

Full Length Research Article

## PREVALENCE OF OBESITY AND HIGH LEVEL OF CHOLESTEROL IN HYPERTENSION: *Analysis of Data from the University College Hospital, Ibadan*

YEKEEN L.A, SANUSI R.A AND KETIKU A.O\*

Department of Human Nutrition, College of Medicine University of Ibadan, Ibadan.

*This study was undertaken to determine what proportion of patients with hypertension are obese and or have elevated serum cholesterol. The data of two hundred and fifty patients who attended the outpatient clinics of the University College Hospital, Ibadan from January 1998 to December 2001 were analysed. Almost half of the subjects (48.8%) had mild, 40.8% moderate, and 8.8% severe hypertension. While mild hypertension was more in the females (55.4%), moderate and severe hypertension was more among males. Among the subjects that were overweight (BMI>25<30), 44% were males and 56% were females. There were more obese (BMI>30) among the females (63.6%) than the males (36.4%). Only 166 of the subjects had serum cholesterol analysis, and only 9.6% had a hyper-cholesterol (>240mg/dl) level. Obesity and hyper-cholesterol and hypertension are known risk factors in cardiovascular diseases. Since weight reduction has been noted to reduce severity of hypertension, this should be a cost effective intervention in both the control of hypertension and lowering the risk of coronary heart diseases.*

**Keywords:** hypertension, obesity, serum cholesterol. *Running title: prevalence of obesity in hypertension.*

\* Author for correspondence

### INTRODUCTION

Obesity and high blood cholesterol have been identified as risk factors in hypertension (Jones and Davis 1992). People with hypertension are also more likely to have lipid abnormality and obesity than those with normal blood pressure (Wannarinthee *et al* 1998). Furthermore blood pressure is strongly related to body weight and control of obesity is a critical component of prevention and control of hypertension (Kummayinka 1997). Clinical trials have also suggested a reduction in the incidence of coronary heart disease by lowering serum cholesterol levels.

Although the population prevalence of obesity and hypertension is not known, a country-wide survey in Nigeria in 1990-91 put the prevalence of hypertension at 11.2% in those older than 15years old (Mabadeje, 1999). Hypertension is the most important of the known risk factors of cardiovascular disease (Sokolow, McIlroy and Roberts 1975).

Since each of these conditions is associated with appreciable morbidity and mortality, and they may occur together increasing the associated complications, this study was undertaken to determine the percentage (or proportion) of patients with hypertension that are obese or have

hypercholesterolemia or both. As dietary control and exercise can influence obesity and high cholesterol level, these may become more prominent in the management of hypertension. This is because epidemiologic studies have suggested that 70% of elevated blood pressure is due to environmental factors, prominent among which is weight gain (Pickering, 1968).

The general objective of this study was to determine the proportion of patients with hypertension who are obese and who also have high blood levels of cholesterol.

### METHODOLOGY

This study was descriptive, cross-sectional and retrospective in design. The location of the study was the medical outpatients (MOP) clinic of the University College Hospital (UCH), Ibadan, Nigeria. This is the oldest teaching Hospital in Nigeria with an outpatient population of over 200,000 per year (Ajayi, 1997).

Subjects of the study were hypertensive patients who were attending MOP clinic for medical treatment. The selection criterion was open and it included all hypertensive patients that had attended that clinic between January 1998 and December 2001. The sampling technique adopted was purposive. Incomplete

data in the patient's records was the exclusion criterion. Two hundred and fifty (250) patients who received treatment from January 1998 to January 2001 and had adequate records, constituted the study sample.

Data was extracted from individual case notes, which were retrieved from the medical records department after all issues of ethical clearance had been adequately satisfied. Extracted data included; age, gender, weight, height, blood pressure on the first visit and total cholesterol in blood. Body mass index (BMI) was derived from weight and height measurements. Data analysis was performed using the statistical package for social sciences (SPSS) for window version 7.5. Main analysis

included descriptive statistics; however relationships were explored using cross-tabulations, correlation and linear regression.

**RESULTS**

A total of two hundred and fifty subjects were studied; One hundred and two (40.8%) were males, while one hundred and forty eight (59.2%) were females. The mean age was 48 ( $\pm$  9.1) yrs. and mean BMI 28.6 ( $\pm$ 4.1) as shown in Table 1. The profile of severity of hypertension and gender (Table 2) showed the prevalence of mild hypertension to be higher in females while moderate and severe hypertension were more in males.

**Table 1:** Characteristics of Subjects and Gender

	MALES			FEMALES		
	N	Mean	SD	N	Mean	SD
Age (yrs)	102	48.2	9.1	148	47.6	9.1
BMI(kg/m <sup>2</sup> )	102	27.9	3.2	148	29.1	4.6
Cholesterol (mg/dl)	77	209.8	44.4	89	208.6	29.2
Diastolic BP (mmHg)	102	108.5	13.5	148	105.5	12.8
Systolic BP (mmHg)	102	173.5	19.7	148	171.5	17.5

**Table 2:** Gender, Obesity and Hypertension

	MALES		FEMALES	
	n	%	n	%
Hypertension				
Mild DBP>90mmHg	40	39.2	82	55.4
Moderate DBP>105mmHg	47	46.0	55	37.2
Severe DBP> 130mmHg	12	11.8	10	6.7
Obesity				
Overweight (BMI 25-29.9)	60	58.8	76	51.4
Grade 2 obese (BMI 30-39.9)	28	27.5	49	33.1
Grade 3 Obese (BMI >40)	0	0.0	5	3.4
Non-Obese (BMI 18.5-24.99)	12	11.8	16	10.8

This difference is statistically significant at  $p < 0.05$ . Among the males 40 (39.2%) had mild hypertension, while 47(46%) had "moderate" hypertension and 12 (11.4%) had "severe" hypertension. Among the females, while 82 (55.4%) had mild hypertension, 55 (37.2%) had moderate hypertension and 10 (6.7%) had severe hypertension. This result suggests that except in the mild hypertension category, there are more males in the moderate and severe categories of hypertension.

There are also more who are overweight (BMI>25<30) among the males (59%) than in females (51%). However grade 2 obesity (BMI>30<40) is more in females (33%) than in males (28%). The non-obese are about equal among the males (11.8%) and females (10.8%). Only 166 of the subjects had serum cholesterol estimation and among these 26 (34%) males and 27 (30%) females had a

"desirable" level of less than 200mg/dl (National Cholesterol Education Program, 1988). In the "borderline" (serum cholesterol level of > 200 < 240mg/dl) category, 42 (43%) were males while 55 (57%) were females. Among the 16 that had high level of serum cholesterol (hyper-cholesterol), 9 (56%) were males while 7 (44%) were females. The proportion of patients having hyper-cholesterol in the study is low (9.6%). These are shown in Table 3.

A brief summary of the interface between obesity and hypertension shows that majority (50%) of those with mild and moderate hypertension are in the overweight category (BMI > 25 < 30). Also greater proportion of females in grade one (BMI > 25 <30) and two (BMI > 30 < 40) obesity, had "mild" hypertension while greater proportion of males

in similar categories of obesity had “moderate” hypertension (Table 4).

**Table 3:** Cholesterol profile of Obese Hypertensives

Serum Cholesterol	MALE		FEMALE	
	n	%	n	%
Desirable	26	33.8	27	30.3
Borderline	42	54.5	55	61.8
High	9	11.7	7	7.8
Total	77	100	89	100

Desirable = <200mg/dl

Borderline= >200<240mg/dl

High > 240mg/dl

(National Cholesterol Education Programme 1998)

## DISCUSSION

The population specific prevalence of hypertension in Nigeria is not known with certainty. However in a countrywide survey in 1990-1991 Mabadeje (1999) reported a rate of 11.2% in those aged 15 years old and above. Olatunbosun *et al* (2000) in a study of urban-based civil servants in Ibadan found the prevalence of hypertension to be 10.3%, although this was higher in men (13.9%) than in women (5.3%). Similarly, the prevalence of hypertension in the elderly whose ages were over 55years was 30% (Ezenwaka *et al* 1997). Okesina *et al* (1999) also observed a prevalence of 15.2% hypertension in Maiduguri with a rate of 19.1% in males and 10.3% in females. The degree of hypertension varies among the sexes. This study shows that while

there was more of the mild hypertension in the females (55.4%), more of the moderate and severe categories occur in men. Lack of categorization of the degree of hypertension limits easy comparison with previous studies. Cooper *et al* (1997) had reported a hypertension prevalence of 16% in West Africa and had implicated obesity and dietary intake of sodium and potassium.

While overweight category was higher in males (5 8.5%) than in females (51.3%), grade two obesity was more in the females (33%) than males (27%). These differences were statistically significant ( $p<0.05$ ) and are consistent with the findings of previous studies (Olatunbosun *et al* 2000, Okesina *et al* 1999). Okesina *et al* (1999) had reported an overall prevalence of obesity to be 2% in the Maiduguri study with a higher 3.2% in females and 1.2% in males.

The percentage of subjects whose BMI was > 30 in this study was 33% in females and 27.4% in males. Okosun *et al* (1999) had suggested that the prevalence of hypertension was closely linked to abdominal adiposity; however since waist-hip ratio was not measured in this study, it is difficult to confirm their observation with the findings of the present study. Ezenwaka *et al* (1997) had also reported a higher prevalence of obesity and high blood pressure in women and in urban settings. Hyper-cholesterol was found in 5.4% of the men and 4.2% of the females in this study.

**Table 4:** Hypertension severity and Obesity category

Obesity Category	HYPERTENSION CATEGORY					
	Males			Females		
	Mild (%)	Moderate (%)	Severe(%)	Mild (%)	Moderate(%)	Severe(%)
Overweight (BMI 25-29.9)	23 (22.5)	29 (28.4)	6 (5.9)	45 (30.4)	29 (19.6)	2 (1.4)
Obese (BMI > 30)	09 (8.8)	14 (13.7)	5 (4.9)	28(18.9)	19 (12.8)	07 (4.7)
	32	43	11	73	48	09

Okesina *et al* (1999), had found a zero % when hyper-cholesterol was defined as a level greater than 206.7mg/dl, however the criterion for this study is serum cholesterol level greater than 240mg/dl (National Cholesterol Education Programme 1998). As the prevalence of hypertension in several population studies has overshoot the 10% trigger- point, it is necessary to activate intervention to lower this rate. The control of dietary energy intake, sodium consumption and inactivity are areas of potential interventions. So far the prevalence of

coronary heart disease is still low in Africa; paradoxically the risk factors of hypertension, obesity and high serum cholesterol associated with coronary heart disease are emerging. As exploration of effect of obesity categories on severity of hypertension showed that while prevalence of obesity (BMI > 30) is almost twice as high in females than in males, prevalence of moderate hypertension is higher in males than in females. It is safe therefore to suggest that except in severe hypertension, obesity and hypertension are highly associated.

The importance of this finding is to enable "care-givers" in hypertension pay more attention to the control of obesity so that several complications associated with it might be prevented. The risk factors of coronary heart disease (CHD) already seen in several of the obese patients can be lowered by dietary intervention, as well as other medical control of hypertension. It is clear that the population prevalence of obesity, hypertension and hypercholesterolemia if known will be useful in planning interventions.

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