Vol. 14(1), pp. 1-4, January-March 2020
DOI: 10.5897/AJBR2019.1063
Article Number: CAC4DA362702
ISSN 1996-0778

http://www.academicjournals.org/AJBR

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African Journal of Biochemistry Research

Full Length Research Paper

Prevalence of dyslipidemia in a Burkinabe military population

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Received 4 November, 2019; Accepted 8 January, 2020

The objective of this study was to determine the prevalence of dyslipidemia in soldiers received at the laboratory of the Medical Center Camp General Aboubacar Sangoulé Lamizana (CMCGASL) for a medical visit. This is a prospective study of 224 military personnel assigned to peacekeeping missions outside Burkina Faso. The study was conducted over the period of September 2017 to November 2017. Included in the study were the military with at least one lipid status parameter. Total cholesterol, HDL cholesterol, LDL cholesterol as well as triglycerides were measured using enzymatic methods on a KONELAB20® Biochemistry machine. The prevalence of dyslipidemia in the study population was 41.96%. The average age of our patients was 39.49 years and the most represented age group was 30 to 57 years old. The prevalences of hypercholesterolemia, hyperlipidemia, hypertriglyceridemia and hypolipidemia were respectively: 3.12, 33, 93, 4.91 and 0%. The dyslipidemias were strongly correlated with hypertension. The prevalence of dyslipidemia in the military was high. These results demonstrate the value of conducting an epidemiological survey on cardiovascular risk factors in the Burkinabe armed forces.

Key words: Dyslipidemia, total cholesterol, HDL cholesterol, LDL cholesterol, atherogenicity index.

INTRODUCTION

Dyslipidemias represent a public health problem with a prevalence that exceeds 30% in Western countries. In sub-Saharan Africa, prevalence varies by region and rates of more than 50% have been found in Ghana, Nigeria and 39.30% in Senegal (Fatou et al., 2016). In Burkina, despite the frequency of cardiovascular diseases, data on the prevalence of risk factors are scarce. Studies in Burkina Faso and other sub-Saharan African countries show dyslipidemia in 20-90% of diabetic patients (Guira et al., 2018). The search for these risk factors and their adequate management could help prevent cardiovascular diseases. The progression of cardiovascular diseases is linked to several factors, among which the development of certain factors, known as "Cardiovascular risk factors". These factors are smoking, diabetes, high blood pressure (hypertension),

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Table 1. Socio-demographic characteristics of the study population.

Variable	Total n (%)	Dyslipidemia	
		Yes, n (%)	No, n (%)
Sex			
Male	215(96)	93(43.25)	122(56.74)
Female	9(4)	1(11.11)	8(88.89)
Age (years)			
<40	121 (54.01)	18 (14.88)	103 (85.12)
40-50	59 (26.34)	39 (66.10)	20 (33.90)
>50	35 (15.62)	29 (82.86)	6 (17.14)
unspecified	9 (4.01)	8 (88.88)	1
Clinical diagnoses			
high blood pressure	45/198 (22.72)	33 (73.33)	12 (26.66)
Overweight- obesity	81/169 (47.93)	30 (37.03)	51 (62.96)
Hyperglycemia	49/191 (25.65)	25 (51.02)	24 (48.98)

Table 2. Prevalence of dyslipidemia.

Prevalence	Effective	Percentage (%)
Dyslipidemia	94	41.96
Hypercholesterolemia	07	3.12
Hyperlipidemia	76	33.93
Hypertriglyceridemia	11	4.91
Hypolipidemia	0	0
Atherogenicity index	191	85.27

dyslipidemia, obesity, sex, family history of cardiovascular disease, nutritional factors, and sedentary lifestyle (Hajar, 2017). The lipid balance, a simple examination accessible to all laboratories is a step in this prevention strategy. Thus, in this work, we set ourselves the objective of assessing the prevalence of dyslipidemia in soldiers placed in an external mission position received at the laboratory of the Medical Center of the Camp of General Aboubacar Sangoulé Lamizana (CMCGASL).

MATERIALS AND METHODS

This is a prospective study of 224 military personnel aged 25 to 57 years designated for peacekeeping missions outside Burkina Faso. The study was carried out over the period from September 2017 to November 2017. Lipid biomarkers were evaluated. Total cholesterol, HDL cholesterol, LDL cholesterol, and triacylglycerol were measured using enzymatic methods on Biochemistry KONELAB20®. The dyslipidemia was defined according to the criteria of The National Cholesterol Education Program (NCEP) (Expert Panel on Detection, 2001): Cholesterolemia (total cholesterol> 2 g/L (11.11 mmol / L), hypolipidemia (HDL cholesterol) <0.4 g/L (2.22 mmol/L), hypertriglyceridemia (triacylglycerol> 1.5 g/L (8.3 mmol / L) and - hyperlipidemia (LDL cholesterol > 1.3 g/L (7, 22 mmol/L). The atherogenicity index (IA) is the ratio of total cholesterol to HDL cholesterol: Male: <5 Female: <4.5. The classification according to the Body Mass Index (BMI) was made according to WHO recommendations in the following intervals: Skinny for a BMI <18.5 kg/m²; Normal BMI (for 18.5 to <BMI ≤ 24.9 kg/m²); Overweight (for BMI of 25 to <BMI ≤ 29.9 kg/m²) and Obese (for BMI ≥ 30 kg/m²). The formula for BMI is weight in kilograms divided by height in meters squared. If height has been measured in centimeters, divide by 100 to convert this to meters. Hyperglycemia was defined as Fasting plasma glucose ≥ 7.0 mmol/L (126 mg/dl). According to WHO recommendations, normal systolic blood pressure is less than 140 mmHg. The mean value of the diastolic blood pressure is less than 90 mmHg. The data was collected on Excel 2016 and analyzed by IBM SPPS 22.

RESULTS AND DISCUSSION

The current study covered 224 subjects. The average age of the patients under this study was 39.49 with extremes of 25 to 57 years. Our sample consisted of nine female patients and 215 male patients (Table 1). It was observed that 14 (6.25%) were obese patients and 67 (29.9%) were overweight patients (Table 2). The mean value of the systolic blood pressure of the patients was 127.6 mmHg. The mean value of patients' diastolic blood

Table 3. Correlation between dyslipidemia and other cardiovascular risk factors (hypertension, diabetes, obesity).

Dyslipidemia	Yes	No	RR
High blood pressure			
Yes (n=45)	33	12	2.55
No (n=153)	44	109	
Hyperglycemia			
Yes (n=49)	25	24	0.90
No (n=142)	65	77	
Overweight, Obesity			
Yes (n=81)	30	51	0.49
No (n=88)	66	22	

pressure was 81.7 mmHg. High blood pressure was found in 45 (22.72%) patients (Table 1). The average blood glucose was 5.38 mmol /L. Hyperglycemia was found in 49 patients. The prevalence of dyslipidemia in the study population is 41.96%. The prevalences of hypercholesterolemia,hyperlipidemia,hypertriglyceridemia and hypolipidemia were respectively: 3.12, 33.93, 4.91 and 0% (Table 2). The distribution of age-related dyslipidemias shows that subjects over 50 are more exposed. Multivariate analysis between the dyslipidemia variable and the other cardiovascular risk factors (Table 3) shows an association between dyslipidemias and high blood pressure (RR = 2.55).

The study of 224 soldiers showed that people over 50 were the most affected (Table 1). These data are confirmed by a study carried out in France in 2006 which found a prevalence of dyslipidemia of about 67% in the age group of subjects aged 55 to 74 and reported by Fatou et al. (2016). Oghagbon and Okesina (2006) and Gao et al. (2012) found an increase in the incidence of dyslipidemia with age in Nigeria and China, respectively. In this study, it was 96% of men in our sample. Balaka et al. (2017) found 67.8% of male patients. Dominique et al. (2014), Pessinaba et al. (2013), Scheidt-Nave et al. (2013), Adébayo et al. (2016) respectively found 62.5, 69, 60.5 and 74.6% of female patients. This predominance of men in our study could be explained because it is a military population. Indeed, although there are women in the Burkinabe army, their number is small. The prevalence of dyslipidemia in this study is high (41.96%). The major role of dyslipidemia in the genesis of cardiovascular disease has been established by large studies in population cohorts, particularly in the United States (Robert and Nelson, 2013) and in Europe (Julian et al., 2017). The results of this are comparable to those found by Tiahou et al. (2010) and also corroborate the prevalence found in Senegalese studies (Pessinaba et al., 2013; Thiombiano et al., 2016; Fatou et al., 2016) and are similar to prevalences observed in industrialized countries that exceed 30% (Ferrieres et al., 2005; Scheidt-Nave et al., 2013; Tóth et al., 2012). In this study, hyperlipidemia is the most common dyslipidemia (33.93%) followed closely by hypertriglyceridemia (4.91%).This predominance of hyperlipidemia has also been reported by the work of Fatou Cissé et al. (2016) as well as Erem et al. (2008) in Turkey. A Togolese study found total hypercholesterolemia (25.91%) followed by hyperlipidemia (24.3%) as part of the annual health check of the staff of the Post Office of Togo (Balaka et al., 2017). Hyperlipidemia was present in 29% of patients in the Guira et al. (2018) in the newly diagnosed type 2 diabetic at the Yalgado Ouedraogo University Hospital Center in Ouagadougou. Agboola-Abu et al. (2000) in Nigeria found a lower frequency of hyperlipidemia (21.4%). Tian et al. (2015) in his study in China reported more than double our prevalence (66%). The results of this study differ from those found in Algeria (14.3%) (Yahia-Berrouiguet et al., 2009). However, most authors have found a predominance of hypercholesterolemia (Tiahou et al., 2010; Khader et al., 2010; Baragou et al., 2012; Scheidt-Nave et al., 2013; Micah and Nkum, 2012). Hyperlipidemia is almost always associated with hypercholesterolemia. This study is distinguished by the fact that hyperlipidemia is not correlated with hypercholesterolemia because LDL values were slightly above normal values and HDLs close to low values, therefore, total cholesterol values are close to normal; limit values without exceeding them. The mean value of the atherogenicity index (TC / HDL-c) in this study population was 9.16, which is higher than normal. The atherogenicity index is high in 85.27% of the study population. In the study of Adébayo et al. (2016), the atherogenicity index was 18.44% higher in people living with HIV with an Atherogenicity Index average of 6.61, which is also higher than normal. The prevalences of hypertriglyceridemia and hypoHDLemia were 4.91 and 0%, respectively. This order of frequency is different from the study of Ferrieres et al. (2005) and Fatou et al. (2016); hypolipidemia was the second most common lipid abnormality. The prevalence of hypertriglyceridemia in

this study differs from that of Guira et al. (2018) with a prevalence of 30.0% in type 2 diabetic population. According to some studies, the influence of genetic, ethnic, and environmental factors may be responsible for a lower frequency of hypertriglyceridemia in black subjects. In this study, no case of hypolipidemia was recorded. This prevalence differs from that of Guira et al. (2018) who observed hypolipidemia in 61.2% of patients which is consistent with the profile of HDL-c described in the classic lipid profile of type 2 diabetic patients. A frequency of 69 .6% was reported by Tian et al. (2015) in China. The exploitation of these data showed an association between dyslipidemia and other risk factors such as hypertension (RR = 2.55) (Table 3). This association was also found in the study by Pessinaba et al. (2013) and Fatou et al. (2016). In the case of obesity, an association with dyslipidemia was not found. This could be explained by the fact that it is a military population that regularly plays sports.

Conclusion

This study highlights a high prevalence of dyslipidemia in the military. Findings may be underestimated as most of these patients were already in contact with the health system and maybe on cholesterol-lowering therapy. This demonstrates the value of conducting an epidemiological survey of cardiovascular risk factors at the national level.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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