

Prevalence of Metabolic Syndrome among Mbo Women Yaounde -Cameroon

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Abstract

Objective: This study aimed to evaluate the metabolic syndrome among Mbo ethnic group women living in Yaounde, Cameroon.

Methods: The study was conducted on ninety-two women aged between 18-60 years who were referred to the Andre Fouda Medical Foundation in Yaounde. Metabolic syndrome was diagnosed using Adult Treatment Panel-III (ATP-III) 2001 guidelines.

Results: The mean of age, high fasting blood glucose, triglycerides levels and total cholesterol levels were significantly ($p < 0.05$) higher in women with metabolic syndrome. The overall prevalence of metabolic syndrome among Mbo women was (3.03%). High blood pressure level (43.93%) and high fasting glucose (14.39%) were respectively the most frequent characteristics in comparison to other metabolic components. 3.03%, 0% and 0% had three, four and five criteria for metabolic syndrome, respectively.

Conclusion: The prevalence of metabolic syndrome is low in women originates of Mbo ethnic group of Yaounde. For efficient measures to limit the rise of cardiovascular diseases in these women, both hypertension and hyperglycaemia should be taken into consideration.

Keywords: Metabolic syndrome; Individual components; Mbo ethnic women; Yaounde-Cameroon

Introduction

Metabolic syndrome is an assemblage of risk factors that increases the risk of cardiovascular disease and type 2 diabetes. These factors include dysglycemia, high blood pressure, elevated triglyceride levels, low high-density lipoprotein cholesterol levels (HDL-C), and obesity [1,2].

Its pathophysiology remains obscure but has been hypothesized to involve insulin resistance and a pro-inflammatory state [3,4]. Several definitions of metabolic syndrome have been proposed, but only two are widely used in different studies [5,6]. With the facilities schedule by scientific progress on 20th century chronic diseases epidemiology is raised in both developed and developing countries. Cameroon is also facing the growing epidemic of metabolic syndrome with as reported in different studies [7-9]. Studies have shown worldwide prevalence of metabolic syndrome in women around the world ranged from 7% to 56% [10]. The prevalence of metabolic syndrome depends on age, region, urban or rural environment, ethnicity, and the definition of metabolic syndrome used [11]. This estimation has started among Bamileké women [12] in Yaounde Cameroon and no epidemiological information about metabolic syndrome among Mbo ethnic group is already available.

Materials and Methods

Ethics

Internal medicine students in Cardiology during the Mbo cultural week of May 2014 did a talk in mother tong (Mbo), French and English related to burden of Cardiovascular Diseases and its prevention in Cameroon. At the end of the talk, the students delivered handouts explaining the study conditions, objectives, procedures, risks and benefits and data confidentiality. Admission to the study was based solely on voluntary participation. The study volunteers were referred at the Medical Foundation Andre Marie Fouda, Yaounde Cameroon. Females were excluded from the study if they were pregnant or lactating.

All participants in the study provided verbal informed consent. The study was approved by the Education Planning Commission of Medical Foundation. All measurements and questionnaire were in accordance with the Helsinki Declaration (1983 version). Due to the unknown size of the Mbo population, priori sampling size was not calculated. Finally, we had one hundred and thirty two people 40 men and 92 women aged between 18-60 years, and only the women sample data were analyzed.

Subjects

This cross-sectional study was performed for one month, the study team worked in all week days except Sundays. The study population consisted of Mbo ethnic individual and the study was done after their cultural week.

The data collection comprised healthcare questionnaire, anthropometric measurement of weight, Height, and abdominal circumference, health examination and laboratory test in fasting state for lipids exclusively.

Height, weight, and waist circumference were all measured using standardized techniques and calibrated equipment. BMI was calculated by dividing weight by height squared (kg/m^2) classified according to WHO rules ≥ 30 [13].

A well trained nurse drew fasting morning blood samples from

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the examinee’s arm for the lipid. Standardized techniques were used to obtain the blood pressure measurements after at least 10 min of rest.

Waist circumference was taken with the subject in a standing position, to the nearest millimetre, using a non-stretchable tape measure at the mid-point between the lowest rib and the iliac crest in expiration. The height was measured in standing position using tape meter while the shoulder was in a normal position to the nearest millimetre (Siber Hegner, Zurich, Switzerland). Body weight and body fat were determined in 12-h fasted participants (with very light clothing on and without shoes) using a Tanita™ scale. Fasting venous blood (5 ml) was collected from participants into heparinised tubes between 6:00 and 10:00 am in the laboratory. Total cholesterol and triglycerides in plasma were measured using previously described standard methods [14,15]. High Density Lipoprotein cholesterol was determined using a heparin manganese precipitation of Apo B-containing lipoproteins [16]. Fasting capillary blood glucose was determined using glucose test strips (GlucoPlus™).

Definition of metabolic syndrome

Women were considered to have Metabolic Syndrome if they had three or more of the following criteria, according to the ATP III criteria [5]

1. Abdominal obesity, defined as a waist circumference in women ≥ 88 cm (35 inches)
2. Hypertriglyceridaemia ≥ 150 mg/dL (1.7 mmol/L) or drug treatment for elevated triglycerides
 - HDL cholesterol level <50 mg/dL (1.3 mmol/L) in women or drug treatment for low HDL-C
 - Blood pressure $\geq 130/85$ mmHg or drug treatment for elevated blood pressure
 - Fasting plasma glucose (FPG) ≥ 100 mg/dL (5.6 mmol/L) or drug treatment for elevated blood glucose

Statistical Analysis

All data were analyzed by STATA® 8.2. Continuous variables are reported as means \pm standard deviations (SD) and categorical variables are presented as percentages. A *p* value less than 0.05 was considered statistically significant. Quantitative and qualitative variables were tested using Student’s *t*-test and the chi-square test respectively. *P* value <0.05 was considered statistically significant.

Results

Characteristics of the study population

Demographic and clinical characteristics of the studied population are shown in (Table 1). The mean age of the Mbo women was 42.45 ± 13.25 years and the mean of BMI 28.90 ± 4.90 kg/m². Women with metabolic syndrome exhibit significant higher mean exhibit significant higher mean of age, fasting blood glucose, triglycerides and total cholesterol comparatively to those without metabolic syndrome. The prevalence of metabolic syndrome and its components are reported in (Table 2). The frequency of metabolic syndrome was present among 3.03% of those women. The prevalence of individuals components of metabolic syndrome were shown to be: high fasting glucose levels 14.39%, low high density lipoprotein-cholesterol levels 4%, high triglyceride levels 7.54 %, high waist circumference 6.81 % and high

blood pressure 43.90 in studied population. It has been found that among the five individual metabolic syndrome components only two were most frequent in comparison to other metabolic components; high blood pressure (43.93%) and high fasting blood glucose levels (14.39%). Table 3 shows the presence of zero and one or more components of the metabolic syndrome. 20.45% of women presented no metabolic abnormality, we have noticed that 35.61 of women had one metabolic abnormality, 10.61% of women had two metabolic abnormalities and 3.03% of women had three metabolic abnormalities. Nobody had four or neither five metabolic abnormalities. Table 4 presents metabolic syndrome prevalence according age trends. The prevalence of metabolic syndrome increases in the age-trends of 40-49 and 50-60 years while occurring subjects with and without metabolic syndrome.

Parameters	Total	Women with MetS	Women without MetS	p value
All women, No. (%)	92	4	88	-
Age (years)	42.45 \pm 13.25	56.00 \pm 14.89	41.82 \pm 12.92	0.035*
BMI, kg/m ²	28.90 \pm 4.90	29.07 \pm 4.99	24.69 \pm 2.78	0.723
WC, cm	90.35 \pm 13.47	94.00 \pm 16.87	90.17 \pm 13.39	0.582
SBP, mmHg	146.16 \pm 32.39	160.00 \pm 36.78	145.41 \pm 32.25	0.384
DBP, mmHg	95.06 \pm 20.33	99.25 \pm 20.33	94.83 \pm 20.45	0.675
FBS, mg/dl	95.24 \pm 31.74	112 \pm 13.13	85.82 \pm 17.89	0.025*
TG, mg/dl	109.32 \pm 40.25	182.75 \pm 21.62	104.94 \pm 36.75	0.000*
T-Chol, mg/dl	151.28 \pm 48.67	210.25 \pm 71.44	147.95 \pm 45.56	0.011*
HDL-Chol, mg/dl	77.38 \pm 30.07	78 \pm 28.58	77.27 \pm 30.36	0.967

*Significant difference between subject with MetS and subject without MetS
 BMI: body mass index, WC: waist circumference, WHR: waist to hip ratio, SBP: systolic blood pressure, DBP: diastolic blood pressure, FBS: fasting blood glucose, TG: triglyceride, T-CHOL: total cholesterol and HDL-CHOL: HDL-cholesterol
 **p* value less than 0.05 was considered significant.

Table 1: Demographic and clinical characteristics of Mbo women (total, women with, women without metabolic syndrome).

	Women
Metabolic Syndrome	4 (3.03%)
Hyperglycaemia	19 (14.39%)
Low HDL	6 (4.54%)
High Triglycerides	10 (7.57%)
Abdominal obesity	9 (6.81%)
Hypertension	58 (43.93%)

* *p* < 0.05 considered significant

Table 2: Prevalence of metabolic syndrome and its individual components.

Parameters	Women
0 criteria n (%)	27 (20.45 %)
1 criteria n (%)	47 (35.61%)
2 criteria n (%)	14 (10.61%)
3 criteria n (%)	4 (3.03%)
4 criteria n (%)	0 (0.00%)
5 criteria n (%)	0 (0.00%)

Table 3: Metabolic syndrome items.

Age groups in years	Women without MetS (n=88)	Women with MetS (n=4)
18-29	11 (12.50%)	0 (0.00%)
30-39	29 (32.95%)	0 (0.00%)
40-49	20 (22.72%)	2 (50.00%)*
50-60	28 (31.81%)	2 (50.00%)*

Table 4: Distribution of Mbo women with and without metabolic syndrome by age groups.

Discussion

Metabolic syndrome is considered as a useful clinical tool to predict premature cardiovascular events. Early management of individual risk factor or clustering of factors is necessary to reduce the risk of cardiovascular diseases in different population. This is the second study related to ethnic variations of metabolic syndrome prevalence among women in the same geographical area after rural migration. Mbo women are originates from villages situated at about four thousand miles from Yaounde, they are genetically distant from other ethnic group. This study estimate metabolic syndrome prevalence among Mbo women living in Yaounde the capital city of Cameroon (Subsaharan-Africa). As already reported, Cameroon is dramatically confronting the growing epidemic of metabolic syndrome especially in urban areas.

The present study report a metabolic syndrome prevalence of 3.03% in Mbo women. Differences of metabolic syndrome prevalence between ethnic groups and lifestyles are hard fact with the magnitude metabolic syndrome level in the Bamiléké and the Mbo women. This frequency was too low comparatively with Bamileke(44.7%) women [12] living in the same town and even with the worldwide prevalence of metabolic syndrome among women(7.0% to 56.7%) [10]. The possible explanation for this lower prevalence of metabolic syndrome is lower abdominal obesity among Mbo women since extra fat mass is highly associated to abnormal metabolism [17]. Although obesity is more common in urban areas, it important to note that no Mbo women of the study was following a special dietary regiment and no previous study has pointed higher risk of obesity among Mbo women. For the study, 92 women were assessed. Out of this sample size, only 4 women presented metabolic syndrome as assessed based on abdominal obesity, hypertriglyceridemia, HDL cholesterol, blood pressure and fasting plasma glucose. This result appears to be in contrast with the high prevalence of metabolic syndrome in women in Cameroon. A clear reason for the differing percentage in metabolic syndrome is not indicated although genetic and basal metabolism might be part of the explanation.

Hypertension and hyperglycemia were the most frequent abnormalities among Mbo women while a high percentage of reduced HDL and increased waist circumference reported in Bamiléké women [12]. Despite the participants of the study of the two studies were exposed to the same environmental influence by living in the same town their exposure to metabolic syndrome and its various abnormalities was not the same. This coincidence of hypertension and diabetes mellitus among Mbo women has previously been reported in these Cameroonian studies [18-20].

In our study, the prevalence of hypertension in Mbo women was 43.93%, this was similar to bamiléké women (41.79%) [12] and was too high comparatively to those of the Sistanee women study in (0.62%) [21], far women (3.12%) [22] and 35.7% reported in urban-Cameroon [17]. The possible explanation of these differences hypertension prevalence may be genetic origin, insulin resistance and environmental factors [22]. Hyperglycemia occur in Mbo women at 14.39%, this percentage was similar to far [23] ethnic women (14.3%) and Sistanee women (12.50) [21], but was lower comparatively to Bamiléké women hyperglycemia (25.53%) [12].

Studies reveal that essential hypertension is generally associated with several metabolic syndrome abnormalities (obesity, glucose intolerance, and dyslipidemia) [24]. Findings suggest that the coexistence of hyperglycemia and hyperinsulinemia activate the Renin angiotensin system by raising the expression of angiotensinogen,

Angiotensin II and the AT1 receptor, that together may favor hypertension in population with insulin resistance [25].

Several reports establish the relation between low HDL cholesterol and coronary artery diseases. Reduced level of HDL cholesterol (4.54%) is the less common encountered feature in our study, our observation was not consistent with previous study of Bamiléké(79.85) women far ethnic women(29.37%) and sistanee women(23.12%) and could be a genetic particularity.

Metabolic syndrome was increasing with age in Mbo women as this agrees with several reports [26] and possibly due to menopause hormonal changes [27].

This study has some major limitations, the too small sample size of population recruited only in Yaounde and its cross-sectional nature prevents it to be generalized in all Mbo women.

Conclusion

The Mbo women study shows low prevalence of metabolic syndrome. High blood pressure and hyperglycemia prevalence is high in this study, early diagnosis and treatment of these conditions may limit the rise of metabolic syndrome. Relationship between genetic and metabolic syndrome among Cameroon ethnic groups should be explore.

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