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Research Article

Prevalence and Factors Associated with Metabolic Syndrome in People Living with HIV in Parakou in 2016

Hugues Dohou*, Dohou Shm, Codjo Hl, Attinsounon Ca, Gomina M, Sonou Dja, Ahouansou Ml and Houenassi DM

Department of Internal Medicine, University of parakou, Benin

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***Corresponding author**

Hugues Dohou, Department of Internal Medicine, University of parakou, Benin, Email: huguesdohou@gmail.com

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Abstract

ARV treatment has improved the quality of life of PHAs, but at the same time the occurrence of complications including the metabolic syndrome.

Objective: To study the prevalence of DM and associated factors in PHAs receiving ARV treatment and follow-up at the University Hospital Center of Borgou (CHUDB) in Parakou in 2016.

Patients and Methods: A cross-sectional, descriptive and analytical study with a prospective collection of data from 1 February to 31 July 2016. A comprehensive recruitment of all PLHIVs of at least 15 years of age was followed at the CHDB and agreed to completion of the study. The metabolic syndrome was defined according to the criteria of the IDF. All patients received a biological check-up.

Results: 215 PHAs were included; the sex ratio was 0.47; the average age: 43.65 ± 11.38 years.

The metabolic syndrome was found in 39 patients (18.14%). Among the subjects surveyed, 33.02% were hypertensive. Abdominal obesity, according to IDF criteria was found in 24.19% of cases;the overweight and overall obesity were 28.37% and 09.20%, respectively. Dyslipidemia in 53.95% of cases with total hypercholesterolemia in 32.09% of cases, LDL hypercholesterolemia in 21.86% of cases, HDL hypocholesterolemia in 68.37% of cases and hypertriglyceridemia in 21.86% of cases. Metabolic syndrome was associated with female sex and overweight.

Conclusion: Metabolic syndrome is common in PHAs.

Introduction

Human Immunodeficiency Virus (HIV) infection is a public health problem [1]. The evolution of this epidemic has taken on a new face in recent years. Indeed, the advent of highly active antiretroviral therapy has improved the quality of life of infected patients, but at the same time the occurrence of long-term complications related to Antiretroviral (ARV) treatment [2]. The most frequent complications are: metabolic abnormalities related to the chronicity of the infection, including metabolic syndrome, lipodystrophy and mitochondrial toxicity.

Metabolic syndrome has become common in people living with HIV (PHAs) compared to the general population [3]. In Africa and more specifically in Benin, the number of PHAs in 2015 was estimated at 69,000 with a prevalence rate of 1.1% among adults aged 15-49 [4]. The prevalence of the metabolic syndrome varies according to the definition used. It was 10% in France [5] but much more important, that is 17.8% in sub-Saharan Africa, according to the work of Eholié et al [6]. Knowledge of the metabolic syndrome and associated factors in PHAs is therefore essential to better prevent this risk factor. Hence the interest of this work, which aims to study the prevalence of DM and associated factors in PHAs receiving ARV treatment and follow-up at the University Hospital Center of Borgou (CHUDB) in Parakou in 2016.

Framework and Method of Study

Study framework

Our study was conducted in the Ambulatory HIV Treatment Unit of the Department of Internal Medicine and in the CHUDB Cardiology Unit in Parakou, northern Benin.

Type and period of study

This was a cross-sectional, descriptive and analytical study with a prospective collection of data from 1 February to 31 July 2016.

Study population

The survey was carried out on all PHAs followed on the site of taking charge of the internal medicine department of CHUDB.

Sampling

We had systematically recruited patients who were monitored at the study site during the study period and met the inclusion criteria. We included: PHAs who were at least 15 years of age at the start of the study who were consulted and gave their written consent.

Pregnant women and PHAs under long-term corticosteroid therapy were not included

Variables studied

The dependent variable was the metabolic syndrome in PHAs. The metabolic syndrome is defined according to the International Diabetes Federation (IDF) criteria by a waist circumference ≥ 94 cm in men or 80 cm in women, associated with two of the following four factors:

- Hypertriglyceridaemia ≥1. 7 mmol / l or 150.44 mg / dl,
- HDL hypocholesterolemia: <1.03 mmol / l (<40mg / dl) in humans and 1.29 mmol / l (<50mg / dl) in women or a specific treatment of these lipid abnormalities,
- An increase in blood pressure: PAS≥130mmHg or PAD≥85 mmHg or the existence of an antihypertensive treatment,
- Fasting hyperglycemia ≥ 5.6 mmol / l (≥ 110mg / dl) or previous history of diabetes [7].

The other variables studied were socio-demographic data (age, gender, ethnicity, origin, occupation, nationality, level of education, economic level); personal history of cardiovascular disease; HIV characteristics (type of HIV, CD4 T cell count, ARV treatment and cotrimoxazole chemoprophylaxis).

Collection of data

Patients who met the inclusion criteria were subjected to a questionnaire developed for this purpose after obtaining their written consent. They then received a complete clinical examination in which weight, height, waist circumference and blood pressure were measured. The clinical examination was done by a doctoral student.

Blood pressure was measured in the subject at rest, sitting for 15 minutes and 30 minutes after consuming a meal, coffee, or cigarette. An OMRON automatic digital tensiometer equipped with an adapted cuff was used for this measurement in the palm seated patient facing upwards. The investigator places the adapted cuff above the elbow fold by aligning the arterial position mark on the humeral artery. Three measures are one-minute intervals; the mean of the first two measurements is used to define the blood pressure of the subject.

The weight was taken using a mechanical balance of the SECA® brand with a maximum capacity of 150 kg with an accuracy of 0.5 Kg, placed on a flat and stable surface. The respondent kept light clothes on his body and was mounted on the balance barefoot symmetrically while remaining motionless until the measurement stabilized. His weight corresponded to the number displayed in Kg. The reading was made, the investigator facing the respondent.

The height was measured in all standing subjects without shoes and looking straight ahead with a SECA® portable gauge with an accuracy of 0.1 cm. The participant stood with his arms upright, his feet together, his knees stretched and his heels in contact with the measuring rod. The investigator lowered the cursor on the head by compressing the hair in order to get a firm contact after asking him to stand upright and look straight ahead. The corresponding size was directly read on the measuring line in centimeters.

The measurement of the waist circumference had taken place halfway between the lower edge of the last palpable side and the top of the iliac crest with a tape measure placed horizontally at the end of an exhalation normal.

Body Mass Index (BMI) was calculated by dividing weight in kilograms by height in meter squared.

Data on serological status and biological assessments were collected from the patient's follow-up record. Any biological check-up dating back more than three months had been redone.

Data analysis

The data were collected and analyzed using the EPI INFO software version 7.1.0.6 of 08 September 2012. The quantitative variables were expressed on average with a standard deviation and the qualitative variables in simple percentage. The Chi2 statistical test of Pearson or Fisher was used as the case for comparing qualitative data. The difference was considered statistically significant when $p < 0.05$.

Ethical and administrative considerations

This work was carried out in accordance with the applicable ethical standards. All the data collected in the course of our work were only used in this study and will remain confidential. All PHAs with a metabolic syndrome have been treated and monitored by a cardiologist.

Results

Of the 227 subjects aged 15 years and older received during the study period, 215 had participated in the study, a response rate of 97.71%.

General characteristics of PHAs

These subjects were divided into 146 female subjects and 69 male subjects, a sex ratio of 0.47. The mean age was 43.65 ± 11.38 years. Subjects aged less than 50 years were more represented in the sample (71.16%). Nearly one in three subjects had secondary education (33.02%). Subjects of craft / worker occupation dominated the sample (53.02%).

Among the subjects surveyed, 33.02% were hypertensive; 3.72% were diabetic; 28.37% of subjects were overweight. Abdominal obesity, according to IDF criteria was found in 24.19% of cases; overweight and overall obesity were 28.37% and 09.20%, respectively. Dyslipidemia in 53.95% of cases with total hypercholesterolemia in 32.09% of cases, LDL hypercholesterolemia in 21.86% of cases, HDL hypocholesterolemia in 68.37% of cases and hypertriglyceridemia in 21.86% of cases.

Table 1: Summarizes the data on the general characteristics of the subjects surveyed (PLHIV).

Variables	Proportion
Sex	
Male	69 (32,09%)
Female	146 (67,91%)
Age group (years)	
<50	153 (71,16%)
≥50	62 (28,83%)
Level of education	
None	66 (30,70%)
Primary	68 (31,63%)
Secondary	71 (33,02%)
Academic	10 (04,65%)
Profession	
Hang out	48 (22,33%)
Students/students	08 (03,72%)
Retired	15 (06,98%)
Craftsmen/Workers	114 (53,02%)
Officials	27 (12,56%)
Without occupation	03 (01,40%)
Cardiovascular risk factor	
HTA	71 (33,02%)
Diabetes	08 (03,72)
Tobacco	13 (06,05%)
Dyslipidemia	116 (53,95%)
Total hypercholesterolemia	69 (32,09%)
Hypercholesterolemia LDL	47 (21,86%)
Hypocholesterolemia HDL	147 (68,37%)
Hypertriglyceridemia	47 (21,86%)
Abdominal Obesity	52 (24,19%)
Overweight	61 (28,37%)
Obesity	20 (9,3%)
Sedentary lifestyle	19 (8,84%)
HIV type	
HIV1	214 (99,53%)
HIV2	01 (0,47%)
ARV Treatment	
Yes	207 (96,28%)
No	08 (03,72%)
Therapeutic regimen	
AZT+3TC+EFV	69 (32,09%)
AZT+3TC+Lpv/r	01 (00,47%)
AZT+3TC+NVP	38 (17,67%)
TDF+3TC+EFV	95 (44,18%)
TDF+3TC+Lpv/r	06 (02,79%)
TDF+3TC+NVP	03 (01,40%)
TDF+ABC+Lpv/r	02 (00,93%)
TDF+Emitricabati+NVP	01 (00,47%)

Table 2: Factors significantly associated with the metabolic syndrome in multivariate analysis of the subjects surveyed in CHUD-B in Parakou in 2016.

Associated Factors	SM	P
	RP [IC95% RP]	
Sex (female)	2,48 [0,94-1,05]	0,0365
HTA	4,53 [2,14-9,57]	0,0000
IMC>25Kg/m²	2,46 [1,19-,07]	0,0124
Abdominal perimeter	22,53 [9,33-54,53]	0,0058
Hypocholesterolemia HDL	0,35 [0,17-0,73]	0,0035
Hypertriglyceridemia	3,76 [1,78-7,92]	0,0002

The prevalence of smoking and alcoholism was respectively 06.05% and 24.19%. The inactivity was found in 08.83% (95% CI: [05.40% -13.46%]) of the cases.

The most common type of HIV among the subjects surveyed (PHAs) was HIV type 1 (99.53%) with an average duration of 61.49 ± 43.84 months. ARV treatment was recovered in 96.28% with an average duration of 57.58 ± 41.16 months. The most common treatment regimen was TDF + 3TC + EFV (44.19%) with an average treatment duration of 56.00 ± 40.20 months.

Overall prevalence of metabolic syndrome in PHAs in CHUD-B in Parakou in 2016.

The prevalence of metabolic syndrome in PHAs according to the IDF definition criteria was 18.14% 95% CI: [13.23% - 23.95%], or 39 patients.

Factors associated with the metabolic syndrome after a logistic regression model.

In multivariate analysis (n = 215), the most important factors that remain significantly associated with the metabolic syndrome are sex (0.0365), hypertension (0.00), BMI (0.0124), perimeter abdominal (0.0058), HDL hypocholesterolemia (0.0035), hypertriglyceridemia (0.0002).

The results are summarized in tables 1& 2.

Discussion

The objective of our study was to study the prevalence of DM and the associated factors in PHAs receiving ARV treatment and monitored at CHUDB in Parakou in 2016. To do this, a cross-sectional study with a descriptive and analytical aim with a prospective collection of the data was appropriate. The systematic nature of the recruitment and the response rate of 97.71% gives a validity to our study and makes it possible to generalize our results to all PHAs followed in hospitals in Parakou.

The prevalence of metabolic syndrome in PHAs: In our study, the prevalence of the metabolic syndrome was 18.14% according to the criteria of the IDF. This result is similar to that of Alassani et al [8], who found a percentage of 18.03 using the same definition criterion. However, our prevalence is higher than that of Samaras (14%) [9] and Zannou [10] who found a cumulative incidence of 13% with the definition of IDF. Authors such as Sawadogo in Burkina Faso

[11] and Biron in France [12] found prevalences of 14% and 19.9% respectively with the definition of NCEP-ATP III.

Indeed, the prevalence of the metabolic syndrome is highly dependent on the definition used. However, the difference in the results obtained with the same definition criteria (IDF) could also be related to the nature of ARVs used and the duration of exposure to these molecules. This duration of ARV exposure was shorter in Zannou and Samaras (2 years) versus 5 years in Eholic in Côte d'Ivoire in 2007 [6] and an average of 4.79 years (57, 58 months) in ours. This high incidence of metabolic syndrome in PHAs contributes to increased cardiovascular risk among this already vulnerable group [13].

Factors associated with the presence of the metabolic syndrome.

Sex and age

In our sample, the prevalence of the metabolic syndrome was higher in women than in men. In univariate analysis, the female sex was significantly associated with the presence of the metabolic syndrome (p = 0.0365). This finding was similar to that of Zannou et al [10] and Samaras et al [9]. Indeed, the literature reports that hypertrophy of visceral adipose tissue is more common in women than in men [14], explaining our results.

In our sample, age was not significantly associated with the presence of the metabolic syndrome (p = 0.4933). On the other hand, in Sawadogo et al [11], the prevalence of the metabolic syndrome increases with age. The incidence of metabolic syndrome was significantly higher in patients older than 42 years (p = 0.04). Eholie, in the Lipo-Afri study [6] made the same observation. Premature aging described in HIV-infected patients may explain these findings. Indeed, aging makes the body vulnerable to a number of diseases, comorbidities and metabolic disorders (dyslipidemia, diabetes and insulin resistance). Thus, studies have shown that HIV-infected patients have the same aging-related complications 10-15 years earlier than the general population [14,15].

The body mass index

In our study, the proportion of the metabolic syndrome (28.81%) was significantly higher in the subgroup of patients with a BMI> 25kg / m^2 (p = 0.0124). Our results are in phase with those of Eholié [6] and Biron [12]. The hypertrophy of adipose tissue or the accumulation of fat, especially visceral fat, is a crucial element. In the definition of the metabolic syndrome, according to the criteria of the IDF could still explain our results. Also, after a logistic regression, the BMI remains significantly associated with the metabolic syndrome (p = 0.0124). Jerico et al [16] when he no longer found an association after a logistic regression.

A history of high blood pressure (hypertension), diabetes: In this study, a history of hypertension and waist circumference were significantly associated with metabolic syndrome (p = 0.0000, 0.0058, respectively). Alassani et al in Benin [8] also observed an association between a history of hypertension, waist circumference and the presence of the metabolic syndrome.

On the other hand, diabetes was not significantly associated with the presence of a metabolic syndrome (p = 0.3267). Same remark in the study of Alassani et al in Benin [8].

The lifestyle

In our sample, consumption of tobacco, alcohol and lack of physical activity (physical inactivity) were not significantly associated with the presence of a metabolic syndrome (p = 0.9161, 0.5170; 0.8582 respectively). Our results differ from those of Eholié et al [6] and Alassani et al in Benin [8] who found that the lack of sports activity was associated with the occurrence of the metabolic syndrome.

The duration of ARV treatment

In our study, no significant association was observed between ARV antigen (after 54 months of ARV exposure) and presence of the metabolic syndrome (p = 0.7336). Our results differ with those of Thiébaut in the Aquitaine cohort in France [17] and Sawadogo in Burkina Faso [11], who had a significant association between ARV antigen (after 54 months of ARV exposure) and presence of the metabolic syndrome.

Conclusion

The prevalence of sm was estimated to be 18.14% among PHAs in hospitals in Parakou, Benin. This prevalence was associated with female sex and overweight. Effective prevention measures should be implemented to help reduce mortality and morbidity associated with the metabolic syndrome in these already vulnerable individuals.

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