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PREVALENCE OF METABOLIC SYNDROME AMONG BAMILEKE ETHNIC WOMEN YAOUNDE, CAMEROON

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ABSTRACT

Metabolic Syndrome (MetS) is the cluster of several cardiovascular risks. A study population of one hundred and thirty four women in Yaoundé Cameroon aged between (20-60 years) were scrutinized using Adult Treatment Panel-III definition. The mean age, body mass index, waist circumference, systolic blood pressure, diastolic blood pressure, triglyceride and fasting blood glucose levels were significantly higher in women with MetS and the mean of HDL-cholesterol was lower ($p<0.001$). The prevalence of MetS was 44.77% and was decreasing with aging; the younger adult women were more affected. Low HDL-cholesterol (79.85%) and high abdominal (64.17%) obesity level are respectively the most frequent characteristics in comparison to other metabolic components. According to our results, 35.07%, 9.70% and 0.00% had three, four and five MetS components correspondingly. MetS prevalence in these women is high; some factors have been pointed out in this study. Women should be scrutinised in other ethnics group of Cameroon.

KEY WORDS: Metabolic Syndrome, National Cholesterol Education Program Adult Treatment Panel III, Bamiléké Ethnic Women, Yaoundé Cameroon.

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INTRODUCTION

Metabolic Syndrome also called by several different names: syndrome X, insulin resistance syndrome, pre-diabetes, metabolic syndrome, dysmetabolic syndrome, plurimetabolic syndrome, cardiometabolic syndrome, dyslipidemic hypertension, hypertriglyceridemic waist, and deadly quartet is the cluster of several risk factors that raises the risk for both atherosclerotic cardiovascular disease and type 2 diabetes [1,2]. There are five harmonized clinical criteria for the diagnosis of metabolic syndrome: central obesity, raised triglycerides, raised blood pressure, raised glucose and reduced High Density Lipoprotein cholesterol [3]. Cameroon as other developing countries is experiencing the burden of rapid epidemiologic transition with the high spread of non-communicable diseases [4] considerably due to changing environment and lifestyle. Most prospective studies have shown that metabolic syndrome estimation is a useful tool for prediction of cardiovascular diseases [5, 6]. Profound disparities in genetic background, socio-economic status, diet, work- related activities, levels of physical activity, age, ethnicity, cultural view of body fat and sex all influence the prevalence of both metabolic syndrome and its components [7]. The prevalence metabolic syndrome is increased generously by the epidemic increase of obesity whole around the world. In Cameroon they are more than two hundred ethnic groups and reliable data on metabolic syndrome in each ethnic group are lacking. More than fifty percent of Cameroon population leaves in urban areas and studies from urban populations in Cameroon have shown that overweight and obesity is especially high among bamiléké women [8]. Thus, it becomes necessary to measure prevalence of metabolic syndrome in Bamiléké women for taking an early lifestyle interventions and treatment to prevent many non-communicable diseases in accordance with WHO recommendation. Scarce studies related to metabolic syndrome prevalence in specific ethnic group has been done. The current study aimed to determine the prevalence of metabolic syndrome and its components distribution in native Bamiléké women living in the urban area of Yaoundé according to the scheme of National Cholesterol Education Program Adult Treatment Panel III (NCEP/ATPIII) [9].

MATERIALS AND METHODS

(i) Study Population

Female Bamiléké adult's women with at least one year continuous residence in Yaoundé, aged between 20-60 years and from different socio-economic background during the national week of the international women day in March were recruited by volunteering. After signing their written informed consent form they were enrolled for the study. Measurements of different parameters were done at the Laboratory of Sciences and Metabolism, at the University of Yaoundé I, Cameroon. Inflammatory diseases, pregnant or lactating women were excluded from the study. From a target population of three hundred Bamiléké women, only one hundred and thirty four (134) had all necessary measurements to evaluate the metabolic syndrome according to the definitions selected for this study. 53.33% of those who were eligible did not participate due to several reasons (eg, lack of time or unexpected reasons that forced them to cancel the interview).

(ii) Questionnaires

The questionnaires set comprised socio-demography, health status on hypertension, diabetes, dyslipidaemia, inflammatory diseases and current medication.

(iii)Ethics

The Cameroon National Ethics committee approved this study. All measurements and questionnaire were in ac with the Helsinki Declaration (1983 version).

(iv) Anthropometry

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. Obesity was classified according to WHO rules. The ratio between the weight (Kg) to height in meters squared (m^2) was used to evaluate body mass index (BMI). BMI was classified according to WHO rules as follow BMI status was categorized as follows: underweight BMI <18.5; normal BMI 18.5-24.9; BMI overweight 25-29.9; obese BMI ≥30 [10]. 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 [11].

(v) Physiological measurements

Systolic and diastolic blood pressures were measured in a resting sitting position on three different visits (day 1,7 and 10) using a mercury sphygmomanometer. An appropriate adult cuff was applied 2 to 3 cm above the antecubital fossa of the right arm. Blood pressure was measured on the right hand to the nearest 2mmHg, reading the calibration below the meniscus. Systolic and diastolic blood pressures were read at the 1st and 5th Korotkoff phases, respectively. The mean of the 3 blood pressure values obtained from the 3 visits was taken as the participant's true blood pressure.

(vi) Biochemical analyses of plasma

Fasting venous blood (5 ml) was collected from participants into heparinised tubes between 6:00 and 10:00 am in the laboratory. If the participant expressed an inability to come to the lab due to personal reasons, therefore a house visit was made to collect their blood sample. After centrifugation (3000 rpm *g*) for 10 min, plasma collected within 4 hours of blood collection was immediately stored in aliquots at -80°C, and analysed within one week. Total cholesterol [12] and triglycerides [13] in plasma were measured using previously described standard methods. High Density Lipoprotein cholesterol was determined using a heparin manganese precipitation of Apo B-containing lipoproteins [14]. Fasting capillary blood glucose was determined using glucose test strips (Gluco-touch).

(vii) Definition of Metabolic Syndrome

Metabolic syndrome was detected according to the National Cholesterol Education Program Adult Treatment Panel III criteria's. Participants having three or more of the diagnostic criteria were defined as having metabolic syndrome according to the NCEP/ATPIII guidelines [9].

1. Abdominal Obesity: Waist Circumference >88cm,
2. Hypertriglyceridemia: Triglycerides >150 mg/dl,
3. Low High Density Lipoprotein-C < 50 mg/dl,
4. Hypertension: known hypertensive or Systolic Blood Pressure >130mmHg, and or Diastolic Blood Pressure >85 mmHg
5. Dysglyceamia: known diabetes mellitus (DM) or fasting plasma glucose >110 mg/dl.

(viii) Statistical analysis

Data were entered into computer using the Statistical Package for Social Sciences software, SPSS version 10.1 then transferred to STATA® 8.2 for analysis. Student's t-test was used to compare mean differences of components by groups of women having or not metabolic syndrome and Chi-square ($\chi 2$) test to determine differences in prevalence by age group. Continuous variables are reported as means ± standard deviations (SD) and categorical variables as percentages. A p value less than 0.05 was considered statistically significant.

RESULTS

Characteristics of the study population

The number of women between 20-29 years was 80 (59.70%), 30 to 39 years was 30 (22.38%), 40-49 years was 19 (14.17%) and 5 (6.71%) were 50-60 years. The general characteristics of the subjects are summarized in Table 1 and also data of subjects with and without metabolic syndrome. The mean of year of the study population was 30.34 ± 8.08 years. The group of women with metabolic syndrome exhibit significant higher mean of age, of body mass index, of waist circumference, of systolic blood pressure, of diastolic blood pressure and fasting blood

glucose comparatively to those without metabolic syndrome. In contrast only the mean of High Density Lipoproteins cholesterol was significant lower in metabolic syndrome positive patient comparatively to those without. They were no significant difference between triglycerides and total cholesterol in those two groups. The prevalence of metabolic syndrome and its individual components in Bamiléké women are shown in table 2. The prevalence of metabolic syndrome was 44.77% and for it individual components prevalence was 25.37% for fasting blood glucose, 79.85% for low HDL-cholesterol, 14.17% for high triglyceride, 64.17% high abdominal obesity and 41.79% for high blood pressure respectively. In our sample, the most commonly found abnormality was low HDL-cholesterol followed by high abdominal obesity. Table 3 presents metabolic syndrome prevalence according to age trends. The most age distribution and the highest were in ages between 18-29 years. The prevalence of metabolic syndrome was high in ages 40-49 years when compared subjects with and without metabolic syndrome.The prevalence of metabolic syndrome was decreasing with aging from the younger ones to the oldest. Table 4 shows number of subjects according to metabolic syndrome criteria. Only 3.73% are healthy with none of metabolic syndrome component, for the rest 17.91% were at low risk with one metabolic abnormality, 33.58% had two metabolic abnormalities and were at high risk, 35.07% had already three metabolic abnormalities and 9.70% had four metabolic abnormalities and nobody had five metabolic abnormalities.

Table 1
Baseline of data of Bamiléké women (Total subjects, subject with and without metabolic syndrome)

Parameters	Total number of subjects	Subjects with MetS	Subjects without MetS	P value
All women, No. (%)	134	60	74	-
Age (years)	30.34 ± 8.08	33.55 ± 8.99	27.84± 6.30	0.0000
BMI, kg/m²	32.18 ± 7.34	34.55 ± 8.05	30.33 ± 6.19	0.0006
WC, cm	94.70 ± 16.21	101.14 ± 15.71	89.65± 14.84	0.0000
SBP, mmHg	122.51 ± 15.35	129.70 ±16.83	116.87 ± 11.31	0.0000
DBP, mmHg	81.39 ± 13.30	88.45± 13.27	75.86 ±10.44	0.0000
FBS, mg/dl	94.63± 27.03	106.69± 28.81	94.63± 27.03	0.0000
TG, mg/dl	102.18 ± 66.96	106.53± 81.39	98.77 ± 53.29	0.49
T-Chol, mg/dl	140.89 ± 49.74	136.48 ± 39.78	144.35 ± 56.35	0.35
HDL-Chol, mg/dl	36.81 ± 23.66	30.37 ± 16.09	41.87 ± 27.27	0.0000

Significant difference between subjects with MetS and subjects without MetS
MetS : Metabolic Syndrome, 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 2
Prevalence of the Metabolic Syndrome and its individual components

	Number	%
Metabolic Syndrome	60	44.77
Fasting Blood Sugar >110 mg/dl	36	25.53
High Density Lipoprotein-cholesterol < 50 mg/dl	107	79.85
Triglyceride > 150 mg/dl	19	14.17
Waist circumference > 88 cm	86	64.17
Systolic blood pressure >130 mmHg/ Diastolic blood pressure>85 mmHg	56	41.79

**** P<0.05 considered significant***

Table 3
Distribution of Bamiléké women with and without Metabolic Syndrome by age groups

Age groups in years	Subjects without MetS (n=74)	Subjects with MetS (n=60)
20-29n (%)	53(45.48%)	27(45.00%)
30-39n (%)	15(20. 27%)	15(25.00%)
40-49 n (%)	5(6. 75%)	14(23.33%)*
50-60n (%)	1(1.35%)	4(6.66%)

Table 4
Metabolic Syndrome Items

Parameters	Subjects (n=134)
0 criteria n (%)	5 (3.73%)
1 criteria n (%)	24 (17.91%)
2 criteria n (%)	45 (33.58%)
3 criteria n (%)	47 (35.07%)
4 criteria n (%)	13 (9.70%)
5 criteria n (%)	0 (0.0%)

DISCUSSION

Cameroon as the rest of the sub-Saharan African country is facing rapid epidemiological transition consequence. Previous studies in sub-Saharan African countries [15] confirmed the relationship between nutrition transition and the increase of cluster of cardiometabolic risk factors called metabolic syndrome. The present study investigated the prevalence of metabolic syndrome and its components among women of Bamiléké ethnic group living in Yaoundé the capital city of Cameroon because the current prevalence data is limited. Majority of women (95%) are suffering from at least one metabolic syndrome components. This finding is consistent with many studies that have demonstrated a high prevalence of non-communicated diseases and their risk factors in some sub-Saharan African settings [16]. Results of data analysis indicate that metabolic syndrome affects a large number of Bamiléké women with a prevalence of 44.77% according to NCEP criteria. The prevalence of metabolic syndrome in adult population worldwide varies from 7 to 46.5% in [17, 18]. Our study prevalence is considered among the highest and too high compared to the prevalence (0.2%) reported in Cameroonian study [19]. The lack of parallel between the two studies could be explained by the low number of our cohort and it ethnic homogeneity compared to the ethnic heterogeneity and higher number of participants of this previous study. Our findings cannot be compared easily with other Africa related studies because of lack of studies related to metabolic syndrome in different ethnic groups in Cameroon or Africa. Low HDL and abdominal obesity were the most frequently features as observed among Sistanee Ethnic Women [20] and Fars Ethnic Women of Iran [21]. The Turkish [22] and the Canadian [23] studies also shows that low HDL-cholesterol is the most common found risk factor in women having metabolic syndrome. The higher frequency of metabolic syndrome in our younger female participants (45%) is possibly as a result of the coexistence of a significantly higher frequency of low HDL-c and abdominal obesity. These results of study showed these abnormalities might start at a young age. At that age women are exposed to these physiological conditions (multiple pregnancies and lactating) that changes, increases predisposition to gain weight, and therefore vulnerability to the development of metabolic syndrome [24]. Generally most of the women take a lot of weight after this physiologic transition associated to some particular Bamiléké practise during lactating. It consists of after deliveries to enhanced women weight at that period through force-feeding with their traditional meals to ensure

enough production of milk for the new born baby. During the period of force-feeding women are mostly indoors and therefore involved in sedentary activities. Some years ago [8], studies revealed that obesity prevalence was higher in Bamiléké women and later abdominal obesity appeared as the key determinant of metabolic syndrome in sub-Saharan African [19]. It is well know that changes in abdominal obesity rather than obesity can cause metabolism abnormality and influence health [25].With the low physical activity level of urban dwellers in Cameroon had comparatively to rural one [26], it difficult to those women to reduce enough weight after childbearing. Excess weight gain and physical inactivity are two important determinants of metabolic syndrome [27]. The prevalence of metabolic syndrome was high in ages 40-49 years while comparing women with and without metabolic syndrome. The transition from pre- to post-menopause may be associated with each feature of the metabolic syndrome. Generally menopause occurs before the age of fifty in women of developing countries [28] is accompanied with the development of arterial hypertension [29, 30] often together with changes in lipid and glucose metabolism [31, 32]. These remarks are clearly appearing in our study where hypertension (41.79%) occurrence is average while dysglyceamia (25.53%) and hypertriglyceridaemia (14.17%) occur in smaller frequencies. The prevalence of metabolic syndrome was progressively decreasing with aging, this is in contrast with others findings where metabolic syndrome generally is age-dependent [19, 33]. One of the possible explanations is the reduction of fertility and pregnancies with aging since women preferred childbearing when they are young. When the children have grown up, women become more active and therefore less sedentary. The main limitation of our study is its cross sectional design consequently its finding should be confirm with longitudinal further studies. The low number of participants and also disproportion in the age trend of studies. Generally, identification of high-risk individuals might be difficult in sub-Saharan Africa where most of the population does not consult a health care professional for preventive care because they are mostly poor and have limited or no access to health care services [34, 35]. The refusal to know metabolic syndrome status and ignorance of it risk is common.

CONCLUSION

Epidemiological data on metabolic syndrome in Cameroon are still limited. However, although the national prevalence is low, this study has provides high evidence to cardiovascular events among Bamiléké ethnic women in Yaoundé especially in the younger ones. Adjustments of some cultural practise and increasing physical activity level should be a reality to prevent the rise of cardiovascular disease. The screening of metabolic syndrome is required for others Cameroonian ethnic groups.

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