

Association between sociodemographic and behavioral factors with metabolic syndrome in people living with HIV



Associação entre fatores sociodemográficos e comportamentais com a síndrome metabólica em pessoas vivendo com HIV

Asociación entre factores sociodemográficos y comportamentales con el síndrome metabólico en personas viviendo con VIH

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ABSTRACT

Objective: To analyze the association between sociodemographic and behavioral factors with the metabolic syndrome in people living with HIV.

Methods: A cross-sectional study was carried out in specialized outpatient clinics in Ribeirão Preto - SP city, between October 2014 and October 2016. The criteria of the National Cholesterol Education Program Adult Treatment Panel III and the International Diabetes Federation were used for the evaluation of metabolic syndrome. Individual interviews were conducted and the Chi-square and Fisher's exact test was used.

Results: 340 patients were evaluated, 28.5% (n=97) with metabolic syndrome by the National Cholesterol Education Program Adult Treatment Panel III criterion, and 39.4% (n=134) by the International Diabetes Federation. There was an association between MS and the variables gender (ATP: p<0.001, p=0.002), age (ATP: p<0.001, IDF: p<0.001), schooling (ATP: p=0.003, IDF: p=0.003), marital status (ATP: p=0.003, IDF: p=0.022), work status (ATP: p=0.003; IDF: p=0.024), smoking (ATP: p=0.037, IDF: p=0.033) and leisure activities (ATP: p=0.010, IDF: p=0.006).

Conclusions: There are significant associations between the metabolic syndrome, sociodemographic and behavioral factors in people living with HIV.

Keywords: Metabolic syndrome. HIV. Acquired immunodeficiency syndrome. Health behavior. Nursing.

RESUMO

Objetivos: Verificar a associação entre os fatores sociodemográficos e comportamentais com a síndrome metabólica em pessoas vivendo com HIV.

Métodos: Estudo transversal, realizado em ambulatórios especializados no município de Ribeirão Preto - SP, entre outubro de 2014 e outubro de 2016. Para avaliação da síndrome metabólica, utilizaram-se os critérios do National Cholesterol Education Program Adult Treatment Panel III e da International Diabetes Federation. Foram realizadas entrevistas individuais e utilizou-se o teste qui-quadrado e exato de Fisher.

Resultados: Foram avaliados 340 pacientes, 28,5% (n=97) com SM pelo critério do National Cholesterol Education Program Adult Treatment Panel III, e 39,4% (n=134) pela International Diabetes Federation. Houve associação entre a síndrome metabólica e as variáveis sexo (ATP: p<0,001; IDF: p=0,002), idade (ATP: p<0,001; IDF: p<0,001), escolaridade (ATP: p=0,003; IDF: p=0,003), estado civil (ATP: p=0,003; IDF: p=0,022), situação de trabalho (ATP: p=0,003; IDF: p=0,024), orientação sexual (ATP: p=0,003; IDF: p=0,015), hábitos de fumar (ATP: p=0,037; IDF: p=0,033) e atividades de lazer (ATP: p=0,010; IDF: p=0,006).

Conclusões: Existem associações significativas entre a síndrome metabólica, os fatores sociodemográficos e os comportamentais em pessoas vivendo com HIV.

Palavras-chave: Síndrome metabólica. HIV. Síndrome de imunodeficiência adquirida. Comportamentos relacionados com a saúde. Enfermagem.

RESUMEN

Objetivo: Verificar la asociación entre factores sociodemográficos y comportamentales con el síndrome metabólico en personas que viven con VIH/SIDA.

Métodos: Estudio transversal, realizado en ambulatorios especializados en la ciudad de Ribeirão Preto-SP, entre octubre de 2014 y octubre de 2016. Para la evaluación de la SM, se utilizaron los criterios del National Cholesterol Education Program Adult Treatment III y de la International Diabetes Federation. Se realizaron entrevistas individuales y se utilizó el test Qui-cuadrado y exacto de Fisher.

Resultados: Se evaluaron 340 pacientes, 28,5% (n = 97) con SM por el criterio del National Cholesterol Education Program Adult Treatment III, y el 39,4% (n = 134) por el IDF. En el presente estudio se evaluó la relación entre el síndrome metabólico y las variables sexo (ATP: p<0,001, IDF: p=0,002), edad (ATP: p<0,001; IDF: p<0,001), escolaridad (ATP: p=0,003; IDF: p=0,003), estado civil (ATP: p=0,003, IDF: p=0,022), situación de trabajo (ATP: p=0,003, IDF: p=0,024), los hábitos de fumar (ATP: p=0,037, IDF: p=0,033) y actividades de ocio (ATP: p=0,010; IDF: p=0,006).

Conclusiones: Existen asociaciones significativas entre el síndrome metabólico, los factores sociodemográficos y los comportamentales en personas que viven con VIH/SIDA.

Palabras clave: Síndrome metabólico. VIH. Síndrome de inmunodeficiencia adquirida. Conductas relacionadas con la salud. Enfermería.

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INTRODUCTION

The introduction of antiretroviral therapy (ART) in the 90s provoked repercussions in the treatment of people living with Human Immunodeficiency Virus (PLHIV)⁽¹⁻²⁾. Thus, the PLHIV began to live under a new perspective, a chronic condition characterized by greater survival⁽¹⁾.

The implementation of ART has contributed to reduce the incidence of opportunistic diseases, decrease the need and complexity of hospital admissions, and increases in life expectancy; observed by the significant reduction of the morbimortality associated to HIV and improvement of the quality of life manifested by the development in the physical and emotional condition of the individuals⁽¹⁾.

As latest reports from the *Joint United Nations Program on HIV/AIDS* (UNAIDS), by June 2017, there were around 36.7 million PLHIV in the world, and about 21 million were on antiretroviral treatment, which shows remarkable progress in treatment adherence⁽³⁾.

The control of morbimortality made them naturally exposed to chronic-degenerative processes, which were not previously manifested, given the early mortality from the disease^(2,4).

Thus, metabolic changes are commonly observed among PLHIV. These changes have been described as complex and multifactorial. On the one hand, there is the exposure to a chronic inflammatory process resulting from HIV infection itself, and on the other hand, the prolonged use of antiretroviral drugs, which are capable of modifying cellular functioning patterns⁽⁵⁾.

Among the metabolic implications, comorbidities resulting from the impact of ART on lipid and glucose metabolism are identified. The metabolic changes include dyslipidemia, lipodystrophy, degradation and redistribution of body fat; besides insulin resistance⁽⁶⁾. Most of these metabolic alterations found in PLHIV are risk factors for the occurrence of the metabolic syndrome (MS)⁽¹⁾.

Attention to MS has been higher due to the impact of each of its diagnostic components and, above all, to the combination of several cardiovascular risk factors⁽⁴⁾.

Factors associated with lifestyle, such as sedentarism and changing eating habits, have contributed to the increase of MS⁽⁴⁾. These behavioral factors, which constitute life habits, increase the risk for cardiovascular diseases and are present among PLHIV.

Thus, this study aims to verify the association between sociodemographic and behavioral factors with the metabolic syndrome in people living with HIV.

METHODS

This is a cross-sectional study with a quantitative approach carried out with people living with HIV/AIDS, with outpatients in the city of Ribeirão Preto-SP. Data collection was performed in all Specialized Attention Services (SAE) of the different Sanitary Districts in the municipality, from October 2014 to September 2016.

Patients were included who knew their serological condition, age equal or superior to 18 years of both sexes; in the use of antiretroviral therapy (ART) (at least six months), undergoing clinical follow-up; and excluded individuals in situations of confinement, history of cardiovascular disease and pregnant women.

A non-probabilistic sample was formed, in which the data were collected through individual interviews, in a private room. A semistructured instrument was used for sociodemographic, clinical and behavioral characterization, constructed for the study.

After the initial interview, the blood pressure measurement was performed by casual measurement in an indirect way, registered in the arm, with aneroid sphygmomanometer and calibrated manometer; and abdominal circumference (AC), with inextensible tape measure.

Finally, the medical records were consulted to obtain information on the results of laboratory tests for total cholesterol, *High Density Lipoproteins* (HDL), triglycerides and fasting glycemia. The results of the exams were recorded at the earliest date of admission of the patient in the study, and exams were discarded in one year.

For the evaluation of MS were the criteria of the *National Cholesterol Education Program Adult Treatment Panel III* (NCEP-ATPIII)⁽⁷⁾ and of the *International Diabetes Federation* (IDF)⁽⁸⁾ (Chart 1).

To identify the MS by the NCEP-ATPIII criteria, the presence of at least three metabolic alterations is required. By the IDF criterion the presence of alteration in the abdominal circumference (AC) is mandatory, added to two other criteria, respecting the parameters by ethnicity. As there are no important studies that establish parameters in Central and South America, it is recommended to use the South Asians reference already described above⁽⁸⁾.

To evaluate the quality of the diet, it was used the questionnaire entitled "How is your food?" Built by the Ministry of Health through the National Food and Nutrition Policy⁽⁹⁾.

It is a Food Frequency Questionnaire (FFQ) for identification of eating habits, created according to the cultural and alimentary habits of the Brazilian. The test evaluates the amount and frequency of ingested foods, salt intake, protein, fat, water, alcoholic beverages and exercise, char-

acterizing consumption with (daily, weekly, monthly and rarely or never)⁽⁹⁾.

It is an instrument composed of 18 questions. The score is obtained by summing all the questions (minimum value 1, maximum value 58). For each question specific scores are assigned, depending on the answer. The result may be less than or equal to 28 points, which means low score for healthy eating; between 29 and 42 points an intermediate score and, greater or equal to 43 points, a satisfactory score for healthy eating⁽⁹⁾.

For the collection of data related to ART adherence, it was used the *Cuestionario para la Evaluación de la Adhesión al Tratamiento Antirretroviral en Personas con Infección by VIH y Sida* (CEAT-VIH) in the validated version for the Portuguese language. It is considered an easy-to-understand resource, applicable to adult patients with HIV infection⁽¹⁰⁾.

It is an instrument composed of 20 items that address the main factors that may interfere with adherence to ART in adult patients⁽¹⁰⁾. The minimum possible score is 17 and the maximum 89. The higher the score, the greater the degree of adherence to treatment. For the analysis, the scores were grouped into two groups classified as adequate or good/strict (gross score ≥ 75) and inadequate or low/insufficient (gross score ≤ 74)⁽¹⁰⁾.

In order to evaluate the consumption of alcoholic beverage, one question was asked through an item in the semi-structured questionnaire: do you make regular use of alcoholic beverages? Thus, individuals who consumed alcoholic beverages at least once a week, periodically and/

or permanently, were included in the “yes” category for consumption.

The present study was based on the resolution of the National Health Council (CNS) 466/2012, which deals with the ethical aspects of research involving human beings.

The data collection was performed only after the agreement of the individuals, by signing the ICF, in a room that protected their privacy. The wording of this term included the guarantee of confidentiality of information related to personal identity, and the guarantee to withdraw from the study at any time deemed necessary.

The study was approved by the Ethics and Research Committee of the University of São Paulo at Ribeirão Preto College of Nursing, obtaining a favorable opinion under number CAAE 58758316.3.0000.5393.

For data analysis, it was built a database in Excel spreadsheet for Windows, in double typing, with later validation to obtain reliable data. After the validation of the corrected spreadsheet, the data was transferred to the definitive database, using the *software Statistical Package for Social Science* (SPSS), 22.0 version.

The data were presented in frequency tables format (absolute and relative) for qualitative variables in order to establish the profile of the population studied. For the analysis of the association between sociodemographic, clinical, behavioral variables and the presence of MS, Pearson’s Chi-Square and Fisher’s Exact tests were used. The significance level was set at $p < 0.05$.

Criteria	NCEP-ATPIII	IDF
Fasting glycemia	≥ 100 mg/dl or Diabetes Mellitus	≥ 100 mg/dl or Diabetes Mellitus
Triglycerides	≥ 150 mg/dl or treatment	≥ 150 mg/dl or treatment
Abdominal circumference	≥ 102 cm (M) ≥ 88 cm (W)	≥ 90 cm (M) ≥ 80 cm (W)
HDL	< 40 mg/dl (M) < 50 mg/dl (W)	< 40 mg/dl (M) < 50 mg/dl (W) or treatment
Blood pressure	SBP ≥ 130 mmHg or DBP ≥ 85 mmHg or treatment	SBP ≥ 130 mmHg or DBP ≥ 85 mmHg or treatment

Chart 1- Criteria for evaluation of the metabolic syndrome, 2018

Source:⁽⁷⁻⁸⁾

M: men; W: women; PAS: Systolic Blood Pressure; PAD: Diastolic Blood Pressure

■ RESULTS

A total of 340 PLHIV patients under ART undergoing outpatient follow-up participated in the study. Regarding the sociodemographic variables (Table 1), 57.9% (n=197) were male, 46.5% (n=158) declared to be white, with a

mean age of 44.35 ± 11.7 , ranging from 20 to 75 years. The highest concentration was in the age group of 40-49 years of age, 34.1% (n=116).

In relation to the work situation, 56.8% (n=193) were active, and 70.3% (n=239) of the respondents stated that they were heterosexual 70.3% (n=239).

Table 1- Characterization of people living with HIV/AIDS (n=340). Ribeirão Preto, SP, 2016

Variables	N	%
Gender		
Male	197	57.9
Female	143	42.1
Age		
20-29	47	13.8
30-39	65	19.1
40-49	116	34.1
50-59	81	23.8
≥ 60	31	9.1
Color		
Caucasian	158	46.5
Black	46	13.5
Asian	14	4.1
Mixed	121	35.6
Indigenous	01	0.3
Schooling		
≤ 8 years	167	49.1
> 8 years old	173	50.9
Marital status		
Single	147	43.2
Married	120	35.3
Separated	39	11.5
Widow/widower	34	10.0
Work situation		
Active	193	56.8
Inactive	147	43.2
Sexual orientation		
Heterosexual	239	70.3
Homosexual	82	24.1
Bisexual	19	5.6
Total	340	100

Source: Research data, 2016.

In addition, according to Table 2, 40.0% (n=136) had regular use of alcoholic beverages, 32.1% (n=109) were smokers, 64.1% (n=218) 5% (n=114) performed leisure activity. Adherence to ART, according to CEAT-VIH, was considered adequate in 80.0% (n=272) of the interviewees.

Regarding eating habits, the food frequency score ranked 69.4% (n=236) of the participants with an intermediate level, while 68.2% (n=232) considered having healthy eating.

The MS was present in 28.5% (n=97) of the PLHIV, by the NCEP-ATPIII criterion, and 39.4% (n=134) by the IDF.

In the evaluation of the sociodemographic factors (Table 3), there was association of MS with the variables gender (ATP: $p < 0.001$; IDF $p = 0.002$), age (ATP: $p < 0.001$, $p < 0.001$), schooling (ATP: $p = 0.003$; IDF: $p = 0.003$), marital status (ATP: $p = 0.003$; IDF: $p = 0.022$), work situation (ATP: $p = 0.003$; IDF: $p = 0.024$) and sexual orientation (ATP: $p = 0.003$, IDF: $p = 0.015$).

In the evaluation of the behavioral factors (Table 4), the diagnosis of MS was statistically perceptible among smok-

ers (ATP: p=0.037; IDF: p=0.033) and non-adherent PLHIV (ATP: p=0.010; IDF: p=0.006).

Table 2- Distribution of behavioral factors in people living with HIV/AIDS (n=340). Ribeirão Preto, SP, 2016

Variables	N	%
Sedentarism		
Yes	218	64.1
No	122	35.9
Smoking		
Yes	109	32.1
No	231	67.9
Consumption of alcoholic beverage		
Yes	136	40.0
No	204	60.0
Leisure Activity		
Yes	114	33.5
No	226	66.5
Healthy eating*		
Yes	232	68.2
No	108	31.8
Healthy eating**		
Low	61	17.9
Intermediate	236	69.4
Satisfactory	43	12.6
Adherence to ART		
Adequate	272	80.0
Inadequate	68	20.0
Total	340	100

Source: Research data, 2016.
*self-reported **food frequency score

Table 3- Association between Metabolic Syndrome and sociodemographic factors in people living with HIV/AIDS. Ribeirão Preto, SP, 2016

Variables	Metabolic Syndrome NCEP-ATPIII Criteria		p*	Metabolic Syndrome IDF Criteria		p*	Total N
	No	Yes		No	Yes		
	n (%)	n (%)		n (%)	n (%)		
	243 (71.5)	97 (28.5)		206 (60.6)	134 (39.4)		340
Gender							
Male	162 (66.7)	35 (36.1)	<0.001	133 (64.6)	64 (47.8)	0.002	197
Female	81 (33.3)	62 (63.9)		73 (35.4)	70 (52.2)		143

Age						
18-29	44 (18.1)	03 (3.1)		40 (19.4)	07 (5.2)	47
30-39	51 (21.0)	14 (14.4)		44 (21.4)	21 (15.7)	65
40-49	88 (36.2)	28 (28.9)	<0.001	73 (35.4)	43 (32.1)	<0.001 116
50-59	45 (18.5)	36 (37.1)		39 (18.9)	42 (31.3)	81
≥60	15 (6.2)	16 (16.5)		10 (4.9)	21 (15.7)	31
Color						
Caucasian	108 (44.4)	50 (51.5)		92 (44.7)	66 (49.3)	158
Black	34 (14)	12 (12.4)		30 (14.6)	16 (11.9)	46
Asian	12 (4.9)	02 (2.1)	0.597 ⁺	11 (5.3)	03 (2.2)	0.405 ⁺ 14
Mixed	88 (36.2)	33 (34.0)		72 (35.0)	49 (36.6)	121
Indigenous	01 (0.4)	00 (0.0)		01 (0.5)	00 (0.0)	01
Schooling						
≤ eight years	107 (44.0)	60 (61.9)		88 (42.7)	79 (59.0)	167
> eight years	136 (56.0)	37 (38.1)	0.003	118 (57.3)	55 (41.0)	0.003 173
Marital status						
Single	117 (48.1)	30 (30.9)		101 (49.0)	46 (34.3)	147
Married	84 (34.6)	36 (37.1)	0.003	70 (34.0)	50 (37.3)	0.022 120
Separated	25 (10.3)	14 (14.4)		20 (9.7)	19 (14.2)	39
Widow/widower	17 (7.0)	17 (17.5)		15 (7.3)	19 (14.2)	34
Work situation						
Active	150 (61.7)	43 (44.3)		127 (61.7)	66 (49.3)	193
Inactive	93 (38.3)	54 (55.7)	0.003	79 (38.3)	68 (50.7)	0.024 147
Sexual orientation						
Heterosexual	158 (65.0)	81 (83.5)		133 (64.6)	106 (79.1)	239
Homosexual	70 (28.8)	12 (24.1)		60 (29.1)	22 (16.4)	82
Bisexual	15 (6.2)	04 (4.1)	0.003	13 (6.3)	06 (4.5)	0.015 19

Source: Research data, 2016.

*Pearson's Chi-Square Test. +Fisher's Exact Test

Table 4- Association between Metabolic Syndrome and behavioral factors in people living with HIV/AIDS. Ribeirão Preto, SP, 2016

Variables	Metabolic Syndrome NCEP-ATPIII Criteria		p*	Metabolic Syndrome IDF Criteria		p*	Total N
	No	Yes		No	Yes		
	n (%)	n (%)		n (%)	n (%)		
	243 (71.5)	97 (28.5)		206 (60.6)	134 (39.4)		
Smoking							
Yes	86 (35.4)	23 (23.7)	0.037	75 (36.4)	34 (25.4)	0.033	109
No	157 (64.6)	74 (76.3)		131 (63.6)	100 (74.6)		231
Sedentarism							
Yes	150 (61.7)	68 (70.1)	0.146	128 (62.1)	90 (67.2)	0.345	218
No	93 (38.3)	29 (29.9)		78 (37.9)	44 (32.8)		122

Consumption of alcoholic beverage			0.352			0.085	
Yes	101 (41.6)	35 (36.1)		90 (43.7)	45 (34.3)		136
No	142 (58.4)	62 (63.9)		116 (56.3)	88 (65.7)		204
Leisure Activity							
Yes	93 (38.3)	21 (21.6)	0.010	82 (39.8)	32 (23.9)	0.006	114
No	150 (61.7)	76 (78.4)		124 (60.2)	102 (76.1)		226
Healthy eating**							
Yes	170 (70.0)	62 (63.9)	0.280	141 (68.4)	91 (67.9)	0.917	232
No	73 (30.0)	35 (36.1)		65 (31.6)	43 (32.1)		108
Healthy eating***							
Low	47 (19.3)	14 (14.4)		39 (18.9)	22 (16.4)		61
Intermediate	169 (69.5)	67 (69.1)	0.283	145 (70.4)	91 (67.9)	0.376	236
Satisfactory	27 (11.1)	16 (16.5)		22 (10.7)	21 (15.7)		43
Adherence to ART			0.904			0.956	
Adequate	194 (79.8)	78 (80.4)		165 (80.1)	107 (79.8)		272
Inadequate	49 (20.2)	19 (19.6)		41 (19.9)	27 (20.1)		68

Source: Research data, 2016.

*Test Qui-Square of Pearson ** self-declared *** food frequency score

DISCUSSION

The results found show that the sociodemographic and behavioral factors interfere in the occurrence of the metabolic syndrome, this knowledge allows a new clinical performance of the nurse with a view to the prevention of comorbidities in the PLHIV and encourages the expansion of the field of research in this area considering that this theme is still incipient for nursing.

The way in which people behave or conduct their habits is related to some components of MS and in several situations is a determinant of morbidity and mortality^(2,4).

Socio-demographic factors make possible the characterization of the population, the knowledge of the social roles they assume and the way in which these characteristics are related to certain comorbidities.

This study identified a higher prevalence of MS among women living with HIV/AIDS. This fact can be attributed to greater female exposure to the components of MS due to the difference in the social role, which may promote negative influences on quality of life⁽⁴⁾.

In addition, physiological factors such as the loss of the protective effect of the female hormones with the onset of menopause and the physical changes that may occur during the transition, such as weight gain and abdominal circumference, are also important factors⁽¹¹⁾.

The age range between 40-49 years was predominant and corroborates with the mean age reported in other researches⁽⁴⁾.

Several studies have shown that the prevalence of MS increases with age⁽⁴⁾. Longevity favors a higher risk of aging-related diseases in PLWHA, even in individuals with controlled infection⁽⁴⁾.

As for the color, self-declared white in most of the interviewees, in Brazil, the heterogeneity of the population and ethnic miscegenation hinders the characterization and consistent associations in the surveys that include this variable.

Still in the sociodemographic aspects, low education and low socioeconomic status in PLWHA are evidenced in the literature and contribute to the concept of pauperization of the epidemic⁽¹²⁾. However, due to the uniqueness of the various cultural and socio-political contexts in which the question is analyzed, the possibility of generalization of the findings is limited. However, a possible explanation is that individuals with more years of study and higher socioeconomic status have greater access to information and understanding of the positive impact of treatment on the clinical evolution of the disease, as well as better internal and external resources to cope with their serological condition⁽¹²⁾.

In the same way that people with low schooling and low purchasing power have limited access to health, education, housing, food, with consequent negative repercus-

sion on the clinical condition⁽¹³⁾; which may also justify the association of MS with the inactive work situation.

Another important aspect in the context of HIV and behavioral factors are the support networks. PLHIV living with partners demonstrate better quality of life indexes related to social support⁽¹³⁾. These support networks influence behavior and lifestyle decisions.

Sexual orientation was also associated with MS. It is observed the highest prevalence among heterosexuals, which may be justified by the change that occurred along the trajectory of the epidemic in which there is a large percentage of HIV infections in the context of heterosexual relations⁽³⁾.

This fact points out that possible infections/reinfections with exposure to new viruses culminate in greater exposure to the inflammatory process. Thus, attention should be paid to strategies for the prevention of new infections, considering that the way in which people relate and establish affective partnerships can also have repercussions on the quality of life⁽¹⁴⁾.

Among the behavior related to physical activity and leisure practices, the sedentarism was present in the majority of participants and there was a predominance of PLHIV who did not engage in leisure activities.

It is important to emphasize that physical activity can be defined as any body movement produced by the skeletal muscles that results in energy expenditure. In practical terms, it can be classified as occupational or labour, sports or leisure⁽¹⁵⁾. And sedentary behavior increases the risk of MS⁽⁴⁾.

The non-performance of leisure activities associated with MS was confirmed in other studies, in which participants with lower percentiles of activity in the leisure domain had a higher occurrence of MS, i.e., the fact of having little energy expenditure in leisure activities associates with SM⁽¹⁶⁾.

The practice of physical activity can contribute to the stimulation of the immune system, increase serum levels of HDL-c, reduce blood glucose, reduce lower blood pressure levels, and increase the capacity of muscle tissue to consume fatty acids, implementing an extra factor of cardiovascular protection, thus provoking a confrontation of the factors that lead to SM⁽¹⁷⁾.

Smoking and harmful use of alcohol also increase the vulnerability of PLHIV to illness. In this study, the higher prevalence of MS was observed among non-smokers, as opposed to some studies that show that smoking and alcohol consumption are considered risk factors for the occurrence of MS, which may be a precursor of cardiovascular diseases⁽⁴⁾.

Despite the results, the evidence demonstrates that smoking not only increases the progression to AIDS and non-AIDS related diseases, but also decreases overall survival⁽¹⁸⁾. There is also a relation between inflammatory me-

diators and SM. Researchers say that smoking activates the inflammatory state because of its association with C-reactive protein (CRP) levels. Thus, they may increase the risk of chronic diseases such as type 2 diabetes (T2DM) and MS⁽¹⁹⁾.

In three cohorts conducted in different states of Brazil, all prevalence rates of smoking were higher among PLHIV than in the general population of the respective states⁽²⁰⁾. Between national and international studies, the values reach up to 75% of PLHIV^(4,20).

Therefore, given the complexity and all the factors that are related to MS, the multiprofessional care and support is fundamental in the prevention and treatment. The evaluation of clinical markers linked to the syndrome can be performed during outpatient, hospital and/or home care.

In this context, the nurse as a member of the multiprofessional health team, present at all levels of care, plays an important role in the management of PLHIV care, considering that the evaluation of the criteria defining the syndrome is simple and does not require sophisticated technological inputs, facilitating the screening of MS during nursing consultation.

CONCLUSIONS

The metabolic syndrome among PLHIV presented a significant association with sociodemographic variables - gender, age, schooling, marital status, work status and sexual orientation - and the behavioral variables - smoking and leisure activity.

The recognition of the associated factors and the evaluation of the metabolic profile become necessary, since they allow the identification of those with higher cardiovascular risk, playing an important role as a marker of metabolic disorders, in order to prevent and treat them.

The limitation of this study is related to the transversal method, which does not allow the establishment of cause and effect relations. Thus, it was not possible to identify how long the individuals presented the criteria for MS.

It is hoped that the results may support the development of strategies to serve this population with a focus on promoting healthy habits. And to stimulate the elaboration of care protocols aimed at identifying the risk factors for MS in PLHIV.

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