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Original Research Article

# Transaminases Level among Obese Women with and Without Metabolic Syndrome

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## ABSTRACT

This study aimed to determine metabolic syndrome prevalence among obese women who attended the different free screening camps of chronic diseases as well as to compare liver enzymes alanine aminotransferase (ALT) and aspartate aminotransferase (AST) according to their metabolic syndrome (MetS) status. In this cross-sectional study total of 662 obese women living in Yaoundé were recruited during free chronic diseases campaign from March 2013 to March 2016 at Fouda Medical Center. MetS was diagnosed according to national cholesterol education program adult treatment III 2001 definition. In that sample, 100 obese women with MetS and 100 others without MetS were randomly selected for transaminases evaluation. All studied parameters were significantly ($P<0.05$) increased among obese women with metabolic syndrome except for HDL cholesterol. The prevalence of MetS was 20.90% and the most frequent individual component were abdominal obesity (60.27%), high triglycerides (33.38%) and hyperglyceamia (18.88%). The Transaminases level was significantly ($P<0.05$) increased among obese women with MetS comparatively to their counterpart. The study shows that transaminases levels are higher among obese women of and transaminases can be considered as a marker of metabolic syndrome.

**Keyword:** Metabolic syndrome; obesity; women; transaminases; Yaounde

## INTRODUCTION

Metabolic syndrome is a group of interrelated risk factors that raises the risk of cardiovascular disease and type 2diabetes. These risk factors are glucose intolerance, hypertension, dyslipidemia and central obesity [1,2]. Rapid urbanization and lifestyle changes are

increasing metabolic syndrome prevalence around the world and particularly in developing nations therefore studies should clearly focus around this disease. Since 198l many definitions of metabolic syndrome are continuously proposed [3,4]. Most metabolic syndrome reports deal with its prevalence and few ones are related to it markers. Classically for it diagnostic, analysis of serum or plasma glucose and lipid biomarkers such as total cholesterol, triglycerides, High density lipoprotein, low-density lipoprotein cholesterol, insulin, and C-peptide levels are used, therefore new markers studies are of interest. Previous report confirmed hepatic dysfunction (5,6) among people with metabolic syndrome. Cameroon has one the highest African rate of women obesity, among the growing metabolic syndrome studies(7-14 ), no study dealing with metabolic syndrome and transaminases has been done among those women. This study aimed to evaluate Metabolic syndrome prevalence among obese women who attended the multiple free screening camps of chronic diseasesas as well as to compare liver enzymes alanine aminotransferase (ALT) and aspartate aminotransferase (AST) according to their metabolic syndrome status metabolic syndrome (MetS).

## MATERIALS AND METHODS

### Ethics

The study was conducted from March 2014 to March 2016.Admission to the study was based solely on voluntary participation of the women. The study volunteers were therefore 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 and the Rector of Yaounde I University gave his authorization. All measurements and questionnaire were in accordance with the Helsinki Declaration (1983 version).

### Subjects

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

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. [15]

A well trained nurse drew 5 ml of fasting morning blood samples from the examinee's arm.. All patients were screened endocrinologically for thyroid, adrenal and gonadal diseases. Standard biochemical tests, lipid profile, fasting blood glucose and transaminases, were measured with the same automatically functioning device on the same day

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 Jocca™ scale

### Definition of Metabolic Syndrome

Workers were considered to have Metabolic Syndrome if they had three or more of the five following criteria, according to the ATPIII definition [3]

1. Abdominal obesity, defined as a waist circumference in women ≥ 88 cm (35 inches), in men ≥ 102 cm (40 inches)

2. Hypertriglycerideamia ≥ 150 mg/dL (1.7 mmol/L) or drug treatment for elevated triglycerides
3. HDL cholesterol level <50 mg/dL (1.3 mmol/L) in women, <40 mg/dL (1mmol/L) in men or drug treatment for low HDL-C
4. Blood pressure ≥ 130/85 mmHg or drug treatment for elevated blood pressure
5. Fasting plasma glucose (FPG) ≥ 110 mg/dL (6.1mmol/L) or drug treatment for elevated blood glucose

**Statistical analysis**

All data were analyzed by STATA® 8.2. Continuous variables are reported as means ± standard deviations (SD) and categorical variables are presented as percentages or numbers. 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

The characteristic of the studied women are recorded in Table 1. The obese women mean age was 36.37±11.23years with mean body mass index of 33.92±3.35kg/m$^2$. Table 2 shows prevalence of metabolic syndrome and its individual components. Low levels of HDL-C were observed in 16.46% (109/662) of the assessed women, and 39.5% (51/129) had high blood pressure. Hyperglycemia was observed in 18.88% (125/662) of the assessed individuals. hypertriglyceridemia was high in 33.38% (221/662) and elevated waist circumference in 60.27% (399/662) of the individuals. 20.99% of the women fulfilled metabolic syndrome criteria. Table 3 shows that Women with metabolic syndrome exhibit significant higher mean exhibit significant higher mean of age, body mass index, fasting blood glucose, triglycerides blood pressure and total cholesterol comparatively to those without metabolic syndrome. Only HDL Cholesterol appears to be lower amongst women with metabolic syndrome. Level of transaminases 32.5 ± 5.13/27.0 ± 2.09U/L for ASAT and for ALAT 44.4 ± 2.07/24.5 ± 6.16U/L were significantly higher among obese women with metabolic syndrome.

**Table 1: Characteristics of the study subjects**

| | **Moyenne ± écart type** |
|---|---|
| Number | 662 |
| Age (years) | 36.37 ± 11.23 |
| BMI, kg/m² | 33.92 ± 3.35 |
| WC, cm | 94.16 ± 12.79 |
| SBP, mmHg | 124.37 ± 21.18 |
| DBP, mmHg | 84.1 ± 15.64 |
| FBS, mg/dl | 91.28 ± 25.9 |
| T-Chol, mg/dl | 143.85 ± 49.88 |
| TG, mg/dl | 103.74 ± 37.83 |
| HDL-Chol, mg/dl | 47.05 ± 17.83 |

**Table 2: Metabolic Syndrome and Individual components**

| | Percentage | Number |
|---|---|---|
| Metabolic Syndrome | 20.99 | 139 |
| Fasting Blood Sugar >110 mg/dl | 18.88 | 125 |
| High Density Lipoprotein-cholesterol < 40 mg/dl | 16.46 | 109 |
| Triglycerides > 150 mg/dl | 33.38 | 221 |
| Waist Circumference > 102 cm | 60.27 | 399 |
| Systolic blood pressure >130 mmHg/ Diastolic blood pressure>85 mmHg % | 16.61 | 110 |

**Table 3: Comparison of studied parameters between women with and without metabolic syndrome**

| Parameters | Obese with MetS (100) | Obese without MetS (100) | P value |
|---|---|---|---|
| Age (années) | 36.82 ± 11.28 | 32.82 ± 11.28 | 0.004* |
| Indice de Masse Corporelle (kg/m$^2$) | 37.08 ± 5.71 | 34.66 ± 2.76 | 0.000* |
| Tour de taille (cm) | 104.89 ± 11.53 | 101.73 ± 10.23 | 0.001* |
| Pression Systolique (mmHg) | 138.21 ± 22,80 | 126.27 ± 19.32 | 0.000* |
| Pression Diastolique (mmHg) | 91.82 ± 13.53 | 84.31 ± 14.57 | 0.000* |
| Triglycérides (mg/dL) | 128.98 ± 21.89 | 96.84 ± 30.61 | 0.000* |
| Cholestérol HDL (mg/dL) | 42.83 ± 17.13 | 47.27 ± 17.81 | 0.002* |
| Cholestérol Total (mg/dL) | 167.75 ± 37.13 | 139.51 ± 42.45 | 0.001* |
| Glycémie (mg/dL) | 106.42 ± 14.87 | 87.45 ± 22.10 | 0.000* |
| Aspartate aminotranférase,IU/L | 32.5 ± 5.13 | 27.0 ± 2.09 | 0.04* |
| Alanine aminotransferase,IU/L | 44.4 ± 2.07 | 24.5 ± 6.16 | 0.009* |

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
SD**:** standard deviation

## DISCUSSION

Metabolic syndrome (MetS) is the cluster of these factors: abdominal obesity, hypertriglyceridemia, low high density lipoprotein cholesterol (HDL-C) level, increased blood pressure, and elevated fasting glucose level. With rapid nutrition transition, both obesity and metabolic syndrome are major public health challenge. The prevalence of metabolic syndrome is dependent on age, gender, ethnicity, diagnostic criteria, year of study and population. They are several groups of biomarkers for metabolic syndrome and with the complexity of this diagnostic parameters, it is hard to make a well-defined distinction between the various markers.

In this study, we found the prevalence of MetS among women of 20.99. This frequency was to

low comparatively with Bamileke [9] women and higher to the ones of Mbo women but [11] range within the worldwide prevalence of metabolic syndrome among women (7.0% to 56.7%) [16, 17]. Obesity is considered the central causative factor in the development of MetS as adipose cells produced bioactive substances directly influencing insulin sensitivity and vascular injury [18]. In fact, the degree of obesity, as evaluated through BMI, has been found to contribute in a dramatic way to the development of the MetS in different reports.

Liver is the headquarter of biomolecules (fat, glucidic and steroidal) metabolism, measurement of liver enzymes is common and is used for evaluation of liver damage in primary health care. Subjects with MetS had statistically significant higher values of ALT and AST compared to subjects without MetS ($p < 0.001$). Our findings are consistent with previous research done among these different studies, the elderly males [19], obese adults [20], postmenopausal women [21], adolescents [22], the Chinese population[23], and even the Bucharest study[24], but was not in accordance with kim et al study[25],

In our study, ALT level between women with and without MetS was stronger than the one of elevated AST. Generally, ALT is well known to be the most precise indicator of hepatic dysfuction and most closely related to liver fat accumulation [26] than AST who is the less specific marker because it also found in many other tissues [27].

Strengths of our study are the use of standardized data collection of protocol as well as a relatively homogenous population of women. Although metabolic syndrome studies in Cameroon are arising, this study is the first study dealing with metabolic syndrome markers.

Our study should be interpreted in light of its limitations, firstly the small sample size of women for transaminases evaluation and it cross-sectional nature prevents it to be generalized in all women of Yaounde.

## CONCLUSION

Our study has show that liver impairment through elevated ALAT and ASAT level among obese women with metabolic syndrome, transaminases are considered as metabolic syndrome biomarkers among obese women with metabolic syndrome.

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## DECLARATION OF CONFLICTING INTEREST

The authors declare that there are no conflicts of interest.

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