient intake for accuracy and periodic interventions tailored at ensuring improving quality if diet in prisons should be established.

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