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Overweight and obesity in people living with HIV

Sobrepeso e obesidade em pessoas que vivem com HIV

Sobrepeso y obesidad en personas que viven con VIH

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ABSTRACT

Objective: To identify overweight and obesity and as associated variables in people living with HIV.

Method: Cross-sectional, quantitative and analytical study, developed in specialized services in southeastern Brazil. Individual specifics were carried out from 2014 to 2016. Pearson's Chi-Square test, Logistic Regression and OddsRatio (OR) were used.

Results: Of the 340 respondents, 47.7% were overweight. The highest abdominal circumferences and lipid changes were predominantly among the highest body mass index (BMI). The greatest chances of obtaining BMI values>25 kg/m^2 were among men (OR: 1.87; 95% CI: 1.02-2.42), having metabolic syndrome (OR: 5.66; 95% CI: 3.26-9.83) and the undue (OR: 3.89; 95% CI: 2.17-7.00). However, having self-reported hypertension was configured as a protective factor (OR: 0.18; 95% CI: 0.08-0.44).

Conclusion: The frequency of obesity and overweight between PLHIV was high. There was an association of male gender, metabolic syndrome and smoking with weight gain. The presence of self-reported hypertension was considered a protective factor.

Keywords: HIV. Obesity. Overweight. Body mass index.

RESUMO

Objetivo: Identificar sobrepeso e obesidade e as variáveis associadas em pessoas que vivem com o HIV.

Método: Estudo transversal, quantitativo e analítico, desenvolvido em serviços especializados no sudeste do Brasil. Realizaram-se entrevistas individuais de 2014 a 2016. Utilizou-se o teste de Qui-Quadrado de Pearson, Regressão Logística e o *OddsRatio* (OR).

Resultados: Dos 340 entrevistados,47,7% estavam acima do peso. As maiores circunferências abdominais e alterações lipídicas estavam predominantemente entre os maiores índices de massa corporal (IMC). As maiores chances de se obter valores do IMC>25 kg/m^2 estavam entre homens (OR:1,87;IC95%:1,02-2,42), ter síndrome metabólica (OR:5,66;IC95%:3,26-9,83) e os fumantes (OR:3,89;IC95%:2,17-7,00). Entretanto, ter hipertensão arterial sistêmica autodeclarada, configurou-se como fator de proteção (OR:0,18;IC95%:0,08-0,44).

Conclusão: A frequência de obesidade e sobrepeso entre PVHIV foi elevada. Houve associação do sexo masculino, síndrome metabólica e o hábito de fumar do aumento de peso. The presence of self-reported SAH was considered a protective factor.

Palavras-chave: HIV. Obesidade. Sobrepeso. Índice de massa corporal.

RESUMEN

Objetivo: Identificar el sobrepeso y la obesidad y como variables asociadas en personas que viven con el VIH.

Método: Estudio transversal, cuantitativo y analítico, desarrollado en servicios especializados en el sureste de Brasil. Se realizaron especificidades individuales de 2014 a 2016. Se utilizaron la prueba de Chi-Cuadrado de Pearson, Regresión logística y OddsRatio (OR).

Resultados: De los 340 encuestados, el 47,7% tenía sobrepeso. Las circunferencias abdominales más altas y los cambios de lípidos se encontraban predominantemente entre los índices de masa corporal (IMC) más altos. Las mayores probabilidades de obtener valores de IMC>25 kg/m^2 se dieron entre los hombres (OR:1,87; IC del 95%: 1,02-2,42), con síndrome metabólico (OR:5,66; IC 95%: 3,26-9,83) y lo indebido (OR:3,89; IC 95%: 2,17-7,00). Sin embargo, tener hipertensión arterial sistémica autoinformada se configuró como un factor protector (OR:0,18; IC del 95%: 0,08-0,44).

Conclusión: la frecuencia de obesidad y sobrepeso entre PVVIH fue alta. Hubo una asociación de sexo masculino, síndrome metabólico y tabaquismo con aumento de peso. La presencia de hipertensión arterial sistémica autoinformada se consideró un factor protector.

Palabras clave: VIH. Obesidad. Sobrepeso. Índice de masa corporal.

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INTRODUCTION

Overweight and obesity have become public health problems in high- and low-income countries and at different stages of life, among children, adolescents, and young adults[1–3].

Obesity is classified as a chronic metabolic disease characterized by excessive/abnormal accumulation of body fat and can be estimated by body mass index (BMI)[1,4]. It is associated with an increase in chronic diseases such as hypertension, diabetes, cancer, metabolic syndrome, and cardiovascular diseases[1–2, 4].

In the context of HIV infection, the use of widely available antiretroviral drugs (ARVs), which turned HIV into a chronic disease, helped reduce mortality and increased life expectancy, while also favoring the appearance of comorbidities typically associated with aging, in addition to possible lipid and glycidic alterations that cause changes to body weight[1,4–5].

At the beginning of the epidemic, weight loss was associated with infection and led to the stigma about looking "weak and thin"[1,4–5]. In addition to the use of ARVs, the transition from low weight to obesity in people living with HIV (PLHIV) is attributed to emotional issues. Fear of being excessively thin has led many to adopt high-calorie diets and avoid physical exertion. Another important factor in the changing profile of PLHIV is increased survival rates and the consequent possibility of gaining body fat[1,4–5].

The prevalence of overweight and obesity varies among PLHIV, considering the heterogeneity of the world population. Of the people who use ARVs worldwide, between 15.9%-42% are overweight and 0%-24% are obese[1,6–9].

Considering the impaired recovery of the immune system, increased cardiovascular risk, and adverse effects of obesity among PLHIV, it is necessary to understand possible factors related to increasing obesity. Moreover, studies on this subject expand the field of research in this area for nursing, considering the relevance of nursing care in reducing metabolic comorbidities, especially in terms of prevention and education. In the care of PLHIV, nurses can answer queries and provide guidelines on pathology, the importance of adhering to treatment, and care related to life habits.

In this regard, the question for this study was, what is the frequency of overweight and obesity and associated variables in PLHIV?

Therefore, the aim of this paper was to identify overweight and obesity and associated variables in PLHIV.

METHOD

This is a quantitative, analytical, and cross-sectional study, conducted in five specialized care services (SCS) in the interior of São Paulo, southeastern region of Brazil, from October 2014 to October 2016, with PLHIV on antiretroviral therapy (ART).

The SCSs are institutions of reference in the care of PLHIV and they are linked to the Unified Health System ("SUS"). In the studied municipality, outpatient clinics are distributed in five health districts (North, South, East, West, and Central). Three of these clinics are references in sexually transmitted infections (STIs) and two are specialty outpatient clinics with specialized teams that provide services such as testing and counseling centers (CTA).

Participants in the PLHIV study met the following inclusion criteria: older than 18 years, both sexes, aware of their serological condition regardless of the stage of HIV infection; undergoing ART for at least six months; and in clinical-outpatient follow-up in the chosen services. Those in confinement and pregnant women were excluded.

The sample calculation was based on the number of individuals in ART for at least six months attended in each reference service of the studied municipality in 2014, totaling 1920 patients. Sample size was calculated using the following formula: $n = \frac{Z\alpha^2.(P.Q)}{d^2}$, where n is the sample size, Z is the variable reduced $\alpha = 5\%$, $P = 50\%$ to , and a level of accuracy $d = 5\%$; correction was made for a finite population, which resulted in 43 in the North; 119 in the Central District; 50 in the East; 78 in the West and 50 in the Southern District, totaling a sample size of 340.

Data were collected through an individual interview using a semi-structured questionnaire created for the study that included sociodemographic, behavioral, and clinical variables. The interview was conducted by a team of four trained and certified individuals for accuracy of measurements. Anthropometric data - weight, height, and waist circumference (WC) - and blood pressure were measured after the interview. Data regarding the laboratory tests (lipid profile, glycemia, and viral load) were obtained from the medical records, considering tests performed at the dates closest to the research period. The sample was recruited consecutively during visits at the SCS while the individuals waited for the nursing/medical consultations or testing or to withdraw medications at the pharmacy.

Anthropometric measurements were performed in a standardized manner. The individuals were weighed on a

Welmy® mechanical scale with 200 kg capacity and 100G accuracy, weari ng as little clothing as possible.

Height was measured with the anthropometric ruler attached to the scale. The horizontal bar was lowered until it rested on the top of the individual's head and height was read as closely as possible to 0.5 cm, with the individual facing away, head upright, feet parallel, ankles together, and arms loose.

WC was measured in the horizontal plane with an inextensible tape measure, in an orthostatic position, with the sole of the feet resting on the ground. Participants were instructed to keep their abdomen relaxed and their clothing was pushed away from the measurement region for better accuracy. The measurement was taken at the midpoint between the last rib and the iliac crest, at the end of the exhalation respiratory movement[10].

BMI was obtained by means of the ratio of weight to height^2 (kg/m^2) and categorized according to the World Health Organization (WHO) as low-weight (<18.5 kg/m^2), normal weight/eutrophic (between 18.5 and 24.9 kg/m^2), overweight or pre-obese (25 and 29.9 kg/m^2), obese I (30-34,9 kg/m^2), obese II (35-39,9 kg/m^2), and obese III (≥40 kg/m^2)[11].

The International Diabetes Federation (IDF) criterion, recommended by the clinical protocol and therapeutic guidelines ("PCDT") for the management of HIV infection in adults was used to evaluate metabolic syndrome (MS)[12].

The IDF criterion is made up of the following risk factors: triglycerides (≥150 mg/dl or on treatment), fasting blood glucose (≥100 mg/dl or diabetes mellitus), systolic blood pressure (SBP) and diastolic blood pressure (DBP) (SBP ≥130 mmHg, DBP ≥85 mmHg or treatment), high-density lipoprotein cholesterol (HDL-c (men <40 mg/dl and women <50 mg/dl), and waist circumference (women ≥80 cm and men ≥90 cm in)[13].

According to the IDF criterion, the condition of MS is defined by change in WC, in addition to two other factors, with observance of ethnic parameters. Since there are no important studies that establish parameters in Central and South America, the reference of South Asians described above is recommended[12–13].

Blood pressure was evaluated by indirect measurement in the arm, using the auscultatory method, with aneroid sphygmomanometer and calibrated manometer. The evaluation took place in a sitting position, after five minutes of rest, with feet on the floor, legs uncrossed, and trunk leaning on the back of the chair.

The measurements in outpatient clinics, namely high-density lipoproteins cholesterol (HDL-c), triglycerides, total cholesterol, and fasting plasma glucose, were performed by enzymatic method in automated equipment (RXL Max®). All laboratory tests were performed in a single biochemistry laboratory of the health department of the studied municipality, after a 12-hour fasting period.

Dyslipidemia was classified using the reference values considered desirable and recommended by the updated Brazilian Guideline for Dyslipidemia and Prevention of Atherosclerosis, namely, total cholesterol <190 ml/dL; HDL-c >40 mg/dL, and triglycerides <150 mg/dl[2].

The studied variables were socio-demographical: sex (male, female), age in years (18-29, 30-39, 40-49, 50-59, ≥60), education in years (≤8, and >8), work status (active, inactive), sexual orientation (heterosexual, homosexual, bisexual); behavioral: physical activity (yes, no), smoking (yes, no), alcohol use (yes, no); and clinical: systemic arterial hypertension (SAH) (yes, no), diabetes mellitus (DM) (yes, no), MS (yes, no), time of diagnosis (≤10 years and >10 years), time of ART (≤10 years and >10 years), viral load (detectable >40 copies/ml, undetectable ≤40 copies/ml), and BMI (underweight, eutrophic, overweight, obese I, II, and III); followed by WC in cm; total cholesterol (preferred, altered); HDL (preferred, altered), and triglycerides (preferred, altered).

The data were presented through descriptive statistics, with absolute and relative frequencies, in the form of graphs and tables.

To associate the sociodemographic, behavioral, and clinical variables with the BMI classification, Pearson's Chi-Square test was used, adopting $p<0.05$.

To evaluate the influence of independent variables on the outcome variable "BMI ≥25 kg/m^2", which jointly represents overweight and obesity (being overweight), multivariate logistic regression analysis was used. The category "no" was adopted as the reference category. Thus, the following independent variables were used: sex, age, education, work status, sexual orientation, smoking, alcohol use, and physical activity, SAH, DM, MS, time of diagnosis, time of ART, and viral load. The independent variables were simultaneously inserted into the regression model and the variable with the highest p-value ($p>0.05$) was removed. Subsequently, new adjustments were made until only variables with $p<0.001$ remained.

For statistically significant variables, the odds ratio (OR) was calculated. The analysis was performed considering the significance level of 5% ($\alpha=0.05$). The software used for analysis was IBM® Statistical Package for the Social Science (SPSS), version 22.0.

The study was approved by the Ethics and Research Committee of the University of São Paulo, CAAE 58758316.3.0000.5393 and opinion 1.727.012. National and international guidelines on ethics in research with human

beings were followed. Informed consent was obtained from all the participants who agreed to participate in the study.

RESULTS

Of the 340 PLHIV investigated, the majority were male, 57.9% (n=197) and 47.7% (n=162) were overweight (Table 1). The predominant age group was 40-49 years, with a mean age of 44.35±11.7, and an active work status (Table 2). Most did not smoke or consume alcohol, did not perform physical activity, and had a 10-year time of diagnosis and time of ART. Around 81.2% (n=263) had undetectable viral load (Table 2).

Table 2 shows the distribution of the sample in relation to sociodemographic, behavioral, and clinical variables, according to BMI. There is an association between BMI classification and sex (p<0.001), sexual orientation (p=0.010), smoking (p<0.001), presence of DM (p=0.012), SAH (<0.001), and MS (<0.001), in addition to time of diagnosis (p=0.013).

Figure 1 shows that the waist circumference values of the participants with the highest BMI are over 100 cm.

Regarding the distribution of lipid profile, PLHIV who were overweight had a high percentage, over 60%, for alterations in total cholesterol, HDL-c, and triglycerides. In the obese, these alterations ranged from 60% to 100% (Figure 2).

Among the sociodemographic, behavioral, and clinical variables, the variables that presented the highest chances of overweight and obesity, considered independent, were: being male (OR: 1.87; 95% CI: 1.02-2.42), being a smoker (OR: 3.89; 95% CI: 2.17-7.00) and having MS (OR: 5.66; 95% CI: 3.26-9.83). The presence of self-reported hypertension in this study was configured as a protective factor for overweight and obesity (OR: 0.18; 95% CI: 0.08-0.44), as shown in Table 3.

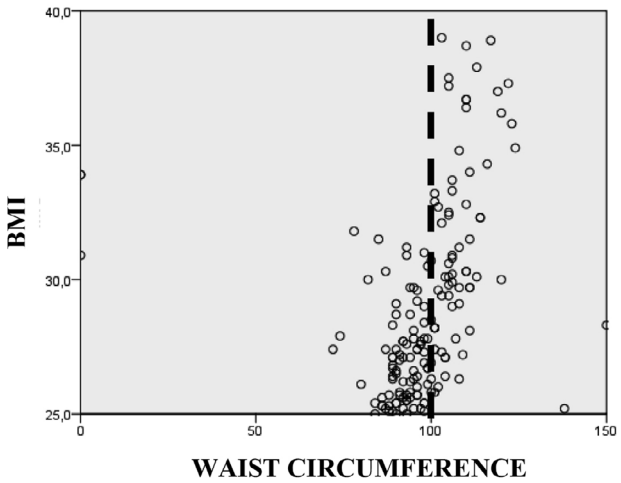

Figure 1 – Distribution of body mass index according to waist circumference of people living with HIV. Ribeirão Preto, SP, Brazil, 2014-2016. (n = 324)*
Source: Research data, 2014-2016.
BMI: Body mass index. *16 classified as low weight were excluded.

Table 1 – Distribution of body mass index by sex in people living with HIV. Ribeirão Preto, SP, Brazil, 2014-2016. (n=340)

	Male n (%)	Female n (%)	Total n (%)
BMI*			
Low weight	06 (1.8)	10 (2.9)	16 (4.7)
Eutrophic	112 (32.9)	50 (14.7)	162 (47.6)
Overweight	60 (17.6)	50 (14.8)	110 (32.4)
Obese I	17 (5.0)	22 (6.5)	39 (11.5)
Obese II	02 (0.6)	11 (3.2)	13 (3.8)
Total	197 (57.9)	143 (42.1)	340 (100)

Source: Research data, 2014-2016.
* BMI = Body mass index.

Table 2 – Factors associated with overweight and obesity in people living with HIV. Ribeirão Preto, SP, Brazil, 2014-2016 (n = 324)*

Variables	Body mass index			p†
	Eutrophic 18.5-24.9 kg/m²	Overweight 25-29.9 kg/m²	Obesity ≥30 kg/m²	
Sociodemographic	n (%)	n (%)	n (%)	
Sex				
Male	112 (34.6)	60 (18.5)	19 (5.9)	<0.001
Female	50 (15.4)	50 (15.4)	33 (10.2)	
Age group (years)				
18-29	30 (9.3)	12 (3.7)	05 (1.5)	0.159
30-39	33 (10.2)	16 (4.9)	11 (3.4)	
40-49	50 (15.4)	38 (11.7)	22 (6.8)	
50-59	31 (9.6)	34 (10.5)	11 (3.4)	
≥60	18 (5.6)	10 (3.1)	03 (0.9)	
Education (in years of study)				
≤eight years	78 (24.1)	55 (17.0)	28 (8.6)	0.772
>eight years	84 (25.9)	55 (17.0)	24 (7.4)	
Work status				
Active	93 (28.7)	62 (19.1)	32 (9.9)	0.819
Inactive	69 (21.3)	48 (14.8)	20 (6.2)	
Sexual orientation				
Heterosexual	102 (31.5)	82 (25.3)	43 (13.3)	0.010
Homosexual	48 (14.8)	26 (8.0)	05 (1.5)	
Bisexual	12 (6.2)	02 (4.1)	04 (1.2)	
Behavioral				
Smoking				
Yes	68 (21.0)	20 (6.2)	11 (3.4)	<0.001
No	94 (29.0)	90 (27.8)	41 (12.7)	

Table 2 – Cont.

Variables	Body mass index			p†
	Eutrophic 18.5-24.9 kg/m²	Overweight 25-29.9 kg/m²	Obesity ≥30 kg/m²	
Alcohol use				
Yes	70 (21.6)	37 (11.4)	18 (5.6)	0.229
No	92 (28.4)	73 (22.5)	34 (10.5)	
Physical activity				
Yes	60 (18.5)	45 (13.9)	14 (4.3)	0.225
No	102 (31.5)	65 (20.1)	38 (11.7)	
Clinical				
Systemic arterial hypertension				
Yes	10 (3.1)	24 (7.4)	19 (5.9)	<0.001
No	152 (46.9)	86 (26.5)	33 (10.2)	
Diabetes mellitus				
Yes	07 (2.2)	14 (4.3)	08 (2.5)	0.012
No	155 (47.8)	96 (29.6)	44 (13.6)	
Metabolic syndrome				
Yes	35 (10.8)	69 (21.3)	30 (9.3)	<0.001
No	127 (39.2)	41 (12.7)	22 (6.8)	
Time of diagnosis				
≤ten years	100 (30.9)	52 (16.0)	22 (6.8)	0.013
>ten years	62 (19.1)	58 (17.9)	30 (9.3)	
Time of ART‡				
≤ten years	112 (34.6)	67 (20.7)	32 (9.9)	0.316
>ten years	50 (15.4)	43 (13.3)	20 (6.2)	
Viral load				
Undetectable	125 (38.6)	92 (28.4)	46 (14.2)	0.139
Detectable	37 (11.4)	18 (5.6)	06 (1.9)	

Source: Research data, 2014-2016.
*16 classified as low weight were excluded; † p: Pearson's chi-square test; ‡ART: antiretroviral therapy.

Table 3 – Logistic regression analysis: independent variables associated with BMI ≥25 kg/m² in people living with HIV. Ribeirão Preto, SP, Brazil, 2014-2016. (n=324)ɵ

Variable	β* (SE)†	OR‡	95% CI§	p‖
Sex				
Male	0.62 (0.30)	1.87	1.02-2.42	0.04
Female		1		
Sexual orientation				
Heterosexual	-0.05 (0.59)	0.94	0.29-3.06	0.92
Homosexual	-0.32 (0.60)	0.72	0.22-2.39	0.59
Bisexual		1		
Smoking				
Yes	1.36 (0.29)	3.89	2.17-7.00	<0.0001
No		1		
Systemic arterial hypertension**				
Yes	-1.66 (0.43)	0.18	0.08-0.44	<0.0001
No		1		
Diabetes mellitus				
Yes	0.41 (0.55)	1.51	0.51-4.48	0.456
No		1		
Metabolic syndrome				
Yes	1.73 (0.28)	5.66	3.26-9.83	<0.0001
No		1		
Time of diagnosis				
≤ten years	0.20 (0.27)	1.22	0.71-2.09	0.461
>ten years		1		

Source: Research data, 2014-2016.
ɵ 16 classified as low weight were excluded; * β: logistic regression coefficient; †EP: standard error; ‡OR: odds ratio; §95% CI: 95% confidence interval; ||: logistic regression analysis; ¶ref.: reference; **: self-declared.

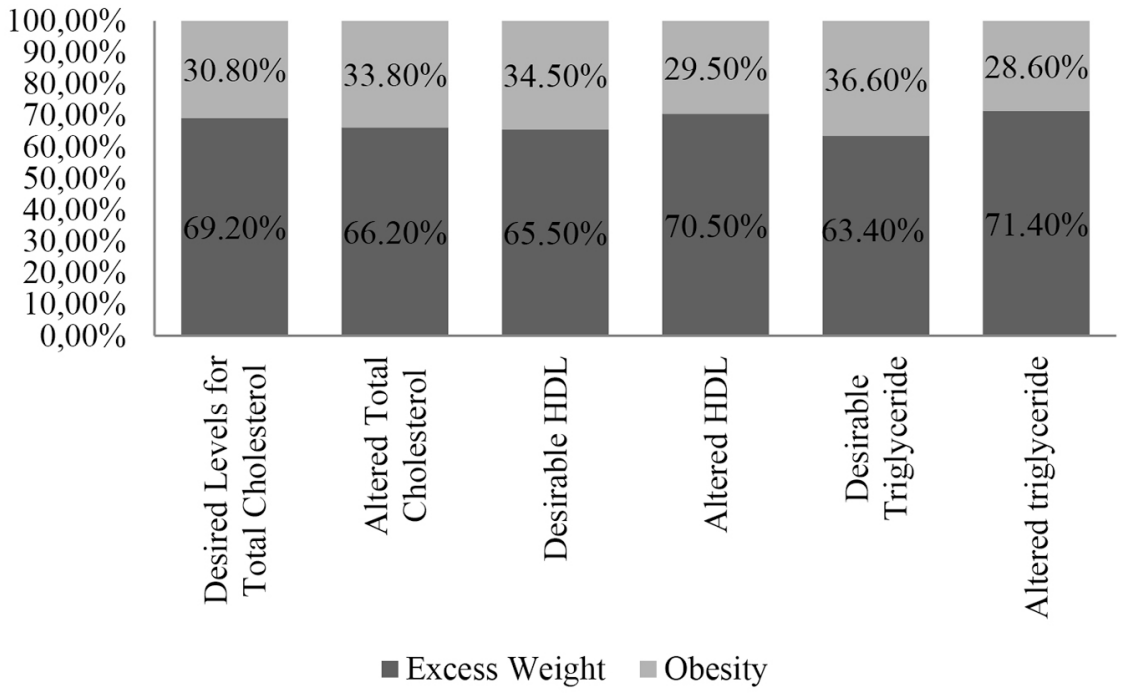

Figure 2 – Distribution of lipid profile among overweight and obese people living with HIV, according to body mass index. Ribeirão Preto, SP, Brazil, 2014-2016. (n = 324)*

Source: Research data, 2014-2016.

*16 classified as low weight were excluded.

DISCUSSION

The main findings of this study include the high percentage of overweight PLHIV, higher waist circumference values, predominantly among those with higher BMI, and the relationship between altered lipid profile, with high percentages between overweight and obese. Higher chances of obtaining BMI≥25kg/m^2 were identified among males, those with MS, and smokers. In contrast, self-reported SAH was configured as a protection factor for higher BMI values.

The impact of improvements in the management of HIV infection on the history of the epidemic reflected on how people live with the virus. However, comorbidities emerged, both related to the use of some classes of ARV, and to the lifestyles of PLHIV[1,4–5]. With the significant percentage of overweight and obesity found in this study, it is inferred that the risk of overweight or obesity is high among PLHIV in ART, as described in the literature in studies conducted in other countries[1,4,15].

Although some studies show that weight gain benefits the immune system and mitigates the impact of opportunistic diseases, the increase in body fat, especially abdominal, can be a chronic source of pro-inflammatory proteins that influence the course of the disease and early aging, thus increasing the risk of mortality from all causes, with a risk three times higher among obese people[4,14].

Depending on the location, adipose tissue has different metabolic characteristics, and intra-abdominal adiposity has the greatest influence on the deterioration of insulin sensitivity. Thus, it is considered one of the most serious cardiovascular risk factors, commonly associated with overweight[6,9]. Adipose tissue secretes chemokines that synthesize various mediators and cytokines that participate in mechanisms, leading to dyslipidemia, insulin resistance, hypertension, and atherosclerosis[6,9]. Moreover, the use of ARVs combined with living conditions, diet, and socioeconomic factors has a huge influence on the development of obesity[1,3].

It is noteworthy that, despite the linear correlation of WC and BMI among the respondents, higher WC and lower BMI can be found. In PLHIV, this factor can be justified by the important lipodystrophic alteration and consequent accumulation of intra-abdominal adiposity[6].

The findings of this study associate male PLHIV with greater chances of being overweight. A cohort study conducted in the USA with 14,084 adults at the beginning of

ART showed an early increase in weight among men, who had a higher incidence of BMI alterations from eutrophic to obese during the first three years of treatment when compared to women[5]. However, there is also evidence that the female sex has a strong association with overweight attributed to physiological factors, such as loss of hormonal protection, which favors weight gain, especially with advancing age[4–15].

BMI is a quantitive predictor of MS, which aggregates several risk factors for cardiovascular diseases and is strongly linked to the increased incidence and prevalence of diabetes in PLHIV[2,4,14–15].

Another important variable associated with higher chances of overweight and obesity is smoking. According to the US Center for Disease Control and Prevention (CDC), approximately 50% of PLHIV are smokers and 75% have smoked at some point in their lives[16]. In Brazil, data from the National Health Survey showed that 14.7% of adult Brazilians are smokers, and among PLHIV, this number practically doubles, reaching a prevalence of 30%[17]. These findings corroborate the result of the present study, in which 30.5% of the PLHIV were smokers. Cigarette use activates the inflammatory state, which increases the risk for weight gain[16–17]. Thus, smoking increases both morbidity and mortality due to AIDS-related causes and non-AIDS-related problems, even for those undergoing ART[1].

Those who declared they were hypertensive, that is, those who were aware of their chronic condition, had lower chances of gaining weight, which does not agree with studies that indicate a close relationship between hypertension and obesity[18]. This association occurred because reportedly diagnosed patients, who were in clinical follow-up with a multidisciplinary team, have more access to information about treatment and the importance of adopting healthy habits, thus reducing the chances of becoming overweight or obese.

In this regard, the preferred actions for weight loss are healthy habits, including a balanced diet, regular physical activity, not smoking, and reduced alcohol intake[2,19].

It is important to note that, although lifestyle changes are effective in reducing weight, the use of medications is also among the therapeutic options. Lipid-lowering drugs are among the medications used[2].

Another intervention that has been proposed to PLHIV with obesity is the classic surgical procedure, such as bariatric surgery, which has shown significant impacts and helped improve the comorbidities associated with obesity[20].

Furthermore, in the present study, the participants were in regular clinical-outpatient follow-up at the health centers. This fact leads us to question the relationship between the high percentage of overweight, access to health services, and the presence/efficiency of information for the prevention of health risk behavior.

Therefore, considering the factors related to weight gain in PLHIV, multiprofessional care is essential for prevention, diagnosis, and adequate treatment. Nurses, as members of the multiprofessional health care team, play an important role in promoting and screening comorbidities and providing timely and appropriate interventions.

Thus, it is hoped that the results of this study will enable reflection of health workers, and other readers, on the importance of this HIV-related issue. Future studies should aim to recognize factors that facilitate and hinder weight control and propose interventions for weight reduction in PLHIV. Moreover, they should encourage health care services to create and maintain areas for receiving and listening to users and provide specialized guidelines for weight control, considering all the possible repercussions associated with this condition.

CONCLUSIONS

The frequency of obesity and overweight was high among PLHIV. The variables associated with weight gain were male, MS, and smoking. The presence of self-reported SAH was considered a protective factor. The present study also showed that higher WC values are predominantly found among those with higher BMI, although it is possible to find higher WC and lower BMI values, and the relationship between lipid alterations, with high percentages between the overweight and obese.

The results found show that sociodemographic, clinical, and behavioral factors may interfere with weight gain in PLHIV. This knowledge fosters the discussion about living with HIV as a chronic condition and expands the field of research in this area. In this regard, recognizing the factors associated with weight gain allows the identification of those who have a greater chance of developing chronic diseases, possibly resulting in mortality, in order to prevent and treat them. Moreover, this knowledge can support the creation of protocols for nurses and other health workers that help reduce and control weight in this population.

This study has limitations. Firstly, the cross-sectional method does not allow determination of causality. Consequently, it was also not possible to identify how long the individuals were overweight and obese, whether before or after the diagnosis of HIV infection and/or treatment with antiretrovirals.

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