Tzu Chi Medical Journal 2023; 35 (2): 200-204

Original Article

Effect of anthropometric and sociodemographic variables on physical activity levels of people living with human immunodeficiency virus/acquired immunodeficiency syndrome on highly active antiretroviral therapy

Jane Nwanneka Anikpe[a], Aroh Joseph Chukwu[b], Ekom Ndifreke Edem[c], Adel A E Elahmar[d], Sohini Sinha[e], David Arome[f]*

[a]Department of Physiotherapy, University of Uyo Teaching Hospital, Uyo, Nigeria, [b]Amazing Physiotherapy Clinic, Abuja, Nigeria, [c]Department of Medical Microbiology, University of Uyo Teaching Hospital, Uyo, Nigeria, [d]Hamad Medical Corporation, Qatar, [e]Department of Anthropology, University of Delhi, India, [f]Healthnews.ng, Nigeria

Submission : 16-Jun-2022
Revision : 10-Aug-2022
Acceptance : 30-Aug-2022
Web Publication : 07-Nov-2022

Abstract

Objectives: Physical inactivity plays a major role in promoting disease outcome, but physical activity enhances effective prevention and treatment of chronic diseases; hence, this study was to determine the effect of anthropometric and demographic factors on the physical activity level of people living with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) on antiretroviral therapy. **Materials and Methods:** This study adopted a cross-sectional method of descriptive research design. A sample size of 170 participants was recruited for this research comprising 113 females and 57 males, who after obtaining their informed consent were issued questionnaires which they meticulously filled under a proper guidance. The participants were almost proportionally distributed across the three levels of physical activity, though about half of them had a normal weight of body mass index (BMI) based on the information obtained. **Results:** The study showed that physical activity according to age significantly affected the BMI ($P < 0.05$). Physical activity level according to gender had no statistically significant effect on BMI of people living with HIV/AIDS on antiretroviral drugs ($P > 0.05$). However, it was observed that gender had a significant determining effect on BMI, though not related to PAL. **Conclusions:** The findings possibly imply that the psychological effect and the stigma may be the determining factors for the unwillingness to engage in physical activities. This calls for a renewed sensitization and orientation in this aspect.

Keywords: *Acquired immunodeficiency syndrome, Antiretroviral therapy, Body mass index, Highly active antiretroviral therapy, Human immunodeficiency virus*

Introduction

Since the beginning of human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) pandemic, over 50 million people have become infected with HIV; about 34 million are living and over 18 million have died from acquired immunodeficiency syndrome (AIDS). HIV infects an average of 15,000 persons a day, about 10 every minute, almost 95% live in developing countries [1]. The current use of highly active antiretroviral therapy (HAART)/antiretroviral therapy (ART) has provided an increase in life expectancy in patients infected with HIV [2]; therefore, a new prognosis has been established. Since then, AIDS has become a chronic disease, enabling the use of nonpharmacological approaches such as physical exercises [3], which maintains functionality and quality of life for several years. Therefore, maintaining the physical and functional fitness of patients with HIV/AIDS has become one of the most important therapeutic targets, particularly in the case of "wasting syndrome," which is an important loss of muscle mass [4].

Physical activity is any bodily movement resulting from the contraction of the skeletal muscles. Physical activity simply means exercise such as gardening, washing the car or cleaning the house, walking, and dancing. In the last decade, participation in physical activity has been identified as one way to prevent and manage the adverse effects of HAART [5], which can include cardiovascular disease, lipodystrophy, and glucose or lipid metabolism complications [6]. Several other studies have reported that the benefits of physical activities/

Access this article online

Quick Response Code:

Website: www.tcmjmed.com

DOI: 10.4103/tcmj.tcmj_180_22

**Address for correspondence:* Mr. Ekom Ndifreke Edem, Department of Medical Microbiology, University of Uyo Teaching Hospital, Uyo, Nigeria.
E-mail: ekomedem@gmail.com

How to cite this article: Anikpe JN, Chukwu AJ, Edem EN, Elahmar AA, Sinha S, Arome D. Effect of anthropometric and sociodemographic variables on physical activity levels of people living with human immunodeficiency virus/acquired immunodeficiency syndrome on highly active antiretroviral therapy. Tzu Chi Med J 2023;35(2):200-4.

exercises in people living with HIV (PLHIV)/AIDS, while being treated with HAART, include the improvement of their quality of life and well-being [7,8], their strength [9], and their increasing functional work capacity [10]. The other benefits indicated are psychological effects[11] and self-efficacy [12].

Regular physical activity is strongly associated with better physical and psychological health outcomes, and the promotion of physical activity is now a high public health priority [13]. Determinants of the adoption and maintenance of healthy physical activity behaviors in adults identified to date include demographic factors such as age, sex [14], socioeconomic status, psychosocial factors (social support, self-efficacy), perceived barriers [15], and features of the physical environment.

The purpose of this research was to examine the sociodemographic and anthropometric characteristics that predict the physical activity of PLHIV/AIDS.

Materials and methods

Research design and area of study

This study was a cross-sectional descriptive study, carried out at the PEPFAR Clinic, University of Uyo Teaching Hospital, Uyo, Akwa Ibom State.

Research population

These comprised PLHIV/AIDS on ART attending clinics at the University of Uyo Teaching Hospital, Uyo, who were available between August 2017 and September 2017, when the study was conducted.

Sample size and sampling technique

In this study, 170 participants were recruited using the purposive or judgmental sampling technique, which is an example of a non-probability sampling method.

Inclusion criteria

This study involved patients without severe immunological complications.

Exclusion criteria

Patients who had not been on ART were excluded.

Subject description

The study involved male and female HIV-/AIDS-diagnosed patients on ART attending clinics at the University of Uyo Teaching Hospital, Uyo.

Method of data collection

The purpose, procedures, and relevance of the study were explained to the 170 participants recruited, after which informed consents were obtained. In situations where participants declined, no prejudice was incurred, and where he/she accepted, the study began in earnest.

The questionnaires were administered to the participants and were appropriately completed with a close monitoring/guidance of the researcher. Height and waist/hip circumferences were measured using height meter and measuring tape, respectively. A hydration monitor was also used to measure the weight, percentage body fat, percentage muscle mass, and percentage body bone of the participants. The height and weight measurements were used to determine their body mass index (BMI) measured in kg/m^2, while the waist and hip circumferences were used to determine their waist–hip ratio measured in centimeters (cm).

Ethical consideration

The ethical considerations that were undertaken in the course of this study were as follows:

1. Obtained ethical approval (Ref: UUTH/AD/S/96/Vol XXI/153) from the Medical Research and Ethics Committee of UUTH, Uyo
2. Obtained participants' informed consent.

Method of data analysis

All the gathered data from the participants were entered, coded, and analyzed using SPSS (version 20, SPSS Inc., Chicago, IL, USA). Descriptive statistics was used for data summarization and presentation. Chi-square was used to estimate the correlation/relationship. Alpha level was set at $P < 0.05$.

Results

The data generated from this work were analyzed, and the results presented in [Tables 1-5] according to the research objectives. Table 1 shows the demographic data of participants. It shows that the general sex distribution of participants comprised 57 (33.5%) males and 113 (66.5%) females. Moreover, out of this number, 11 (6.5%) were below 25 years, 113 (66.5%) were between 26 and 45 years, 44 (25.9%) were between 46and 60 years, while 2 (1.2) were between 61 and 100 years of age.

Table 1 shows that 11.8% of the participants were underweight which are about 20, 50% were of normal weight that are about 85, about 25.3% of the participants were overweight, 9.4% of them had level 1 obesity, and 3.5% had obesity level 2. Physical activity level data of the participants showed that 65 (38.2%) of the participants were inactive, 53 (31.2%) were active, while 52 (30.6%) were hyperactive (extremely active) [Table 2].

Table 3 shows that there was a statistical significant relationship between the gross BMI and gender classification with a P value of about 0.000 ($P < 0.05$). This was an indication that there was a marked difference in terms of gender classification.

Table 4 shows the effect of physical activities by age on anthropometric variable (BMI). According to the age of participants, their PAL level actually had a significant relationship with BMI. The active group showed that people with normal weight were more, while people in the inactive group had more overweighed participants. Therefore, it showed

Table 1: Sociodemographic data of participants (n=170)

Variables	Frequency (%)
Sex	
Male	57 (33.5)
Female	113 (66.5)
Age (years)	
0-25	11 (6.5)
26-45	113 (66.5)
46-60	44 (25.9)
61-100	2 (1.2)

n: Number of participants

that the active and inactive PAL group had a significant effect on the BMI ($P < 0.05$).

Table 5 shows that the effect of PAL groups by gender on BMI was not statistically significant ($P > 0.05$). The genders that are active and hyperactive had more participants with normal weight against those who are inactive on physical activities with participants being more of overweight.

Discussion

A properly implemented physical activity demonstrates a tremendous effect in preventing and managing several chronic diseases and health-related conditions. Physical activities are of benefit to both the young and old [16]. The sociodemographic variables of the participants show a fewer number of male participants who are actually not within sexually active range, which visibly implies that there is a need for a fresh trend of sensitization focused mainly on the male population. This is because more women than men report to HIV/AIDS clinics for testing and antiretroviral drugs. The BMI of participants shows that 20 (11.8%) were underweight, 85 (50%) of them within normal weight, and about 43 (25.3%) of the participants were overweight, with 16 (9.4%) of them having level 1 obesity and 6 (3.5%) having obesity level 2. This possibly implies that those living with HIV/AIDS usually tend toward obesity with only a fair fraction of them. This is in line with a work done by Mashinya [17], on weight status and associated factors among HIV-infected people on ART in rural Dikgale, Limpopo, South Africa. Her work showed BMI of the participants as follows: 8.9% were underweight, 54.7% had a normal weight, while 36.4% were overweight. Also supporting this work is a study by Florindo *et al*. [7] which showed that 40% were obese and 43% overweight. The PAL data depict that almost equal number were active and hyperactive, while the inactive group were more than the active and hyperactive groups, respectively. This possibly implies that there are more inactive people among those living with HIV/AIDS, which might be due to sedentary lifestyle of the participants, maybe due to their present health conditions. This is also in line with a work done by Florindo *et al*. [7], on how leisure time and physical activity prevents accumulation of central fat in highly active ART HIV/AIDS participants. The study showed that more than 30% of the participants were physically inactive. There is a statistically significant association between gross BMI and their gender in terms of physical activity levels. The possible implication of the finding is that females who are more of the participants than the males are living sedentary lives as a result of their health condition. This is in line with the result of the study done by Mashinya [17], on weight status and associated factors among HIV-infected people on ART in rural Dikgale, Limpopo, South Africa, which showed that

Table 2: Anthropometric data and physical activity level of participants

Variables	Frequency (%)
BMI (kg/m^2)	
Underweight	20 (11.8)
Normal weight	85 (50)
Overweight	43 (25.3)
Obesity I	16 (9.4)
Obesity II	6 (3.5)
PAL	
Inactive	65 (38.2)
Active	53 (31.2)
Hyperactive	52 (30.6)

Active: Engaged on physical activity, Inactive: Not engaged on physical activity, Hyperactive: Extremely engaged on physical activity. BMI: Body mass index, PAL: Physical activity level

Table 3: Relationship between body mass index and the gender of people living with human immunodeficiency virus/acquired immunodeficiency syndrome

Variables	*n*	SE	*t*	*P*
Gender				
Female	113	0.183	13.464	0.000
Male	57			

SE: Standard error

Table 4: Relationship between physical activity level by age of participants and body mass index of people living with human immunodeficiency virus/acquired immunodeficiency syndrome

PAL	Age	Total	BMI					*P*
			Underweight	Normal weight	Overweight	Obesity I	Obesity II	
Active	0-25	4	3	1	0	0	0	0.000
	26-45	54	5	32	11	2	4	
	46-60	7	0	2	2	3	0	
	Total	65	8	35	13	5	4	
Inactive	0-25	5	4	0	0	1	0	0.015
	26-45	12	2	4	4	1	1	
	46-60	34	2	9	18	5	0	
	61-100	2	1	0	1	0	0	
	Total	53	9	13	23	7	1	
Hyperactive	0-25	2	0	1	0	1	0	0.109
	26-45	47	3	35	5	3	1	
	46-60	3	0	1	2	0	0	
	Total	52	3	37	7	4	1	

Active: Engaged on physical activity, Inactive: Not engaged on physical activity, Hyperactive: Extremely engaged on physical activity. BMI: Body mass index, PAL: Physical activity level

Table 5: Relationship between physical activity level by gender of participants and body mass index of people living with human immunodeficiency virus/acquired immunodeficiency syndrome

PAL	Gender	Total	BMI					*P*
			Underweight	Normal weight	Overweight	Obesity I	Obesity II	
Active	Male	13	1	8	3	0	1	0.763
	Female	52	7	27	10	5	3	
	Total	65	8	35	13	5	4	
Inactive	Male	18	2	4	8	3	1	0.590
	Female	35	7	9	15	4	0	
	Total	53	9	13	23	7	1	
Hyperactive	Male	26	1	21	2	1	1	0.383
	Female	26	2	16	5	3	0	
	Total	52	3	37	7	4	1	

Active: Engaged on physical activity, Inactive: Not engaged on physical activity, Hyperactive: Extremely engaged on physical activity. BMI: Body mass index, PAL: Physical activity level

approximately underweight participants were three times in men (18.6%) than in women (6.4%), whereas overweight was twice as prevalent in women (40.9%) than in men (18.6%). Of this number, 64.6% were classified as sedentary and 35.4% as active. The effect of PAL by age on BMI was statistically significant ($P < 0.05$). This possibly implies that physical activity affects the BMI among PLHIV/AIDS. This finding is supported by a work done by Mendes *et al*. [18], on the beneficial effects of physical activity in HIV-infected women. Also, the present report was supported by Guilherme *et al*. [19] and Karaca *et al*. [20], where they explained that physical activities by age affects BMI. PAL according to gender had no significant effect on the BMI ($P > 0.05$). This possibly implies that gender of the PLHIV/AIDS is not a determinant of the physical activities. Therefore, people of all ages can be inactive, active, or hyperactive in physical activities.

Conclusions

The result of this study reveals that there is a statistically significant effect of age on BMI regarding the physical activity level of PLHIV/AIDS. This study also provides additional support for the well-evidenced correlation of physical activity and anthropometric parameters on health, implying that active people have favorable anthropometric parameters and are healthier than those who are inactive. However, this study reveals the need for renewed energy and attention channeled mainly on the public sensitization with prime focus on males. This call is due to the incessant report and records of females who report to the HIV/AIDS clinics for antiretroviral medications, without their partners knowing what they are going through. Furthermore, people have the notion that there is no need to be tested for HIV/AIDS.

The following conclusions were made from the result of this study.

- Age is a determinant of physical activity level among PLHIV/AIDS
- Gender is not a determinant of physical activity level among PLHIV/AIDS
- That physical activity level is a determining factor for BMI among PLHIV/AIDS
- More females visit HIV/AIDS clinic for testing and medication
- Few males visit the HIV/AIDS clinic
- PLHIV/AIDS do not also walk out or get involved in physical activities due to fear of being stigmatized.

Recommendations

The following recommendations are made based on the findings of this study.

- There is a need to encourage PLHIV/AIDS to get involved in physical activities to improve their health status, fitness level, and general well-being
- People should be enlightened to know their HIV/AIDS status and partners encouraged to disclose their status to each other.

Acknowledgments

The authors thank all participants and Ebisike Gideon Chidiebere for his succinct data analysis.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. UNAIDS (Joint United National Programme on HIV/AIDS). AIDS Epidemic Update; 2009. Available from: http://data.unaids.org/pub/EPIslides/2009/2009epiupdateen.pdf. [Last accessed on 2021 Apr 23].
2. Kitahata MM, Gange SJ, Abraham AG, Merriman B, Saag MS, Justice AC, et al. Effect of early versus deferred antiretroviral therapy for HIV on survival. N Engl J Med 2009;360:1815-26.
3. O'Brien K, Nixon S, Tynan AM, Glazier RH. Effectiveness of aerobic exercise in adults living with HIV/AIDS: Systematic review. Med Sci Sports Exerc 2004;36:1659-66.
4. Souza PM, Jacob-Filho W, Santarém JM, Silva AR, Li HY, Burattini MN. Progressive resistance training in elderly HIV-positive patients: Does it work? Clinics (Sao Paulo) 2008;63:619-24.
5. Amorosa V, Synnestvedt M, Gross R, Friedman H, MacGregor RR, Gudonis D, et al. A tale of 2 epidemics: The intersection between obesity and HIV infection in Philadelphia. J Acquir Immune Defic Syndr 2005;39:557-61.
6. Terry L, Sprinz E, Stein R, Medeiros NB, Oliveira J, Ribeiro JP. Exercise training in HIV-1-infected individuals with dyslipidemia and lipodystrophy. Med Sci Sports Exerc 2006;38:411-7.
7. Florindo AA, de Oliveira Latorre Mdo R, Jaime PC, Segurado AA. Leisure time physical activity prevents accumulation of central fat in

HIV/AIDS subjects on highly active antiretroviral therapy. Int J STD AIDS 2007;18:692-6.

8. Mutimura E, Stewart A, Crowther NJ, Yarasheski KE, Cade WT. The effects of exercise training on quality of life in HAART-treated HIV-positive Rwandan subjects with body fat redistribution. Qual Life Res 2008;17:377-85.
9. Roubenoff R, Wilson IB. Effect of resistance training on self-reported physical functioning in HIV infection. Med Sci Sports Exerc 2001;33:1811-7.
10. Hand GA, Phillips KD, Dudgeon WD, William Lyerly G, Larry Durstine J, Burgess SE. Moderate intensity exercise training reverses functional aerobic impairment in HIV-infected individuals. AIDS Care 2008;20:1066-74.
11. Roubenoff R. Acquired immunodeficiency syndrome wasting, functional performance, and quality of life. Am J Manag Care 2000;6:1003-16.
12. Fillipas S, Oldmeadow LB, Bailey MJ, Cherry CL. A six-month, supervised, aerobic and resistance exercise program improves self-efficacy in people with human immunodeficiency virus: A randomised controlled trial. Aust J Physiother 2006;52:185-90.
13. U.S. Department of Health and Human Services. Healthy people 2000: National health promotion and disease prevention objectives. Washington: US Department of Health and Human Services; 1991.
14. U.S. Department of Health, Human Services. Physicalactivity and Health. A Report of the Surgeon General. US Department of Health and Human Services, Centres for Disease Control and Prevention. Atlanta, Georgia: National Center for Chronic Disease Prevention and Health Promotion; 1996.
15. Ståhl T, Rütten A, Nutbeam D, Bauman A, Kannas L, Abel T, et al. The importance of the social environment for physically active lifestyle – Results from an international study. Soc Sci Med 2001;52:1-10.
16. Turner JE, Lira VA, Brum PC. New insights into the benefits of physical activity and exercise for aging and chronic disease. Oxid Med Cell Longev 2017;2017:2503767.
17. Mashinya F, Alberts M, Colebunders R, Van Geertruyden JP. Weight status and associated factors among HIV infected people on antiretroviral therapy in rural Dikgale, Limpopo, South Africa. Afr J Prim Health Care Fam Med 2016;8:e1-8.
18. Mendes EL, Ribeiro Andaki AC, Brito CJ, Córdova C, Natali AJ, Santos Amorim PR, et al. Beneficial effects of physical activity in an HIV-infected woman with lipodystrophy: A case report. J Med Case Rep 2011;5:430.
19. Guilherme FR, Molena-Fernandes CA, Guilherme VR, Fávero MT, dos Reis EJ, Rinaldi W. Physical inactivity and anthropometric measures in school children from Paranavaí, Paraná, Brazil. Rev Paul Pediatr 2015;33:50-5.
20. Karaca E, Toprak D, Dogan N, Ersoy N, Ersoy G. Evaluation of physical activity levels and athropometric measurements in Turkish adults. Prog Nutr 2021;23:e2021016.