



Research Article

Metabolic Syndrome in Nigeria: A Survey of Six Geo-political Zones

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SUMMARY

Objectives: The global prevalence of chronic non-communicable diseases is increasing with the majority of the growth occurring among populations in developing countries. Metabolic syndrome has been a major challenge for the healthcare system in developed and developing countries. The aim of this study was to determine the prevalence of metabolic syndrome among otherwise healthy Nigerians across the various geopolitical zones.

Methods: The data for the study was derived from the Nationwide MTN-Foundation/Nigerian Association of Nephrology Community Health Screening Project: a cross-sectional screening programme for chronic kidney disease, hypertension, obesity and dyslipidaemia in all the six geopolitical zones. A total of 1679 participants who had complete lipids profile data were included in the analysis.

Results: The prevalence rate of metabolic syndrome was 27.3% and varied significantly across the six geopolitical zones. The age-group “>60years” had the highest prevalence rate of 53.2%. Female gender had a higher prevalence rate compared to males (30% versus 23%). The commonest individual component of the metabolic syndrome was low HDL–Cholesterol at 81.3%.

Conclusion: High prevalence rate of metabolic syndrome was observed among the various ethnic groups and this was related to age.

INTRODUCTION

The prevalence of chronic non-communicable diseases (NCDs) is increasing worldwide, with the majority of the growth occurring among populations in developing countries.[1] In sub-Saharan Africa, NCDs including metabolic syndrome, are projected to surpass infectious diseases by 2030.[2,3] Metabolic Syndrome, which has been defined as a clustering of dyslipidaemia, elevated blood pressure, diabetes and obesity has become a major challenge for the healthcare systems in developed and developing countries.[4] Several studies have shown that morbidity associated with coronary heart disease and vascular disease is three times higher, and mortality is 5 – 6 times higher in patients with metabolic syndrome than in those without.[5] In the United States, prevalence of metabolic syndrome increased from 23.1% in the National Health and Nutrition Examination Survey - NHANES 111(1988 – 1994) to 26.7% in NHANES (1999 – 2000).[6] In a study conducted in a tertiary and a secondary health facilities in Lagos, it was found that the prevalence of metabolic syndrome was as high as 86%. Metabolic syndrome was found to be similar for men (83%) and women (86%) and increased with age in both sexes.[7]

Several diagnostic criteria have been proposed for the diagnosis of the metabolic syndrome. These include World Health Organization (WHO),[8] the Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (NCEP/ATPIII),[9] the European Group for the Study of Insulin Resistance,[10] the American Association of Clinical Endocrinologists[11] and the Chinese Diabetes Society (CDS) diagnostic criteria.[12] The WHO, NCEP–ATPIII and International Diabetes Federation (IDF) diagnostic criteria remain the three most widely used for identifying the metabolic syndrome. Limited available evidence suggests an increasing prevalence of metabolic syndrome among populations in sub-Saharan African countries over the past decade.[13,14]

The Third Report of the NCEP-ATPIII showed that ethnicity influences the prevalence of metabolic syndrome.[15] With increasing urbanization, industrialization and adoption of western lifestyle, there is an increasing prevalence of non-communicable diseases with resultant morbidity and mortality in cardiovascular diseases. There have been reported clusters of cardio-metabolic risk factors among healthy people which has been adduced to the lack of

awareness on the cardio-metabolic risk factors. Nigeria, a developing country is presently going through a significant epidemiological transition where non-communicable and communicable diseases co-exist, contributing to high morbidity and mortality. Some of the non-communicable diseases (hypertension and diabetes) are classified as silent killers which contribute to the increased morbidity and mortality among seemingly healthy populations. In a study conducted in rural populations in China, the prevalence rate of metabolic syndrome was identified to be between 33.9% - 37.6% of the population studied which showed high prevalence with ethnic differences in the Chinese populations.[12,15] However, there is paucity of data on the prevalence of metabolic syndrome across ethnic groups in Nigeria.

MATERIALS AND METHODS

The data for the study was derived from the Nationwide MTN-Foundation/Nigerian Association of Nephrology Community Health Screening Project: a cross-sectional screening programme for chronic kidney disease, hypertension, obesity and dyslipidaemia in all the six geopolitical zones. The study was conducted to determine the prevalence of metabolic syndrome among healthy Nigerians across the various geopolitical zones in the country. A total of 1679 participants who had complete lipids profile data were recruited. Data was analyzed using Statistical Packages for Social Sciences (SPSS) version 21. In the statistical analysis, frequencies, percentages and Chi-square test was used to compare the differences between proportions of categorical variables. Results are presented as counts and percentages or means plus or minus one standard deviation. A p-value less than 0.05 was considered to constitute a statistically significant difference.

RESULTS

The socio-demographic characteristics showed that males and females were 949 (56.5%) and 730 (43.5%) respectively. The male to female ratio was 1:1.3. About a quarter 433 (25.8%) of the participants were from the South-Western zone of the country. About half of the participants were in the age-group 20 - 39 years. Similarly, almost half of the participants were in the social class 2. A summary of the sociodemographic parameters is shown in [Table 1]

The prevalence rate of metabolic syndrome was 27.3%. Prevalence rates varied significantly across the six geopolitical zones from 19.6% in the North Central zone to 36.6%, in the North West [Table 2]. A significant difference was also observed in the age distribution of metabolic syndrome with participants aged 60 years and above having the highest prevalence of metabolic syndrome 66 (53.2%) compared to a prevalence of 11.2% among the age group 0 - 39 years ($p < 0.05$). The female gender had a higher prevalence of metabolic syndrome compared to the males (30.3% versus 23.4%, $p = 0.0016$). When the social classes were compared, highest prevalence of 62.6% was found in social class 4 compared with 18.2% in social class 1. This was found to be statistically significant ($p = < 0.05$).

The commonest individual component of the metabolic syndrome was the low HDL-cholesterol among 1374 (81.8%) of the participants, followed by hypertension which was found in 694 (41.3%) (Table 3). The pattern of the prevalence of each component of the metabolic syndrome according to the zonal distribution was examined. The prevalence of obesity was the highest (38.8%) in the South while the North had the highest prevalence of high blood pressure.

Table 1: Sociodemographic characteristics of the participants.

Variable n (%)	NC n(%)	NE n(%)	NW n(%)	SE n(%)	SS n(%)	SW n(%)	TOTAL n(%)
Sex							
F	112(34.6)	96(46.4)	97(59.1)	197(72.2)	172(62.6)	274(63.3)	949(56.5)
M	214(65.4)	111(53.6)	67(40.9)	76(27.8)	103(37.5)	159(36.7)	730(43.5)
Age group							
0-39	182(55.7)	125(60.4)	46(28.0)	122(44.7)	146(53.1)	185(42.7)	806(48.0)
40-59	112(34.3)	78(37.7)	113(68.9)	133(48.7)	118(42.9)	193(44.6)	747(44.5)
>60	33(10.1)	4(1.9)	5(3.0)	18(6.6)	11(4.0)	55(12.7)	126(7.5)
Social class							
1	4(1.2)	0(0.0)	0(0.0)	3(1.1)	3(1.1)	20(4.6)	33(2.0)
2	96(29.4)	139(67.1)	118(72.0)	150(54.9)	140(50.9)	168(38.8)	811(48.3)
3	118(36.1)	38(18.4)	8(4.9)	51(18.7)	105(38.2)	118(27.3)	438(26.1)
4	14(4.3)	1(0.5)	1(0.6)	25(9.2)	7(2.6)	51(11.8)	99(5.9)
5	92(28.1)	26(12.6)	25(15.2)	31(11.4)	20(7.3)	56(12.9)	250(14.9)
n/a	3(0.9)	1(0.5)	11(6.7)	13(4.8)	0(0.00)	20(4.6)	48(2.9)
Total	327(100)	207(100)	164(100)	273(100)	275(100)	433(100)	1679(100.0)

More than half (56.5%) of the respondents were females with South-West having the highest (63.3%) compared to 65.4% of males from the North-Central. Less half of the respondents belonged to the age group 0-39 years.

NC:- North Central, NE:- North East, NW:- North West, SE:- South East, SW:- South West, SS:- South South.

Table 2: Sociodemographic distribution of Metabolic Syndrome among the study participants

Variable	Met-s n(%)	Normal n(%)	Total n (%)	X ²	Test Statistics df	p-value
Zone						
NC	64(19.6)	263(80.4)	327(100.0)	27.36	5	0.0000
NE	48(23.2)	159(76.8)	207(100.0)			
NW	60(36.6)	104(63.4)	164(100.0)			
SE	75(27.5)	198(72.5)	273(100.0)			
SS	68(24.7)	207(75.3)	275(100.0)			
SW	144(33.3)	289(66.7)	433(100.0)			
Total	459(27.3)	1220(72.7)	1679(100.0)			
Age group						
0-39	90(11.2)	716(88.8)	806(100.0)	211.49	2	0.05
40-59	301(40.3)	446(59.7)	747(100.0)			
>60	66(53.2)	58(46.8)	124(100.0)			
Total	457(27.3)	1220(72.8)	1677(100.0)			
Gender						
F	288(30.3)	661(69.7)	949(100.0)	9.95	1	0.016
M	171(23.4)	559(76.6)	730(100.0)			
Total	459(27.3)	1220(72.7)	1679(100.0)			
Social class						
1	6(18.2)	27(81.8)	33(100.0)	73.60	4	0.05
2	206(25.4)	605(74.6)	811(100.0)			
3	94(21.5)	344(78.5)	438(100.0)			
4	62(62.6)	37(37.4)	99(100.0)			
5	74(29.6)	176(70.4)	250(100.0)			
Total	442(27.1)	1189(72.9)	1631(100.0)			

The prevalence of Metabolic Syndrome was 27.3%, with North-West having the highest of 36.6%. Females had the highest prevalence of 30.3%.

NC - North Central, NE - North East, NW - North West, SE - South East, SW - South West, SS - South South.

Table 3: Zonal distribution of individual components of Metabolic syndrome

Variable	NC n(%)	NE n(%)	NW n(%)	SE n(%)	SS n(%)	SW n(%)	TOTAL n(%)
Obesity	63(19.3)	42(20.3)	59(35.9)	106(38.8)	93(33.8)	168(38.6)	531(31.6)
HBP	131(40.1)	72(34.8)	77(46.9)	99(36.3)	94(34.2)	221(51.0)	694(41.1)
RBS	48(14.7)	48(23.2)	49(29.9)	67(24.5)	51(18.6)	102(23.6)	365(21.7)
HDL	301(92.1)	156(75.4)	144(87.8)	198(72.5)	241(87.6)	334(77.1)	1374(81.8)
TG	18(5.5)	35(15.5)	21(12.8)	21(7.7)	11(4.0)	40(9.2)	143(8.52)
Total	327	207	164	273	275	433	1679

Among the components of metabolic syndrome, obesity constituted the highest (South-East) compared to high blood pressure (51.0%) in South-West.

NB. Percentages were calculated based on the proportion of participants in each zone with the specified abnormalities.

NC - North Central, NE - North East, NW - North West, SE - South East, SW - South West, SS - South South

DISCUSSION

Findings from the study confirmed a high prevalence of metabolic syndrome which varied across the various zones. The prevalence of metabolic syndrome increased strongly with age. The influence of age as a risk factor for metabolic syndrome cannot be overemphasized as age dependency of the syndrome has been reflected in most populations around the world.[7,18,19] Several studies from sub-Saharan countries including Tanzania, Cameroon, semi urban and a rural community in Nigeria reported similar prevalence rates ranging from 18% to 30%.[20,21] This could be due to adoption of increased sedentary lifestyle at old age and also the well-known fact that the prevalence rates of some components of metabolic syndrome (hypertension,

diabetes and obesity) increases with age. This finding was similar to that of a Norwegian population study in which the metabolic syndrome was strongly related to increasing age.[19,22] In the Northern part of the country, the prevalence rates of metabolic syndrome varies from the lowest (19.6%) in the North Central zone to the highest (36.6%) in the North West zone. This variation in the prevalence of metabolic syndrome in the zones could be as a result of the changes in dietary habits associated with rapid industrialization and urbanization as well as genetic predisposition. Women were more likely to have metabolic syndrome compared to men as shown in the study.

The pattern of the prevalence rates of each component of the metabolic syndrome according to the zonal distribution

was examined. The prevalence of obesity was the highest (38.8%) in the South East while the North had the highest prevalence of high blood pressure. Although the Southern part is relatively more urbanized than the North, and both obesity and diabetes are diseases associated with urbanization and industrialization, the observed higher prevalence of diabetes in the North may be due to genetic predisposition as earlier mentioned.

Participants from the North Central zone appeared to have comparatively lower prevalence rates of individual components of the metabolic syndrome (Obesity-19.2%, diabetes-14.6%, hypertriglyceridemia-5.5%) than participants from other regions. Prevalence of low HDL-cholesterol was generally found to be high in all the zones. Similar observations have been reported by other authors.[22-24] In a study of metabolic syndrome in Port-Harcourt, it was discovered that the prevalence of low HDL-cholesterol was 85.67% which was the highest.[26] This high proportion of low good cholesterol could be related to the diet.

CONCLUSION

The study showed the unacceptably high prevalence rate of metabolic syndrome among the various zones in the country which was also related to age. Urgent measures should be put in place to address the various components of the metabolic syndrome in order to mitigate the morbidity and mortality of cardiovascular diseases.

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Conflict of Interest

The authors declare no competing interests.

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