Obesity and Hypertension, Prevalence and Correlates among Patients Seen in a Tertiary Hospital in South-south Nigeria

Azinge N[1] & Anizor C.O[1]

Abstract

Background: The relevance of both hypertension and obesity as important public health challenges is increasing world-wide. The growing prevalence of obesity is increasingly recognized as one of the most important risk factors for the development of hypertension. This study is aimed at determining the prevalence of hypertension and obesity with its associations in patients seen in a tertiary hospital in South-South Nigeria

Method: This study was carried out at the Delta State University Teaching Hospital, Oghara. It is a cross sectional descriptive study of 1045 adult patients seen at the Out-patient department between January – December 2010. Blood pressure and their anthropometric were measures taken at their first clinic visit. Overweight and obesity were determined using the body mass index (Quetelet index)

Result: Prevalence of hypertension was 28% while the prevalence of obesity was 22.1%. Specifically, 19.5% of the males and 24% of the females were obese respectively. Mean body mass index was 24.63 + 8.52kglm2. Male prevalence of hypertension was 14.4% while female prevalence was 14.1%. The prevalence of hypertension was significantly higher among obese patients compared to non-obese patients (32.5% vs. 23.5%) $p<0.05$.

Conclusion: Hypertension places an excessive financial burden and populations and health systems, consuming scarce resources. Body mass index is positively and independently associated with morbidity and mortality from hypertension and cardiovascular disease. Lifestyle modification would help in controlling hypertension as well as reduce its prevalence and its subsequent financial burden.

Keywords: *Obesity, hypertension, prevalence*

[1]*Department of Internal Medicine, Delta Sate University Teaching Hospital, Oghara, Delta State*

Correspondence: *Dr. Azinge N. Endocrinology Unit, Dept of Internal Medicine, Delta Sate University Teaching Hospital, Oghara, Delta State. Email: nicholasazinge@yahoo.com*

Introduction

The relationship between body mass and blood pressure has been established more than 10 years ago. Both cross-sectional and longitudinal studies[1,2,3] in western populations have consistently indentified an association between overweight and hypertension [1,2]

According to the current definition of hypertension from the Seventh Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC7) guidelines many Nigerians (20-25%) would be classified as hypertensives[3]. The relationship between body mass index and hypertension is of particular interest to developing countries as reduced cardiovascular mortality among lean hypertensive subjects has been reported in some

longitudinal studies [4,5].

In the INTERSALT study, the relationship between body mass index (BMI) and blood pressure was studied in over 10,000 men and women between 20 and 59 years of age, sampled from 52 centers around the world. BMI was significantly associated with systolic and diastolic blood pressure, independent of age, alcohol intake and smoking habit[2].

Population based preventive approaches are thus central for the control of obesity and management of deviated blood pressure in developing countries where hospital based care of complications is not a readily available option.

This study intends to generate relevant information that helps understand the patterns of high blood pressure, prevalence and correlates with obesity in patients at a tertiary hospital in a semi-urban area in South-South Nigeria. Such information would thus be relevant to the prevention and control of hypertension and obesity in these areas.

Materials and Methods

This study was carried out at the Department of Internal Medicine, Delta State University Teaching Hospital (DELSUTH), Oghara, Delta state, Nigeria. The Ethics and Research Committee of DELSUTH, Oghara approved the study. The study was conducted at the medical outpatient clinic involving 1045 patients seen between January, 2010 and December, 2010.

At each clinical visit, blood pressure was measured using a standard mercury(Accoson) sphygmomanometer. The weight and height of each patient was also taken and the body mass index calculated using the Quetelet index (kg/m^2). Hypertension was defined and classified using the JNC VII criteria while obesity was defined according to the WHO criteria[3]. Normal Body mass index (BMI) is 19.5 – 24.9, Overweight is BMI of 25 – 29.9, while obesity is BMI > 30kg/m^2.

All statistical analysis was done with SPSS version 11 and a P value of less than 0.05 was taken as significant. Results were expressed as mean +_ standard deviation.

Results

A total of 1045 patients were involved in the study with 502 (48%) being males and 543 (52%) being females. The mean age of patients was 44.08 + 14.14 years while mean BMI was 24.63 + 8.522kg/m^2. Prevalence of hypertension was 28.5% while prevalence of obesity among patients was 22.1%.

The prevalence of hypertension among normal, overweight and obese patients were 23.7% , 33.7% and 32.5% respectively. Conversely, 59% of the hypertensives were overweight. By gender, the prevalence of hypertension was 30% and 27.1% among males and females respectively. The prevalence of obesity by gender was 9.4% among males and 12.7% in females. Similarly, 19.5% of the males were obese while 24.5% of the females were obese.

Male prevalence of hypertension was 14.4% while female prevalence was 14.1%. There was a significant difference between the prevalence of hypertension among obese patients compared to non-obese patients (P<0.05).

Table 1: *Pattern of Body Mass Index among the Sexes*

BMI	MALE	FEMALE
Normal	259(49.6%)	255 (47.%)
Overweight	145 (28.9%)	155 (28.5%)
Obese	98 (19.5%)	133 (24.5%)

Table 2: *Pattern of Body Mass Index and Hypertension*

BM 1	NORMAL	PRE-HTN	HTN
Normal	215(41.8%)	177 (34.5%)	122 (23.7%)
Overweight	101 (33.7%)	98 (32.6%)	101 (33.7%)
Obese	76 (32.9%)	80 (34.6%)	75 (32.5%)

Table 3: *Gender, Body Mass Index and Hypertension*

	MALE NO HTN	FEMALE NO HTN
Normal	61 (40.4%)	61 (41.5%)
Overweight	55 (36.4%)	46 (31.3%)
Obese	35 (23.4%)	40 (27.2%)

Discussion

Obesity and in particular central obesity have been consistently associated with hypertension and increased cardiovascular risk. Based on population studies, risk estimates indicate that at least two-thirds of the prevalence of hypertension can be directly attributed to obesity[6].

In our study, the overall prevalence of hypertension amongst our study population was 28.5%. Many studies have been done in various areas of Nigeria involving specific subsections of the population on the prevalence of hypertension. Osilesi *et al* estimated a prevalence of 11.5% in the cardiovascular clinic of the University College Hospital. Similar work at the University of Nigeria Teaching Hospital, Enugu yielded 15.2% prevalence[7,8]. In our study, we obtained a higher prevalence of 28.5%. This could be attributed to different socio-economic and lifestyle differences between patients residing in these communities.

Recent reports from various studies have indicated increasing prevalence of obesity[16,17]. Some recent studies have documented alarming prevalence rates of 71.6% in females and 50.5% in males in a population of hypertensive patients[18]. In our study, 28.7% were overweight and 22.1% were obese. These results are slightly less compared to studies done at the University College Hospital among patients where prevalence of 54.4% and 32.8% were observed for overweight and obesity respectively [9]. This higher prevalence could be attributed to the higher carbohydrate content of staple foods in the South Western Nigeria compared to the South-South Nigeria. This study shows that obesity is more prevalent among females then males which is in agreement with similar studies [10,11,12]. Women are more prone to gluteo- femoral lipogenesis and fat deposition and account for the increased frequency of obesity among females[12]. Another plausible explanation for the higher prevalence of obesity among our female patients could be a superimposition of sedentary lifestyle on the nutritional transition being witnessed in the country although we did not obtain information on physical activity in our study. The perception of obesity as a sign of affluence by many people (especially women) in this part of the world could have also contributed. A study in a university community in South-Western Nigeria found that in spite of the higher education of their subjects, many of the respondents believed that being obese gives respect and that it is a sign

of good living[13].

This study showing increased prevalence of overweight and obesity among patients with hypertension which also agrees with earlier studies [13,14]. The precise mechanism linking obesity to hypertension and increased cardiovascular risk are not fully understood. However, neuro-endocrine mechanisms and most recently factors derived from adipose are thought to play a major role [15,16]. While obese subjects are prone to hypertension, hypertensive subjects appear to be prone to weight gain.

The association between body mass index and blood pressure has been widely reported across populations in Asia, Latin America, United States and Canada. In a study that included five Latin American populations (urban) and seven Asian populations (four urban, three rural), significant positive relationships of similar magnitude were observed between BMI and BP, despite differences in mean BMI levels between the populations studied [15]

In the INTERSALT study, the relationship between body mass index (BMI) and blood pressure was studied in over 10,000 men and women from 52 centers around the world. It was observed that BMI was significantly associated with systolic and diastolic blood pressure[2].

Both the Framingham and Tecumsell studies have shows that future weight gain is significantly greater in hypertensive patients than in normotensives suggesting that even normal weight hypertensives are at a risk of developing obesity [20]. Weight gain in adulthood is in itself an important risk factor for the development of hypertension[21]. Studies among Nigeria adults also observed that females with obesity had a risk of hypertension three times that of normal weight females[22].

The precise prevalence of obesity related hypertension varies with age, race and sex of the population studied and with the criteria used for the definition of hypertension and obesity[23]. In the Framingham offspring studying, 78% of cases of hypertension in men and 64% in women were attributable to obesity[24.]

Limitations

The researchers have identified certain constraints that imposes some degree of limitations to the absolute generalizations of the finding. Ideal measurement of obesity should consider both the amount and the site of deposition of the adipose tissues, the waist indices (waist circumference, waist-hip ratio, Rohrer's index, Ponderal index) were not used for the definition of obesity in this study. However, many studies have documented that Quetelet index provides a simple clinical estimate of generalized adiposity that can be compared across studies and populations[25,26]. Furthermore, the limitations imposed by it being hospital-based retrospective is recognized, however this study still provides useful baseline information for more large scale analytical and longitudinal studies on obesity and hypertension in the community on which subsequent interventions could be based and evaluated.

Conclusion

There is a high prevalence of both obesity and hypertension in the population studied. There is a clear need to develop a strategies for managing the increasing number of overweight and obese subjects in the community. Effective long-term weight loss necessitates persistent changes in dietary quality, energy intake and physical activity which is associated with a significant reduction of blood pressure

References

1. Stamler R., Stamler J., Reidinge WF. et al Weight and blood pressure findings in

hypertension screening of 1 million Americans. JAMA 1978; 240: 1607-10

2. Dyer AR, Elliot P, Stupley M for the INTERSALT Co-operative Research Group. Body mass index versus height and weight in relation to blood pressure: findings for the 10,079 persons in the INTERSALT study, Am J Epidemiol 1990:131:589-96.
3. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC7) JAMA. 2003,289 (19): 2560-2572.
4. Folson AR, L, Y, Rav X, Cen R, Zhang K, Liv X et al. Body mass, fat distribution and cardiovascular risk factors in a lean population of South China. J Clin Epidemiol 1994; 47:173-181
5. Goldbourt U, Holtzmal E, Cohesi-Mandelzinvcig L, Neufield UN. Enhaced risk of coronary heart disease mortality in lean hypertensive men. Hypertension 1987; 10:22-28
6. Krause RM, Winslon M, Fletcher BJ, Gnendy SM, Obesity, impact on cardiovascular disease. Circulation 1998; 98: 1472-1476
7. Osilesi O, David LT, Mbofung CF, Osiyeme FO, A Lenmo T. Dietary mineral effects on the occurence of the control of hypertension – review paper Nigeria J of Nutri Sci 1987; 8(2): 83-86
8. Onwubere BYC, Ike SO, Prevalence of hypertension and its complication among medical admissions at the University of Nigeria Teaching Hospital, Enugu. Nigeria J Int. Med. 2000; 3(1):17-20
9. Copper R, Rotimi C, Ataman D,McGeeD, Osotimein B, Kadiri S et al. prevalence of hypertension in seven populations of West African origin. Am J Pub Health 1997; 87: 60-8
10. Akpa MR, Agomouh DI, Alasia DD. Serum Lipid pattern of healthy adult Nigerians in Port Harcourt. Nig J of Med. 2006; 15(2): 137-4
11. Yekeen LA, Sanusi RA, Ketiku AO Prevalence of Obesity and High level of cholesterol in Hypertension: Analysis of Data from the University College Hospital, Ibadan. African Council of Biomedical Research, 6(2003):129-132
12. Akintunde AA, Akinwusi PO, Adebayo PA, Ogunyemi S, Opadiyo OG. Burden of obesity is essential hypertension: Pattern and Prevalence. Niger J Clin Pract 2010;13 (4):399-402
13. Ojofeitimi EO, Adeyeye AO, Fadiora Ao, Kuteyi AO et al. Awareness of obesity and its health hazard among women in a university community. Pakistan Journal of Nutrition 2007; 6(5): 502-5
14. Amodu PH, Mbah IO, Lawson L. Prevalence of obesity and dysliypidoemia in hypertensives seen in Abuja, Nigeria. Scand J Clin Lab Invest Suppl. 2005; 240:14-7
15. Puepet FH, Zoakah AL, Chuhwak Ek. Prevalence of Overweight and obesity among Urban Nigeria Adults is Jos. Highland Medical Research Journal Vol, No 1(2002) ISSN 1596-2402
16. Opadipo OG. Risk factors associated with Cardiovascular disease and death in Adult Nigerians with Essential Hypertension. Nig J Int Med 2000; 3(2):41-45
17. Oghabon EK, Okesna AB. Pattern of some risk factors for cardiovascular diseases is untreated Nigerian Hypertensive patients. West African J. Med. 2006;25(3):190-194
18. Engeli S, Sharma AM. Role of adipose tissue and disease. Horm Metab Res 2000;23:485-499
19. Wiecek A, Kokot F. Chudek J, Adamczak M. The adipose tissue-a novel endocrine organ

of Interest to the Nephrologist. Nephrol Dial Transplant 2002; 17: 191-195

20. Julius S, Valentini M, Palatini P. Overweight and Hypertension; a 2-way Street? Hypertension 2000; 35:807-813
21. Brown, CD *et al.* Body mass index and the prevalence of hypertension and dyshpidaemias. Obes Res 2000; 8:605-619.
22. Adedoyin RA, Mbada CE, Bisiriyu LA, Adebayor Balogun MO, Akintonide AO. Relationship of anthropometric indicators with blood pressure levels and the risk of hypertension in Nigeria adults. Int. J Gen Med. 2009 Nov 30;133-40.
23. Aronne. LJ, Segal. KR. Adiposity and fat distribution, out come, measures, assessment and clinical implications, Obes Res. 2002; 10:145-125.
24. Garrison R.J, *et al.* Incidence and precursors of hypertension in young adults. The Framingham Offspring study (1987), Prev Med. 16; 225 – 35.
25. Calle EE, Kaaks R. Overweight, obesity and cancer: Epidemiological evidence and proposed mechanisms. Nat Rev Cancer 2004; 4 : 579-591
26. Siminnialayi IM, Emem-Chioma PC, Dappe DV. The prevalence of obesity as indicated by BMI and waist circumference among Nigerian adults attending Family Medicine clinics as out-patients in Rivers State. Niger J Med 2008; 17: 340-5