



RESEARCH ARTICLE

PREVALENCE OF METABOLIC SYNDROME AMONG TOUPOURI ETHNIC MEN CAMEROON
(YAOUNDE)

*Damaris Enyegue Mandob and Mounmo Thomas Dagain

Department of Biological Sciences, ENS University of Yaoundé 1, PO Box 047, Yaoundé, Cameroon

ARTICLE INFO

Article History:

Received 27th December, 2015
Received in revised form
18th January, 2016
Accepted 24th February, 2016
Published online 31st March, 2016

Key words:

Metabolic Syndrome, Individual
Components, Toupouri ethnic men,
Yaounde- Cameroon.

ABSTRACT

Background: The Metabolic Syndrome is now considered as important factor of cardiovascular mortality around the world.

Objective: This cross-sectional study aimed to determine the prevalence of metabolic syndrome in 81 voluntary men belonging to Toupouri ethnic group of Yaoundé Cameroon. The definition used is that of National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) 2001.

Result: The prevalence of metabolic syndrome among Toupouri men was 29.62%. The prevalence of metabolic syndrome individual components was hypocholesterolemia HDL (64.20%), hypertension (60.49%), hypertriglyceridemia (37.03%), high waist circumference (22.22%) and hyperglycemia (2.46%). In our results 25.92% had three altered metabolic syndrome components while 3.70% had four and nobody met five criteria.

Conclusion: Metabolic Syndrome is common amongst Toupouri men of Yaoundé.

Copyright © 2016, Damaris Enyegue Mandob and Mounmo Thomas Dagain. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Damaris Enyegue Mandob and Mounmo Thomas Dagain, 2016. "Prevalence of metabolic syndrome among Toupouri ethnic men Cameroon (Yaounde)", *International Journal of Current Research*, 8, (03), 28079-28082.

INTRODUCTION

Cardiovascular diseases are the leading cause of deaths in both developed and developing nations (Yach, 2004). Africa is facing the double burden of infectious and chronic diseases, projections show that non communicable diseases will seriously challenge infectious diseases in Sub-saharan Africa by the year 2030 (Grundy *et al.*, 2005; Mathers *et al.*, 2006). In developing countries the increase in cardiovascular diseases burden is largely a result of an increase in the prevalence of the risk factors and a relative lack of access to prevention strategies through early diagnostic and education program in communities. Metabolic Syndrome is described as the clustering of several risk factors such as obesity, hypertension, dyslipideamia, and dysglyceamia that enhanced unexpected arrival of type 2 diabetes and cardiovascular diseases (Wilson *et al.*, 2005). Many definitions have been set up to evaluate this syndrome and the widely accepted and clinically used definition is ATP III definition (Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol). Prevalence of metabolic syndrome and it individual component varies according age distribution, socioeconomic or nutritional statuses and different ethnic groups (Kolovou *et al.*, 2007). Little information related to metabolic syndrome and ethnic

group have been done in Cameroon (Mandob *et al.*, 2015) and no study has already focus on metabolic syndrome among Toupouri men. The purpose of this study is therefore to estimated prevalence of metabolic syndrome among Toupouri men community of Yaoundé according to the scheme of National Cholesterol Education Program Adult Treatment Panel III (NCEPATPIII) (Executive summary ATP III, 2001).

MATERIALS AND METHODS

Ethics

Internal medicine students in Cardiology during the Toupouri meetings of November 2014 did a talk in mother tong (Toupouri) and French 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 Holy Spirit Medical Center Yaounde Cameroon. Females were excluded from the study. All participants in the study provided verbal informed consent. The study was approved by the Education Planning Commission of the center. All measurements and questionnaire were in accordance with the Helsinki Declaration (1983 version).

*Corresponding author: Damaris Enyegue Mandob,
Department of Biological Sciences, ENS University of Yaoundé 1, PO Box
047, Yaoundé, Cameroon.

Subjects

This cross-sectional study was performed from November to December, the study team worked in all week days except Sundays. The study population consisted of Male Toupouri individual. The data collection comprised healthcare questionnaire, anthropometric measurement of weight, Height, and abdominal circumference, health examination and laboratory test in fasting state for lipids. 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 (WHO, 1997) A well trained nurse drew fasting morning blood samples from 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 (Allain *et al.*, 1974) and triglycerides in plasma were measured using previously described standard methods (Buccolo and David H, 1974) High Density Lipoprotein cholesterol was determined using a heparin manganese precipitation of Apo B-containing lipoproteins (Warnick and Alberers, 1978). Fasting capillary blood glucose was determined using glucose test strips (GlucoPlus™).

Definition of Metabolic Syndrome

Men were considered to have Metabolic Syndrome if they had three or more of the following criteria, according to the ATP III criteria (Executive summary ATP III, 2001).

- 1) Abdominal Obesity: Waist Circumference ≥ 102 cm for men,
- 2) Hypertriglyceridemia: Triglycerides ≥ 150 mg/dl or drug treatment for elevated triglycerides
- 3) Low High Density Lipoprotein-C (< 40 mg/dl for men), or drug treatment for low HDL-C
- 4) Hypertension: known hypertensive or Systolic Blood Pressure > 130 mmHg, and or Diastolic Blood Pressure > 85 mmHg or drug treatment for elevated blood pressure
- 5) Dysglycemia: known diabetes mellitus or fasting plasma glucose > 110 mg/dl 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. The distribution of continuous variables was assessed by Kolomogrov-Smirnov test and a normal distribution was

demonstrated. A *p* value less than 0.05 was considered statistically significant.

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

The data of Toupouri men were analyzed. The general characteristics of Toupouri men having or not metabolic syndrome are summarized in Table 1. The mean of year of Toupouri men without metabolic syndrome is 29.38 ± 0.76 years while the mean of years of Toupouri men with metabolic syndrome was 37.37 ± 1.54 years. Toupouri men with metabolic syndrome exhibit significantly higher mean of age, body mass index, waist circumference, hip circumference, systolic blood pressure, diastolic blood pressure, triglyceride and total cholesterol but lower high density lipoprotein comparatively to Toupouri men without metabolic syndrome. They were no significant differences only for fasting blood glucose between the two category of men. The prevalence of Metabolic Syndrome and its individual components among Toupouri men according to their metabolic syndrome status are highlighted in Table 2. The prevalence of metabolic syndrome among Toupouri men is 29.62%. In our sample, the most common abnormalities were HDL-cholesterol (64.19%) high blood pressure (60.49%) and elevated triglycerides level (37.03%). High waist circumference (7.76%) and Hyperglycemia (2.46%) are the less frequent metabolic syndrome components.

Table 1. Baseline of data of Metabolic Syndrome among Toupouri men with and without

Parameters	Toupouri men with MetS	Toupouri men without MetS	P-value
Age (years)	37.37 \pm 1.54	29.38 \pm 0.76	0.000*
WC, cm	87.75 \pm 1.80	80.68 \pm 0.97	0.000*
BMI, kg/m^2	24.15 \pm 0.55	21.97 \pm 0.30	0.000*
SBP, mmHg	137.75 \pm 2.26	127.36 \pm 1.25	0.000*
DBP, mmHg	89.00 \pm 2.27	81.63 \pm 1.22	0.002*
FBS, mg/dl	85.87 \pm 10.60	84.05 \pm 1.34	0.054
TG, mg/dl	236.62 \pm 33.66	115.91 \pm 12.84	0.000*
HDL-Chol, mg/dl	35.87 \pm 5.02	61.78 \pm 5.62	0.005*
T-Chol, mg/dl	126.12 \pm 5.99	107.75 \pm 4.08	0.015*

* *P* < 0.05 considered significant

BMI: Body mass index, WC: waist circumference, SBP: systolic blood pressure, DBP: diastolic blood pressure, FBS: fasting blood glucose, TG: triglycerides, T-CHOL: total cholesterol and HDL-Chol: HDL-cholesterol

**P* value less than 0.05 was considered

Table 2. Prevalence of the Metabolic Syndrome and its individual components

	Number	Percentage
Metabolic Syndrome	24	29.62%
Fasting Blood Sugar > 110 mg/dl	2	2.46%
High Density Lipoprotein-cholesterol < 40 mg/dl	52	64.19%
Triglycerides > 150 mg/dl	30	37.03%
Waist Circumference > 102 cm	18	22.22%
Systolic blood pressure > 130 mmHg/ Diastolic blood pressure > 85 mmHg %	49	60.49%

The results saved in Table 3 shows number of subjects according to metabolic syndrome items. 25.92%, 3.70% and 0% had three, four and five criteria for metabolic syndrome, respectively.

Table 3. Metabolic Syndrome Items in Toupouri Ethnic men

Parameters	Number	Percentage
0 criteria n (%)	6	7.40%
1 criteria n (%)	27	33.33%
2 criteria n (%)	24	29.62%
3 criteria n (%)	21	25.92%
4 criteria n (%)	3	3.66%
5 criteria n (%)	0	0.00%

DISCUSSION

Metabolic Syndrome is widely recognized as the a complex of metabolic disorder in the modern world and is responsible for most cardiovascular events (Wannamethee *et al.*, 2005, Ford *et al.*, 2005, Balti *et al.*, 2013). Prevalence of metabolic syndrome and its components disparately varies in different populations (Batsis *et al.*, 2007). The identification of metabolic syndrome unable to predict cardiovascular and type 2 diabetes (Empana *et al.*, 2007) status and, to set up community adapted preventive measures. Several reports show that prevalence of metabolic syndrome may vary according to sex, age distribution, socioeconomic, nutritional statuses and different ethnic groups (Cameron *et al.*, 2004). As population migrates from rural to urban areas, there are a series of environmental, social, and structural changes that occur, and may lead in exposure to risk factors for chronic diseases. The Toupouri population originates from the desert Nord region of Cameroon may represents a target population who is exposed to this nutritional transition in Yaounde a non desert region. Some changes will help us to understand the nutrition transition level in Toupouri. Firstly, their traditional food never contains lipids and they normally eat twice a day (Masseyeff *et al.*, 1965), this habit is dramatically modified at their arrival in Yaounde. Most Toupouri men spend a large part of their day at the workplace and therefore are constraint to eat food which does not belong to their traditional habits and may contain rich sources of lipids. Toupouri men live in the same areas and are neighbors, the majority of men of the study were university students, night watchman, street vendors, motor bike drivers and belong to low socioeconomic status. For their moving, most men of the study used motor bike or taxi and for the students they use electrical free campus bus, this practice reduce their daily physical activity level and it is well known that a low amount of physical activity is associated with an increased risk of metabolic syndrome (Laaksonen *et al.*, 2002, Ilanne-Parikka *et al.*, 2010). Many others unhealthy practices (smoking, sleep deprivation, mental stress) that favors Metabolic Syndrome were common among many Toupouri men. The reported prevalence of metabolic syndrome in this study is 29.27%. Regarding metabolic syndrome profile, Toupouri men with metabolic syndrome belong to the upper grade of normal body mass index and this is in accordance with previous metabolic syndrome characteristic among normal weight Cameroonians (Mandob *et al.*, 2015) but differ with the metabolic syndrome profile of Bamiléké (Mandob *et al.*, 2015) and Mbo (Mandob *et al.*, 2015) women. Already 29.62% of

the studied population has premetabolic syndrome, and this should be a call of concern. We found that Toupouri men with metabolic syndrome exhibit significantly higher mean of age, body mass index, waist circumference, hip circumference, systolic blood pressure, diastolic blood pressure, triglyceride and total cholesterol but lower high density lipoprotein comparatively to Toupouri men without metabolic syndrome. The most frequent abnormality was low HDL level with a frequency of 64.19%. Many reports indicate that Africans have low levels of HDL-cholesterol and that low-HDL cholesterol is not considered as good indicator of cardiovascular disease risk in Africans. There were also some limitations to the study, it cross-sectional nature and little study population. This report will provide the first population based estimates of the prevalence of the metabolic syndrome among exclusively adult's men in the Toupouri tribe and will further allow for comparison with other men of different ethnic group at a similar stage of development.

Conclusion

In conclusion, the metabolic syndrome is common among Toupouri men community of Yaounde. Low HDL cholesterol and high blood pressure are the most common abnormalities. Therefore educational programs and interventions should be instituted in regard to dietary life style modification.

Acknowledgements

The authors thank all participants of the study for their comprehension during recruitment of the study population. The authors declare no conflict of interest. The present study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors. All authors read and approved the final manuscript.

REFERENCES

- Allain CC, Poon LS, Chan CSG, Richmond W, Fu PC Quantitative determination of serum cholesterol by the use of enzymes. *Clin Chem.*, 1974; 20:470-475.
- Balti EV, Kengne AP, Fokouo JVF, Nouthé BE, Sobngwi E. Metabolic Syndrome and Fatal Outcomes in the Post-Stroke Event: A 5-Year Cohort Study in Cameroon, *PLoS ONE* 2013; 8(4): e60117. doi:10.1371/journal.pone.0060117.
- Batsis JA, Nieto-Martinez RE, Lopez-Jimenez F. Metabolic syndrome: from global epidemiology to individualized medicine. *Clin Pharmacol Ther.*, 2007; 82:509-24. [17851562]
- Buccolo G, David H. Quantitative determination of serum triglycerides by the use of enzymes. *Clin Chem.*, 1974; 19: 476-482.
- Empana, J.P., P. Ducimetiere, B. Balkau and X. Jouven., Contribution of the metabolic syndrome to sudden death risk in asymptomatic men: The Paris prospective study I. *Eur. Heart J.*, 2007, 28: 1149-1154.
- Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults Executive summary of the third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and

- Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *JAMA*, 2001; 285: 2486-97.
- Ford ES. Risks for all-cause mortality, cardiovascular disease, and diabetes associated with the metabolic syndrome: a summary of the evidence. *Diabetes Care*, 2005; 28(7): 1769-1778.
- Grundy SM, Cleeman JI, Daniels SR, Donato KA, Eckel RH, et al. "Diagnosis and management of the metabolic syndrome: an American Heart Association/National Heart, Lung, and Blood Institute scientific statement. *Circulation*, 2005; 112: 2735-2752.
- Ilanne-Parikka P, Laaksonen DE, Eriksson JG, Lakka TA, Lindstr J, Peltonen M, Aunola S, Keinanen-Kiukkaanniemi S, Uusitupa M, Tuomilehto J & Finnish Diabetes Prevention Study Group. Leisure-time physical activity and the metabolic syndrome in the Finnish diabetes prevention study. *Diabetes Care*, 2010; 33(7): 1610-1617.
- Kolovou GD, Anagnostopoulou KK, Salpea KD, Mikhailidis DP. The prevalence of metabolic syndrome in various populations. *Am J Med Sci.*, 2007; 333:362-71.
- Laaksonen DE, Lakka HM, Salonen JT, Niskanen LK, Rauramaa R & Lakka TA Low levels of leisure-time physical activity and cardiorespiratory fitness predict development of the metabolic syndrome. *Diabetes Care*, 2002; 25(9): 1612-1618.
- Mandob DE, Fomekong GID, Ngondi JL. Prevalence of Metabolic Syndrome Among Bamileke Ethnic Women Yaounde, Cameroon. *Int J Pharm Bio Sci.*, 2013; 4: 255 - 262.
- Mandob DE, Samuel M, Viviane ON. Prevalence of Metabolic Syndrome among Mbo Women Yaounde-Cameroon. *J Metabolic Synd.*, 2015; 4:186.doi: 10.4172/2167-0943.1000186.
- Mandob Enyegue Damaris, René Samuel Minka, Jean Marcel Solle Sah. Prevalence of Metabolic Syndrome among Normal Weight Cameroonians. *WJPPS*, 2015; 4(9): 1569-1578.
- Masseyeff R, Cambon A, Bergeret B. Une enquête alimentaire et nutritionnelle chez les Toupouri de Golompoui ORSTOM. Centre de Yaoundé. ORSTOM ; 1965 :72 p
- Mathers CD, Loncar D. "Projections of global mortality and burden of disease from 2002 to 2030." *PLoS Medicine* 2006; 3:11, 442.
- Wannamethee SG, Shaper AG, Lennon L, Morris RW. Metabolic syndrome vs Framingham Risk Score for prediction of coronary heart disease, stroke, and type 2 diabetes mellitus. *Arch Intern Med.*, 2005; 165: 2644-2650.
- Warnick GR, Alberers JJ. Heparin-Mn²⁺ quantification of high density-lipoprotein by ultrafiltration procedure for lipemic samples. *Clin Chem.*, 1978; 24: 900-904.
- Wilson PWF, D'Agostino RB, Parise H, Sullivan L, Meigs JB Metabolic syndrome as a precursor of cardiovascular disease and type 2 diabetes mellitus. *Circulation*, 2005; 112: 3066-3072.
- World Health Organisation 1997b. Obesity Preventing and Managing the global obesity. Obesity: Preventing and managing the Global Epidemic Report of a WHO. Consultation on Obesity, 3-5 June 1997, Geneva, WHO/NUT/NCD/98.1.
- Yach D, Hawkes C, Gould CL, Hofman KJ. "The global burden of chronic diseases: overcoming impediments to prevention and control. *JAMA*, 2004; 291(21): 2616-2622.
