Original Research Article

An Examination of Physical Activity, Non-Communicable Diseases, and Health Screening among People Living with HIV in Zamfara State, Nigeria

ABSTRACT

Aim: This study provides a comprehensive analysis of physical activity levels, non-communicable disease prevalence, and health screening practices of people living with HIV in Zamfara State, Nigeria.

Methodology: A total of 424 individuals living with HIV (PLWH) in Zamfara State, Nigeria.

Results: The socio-demographic analysis reveals that the study participants were predominantly within the age group of 30-39 (38.7%) and were mainly female (70.3%). In terms of ethnicity, Hausa was the most common (75.7%), followed by Yoruba (9.7%) and Igbo (4.7%). The participants were largely married (57.8%) and had no formal schooling (45.8%). Physical activity levels were evaluated based on the time spent on different domains of activity in a typical week. The mean time spent on vigorous intensity activity was 28.6 minutes per week, while moderate-intensity activity and walking/cycling were higher at 69.9 minutes and 205.1 minutes per day, respectively. However, 47.2% of participants overall did not meet WHO recommendations on physical activity for health, with females demonstrating a higher rate of non-compliance (50.7%) compared to males (38.9%). A notable aspect of the study is the examination of the prevalence of non-communicable diseases (NCDs) among the participants. Overall, the highest prevalence was seen for raised blood pressure (10.4%), followed by cardiovascular diseases (7.3%) and raised blood sugar (4.0%), while raised cholesterol levels were minimal (0.2%). Females presented a higher prevalence of raised blood pressure and cardiovascular diseases. The study also scrutinized health screening practices, revealing that the screening for cervical cancer among female respondents was worryingly low at 2.3%. The mean weight and height for both sexes were 63.8 Kg and 1.6 meters, respectively. The mean Body Mass Index (BMI) was found to be 23.5 for males and 25.5 for females. Concerningly, 37.5% of the population had a BMI greater than 25, indicating overweight or obesity, with a higher prevalence among females (31.8%) than males (7.6%).

Conclusion: This study provides valuable insights into physical activity trends, non-communicable disease prevalence, and health screening practices among PLWH in Zamfara State, Nigeria. The findings underline the importance of tailored interventions to promote physical activity, manage non-communicable diseases, and encourage routine health screenings in this demographic.

Keywords: Health Screening, Non-Communicable Diseases, People Living with HIV, Physical Activity

1. INTRODUCTION

People Living with HIV (PLWH) face multifaceted health issues related to the immunodeficient condition of their bodies, as well as the subsequent susceptibility to other health issues such as non-communicable diseases (NCDs). The advent of Antiretroviral Therapy (ART) has considerably improved the life expectancy of PLWH, turning HIV/AIDS into a chronic, manageable condition. However, the longer life expectancy now exposes these individuals to an increased risk of NCDs, some of which are associated with the side effects of long-term ART [1]. This research investigates the role of physical activity, NCDs, and health screening among PLWH in Zamfara State, Nigeria.

In Nigeria, NCDs have emerged as a significant health problem among the general population. According to the World Health Organization (WHO), NCDs accounted for 29% of deaths in Nigeria in 2018 [2]. Among PLWH, the prevalence of NCDs is notably high, and it poses a significant threat to their

health status. A study by Nduka, *et al*., [3] suggested a double burden of HIV and NCDs among PLWH in sub-Saharan Africa, including Nigeria.

Physical activity is known to be an effective intervention for the prevention and management of several NCDs. It is well established that regular physical activity can lower the risk of hypertension, cardiovascular diseases, diabetes, and several cancers [4]. Despite the growing evidence, the benefits of physical activity for PLWH in resource-limited settings like Zamfara State have not been fully explored.

Health screenings can play a crucial role in early detection, management, and reduction of NCDs among PLWH [5,6]. However, there's a dearth of data on the coverage and impact of health screening services for NCDs among PLWH in Zamfara State.

Considering the high burden of NCDs among PLWH, the potential benefits of physical activity, and the role of health screenings, this study is warranted. It aims to fill this gap in literature by providing crucial insights that may guide health interventions targeted at PLWH in Nigeria.

2. RESEARCH METHODOLOGY

2.1 Study Area

This study was carried out at two tertiary centers in Gusau the capital city of Zamfara state in northwestern region of Nigeria. Federal medical center and Yariman Bakura specialist hospital Gusau. The two tertiary hospitals are situated in Gusau the capital city and the administrative headquarters of Zamfara state, north-western Nigeria. The state has 14 local government areas, it covers a total surface area of 39,762 km^2 with coordinates 12°10′N 6°15′E and an estimated population of 3,278,873. The centers provide comprehensive HIV treatment, which includes HIV testing, and counseling (HTC), Adult and Pediatric antiretroviral treatment (ART) and prevention of mother to child transmission of HIV (PMTCT). As at the end of 2019, over 5000 patients were receiving HIV testing and treatment in these hospitals. The hospitals received technical support for management of HIV/AIDs from Chemonics international and institute of human Virology Jos.

Figure 1: Map of Zamfara State

2.2 Study Design

The study was a cross-sectional study design among PLWH attending ART clinics at federal medical centres Gusau and Yariman Bakura Specialist Hospital Gusau, Zamfara state Nigeria.

2.3 Study Population

The target populations are People living with HIV (PLWH) attending ART centres at federal medical centres Gusau and Yariman Bakura Specialist Hospital Gusau, Zamfara state Nigeria.

2.3.1 Inclusion Criteria

The participants who were considered for study have met the following inclusion criteria.

- ✓ Patients aged 18 years and above.
- ✓ Patients who had received ART for more than 3 months.
- ✓ Consented to participate in the study.

2.3.2 Exclusion Criteria

- ➢ Patients physically or mentally unstable
- ➢ Pregnant women or under 18 years

2.4 Sampling Technique

The sampling units or populations are People living with HIV/AIDs receiving ART at Federal medical centre Gusau and Yariman Bakura specialist Hospital Gusau Zamfara. The Kish Leslie formula for descriptive studies (Kish, 1965) was adopted to estimate the needed sample size to determine the prevalence of NCDs and identify risk factors among people with HIV/AIDs receivingART at Federal medical centre and Yariman Bakura specialist

Hospital, Zamfara state. A prevalence of 50% was used toestimate the maximum sample size required.

$$n = \frac{(Z^2 \times P \times Q)}{d^2}$$

n: The required sample size

Z: standard normal value at 95% level of confidence (1.96)

P: Prevalence of the NCDs in HIV/AIDs patient selected is unknown (assuming 50%)

d: Allowing an error of 5%

Q: (1-P)

$\mathbf{n} = \frac{1.96^2 \text{x } 0.5 \text{ x } (1-0.5)}{0.05^2}$ = 385 patients or participants

The minimum sample size was 385 and was adjusted to 424 to account for non-response rate of 10%.

A random sampling was used to select study participants. All Patients that reported to the twice weekly ART clinics for follow up visits were invited to participate within the study period (from April to May 2020). All patients who agreed to participate were required to complete an informed consent form which was administered by trained research assistants.

2.5 Instrumentation

The main instrument used for data collection was a structured questionnaire. This questionnaire was divided into sections that covered demographics, physical exercise, medical history, and non-communicable diseases.

2.5.1 Validity of the Questionnaire

To ensure content and construct validity, the questionnaire was developed in collaboration with experts in HIV care, physical activities, non-communicable diseases, and public health. A pilot study was conducted with a small subset of the population (n=30) to test the clarity and relevance of the questions. Their feedback was incorporated into the final version of the questionnaire.

2.5.2 Reliability of the Questionnaire

The reliability of the questionnaire was evaluated using Cronbach's alpha coefficient. This statistical measure assesses the internal consistency of a set of scale items. The Cronbach's alpha value for the questionnaire was found to be 0.85, indicating a high level of reliability and internal consistency.

2.6 Data Collection

The data for this study was collected by six trained data collectors using the slightly modified world health organization Stepwise approach questionnaire for non-communicable diseases surveillance. Experienced data collectors familiar with the HIV/AIDS clinic data were recruited and trained to conduct the interviews. Mostly, part-time staff working within the ART were used as research assistants (RAs). They have bachelor's degree in health-related discipline. Five data collectors and one supervisor were trained for a day at the ART clinic of FMC Gusau. The focus of the training was to understand the following: Overview of the study, what the study was all about, conducting interviews, observing research ethics, introduced to the WHO steps questionnaire, doing a finger prick, how to take BP using automatic BP apparatus and keeping records. During the training mock interviews were conducted and physical measurement before commencement of proper data collection.

2.7 Data Analysis

All study data was checked for accuracy, completeness and consistency at the end of each working day by the Principal Investigator, and any identified errors were corrected at the same time. Then an excel table was created using the WHO steps questionnaire, all the filled questionnaires were entered in the excel sheet. Thereafter, the data was cleaned and imported into the SPSS (version 23) for Analysis.

2.8 Ethical Consideration

Relevant ethical clearance was obtained from Zamfara State Ministry of health Ethics committee on research. The study procedure was explained to the patients and informed verbal consent was also obtained from each of the participants and participation was absolutely voluntary. The participants were free to withdraw from the study at any time without any adverse effect on their care. Confidentiality was maintained by using codes on questionnaires with no names and all information and completed questionnaires was kept in a locked safe accessible to only the researcher, the supervisor and examiners when needed.

3. RESULTS

The results showed that 70.3% of the participants are female and 38.7% of participants are between 30-39 years old (Table 1). On average, participants spend around 28.6 minutes on vigorous intensity activities each week (Table 2), however 50.7%

of the female participants and 38.9% of the male participants do not meet the World Health Organization's recommendations for physical activity (Table 3). Table 4 provides the percentage of participants with a history of common non-communicable diseases (NCDs) such as raised blood pressure, raised blood sugar, raised blood cholesterol, and cardiovascular diseases. It is segmented by overall prevalence, age group, gender, and ethnic group. Table 5 shows the percentage of female participants who have ever had a cervical cancer screening test, broken down by age group. The table shows a very low percentage of women have been tested across all age groups. Table 6 provides the mean weight and height of the participants, segmented by gender. Both males and females have almost similar average weights and heights. Table 7 provides the mean Body Mass Index (BMI) of the participants, segmented by gender. The average BMI is slightly higher in females than in males. Table 8 shows the percentage of participants with a BMI of 25 or more (considered overweight or obese), broken down by age group and gender. Overall, 37.5% of participants fall into this category, with females having a higher percentage (31.8%) than males (7.6%).

Table 1: Socio-Demographic Distribution of Study Participants

Demographic Characteristics	Frequency (n = 424)	Percentage (%)
Age group		
18-29	93	21.9
30-39	164	38.7
40-49	108	25.5
50-59	44	10.4
≥ 60	15	3.5
Gender		
Male	126	29.7
Female	298	70.3
Ethnic group		
Hausa	321	75.7
Yoruba	41	9.7
Igbo	20	4.7
Others	42	9.9
Marital Status		
Never Married	35	8.3
Married	245	57.8
Separated	54	12.7
Divorced	19	4.5
Widowed	79	16.5
Cohabiting	1	0.2
Refused	0	0
Educational level		
No formal schooling	194	45.8
Primary school	45	10.6
Secondary school completed	131	30.9

College/University graduate	51	12.0
Postgraduate	2	0.5
Refused	1	0.2

Table 2: Mean and standard deviation of time spent on different domains of physical activity in a typical week among PLWH in Zamfara State

Time spent on various intensity activities	N	Mean (minutes)	Std. Deviation
Time spent in minutes doing Vigorous intensity activity in a week	424	28.6	±12.3
Time spent in minutes doing moderate intensity activity in a week	424	69.9	±17.4
Time spent in minutes walking and/or cycling in a day	424	205.1	±38.1
Time spent on Vigorous intensity sport in a week	424	16.7	±6.4
Time spent on moderate intensity sport in a week	424	20.7	±9.7

Table 3: Percentage not meeting WHO recommendations on physical activity for health among study participants

Variables	Percent not meeting WHO recommendations on physical activity for health								
	Male			Female			Both sexes		
Age group	n	% not meeting recs	95% CI	n	% not meeting recs	95% CI	n	% not meeting recs	95% CI
18-29	4	3.2	0.1-6.2	39	13.1	9.3-16.9	43	10.1	7.3-13.0
30-39	16	12.7	6.9-18.9	67	22.5	17.7-27.2	83	19.6	15.8-23.4
40-49	16	12.7	6.9-18.9	32	10.7	7.2-14.3	48	11.3	8.3-14.3
50-59	12	9.7	4.4-14.7	10	3.4	1.3-5.4	22	5.2	3.1-7.3
≥ 60	1	0.8	0.0-2.3	3	1.0	0.0-2.1	4	0.9	0.0-1.9
Overall	**49**	**38.9**	**30.4-47.4**	**151**	**50.7**	**45.0-56.4**	**200**	**47.2**	**42.4-51.9**

Table 4: Proportion (%) with 95% confidence interval of study participants with History of common NCDs

Demographic Characteristics	History of raised blood pressure %	History of raised blood sugar	History of raised blood Cholesterol	History of Cardiovascular diseases
Overall prevalence	**10.4 (7.5-13.3)**	**4.0 (2.1-5.9)**	**0.2 (0.0-0.7)**	**7.3 (4.8-9.8)**
Age group				
18-29	1.4 (0.2-2.5)	0.5 (0.0-1.1)	0.0 (0.0-0.0)	2.1 (0.8-3.5)
30-39	4.0 (2.1-5.9)	1.2 (0.2-2.2)	0.0 (0.0-0.0)	0.9 (0.0-1.8)
40-49	2.8 (1.3-4.4)	0.7 (0.0-1.5)	0.2 (0.0-0.7)	2.4 (0.9-3.8)
50-59	2.1 (0.8-3.4)	1.7 (0.4-2.9)	0.0 (0.0-0.0)	1.4 (0.3-2.5)
≥ 60	1.0 (0.0-0.0)	0.0 (0.0-0.0)	0.0 (0.0-0.0)	0.4 (0.0-1.1)
Gender				
Male	2.4 (0.9-3.8)	1.4 (0.-2.8)	0.0 (0.0-0.0)	1.7 (0.4-2.9)
Female	8.0 (5.4-10.6)	2.6 (1.1-4.1)	0.2 (0.0-0.7)	5.7 (3.5-7.9)
Ethnic group				
Hausa	7.8 (5.2-10.3)	3.1 (1.4-4.7)	0.2 (0.0-0.7)	4.5 (2.5-6.5)
Yoruba	0.5 (0.0-1.1)	0.5 (0.0-1.1)	0.0 (0.0-0.0)	1.7 (0.4-2.9)
Igbo	0.5 (0.0-1.1)	0.2 (0.0-0.7)	0.0 (0.0-0.0)	0.5 (0.0-1.1)
Others	1.7 -(0.4-2.9)	0.2 (0.0-0.7)	0.0 (0.0-0.0)	0.7 (0.0-1.5)

Table 5: Percentage of female respondents who have ever had a screening test for cervical cancer among all female respondents

Age Group	Female		
	n	% ever Tested for cervical cancer	95% CI
18-29	5	1.7	0.2-3.1
30-39	0	0	0.0-0.0
40-49	2	0.7	0.0-1.6
50-59	0	0	0.0-0.0
≥ 60	0	0	0.0-0.0
Total	7	2.3	0.6-4.1

Table 6: Mean Weight and Height among PLWH by gender in Zamfara State

Gender	Mean weight (Kg)	95% CI	Mean height (Meters)	95% CI

Male	64.1	61.8-66.4	1.7	1.6-1.7
Female	63.7	62.0-65.3	1.6	1.6-1.6
Both sexes	**63.8**	**62.4-65.2**	**1.6**	**1.6-1.6**

Table 7: Mean and 95% CI of Body Mass Index (BMI) by sex among PLWH in Zamfara State

Gender	Mean BMI	95% CI
Male	23.5	22.6-24.4
Female	25.5	24.8-26.2
Both sexes	**24.9**	**24.3-25.5**

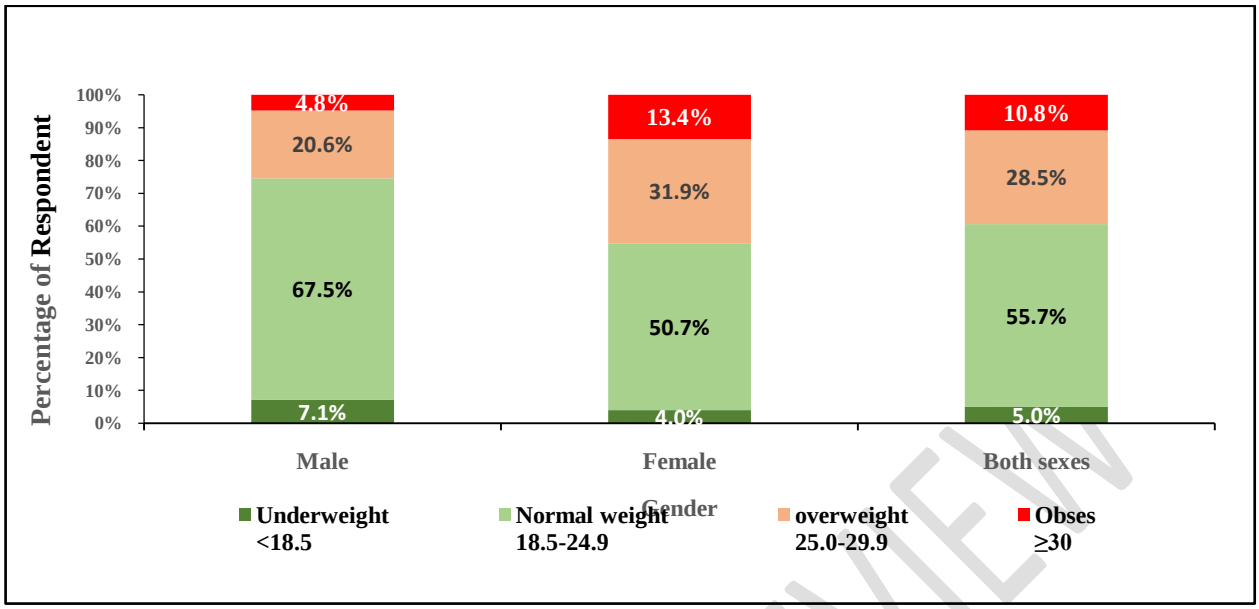

Figure 2: Distribution by BMI category, by sex among study participants

Table 8: Percentage of respondents with BMI >25 (overweight and obese)

Variables	Percentage of respondents with BMI ≥ 25 (overweight and obese)								
	Male			Female			Both sexes		
Age group	n	% with BMI ≥ 25	95% CI	n	% with BMI ≥ 25	95% CI	n	% with BMI ≥ 25	95% CI
18-29	2	1.6	0.0-3.8	23	7.7	4.7-10.8	25	5.9	3.7-8.1
30-39	10	7.9	3.2-12.7	62	20.8	16.2-25.4	72	17.0	13.4-20.6
40-49	10	7.9	3.2-12.7	31	10.4	6.9-13.9	41	9.7	6.9-12.5
50-59	5	4.0	0.6-7.4	14	4.7	2.3-7.1	19	4.5	2.5-6.5
≥ 60	5	4.0	0.6-7.4	5	1.7	0.2-3.1	10	2.4	0.9-3.8
Overall	**32**	**7.6**	**5.0-10.1**	**135**	**31.8**	**27.4-36.3**	**159**	**37.5**	**32.9-42.1**

DISCUSSION

This research examined the relationship between physical activity, non-communicable diseases (NCDs), and health screening among people living with HIV (PLWH) in Zamfara State, Nigeria. The study presented in-depth data regarding the sociodemographic characteristics of the respondents, the amount of time spent on various physical activities, adherence to WHO recommendations on physical activity, the prevalence of NCDs, cancer screening, and body metrics such as weight, height, and BMI.

Demographically, the majority of the study participants were in the age group of 30-39 years (38.7%), female (70.3%), of the Hausa ethnic group (75.7%) and married (57.8%). It was noted that 45.8% of the participants did not have formal schooling, highlighting the need for health interventions and information to be accessible and easily understood by all groups [7]. These findings align with the broader socio-demographic context of Zamfara State, and Nigeria more broadly, where gender, age, and ethnic disparities exist in terms of access to education and health services [8].

Regarding physical activity, PLWH in Zamfara state appeared to be engaged more in moderate-intensity activities and walking or cycling daily. Participants reported spending

an average of approximately 28.6 minutes per week on vigorous-intensity activity, 69.9 minutes on moderate-intensity activity, 205.1 minutes per day walking or cycling, 16.7 minutes on vigorous-intensity sports, and 20.7 minutes on moderate-intensity sports (Table 2).

However, a significant percentage of the study population (47.2%) did not meet the World Health Organization's (WHO) recommendations for physical activity for health, with females (50.7%) being less likely than males (38.9%) to meet these guidelines (Table 3). The 30-39 age group reported the highest non-compliance across both sexes (19.6%). This discrepancy between reported activity (Table 2) and WHO guideline adherence (Table 3) suggests that while participants may be relatively active, they are not necessarily reaching internationally recommended levels of activity to optimally support their health. This figure is concerning, especially considering that regular physical activity is linked with improved health outcomes and reduced risk of non-communicable diseases (NCDs) [9]. This underscores the need for further interventions to promote physical activity among PLWH, as previous research has shown that physical activity can improve the health outcomes of people with HIV [10]. Given the demonstrated benefits of physical activity in managing HIV-related health outcomes [11], these findings suggest that participants are generally engaged in active lifestyles.

The prevalence of common NCDs among the study participants included raised blood pressure (10.4%), raised blood sugar (4.0%), raised blood cholesterol (0.2%), and cardiovascular diseases (7.3%). These rates of NCDs are relatively high, especially considering the potential negative implications for people living with HIV [12]. It has been reported that NCDs are common comorbidities in PLWH and need to be properly managed in this population to prevent complications [3]. Females had higher percentages in almost all NCDs categories except raised blood sugar, which was slightly higher in males. This could be due to factors like biological differences, health behaviour, or differential access to healthcare [5]. This is a point of concern, especially considering that PLWH have an increased risk of developing cervical cancer [13].

Cervical cancer screening among the female participants was disconcertingly low, with only 2.3% of all female respondents having ever been tested. Previous research has found that women living with HIV are more likely to develop cervical cancer, underlining the urgent need to increase screening rates in this group [14]. This aligns with broader research highlighting barriers to cervical cancer screening in Nigeria, including lack of awareness, fear, and access issues [15].

The mean weight and height among the study participants were fairly similar across both genders. However, the mean body mass index (BMI) was higher in females (25.5) compared to males (23.5), with 37.5% of the participants being overweight or obese (BMI ≥ 25). The prevalence of overweight and obesity among PLWH has been associated with an increased risk of NCDs [16]. Given that the population already has a high risk of NCDs due to their HIV status, overweight, and obesity are additional risk factors that need to be addressed. Obesity is a known risk factor for NCDs, including heart disease, stroke, and diabetes, further compounding health risks for PLWH [17]. These findings align with global trends indicating a higher prevalence of overweight and obesity among women, including those living with HIV [11].

CONCLUSION

The findings from this study provide valuable insights into the physical activity, health screening, and prevalence of non-communicable diseases (NCDs) among people living with HIV (PLWH) in Zamfara State, Nigeria. The demographic characteristics of the study population were primarily females, aged between 30 and 39, with no formal schooling, and belonging to the Hausa ethnic group. The study discovered a low mean time spent on vigorous intensity activity and sports among PLWH. Furthermore, approximately half of the participants did not meet the WHO recommendations on physical activity for health. The research also exposed a significant prevalence of NCDs such as raised blood pressure, raised blood sugar, raised blood cholesterol, and cardiovascular diseases. The proportions of these NCDs increased with age and were higher in females than males. Additionally, the study observed that the majority of the females had never been tested for cervical cancer, indicating a lack of health screening among this vulnerable population. The mean weight and height of both sexes were comparable, with a higher mean BMI observed among the female participants. Notably, about 37.5% of the respondents had a BMI of 25 or above, suggesting overweight or obesity among both sexes.

RECOMMENDATIONS

i. **Increase Physical Activity**: The evidence of suboptimal physical activity levels among PLWH suggests a need for increased focus on promoting physical activity in this population. Health interventions should include the establishment of programs encouraging regular exercise and sports activities tailored to the needs and abilities of PLWH.

ii. **Promote Regular Health Screening**: The low rates of health screening, particularly for cervical cancer among females, are a concern. Therefore, healthcare providers should actively promote the benefits of regular health screening and ensure that these services are readily accessible and affordable for all PLWH.

iii. **Management of Non-Communicable Diseases**: There should be an integrated approach in managing HIV and NCDs, given the significant prevalence of raised blood pressure, blood sugar, cholesterol, and cardiovascular diseases among the respondents. This could involve enhancing existing healthcare services to include routine screening and management of NCDs for PLWH.

iv. **Health Education**: Educational interventions are crucial to improve awareness about the importance of maintaining a healthy lifestyle, including physical activity and balanced nutrition. This is necessary to manage BMI effectively and reduce the risk of NCDs.

v. **Research**: Further research is needed to understand the barriers to physical activity and regular health screening among PLWH in Nigeria. Such research could provide deeper insights into cultural, economic, or logistical issues that could be addressed by future interventions.

vi. **Policy**: Policies should be enacted to ensure that the healthcare needs of PLWH are met, including physical activity promotion, health screening, and the management of NCDs.

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