



RESEARCH ARTICLE

CARDIOVASCULAR RISK AND HIV INFECTION IN PATIENTS AGED 50 YEARS AND OLDER AT THE AHALA DISTRICT MEDICAL CENTER, CAMEROON

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Abstract



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Aim and objectives: Older people living with HIV (P50+) are living longer and longer and are therefore prone to age-related comorbidities. The objective of this study was to investigate the cardiovascular risk of P50+ followed in an HIV care unit in Cameroon.

Methods: Cardiovascular risk factors (CVRF) were assessed through clinical examination and the following paraclinical exams fasting blood glucose, lipid profile, creatinine level with calculation of glomerular filtration rate according to the Cockcroft and Gault formula and resting electrocardiogram.

Results: The proportion of P50+ was 13.9% and 80 patients were included in the study. The following prevalence of CVRF were found sedentary lifestyle (77.5%), chronic smoking (5%). Fifteen percent reported having hypertension and 25% of the P50+ had high blood pressure during physical examination. Similarly, 2.5% of the patients reported diabetes and 7.5% of the P50+ had high blood sugar levels. The examinations performed revealed 2.5% of LDL-cholesterol dyslipidemia, 23.1% of glomerular filtration rate abnormalities, 5.7% of left ventricular hypertrophy (LVH), and 22.9% of electrocardiographic signs of myocardial ischemia. The study of the interdependence between CVRF and the characteristics of the population revealed a relationship of dependence between physical activity and age ($p=0.002$), diabetes and age ($p=0.004$), diabetes and duration of HIV ($p=0.007$), LVH and duration of HIV ($p=0.001$).

Conclusion: Cardiovascular risk is high in P50+ which could make them vulnerable to cardiovascular events. It is therefore necessary or even essential that cardiovascular risk assessment be integrated into the continuum of care of PLWH in general and P50+ particularly in HIV care units.

Keywords: Cameroon, cardiovascular risk, elderly, HIV.

INTRODUCTION

Human immunodeficiency virus (HIV) infection is a health problem that has had and continues to have an impact on global health. Since its discovery in the 1980s, HIV has continued to alarm the world with its high morbidity and mortality. In 1999, 3.16 million new HIV cases were detected; in 2006, 1.95 million deaths were attributed to HIV; and in 2017, 36.8 million people were living with HIV¹. Numerous strategies to eradicate HIV infection have been implemented, including the availability of antiretroviral drugs, the Test and Treat strategy for newly tested HIV-positive people, the 95-95-95 triple aim strategy

which aims to screen 95% of all HIV-positive people, provide ARV treatment to 95% of those diagnosed, and achieve an undetectable viral load for 95% of those treated by 2030. These strategies have been successful in reducing HIV incidence and mortality^{2,3}. In 2020, the Joint United Nations Programme on HIV/AIDS (UNAIDS) released statistics showing a decline in HIV-related morbidity and mortality, with 680,000 deaths, 1.5 million new cases and 37.7 million people living with HIV⁴. These results are even more palpable with the increase in life expectancy of people living with HIV (PLWH) who are now more likely to reach old age (P50+). This age is associated with a physiological alteration of the body's functions. The

cardiovascular system is one of the systems that is affected by aging on the one hand and by HIV infection on the other in P50+. Cardiovascular pathologies represent the 2nd cause of non-HIV related mortality in PLWH^{5,6}. In the organization chart of hospitals in Cameroon, 1st, 2nd, 3rd and 4th category health facilities have specialized services for the management of cardiovascular diseases and at these different levels, where services dedicated to the follow-up of PLWH are available, screening for these pathologies does not pose a problem. In contrast, in the 5th category health facilities where strategies for integrating services have enabled the creation of services dedicated to the care of PLWH, the minimum package of activities does not include specialized services for the care of cardiovascular diseases. Given that the number of P50+ is increasing and they are populations at high cardiovascular risk, it makes sense to study the cardiovascular risk of the P50+ in a 5th category health facility such as the Ahala district medical center⁷. The objective of this study was to determine the cardiovascular risk of elderly PLWH (P50+).

MATERIALS AND METHODS

Location and duration of the study

This was a descriptive study conducted from October 2021 to March 2022 at the HIV unit care of the Ahala District Medical Center. The sampling is of the non-probability convenience type and the minimum sample size was calculated according to the following formula.

$$n = z^2 * p(1 - p) / m^2$$

Selection criteria

All the PLWH followed at HIV unit care and aged 50 years and over (P50+) were included.

Sampling and procedure

The sampling was consecutive. The data collection procedure was carried out using a pre-established questionnaire. Modifiable CVRF were assessed and the following paraclinical exams were done fasting blood glucose, lipid profile, creatinine level with calculation of glomerular filtration rate according to the Cockcroft and Gault formula and resting electrocardiogram.

Data analysis

Data were entered into CsPro 7.1 software and analyzed via SPSS 23 software. Because the data did not follow a normal distribution, quantitative data were expressed as median and interquartile range, whereas qualitative data were expressed as frequency and percentage. The Chi-square test was used to investigate the relationship between CVRF and other population characteristics.

Ethical considerations

This study was approved by the Ethics Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I (FMBS) and was conducted in strict compliance with the fundamental principles of the Declaration of Helsinki.

RESULTS

Clinical data

At the time of the study, 13.9% (86/620) of PLWH aged 50 years and older were being followed in the HIV care unit at the Ahala district medical center and 80 were included in this study. Data collected during the interview revealed that 62/80 (77.5%) were not physically active, 6/80 (7.5%) were alcohol abusers and 4/80 (5%) were chronic smokers. Fifteen percent (12/80) reported hypertension and 2.5% (2/80) diabetes. On physical examination, 44/76 (57.9%) P50+ were overweight or obese with a BMI ≥ 25 kg/m². Elevated blood pressure ($\geq 140/90$ mmHg) and blood glucose (≥ 1.26 g/l) were found in 20/80 (25%) and 6/80 (7.5%) patients, respectively. **Biological and electrocardiographic data**

Cardiovascular risk factor assessment in the paraclinical evaluation revealed dyslipidemia with HDL (<0.4 g/l) in 10/80 (12.5%) P50+ and LDL (≥ 1.6 g/l) in 2/80 (2.5%) patients. Eighteen of 78 (23.1%) P50+ had suspicious renal disease (GFR <60 ml/min/1.73m²). On electrocardiographic examination, rhythm, depolarization, and conduction disorders (bundle branch block) were found in 8/70 (11.4%), 4/70 (5.7%), and 18/70 (25.7%) of the P50+, respectively. Left ventricular hypertrophy was present in 4/70 (5.7%) patients, abnormal T wave in 6/70 (8.6%) and signs of myocardial ischemia in 16/70 (22.9%).

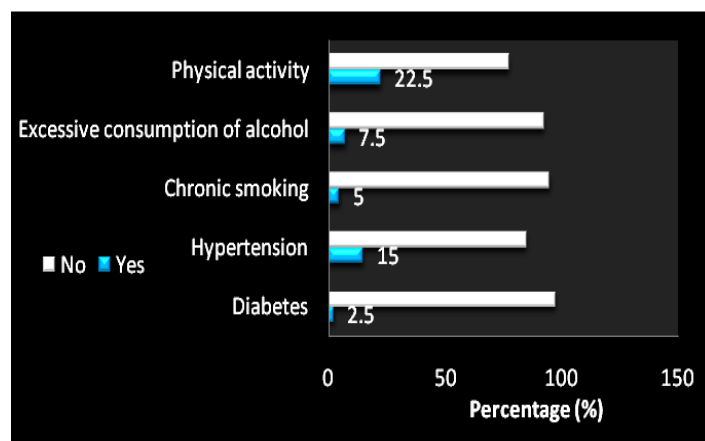


Figure 1: Clinical data.

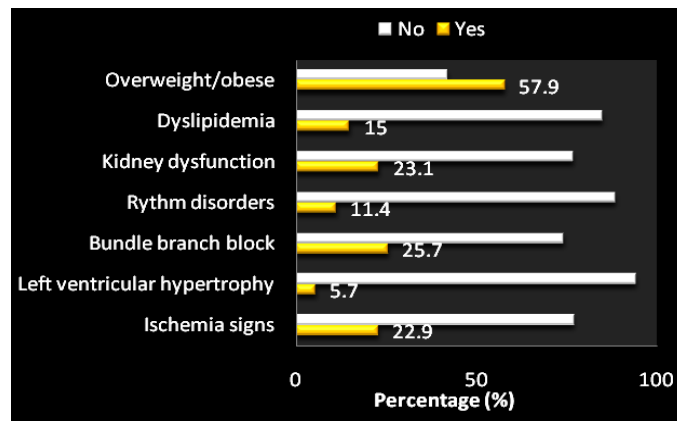


Figure 2: Biological and electrocardiographic data.

Factors associated with CVRF

Investigation of the relationship between CVRF and population characteristics found that many CVRF were significantly dependent on the sociodemographic profile of the population. These were physical activity and gender ($p=0.002$) (Table 1); diabetes and age

($p=0.004$) and diabetes and duration of HIV disease ($p=0.007$) (Table 2); GFR, indicator of the existence of nephropathy, and gender ($p=0.003$) on one hand and the level of education on the other hand ($p=0.037$) (Table 3); rhythm disorders and the duration of HIV ($p=0.001$) (Table 4).

Table 1: Factors associated with physical activity.

Categories	Physical activity		Chi-square	p	
	Yes	No			
Sex	Female	2	24	9.341	0.002
	Male	7	7		
Age (years)	50-54	6	12	3.361	0.499
	55-59	2	6		
	60-64	1	8		
	65-69	0	4		
	≥70	0	1		
Marital status	Single	3	11	1.359	0.929
	Married	4	10		
	Common-law	1	1		
	Widowed	1	2		
	Divorced	0	6		
Sector of activity	Unemployed	1	11	5.145	0.273
	Public	1	3		
	Private	1	0		
	Informal	5	13		
	Retired	1	4		
Level of education	Not in school	1	2	3.338	0.342
	Primary	1	11		
	Secondary	5	16		
	University	2	2		
Duration of HIV (years)	< 1	1	0	4.363	0.359
	1-4	5	15		
	5-9	2	12		
	10-14	1	3		
	15-19	0	1		

Left ventricular hypertrophy ($p=0.001$) and T-wave abnormalities ($p=0.024$) were dependent on the duration of HIV (Table 5 and Table 6).

DISCUSSION

This study found a proportion of 13.9% of the P50+ currently being followed at the Ahala district medical center. This result is similar to the findings of Essomba *et al.*, who found a proportion of P50+ of 13,3%⁷. It is also comparable to the result of Autenrieth *et al.*, who,

in their projections of the world population aged 50 years and over and infected by HIV, estimated that this population would increase from 16 to 20% from 2016 to 2020⁸. This study shows that the P50+ population will be a growing one worldwide. This highlights the benefits of antiretroviral treatment for PLHIV, whose life expectancy is prolonged⁹.

The main cardiovascular risk factors found in current study were physical inactivity (77.5%), overweight /obesity (57.9%), elevated blood pressure (25%), dyslipidemia (15%) and elevated blood sugar (7.5%).

Table 2: Factors associated with diabetes.

	Categories	Diabetes		Chi-square	p
		Yes	No		
Sex	Female	2	24	0.004	0.950
	Male	1	13		
Age (years)	50-54	1	17	15.576	0.004
	55-59	0	8		
	60-64	0	9		
	65-69	1	3		
	≥70	1	0		
Marital status	Single	0	14	6.023	0.304
	Married	3	11		
	Common-law	0	1		
	Widowed	0	3		
	Divorced	0	7		
Sector of activity	Unemployed	2	10	4.444	0.349
	Public	0	4		
	Private	0	1		
	Informal	0	18		
	Retired	1	4		
Level of education	Not in school	0	3	2.248	0.523
	Primary	2	10		
	Secondary	1	20		
	University	0	4		
Duration of HIV (years)	< 1	0	1	14.054	0.007
	1-4	2	18		
	5-9	2	14		
	10-14	0	4		
	15-19	1	0		

These results are comparable to those of Therese *et al.*, who found physical inactivity (22.5%), elevated blood pressure (24.3%), hyperglycemia (7.5%) as predominant CVRF⁷. It is also similar to the findings of Belaunzaran *et al.*, who, in a comparative study of non-communicable diseases between PLWH aged less than 50 years and those aged 50 years and over, found

prevalence of dyslipidemia, arterial hypertension and diabetes of 28%, 18% and 12% respectively¹⁰. In addition, Achila *et al.*, found high prevalence of dyslipidemia (86.6%) in PLWH and predominantly high levels of LDL cholesterol (55.8%) which was associated with sex, age and smoking¹¹.

Table 3: Factors associated with GFR.

	Categories	GFR (ml/min/1.73m ²)		Chi-square	p
		< 60	≥ 60		
Sex	Female	2	23	8.918	0.003
	Male	7	7		
Age (years)	50-54	5	12	3.548	0.471
	55-59	3	5		
	60-64	1	8		
	65-69	0	4		
	≥70	0	1		
Marital status	Single	2	11	7.604	0.179
	Married	5	10		
	Common-law	2	1		
	Widowed	0	7		
	Divorced	0	1		
Sector of activity	Unemployed	2	9	3.023	0.554
	Public	1	3		
	Private	0	1		
	Informal	6	12		
	Retired	0	5		
Level of education	Not in school	2	1	8.486	0.037
	Primary	0	12		
	Secondary	5	15		
	University	2	2		
Duration of HIV (years)	< 1	0	1	2.436	0.656
	1-4	3	16		
	5-9	5	9		
	10-14	1	3		
	15-19	0	1		

Table 4: Factors associated with rhythm disorders.

	Rhythm disorders				Chi-square	p
	Categories	Yes	No			
Sex	Female	2	20	0.320	0.572	
	Male	2	11			
Age (years)	50-54	3	12	4.704	0.319	
	55-59	0	7			
	60-64	0	9			
	65-69	1	2			
	≥70	0	1			
Marital status	Single	2	9	2.116	0.833	
	Married	2	12			
	Common-law	0	3			
	Widowed	0	6			
	Divorced	0	1			
Sector of activity	Unemployed	1	10	8.731	0.068	
	Public	0	3			
	Private	1	0			
	Informal	2	4			
	Retired	0	14			
Level of education	Not in school	0	2	1.156	0.764	
	Primary	2	9			
	Secondary	2	17			
	University	0	3			
Duration of HIV (years)	< 1	1	0	18.329	0.001	
	1-4	1	15			
	5-9	0	13			
	10-14	1	3			
	15-19	1	0			

These results are also consistent with the work of Judith A. Aberg who reported high proportions of PLWH with age-related comorbidities¹². This again suggests that P50+ are carriers of many cardiovascular risk factors that could negatively impact their

cardiovascular health and increase non-HIV related mortality. It may be suggested following Hsue *et al.*, that it is time to recognize that HIV infection may be a major cardiovascular risk factor along with traditional CVRF¹³.

Table 5: Factors associated with left ventricular hypertrophy.

	Left ventricular hypertrophy				Chi-square	p
	Categories	Yes	No			
Sex	Female	2	20	1.253	0.263	
	Male	0	13			
Age (years)	50-54	0	15	6.717	0.152	
	55-59	1	6			
	60-64	0	9			
	65-69	1	2			
	≥70	0	1			
Marital status	Single	0	11	2.400	0.791	
	Married	1	13			
	Common-law	0	3			
	Widowed	1	6			
	Divorced	0	1			
Sector of activity	Unemployed	2	9	4.628	0.328	
	Public	0	3			
	Private	0	1			
	Informal	0	16			
	Retired	0	4			
Level of education	Not in school	0	2	0.543	0.909	
	Primary	1	10			
	Secondary	1	18			
	University	0	3			
Duration of HIV (years)	< 1	0	1	17.867	0.001	
	1-4	0	16			
	5-9	1	12			
	10-14	0	4			
	15-19	1	0			

Table 6: Factors associated with a normal T wave.

	Categories	Abnormal T wave		Chi-square	p
		Yes	No		
Sex	Female	2	20	0.020	0.886
	Male	1	12		
Age (years)	50-54	2	13	4.375	0.358
	55-59	0	7		
	60-64	0	9		
	65-69	1	2		
	≥70	0	1		
Marital status	Single	1	10	3.114	0.682
	Married	1	13		
	Common-law	1	2		
	Widowed	0	6		
	Divorced	0	1		
Sector of activity	Unemployed	1	10	2.930	0.570
	Public	1	2		
	Private	0	1		
	Informal	1	15		
	Retired	0	4		
Level of education	Not in school	0	2	2.031	0.566
	Primary	2	9		
	Secondary	1	18		
	University	0	3		
Duration of HIV (years)	< 1	0	1	11.258	0.024
	1-4	1	15		
	5-9	1	12		
	10-14	0	4		
	15-19	1	0		

This would allow a better knowledge of the CVRF, prevention and early management of cardiovascular events, whose associated factors identified by Rimke *et al.*, are advanced age, hyper-tension, dyslipidemia and high BMI¹⁴. Many efforts should therefore be made to promote the integration of these diseases in the follow-up of P50+.

Limitations

No work being perfect, this study presents several limits. The non-probabilistic sampling makes the data of this study non-generalizable. Also, the availability of the selected patients was not total which is at the origin of the missing data.

CONCLUSIONS

The issue of cardiovascular risk in aging PLWH is still a topical one. This work reinforces the idea that PLWH in general and P50+ in particular, represent populations that public policies should consider when developing cardiovascular disease management strategies. Indeed, antiretroviral treatment has certainly favored the survival of PLWH, but it has also highlighted their cardiovascular health, which should be considered during their follow-up and even be integrated into the continuum of their care. The question that arises from this is how to manage cardiovascular disease in P50+ patients as part of their continuum of care.

CONFLICT OF INTEREST

None to declare.

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DATA AVAILABILITY

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

AUTHOR'S CONTRIBUTIONS

Essomba TM: writing original draft, literature survey. **Esther Djanga MC:** investigation, data interpretation. **Edo'o VD:** methodology, conceptualization. **Hervé JN:** formal analysis, review. **Essomba MJN:** critical review. **Mossus T:** data curation, investigation. **Essi MJ:** data curation, investigation. All authors revised the article and approved the final version.

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