

The Prevalence of Overweight/Obesity and Dyslipidemia Amongst a Group of Women Attending “August” Meeting

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SUMMARY

Background: Obesity and dyslipidemia are major risk factors for cardiovascular disease while obesity is a leading determinant for hypertension and diabetes mellitus. The objective of this study was to assess the prevalence of overweight/obesity and dyslipidemia amongst a group of women attending “August” meeting.

Methods: A total of 186 women attending the 2006 “August” meeting at Naze, Owerri North Local Government Area, Imo State, were recruited into the study but only 183 had complete data. The Blood Pressure (BP) was measured using a Standard Mercury Sphygmomanometer with appropriate cuff size. BMI was calculated as weight (in kilograms) divided by height (in meters) squared. Based on the WHO classification overweight was defined as BMI between 25 and 29.9kg/m², and obesity was defined as BMI ≥30kg/m². Total serum cholesterol was determined by the method of Trinder 1969, triglycerides by the method of Jacobs and van Demark 1960 while LDL-C and HDL-C were determined by the method of Assmann, Jabs Kohnert *et al* 1984. Hypercholesterolemia was defined as total cholesterol 6.20mmol/L (240mg/dl), reduced HDL less than 1.29mmol/L (50mg/dl), Hypertriglyceridemia as triglycerides greater than 1.7mmol/L (150mg/dl).

Result: The mean age is 54.84yrs ± 10.76, the mean BMI 26.47 ± 4.50, mean SBP 132.38mmHg ± 21.94, mean DBP 77.07mmHg ± 12.25, mean TC 5.29 mmol/L ± 1.76, mean HDL 1.14mmol/L ± 0.83, mean LDL 1.39mmol/L ± 0.63, mean TG 1.49mmol/L ± 0.63. The prevalence of overweight was 38.5%, obesity 20.7%, hypertriglyceridemia 34.1%, hypercholesterolemia 31.4%, low HDL 37.6%, hypertension 44.3% and dyslipidemia 60.5%. BMI correlated with DBP $r=0.290$, $P<0.000$; TC $r=0.246$, $P<0.001$; LDL $r=0.172$, $P=0.024$ but did not correlate with age SBP, TG and HDL. Age correlated with SBP $r=0.321$, $P<0.000$ and LDL $r=0.163$, $P=0.031$. TC correlated with SBP $r=0.370$, $P<0.000$, DBP $r=0.274$, $P<0.000$, TG $r=0.441$, $P<0.000$ LDL $r=0.757$, $P<0.000$ but did not correlate with HDL.

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Conclusion: In conclusion this study has shown a high prevalence of Obesity/Overweight, Hypercholesterolemia, Hyperglyceridemia as well as low HDL amongst a group of women attending “August” meeting.

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INTRODUCTION

Cardiovascular disease is a leading cause of death among women in the developed world. In the United States, more than 500,000 women die of cardiovascular disease and about half are due to coronary artery disease (CAD) ¹. The major modifiable risk factors for coronary heart disease include obesity, hypertension, hyperlipidemic states, and diabetes mellitus among others. Obesity is also a leading determinant of hypertension, dyslipidemia and diabetes mellitus ².

Obesity is recognized worldwide as a serious health problem and The World Health Organization (WHO) defines obesity as a condition with excessive fat accumulation in the body, to the extent that health and well being are adversely affected ³. Studies from US and Europe have shown that obesity is closely associated with increased risks of disease and reduced life expectancy ^{4,5}. The prevalence of overweight and obesity is increasing at an alarming rate worldwide ^{1,6,7,8} and in the USA, for example, the prevalence of obesity rose from 15% to 30% between 1980 and 2000 ⁴. Many countries in the Africa Region focus principally on under-nutrition and food security and as a result trends in obesity have been documented in only a few countries ³.

Dyslipidemia is a well known and major risk factor for ischaemic heart disease, as elevated levels of triglycerides, total cholesterol, low density lipoprotein cholesterol (LDL-C) and low levels of high density lipoprotein cholesterol (HDL-C) are documented risk factors for atherogenesis ^{9,10}. It has also been shown that serum total cholesterol levels are continuously correlated with CHD risk over a broad range of cholesterol values in various populations throughout the world ^{11,12}.

Thus the recognition of risk factors for cardiovascular disease in women such as obesity and lipid abnormalities is important as the economic burden resulting from CHD is enormous ³. This study came out of the observation by the authors while giving a health talk on hypertension to Aladinma

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Ndom Naze women during their 2005 "August" Meeting, that many of them appeared overweight or obese, with the objective of determining the prevalence of overweight, obesity and dyslipidemia amongst this group of women.

Naze is one of the communities that make up Owerri- North Local Government Area, Imo State of Nigeria. It is a suburb of Owerri, the capital of Imo State which is one of the five states that make-up the South East Zone of Nigeria, inhabited by Igbo speaking people. In the month of August every year, women married to men of the South East origin usually return to the towns and villages of their husbands irrespective of where they reside in Nigeria to attend the "August" meeting. Initially it used to be mass return but later it became a delegate's conference. During these meetings various development projects are discussed as well as how to achieve the desired goals. Decisions taken at these "August" meetings play important roles in the lives of these towns and villages. The previous year the authors had given a health talk on hypertension during that year's August meeting and in the course of the talk many of the attendees appeared overweight and this led the authors deciding to look at the weight and lipid abnormalities amongst this group of women.

SUBJECTS AND METHODS

A total of 186 women attending the 2006 "August" meeting at Naze, Owerri North Local Government Area, Imo State, were admitted into the study. These attendees represented all the socio- economic classes as amongst them were medical doctors, lawyers, teachers of secondary and primary schools, senior civil servants, market women etc, though the authors did not categorize them. Included in the sample were those who gave informed consent. Those who withheld consent were excluded from the study. Those on drugs that affect lipids as well as those who were pregnant were excluded.

Each participant was asked about history of hypertension and or antihypertensive drug use and use of any other medication like the statins etc and age. Blood pressure (BP), weight and height measurement were taken. Those on statins and other drugs that affect lipid profile were not admitted into the study. The Blood Pressure (BP) was measured using a Standard Mercury Sphygmomanometer with appropriate cuff size, in a well ventilated room in the sitting position by nurses who were also attending the "August" meeting and had earlier been shown by the authors what is expected regarding BP

measurement. Two BP readings were obtained at intervals of 2 minutes and the mean was used for analysis. Korotokoff I, V were taken as systolic and diastolic BP respectively. Hypertension was considered to be present if the participant gave a history of hypertension and or at the time taking medication or had Systolic BP (SBP) or Diastolic BP (DBP) \geq 140/90 mmHg.

Height was measured, to the nearest 0.5cm, without shoes, back square against the wall tape, eyes looking straight ahead (visual axis is horizontal when the top of the external auditory meatus is level with the inferior margin of bony orbit), with a right-angled triangle resting on the scalp and against the wall. Weight was measured with lever balance, to the nearest 100grams, without shoes in light clothing. BMI was calculated as weight (in kilograms) divided by height (in meters) squared. Based on the WHO classification overweight was defined as BMI between 25 and 29.9kg/m², and obesity was defined as BMI \geq 30kg/m².

Total serum cholesterol was determined by the method of Trinder 1969¹³, triglycerides by the method of Jacobs and van Demark 1960¹⁴ while LDL-C and HDL-C were determined by the method of Assmann, Jabs Kohnert et al 1984.¹⁵ Hypercholesterolemia was defined as total cholesterol 6.20mmol/L (240mg/dl), reduced HDL less than 1.29 mmol/L (50mg/dl), Hypertriglyceridemia as triglycerides greater than 1.7mmol/L (150mg/dl)¹⁶.

Statistical analysis was carried out using SPSS version 13. In the analyses a p value of < 0.05 was considered statistically significant.

RESULTS

The mean age is 54.88yrs \pm 10.74, the mean BMI 26.47 \pm 4.50, mean SBP 132.38mmHg \pm 21.94, mean DBP 77.07mmHg \pm 12.25, mean TC 5.29 mmol/L \pm 1.76, mean HDL 1.14mmol/L \pm 0.83, mean LDL 1.39mmol/L \pm 0.63, mean TG 1.49mmol/L \pm 0.63. The prevalence of overweight was 38.5 %, obesity 20.7 %, hypertriglyceridemia 34.1%, hypercholesterolemia 31.4%, low HDL 37.6 %, hypertension 44.3% and dyslipidemia 60.5%.

BMI correlated with DBP $r=.290$, $P<.000$; TC $r=.246$, $P<.001$; LDL $r=.172$, $P=.024$ but did not correlate with age SBP, TG and HDL. Age correlated with SBP $r=.321$, $P<.000$ and LDL $r=.163$, $P=.031$. TC correlated with SBP $r=.370$, $P<.000$, DBP $r=.274$, $P<.000$, TG $r=.441$, $P<.000$ LDL $r=.757$, $P<.000$ but did not correlate with HDL.

Table 1: showing mean, standard deviation, range, minimum and maximum of age, BMI, SBP, DBP, TC, HDL, LDL and TG.

N	Age (yrs)	BMI (kg/m ²)	SBP mmHg	DBP mmHg	TC mmol/L	HDL mmol/L	LDL mmol/L	TG mmol/L
Valid	183	183	183	183	183	183	183	183
Mean	54.88	26.47	132.38	77.07	5.29	1.14	1.39	1.49
Std. Deviation	10.76	4.50	21.94	12.25	1.76	0.83	0.63	0.623
Range	59	22.7	150	75	8.60	8.50	2.30	2.8
Minimum	25	17.3	80	40	2.30	0.50	0.50	0.50
Maximum	84	40	230	115	10.90	9.00	2.8	3.30

BMI= body mass index, SBP= systolic blood pressure, DBP= diastolic blood pressure TC=total cholesterol HDL=high density lipoprotein cholesterol LDL = low density lipoprotein cholesterol TG= triglycerides

Table 2: Showing correlation of age, BMI, SBP, DBP, Chol, TG, LDL, HDL.

	Age	BMI	SBP	DBP	Chol	TG	LDL	HDL
Age		P=.679	P<.000	P=.697	P=.81	P=.154	P<.030	P=.501
BMI	P=.679		P=.775	P<.000	P<.001	P=.107	P<.025	P=.099
SBP	P<.000	P=.775		P<.000	P<.001	P<.000	P<.000	P=.939
DBP	P=.697	P<.000	P<.000		P<.000	P<.042	P<.000	P=.314
Chol	P=.081	P<.001	P<.000	P<.000		P<.000	P<.000	P=.351
TG	P=.154	P=.107	P<.000	P<.042	P<.000		P<.000	P=.100
LDL	P<.030	P<.025	P<.000	P<.000	P<.000	P<.000		P<.05
HDL	P=.501	P=.099	P=.939	P=.314	P=.351	P=.100	P<.050	

BMI= body mass index, SBP= systolic blood pressure, DBP= diastolic blood pressure, Chol= total cholesterol, TG= triglyceride, LDL= low density lipoprotein cholesterol, HDL= high density lipoprotein cholesterol.

DISCUSSION

Studies of anthropometric measures among adult populations of sub Saharan African countries are limited. Weight and body mass index are some of the most useful indicators which have been used to assess overweight and obesity. In this study which examined the prevalence of overweight and obesity in a group of Nigerian women based on WHO criteria showed a high prevalence of obesity/overweight. This group of women is important as they serve as role models when they go to their towns and villages. It should be remembered that these group of women came from the urban centers where they have been exposed to "modern living". Our finding of a prevalence of obesity of 20.7% shows that obesity is a problem in this environment and compares favorably with the Australian study⁸ as well as the Tehran study¹⁷ that had a prevalence of 20.8% but higher than the Greek¹⁸ study with a prevalence of 15%. It is lower than the Port Harcourt study¹⁹ with a prevalence of 33.69%, the study by Bakari et al of 22%²⁰, the Canadian study with a prevalence of 27%²¹, the Indian study with a prevalence of 31%²² and the American study with a prevalence of 34%⁴. In the study of Bakari et al²⁰ the prevalence of obesity in the total population was 13.1% but 22% in females though there was a statistical difference between the male and female populations. It is interesting to note that both America and Canada are among the group of most prosperous and developed of countries and where obesity is recognized as a serious health problem. In these societies high BMI is not unexpected as obesity is related to prosperity and affluence³. In the American study⁴ as well as the Teheran¹⁸ study there were increases in BMI over time. The high prevalence of overweight and obesity in this study is worrisome as our environment is one where being fat (overweight/obese) is regarded as evidence of the good life without bothering about the health consequences and in some cultures fattening ceremonies precede becoming a woman and marriage.

The overweight prevalence of 38.5% compares very favorably with the Australian study⁸ with a prevalence of 39% and the Teheran study¹⁷ with a prevalence of 39.5% while the corresponding value from the US was 62%⁴. The mean BMI recorded in this study was lower than the mean of 28.76±5.91 obtained by Akpa et al in Port Harcourt¹⁹. This is understandable as Port Harcourt where that study was done is the headquarters of the oil industry in Nigeria and therefore of a higher socioeconomic stratum and not a true representative of the

population, as according to the WHO³, the less developed countries become more obese as they become more affluent. The high rate of overweight and obesity raise questions on the health implications of this on health outcomes in our environment as obesity is a risk factor for many chronic conditions including diabetes mellitus (DM)²³, hypertension²³, hypercholesterolemia²³, stroke²³, heart disease, certain cancers and arthritis²³.

Of these conditions DM may be the most closely linked to obesity, and its prevalence appears to increase as the prevalence of obesity increases^{4,24}. With rising rates of obesity, diseases other than DM are showing increasing prevalence, an example being hypertension which in the 1980s was reported to have a prevalence of 10%-11%^{25,26} but today prevalence rates of 30%²⁷ are being reported while the authors reported a prevalence of 45%²⁸. Suggested reasons for increasing obesity include reduction in physical activity, diet, and increased television viewing hours, and those transiting from traditional lifestyle to rapid urbanization^{3,8,29,30}. This is particularly important in our environment with the explosion of the home video entertainment industry. The AusDiab Study as well as the study by Salmon J *et al*²⁹ showed a very strong association between television viewing time and obesity^{8,29}. In previous cross-sectional studies, body mass or BMI has been positively associated with prevalence of hypertension in a continuous, monotonic manner³¹. This association has been found in populations from industrialized and non-industrialized areas^{32,33,34}. Data from prospective studies such as the Framingham Study and the Normative Aging Study, have confirmed this association^{32,33,34}. The mechanisms leading to hypertension in obese persons are not completely known. It is hypothesized that increased sympathetic nervous activity, insulin resistance and hyperinsulinemia, sodium retention, and enhanced vascular reactivity are involved in the development of hypertension^{35,36}. Some investigators^{35,37,38,39} have reported a decrease in plasma rennin activity and plasma aldosterone levels after weight loss. This suggests that the rennin-angiotensin-aldosterone axis may play a role in causing hypertension in obese persons.

The prevalence of Hypercholesterolemia was 31.4%. This compares favorably with 31.52% of Akpa et al¹⁹ though they had used 6.5mmol/L as the cut-off for hypercholesterolemia a value much higher than the NCEP ATP-III recommendation¹⁶, but much higher than the 18.7%±1.2% recorded by Ford ES *et al*⁴⁰. The mean Total Cholesterol of 5.29mmol/L compares with 5.26mmol/L of Ford *et al*⁴⁰. The prevalence of low HDL was 37.6% and compares with the findings in India by Gupta et al⁴¹ who found a prevalence of 48.8% in 40-49 years old women of urban Indian population though higher than our finding of 37.6%. Lipid abnormalities noted in this study reveal low HDL to be the most common lipid abnormality, and is in keeping with the findings of Sharifi *et al*⁴², followed by hypertriglyceridemia and hypercholesterolemia. Dyslipidemia has been associated with atherosclerosis^{43,44} and the suggested mechanisms include oxidation, induction of inflammatory molecules and plaque formation⁴⁵.

This study has shown high prevalence of obesity/overweight, TC, TG as well as low HDL. These are well known risk factors for atherogenesis. There is therefore an urgent need

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for action on many levels including programs to promote healthy body mass and diets to prevent further rises in the prevalence of diseases like type 2 DM, Hypertension, cardiovascular disease.

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