ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 04, pp.49059-49062, April, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

METABOLIC SYNDROME PREVALENCE AMONG TYPE 2 RURAL DIABETIC PATIENTS OF CAMEROON

***Damaris Enyegue Mandob and Essoh Vanessa Falonne**

Department of Biological Sciences, Higher Teachers' Training College, University of Yaoundé I, P.O. Box 047, Yaoundé, Cameroon

ARTICLE INFO

Article History:
Received 16th January, 2017
Received in revised form
20th February, 2017
Accepted 09th March, 2017
Published online 30th April, 2017

Key words:

Metabolic Syndrome,
Type 2 diabetes,
Mbaré,
District hospital,
Cameroon.

ABSTRACT

Background: The simultaneous presence of Metabolic syndrome and type 2 diabetes among individuals is a favorable field for development of cardiovascular diseases. The aim of this study was to evaluated metabolic syndrome magnitude (MetS) among members of type 2 diabetic community of a Cameroonian rural area.

Methods: A cross sectional study with a total of 100 known diabetic patients (37women and 63men) participated in the study at Mbaré district hospital, they were aged between 32-68 years. Anthropometry, blood pressure and fasting blood glucose were measured Metabolic syndrome was diagnosed using Adult Treatment Panel-III (ATP-III) 2001 guidelines.

Results: The prevalence of MetS among this rural diabetic community was 41.23% (45.95%) for women and (36.51%) for men. Among the diabetic men a total 88.89% of patients had low HDL (52%), 42.62% had hypertension, 18.03% had increased waist circumference. The most common abnormalities among diabetic women were low HDL (91.89%) increased waist circumference (59.45%) and hypertension (56.76%).

Conclusion: This study shows that metabolic syndrome is less frequent among diabetes patients of rural Cameroon therefore cardiovascular risk is still low.

Citation: Damaris Enyegue Mandob and Essoh Vanessa Falonne, 2017. "Metabolic syndrome prevalence among type 2 rural diabetic patients of Cameroon", *International Journal of Current Research*, 9, (04), 49059-49062.

INTRODUCTION

Metabolic syndrome (MetS) is the cluster of several risk factors for cardiovascular disease (CVD) such as hypertension, dyslipidaemia, obesity, insulin resistance and high fasting plasma glucose and it physiopathology is not well understood(Zimmet PZ and Kelly,1992; Lorenzo *et al*., 2003, Resnick *et al*., 2003). Type 2 diabetes is a metabolic disorder linked to obesity and is developed among individuals over 40 years. With obesity pandemic, the incidence of type 2 diabetes is increasing seriously worldwide and sub-Saharan Africa countries are concerned. Statistics show that in 2030 more than more than 23.9 will be diabetic patients in Africa (Whiting *et al*., 2011, King *et al*., 1998). In Cameroon, the prevalence of type 2 diabetes is 6% and at the same time countries are facing the fatal double burden of infectious and non communicable diseases. With the UN meeting focusing on type 2 diabetes management, much consideration is accorded to diabetes care but with it high economic cost limited access to diagnosis and medical monitoring is accorded to diabetes and this is more concuspicius in high urban centers. Therefore, private initiatives for medical monitoring of diabetes are occasionally proposed. The coexistence of diabetes, and metabolic syndrome among individuals is a favorable field for cardiovascular diseases them However in Cameroon, they are limited data dealing with diabetes and metabolic syndrome in rural areas. Our study objective was to estimate the prevalence of metabolic syndrome among diabetic patients who attended

Corresponding author:* **Damaris Enyegue Mandob,
Department of Biological Sciences, Higher Teachers' Training College, University of Yaoundé I, P.O. Box 047, Yaoundé, Cameroon

MATERIALS AND METHODS

Ethics

The cross sectional study was approved by the head of Mbare hospital and the Education Planning Commission of Fouda Medical Foundation of Yaounde. After their verbal consent, type-2 diabetics' out-patients were recruited during the activities of 2016 international diabetes day week. Admission to the study was based solely on voluntary participation of diabetes patients. Females were excluded from the study if they were pregnant or lactating. All participants in the study provided verbal informed consent. All measurements and questionnaire were in accordance with the Helsinki Declaration (1983 version).

Subjects

This descriptive study was conducted at the district hospital of Mbaré. All male and female type-2 diabetics regularly attending the glyceamic control aged between 35-65 years old were included in the study. Patients informed consent was taken from study subject and basis of the study was also explained. A detailed history including age, gender, duration of DM and compliance with medication was taken. Fasting Plasma Glucose (FPG) was measured using a portable hand held gluco-meter GlucoPlus™ in Mbaré after at least 8 fasting hours while lipid profile was measured at the biological laboratory of the Andre Fouda Medical Fundation in Yaounde.The data collection comprised healthcare questionnaire, anthropometric measurement of weight, Height, and waist circumference, health examination and a well trained nurse drew 5 ml of fasting morning blood samples from the examinee's arm dispensed into vacutainer® plain tubes for laboratory test in fasting state for lipids. After centrifugation at 3000 g for 10 min, the plasma were stored at -4°C until then transferred at Yaounde for lipids assayed. Total cholesterol and triglycerides in plasma were measured using previously described standard methods. [Allain *et al*., 1974, Buccolo and David, 1974] High Density Lipoprotein cholesterol was determined using a heparin manganese precipitation of Apo B-containing lipoproteins. [Warnick and Alberers, 1978] 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]. 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 was determined in 12-h fasted participants (with very light clothing on and without shoes) using a Jocca™ scale.

Definition of Metabolic Syndrome

Type 2 diabetes patients were considered to have Metabolic Syndrome if they had three or more of the five following criteria, according to the ATPIII definition [NCEP, 2005]

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. It's important to remembered that all patients were known diabetic patient on anti-diabetic medications and were considered to have diabetes even when their blood glucose was in the normal range.

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

Of a total of 100 diabetic patient were received during the campaign, 63 were men and 37 the rest consist of women our study. According to table 1, the mean age for diabetic men was 48.49± 16.69 while the mean age of diabetic women was 47.56± 15.06 years. Abdominal circumference and high triglycerides level was significant higher among diabetic women comparatively to men. In table 2, considering the diabetics status of the population study, the prevalence of rest of individual's components of metabolic syndrome among diabetic men was shown to be: 18.03% for high waist circumference 42.62 for high blood pressure 88.89% for low high density lipoprotein-cholesterol 1.59% for triglyceride. Among diabetic women, high blood pressure was reported among 56.76%, high waist circumference among 59.45%, low high density lipoprotein-cholesterol among 91.89% and no (0.00% women) with high triglyceride levels.

Table 1. Demographic, clinical and biochemical characteristics of Diabetics Men and Women

Parameters	Diabetic Men	Diabetic Women	P value
Number	63	37	-
Age (years)	48.49± 16.69	47.56± 15.06	0.784
BMI, kg/m²	26.59± 6.99	27.07± 7.38	0.715
WC, cm	88.70± 13.49	94.42± 12.95	0.045*
SBP, mmHg	124.90± 30.68	133.37± 26.94	0.168
DBP, mmHg	77.37± 15.66	82.29± 17.90	0.156
FBS, mg/dl	96.52 ± 25.17	102.91 ± 25.33	0.332
TG, mg/dl	38.66± 28.41	52.37± 31.26	0.027*
T-Chol, mg/dl	235.46± 69.71	227.27± 79.16	0.591
HDL-Chol, mg/dl	18.02± 5.87	16.29± 7.50	0.612

*Significant difference between diabetic men and diabetic women
BMI: Body mass index, WC: waist circumference, 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 Metabolic Syndrome individual components

Individual components	Diabetic Men	Diabetic Women	P-Value
Hyperglyceamia	100	100	/
Low HDL	88.89	91.89	0.821
High Triglycerides	1.59	0.00	0.342
Abdominal Obesity	18.03	59.45	0.043*
Hypertension	42.62	56.76	0.746

* *P*<0.05 considered significant

Table 3. Metabolic Syndrome Items

Parameters	All	Diabetic Men	Diabetic Women	P-Value
3 criteria (%)	41.23	36.51	45.95	0.000
4 criteria (%)	0.00	0.00	0.00	/
5 criteria (%)	0.00	0.00	0.00	/
Metabolic Syndrome (%)	41.23	36.51	45.95	0.000

The most frequent abnormalities were low high density lipoprotein-cholesterol and hypertension for men and low high density lipoprotein-cholesterol and high waist circumference for women 45.95 women and 36.5% men had metabolic syndrome with 3 abnormalities nobody exhibit four or five abnormalities.

DISCUSSION

Diabetes is the four leading cause of mortality among developing countries. With cowardly medical monitoring only 60% of diabetes cases are undiagnosed. Many people discover their diabetic status after many years of unknown illness and this may favor long term complications such as cardiovascular diseases. In Cameroon there is an urban rural discrepancy among diabetes prevalence. Few Cameroonians studies have already focused on diabetes and metabolic syndrome, this is the first report focusing on metabolic syndrome prevalence among type 2 rural diabetics. Based on NCEP definition, the overall prevalence of metabolic syndrome among studied type 2 diabetic patients was 41.23%. Our prevalence is lower than the one reported in many studies 83% in Pakistan (Imam *et al*., 2007), the prevalence in Bruno *et al*., 2004 study; among inndian migrants (Foucan *et al*., 2006), the reported prevalence of 86% from Iraq (Mansour 2007), 56% in Saudi Arabian (Akbar, 2002), 51% in Lagos (Adediran *et al*., 2007) and 60.4% in urban Cameroon. (Kegne *et al*., 2012) Some factors that may justified the relative lower prevalence of metabolic syndrome among this diabetic population of our study comparatively to previous studies, are the area of study. It is a rural area were urbanization level and transition is low, the majority of the studied population were farmers, therefore they are strongly physical active towards, they all belong to rural area where access adoption of unhealthy westernized lifestyle is reduced. The metabolic syndrome prevalence among female diabetic patient is significant higher among women45.95% than men36.51% and this was consistent with many previous studies Ashraf *et al*., 2006; Janghorbani *et al*., 2007) Through their lifetime women are face to many hormonal stage in women that may explained the higher abdominal circumference, metabolic syndrome prevalence among women multiple pregnancies, gestational diabetes mellitus, preeclampsia, lactation, hormonal contraceptives, and menopause. The most prevalent risk factor in this study was low HDL-CH, abdominal obesity and hypertension and this is in agreement with previous studies (Zana, 2011; Alshkri and Elmehdawi, 2008). The main limitation of this study was it cross sectional nature and diabetes was not diagnostic through oral glucose tolerance test.

Conclusion

Metabolic Syndrome was present in 41.23% of the diabetic population of Mbare. Metabolic Syndrome was most common in the female patients. The most commonly occurring finding was a decreased HDL-c. Lipid profile of rural diabetic patients should be frequently evaluated for a better management of prevention of cardiovascular diseases in rural areas.

Acknowledgements

The authors thank all the participants of the study as well as the Mbaré hospital and the medical foundation personnel.

REFERENCES

Adediran OS, Edo AE, Jimoh AK, Ohwovoriole A. E. 2007. Prevalence of the Metabolic Syndrome among Nigerians with type 2 diabetes. *Diabetes Int*., 15: 13-14.

Akbar DH. 2002. Metabolic Syndrome is common in Saudi type 2 diabetic patients. *Diabetes Int*., 12: 47-49.

Allain CC, Poon LS, Chan CSG, Richmond W, Fu PC. 1974. Quantitative determination of serum cholesterol by the use of enzymes. *Clin Chem,* 20:470-475.

Alshkri MM. and Elmehdawi RR. 2008. Metabolic syndrome among type-2 diabetic patients in Benghazi-Libya: a pilot study. *Libyan J Med*., 3:177-80.

Ashraf SMS, Ziauddin F, Jahangeer U. 2006. Metabolic syndrome in type2 diabetes mellitus. *Pak J Med Sci*., 22(3): 295-9.

Bruno G, Merletti F, Biggeri A, Bargero G, Ferrero S, Runzo C, Prina Cerai S, Pagano G, Cavallo-Perin P, 2004. Casale Monferrato Study. Metabolic syndrome as a predictor of all-cause and cardiovascular mortality in type 2 diabetes: The Casale Monferrato study. *Diabetes Care*, 27:2689-94.

Buccolo G. and David H. 1974. Quantitative determination of serum triglycerides by the use of enzymes. *Clin Chem,* 19: 476-482.

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*, 2005; 285: 2486-97.

Foucan L, Deloumeaux J, Donnet JP, Bangou J, Larifla L, Messerchmitt C, Salmi LR, Kangambega P. 2006. Metabolic syndrome components in Indian migrants with type 2 diabetes. A matched comparative study. *Diabetes Metab*., 32:337-42.

Imam SK, Shahid SK, Hassan A, Alvi Z. 2007. Frequency of the metabolic syndrome in type 2 diabetic subjects attending the diabetes clinic of a tertiary care hospital. *J Pak Med Assoc*., 57:239-42.

Janghorbani M. and Amini M. 2007. Metabolic syndrome in type 2 diabetes mellitus in Isfahan, Iran: prevalence and risk factors. *Metab Syndr Relat Disord*., 5(3):243-54.

Kengne AP, Limen SN, Sobngwi E, 2012. Djouogo CFT and Nouedoui C. Metabolic syndrome in type 2 diabetes:comparative prevalence according to two sets ofdiagnostic criteria in sub-Saharan Africans Diabetology & Metabolic Syndrome, 4:22

King H, Aubert RE, Herman WH. 1998. Global burden of diabetes, 1995-2025: Prevalence, numerical estimates, and projections. *Diabetes Care*, 21:1414-31.

Lorenzo C, Okoloise M, Williams K, Stern MP, Haffner SM, 2003. San Antonio Heart Study. The metabolic syndrome as predictor of type 2 diabetes: The San Antonio heart study. *Diabetes Care*, 26:3153-59.

Mansour, AA. 2007. Prevalence of the Metabolic Syndrome among patients with Type 2 diabetes in Iraq. *Diabetes Int*, 15:12.

Obesity: Preventing and managing the Global Epidemic Report of a WHO. Consultation on Obesity, 3-5 June 1997, Geneva, WHO/NUT/NCD/98.1.

Resnick HE, Jones K, Ruotolo G, Jain AK, Henderson J, Lu W, Howard BV, 2003. Strong Heart Study. Insulin resistance, the metabolic syndrome, and risk of incident

cardiovascular disease in nondiabetic American Indians: The strong heart study. *Diabetes Care*, 26:861-67.

Warnick GR. and Alberers JJ. 1978. Heparin-Mn^{+2} quantification of high density-lipoprotein by ultrafiltration procedure for lipemic samples. *Clin Chem.,* 24: 900-904.

Whiting DR, Guariguata L, Weil C, Shaw J. 2011. IDF Diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030. *Diabetes Res Clin Pract*., 94: 311–21.

World Health Organisation, 1997b. Obesity Preventing and Managing the global obesity.

Zana Sidiq Mohammed Saleem and Hama Najm Jaf / JSMC, 2011 1:29-36

Zimmet PZ. 1991. Kelly West Lecture, Challenges in diabetes epidemiology—from West to the rest. *Diabetes Care*, 15:232-52.

****