



Full Length Research Paper

Prevalence and awareness of hypertension amongst staff and students of a tertiary institution in Nigeria

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Hypertension is a growing public health problem and a major risk factor for cardiovascular diseases. This study assessed the prevalence and level of awareness of hypertension in a tertiary institution in Nigeria and its association with some socio-demographic factors. In a cross-sectional survey, by a cluster sampling method, 471 subjects were selected. Blood pressure was measured by standard protocol. Hypertension was defined as systolic blood pressure ≥ 140 mmHg and /or diastolic blood pressure ≥ 90 mmHg. A structured questionnaire was used to collect socio-demographic data. The overall prevalence of hypertension in the study was 15.7%. The level of awareness of hypertension amongst hypertensives was 21.6% while 78.4% were unaware of their hypertensive state. Hypertension was not significantly associated with male sex ($\chi^2 = 0.456$; $p=0.500$) or lower educational status ($\chi^2 = 1.480$; $p=0.224$). However, it was significantly associated with marriage ($\chi^2 = 18.684$; $p<0.001$), low socio-economic status ($\chi^2 = 9.416$; $p=0.002$) and older age ($\chi^2 = 27.302$; $p<0.001$). There were significant correlations between blood pressure, age and BMI ($p<0.001$). There is a low level of awareness of hypertension in this institution. The determinants of hypertension in this tertiary institution are marriage, low socio-economic status and older age.

Key words: Hypertension, Prevalence, Awareness, Socio-demographic, Tertiary Institution.

INTRODUCTION

Hypertension is a major risk factor for cardiovascular diseases (CVD) and a major public health problem. Worldwide, prevalence estimates for hypertension is about 1 billion individuals (Burt et al., 1995). It causes about 7.1 million deaths per year (World Health Report 2002) and 4.5% of disease burden which translates to 64 million disability adjusted life years (DALYs) (World Health Organization 2008).

The relationship between blood pressure (BP) and risk of CVD is continuous, consistent and independent of other risk factors. The higher the BP, the greater the chances of heart attack, heart failure and stroke (Cressman and Gifford, 1983). It is estimated that, by 2030, mortality due to CVD in the adult population will reach 23 million with about 85% of such deaths occurring in low and middle income countries (Mathers and Loncar, 2006).

Prevention of hypertension is workable if its awareness and knowledge of its risk factors are increased and this could lead to prevention of its complications (Damasceno et al., 2009). Early diagnosis and early

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treatment will also reduce the morbidity and mortality from hypertension.

Hypertension is an example of a non-communicable disease (NCD) considered the next epidemic in Nigeria, due to the rapid epidemiologic transition taking place (Akinkugbe, 2000). In a national survey of NCD, only about a third of hypertensives were aware of their condition (Akinkugbe, 1999). Of those aware, only half were on any form of treatment, and of those that were on treatment, less than one third were effectively controlled.

Studies on prevalence of hypertension and its awareness amongst the general population are well documented in West Africa (Cooper et al., 1997; Cappuccio et al., 2004) and Nigeria (Ogah, 2006; Ekwunife et al., 2010). One of the studies found a prevalence of 21.1% (Ekwunife et al., 2010) among urban men and women in Nigeria while a study in Accra, Ghana found a prevalence of 28.3% (Amoah, 2003).

However, there is little information about this in tertiary institutions. It is expected that a tertiary institution will have a higher level of awareness of this condition so as to serve as a means of informing the general population and uneducated.

The present study was conducted to assess the prevalence and awareness of hypertension in a tertiary institution in Nigeria and its relationship with socio-demographic factors. Such information will help in policy formulation for the prevention and management of the condition and also development of strategies to fill in deficiencies in the awareness and treatment of the condition.

MATERIALS AND METHOD

The study was a cross-sectional survey of staff and students of the Benue State University aged 16 years and above conducted between March 2011 and June 2011. The Benue State University is located in Makurdi Town which is the most urbanized town in Benue State, Nigeria.

The various departments in the institution were considered as clusters and were subjected to simple random sampling to obtain the sample size of 471.

Informed consent in written form was given by each of the subjects before they were used for the study. Ethical approval was obtained from the ethical committee of the Benue State University before the study was carried out. Consented subject who were pregnant or unwilling to remove their heavy garments for measurements were excluded from the study.

A structured questionnaire designed to obtain information regarding age, sex, marital status, level of education, and salary scale was administered to the participants by trained assistants. Based on the salary scale, the population was stratified into low and high

income groups and based on age into older and younger age groups.

The body weight was measured to the nearest 0.5kg using a weighing scale with the participants wearing minimal clothing. Height was measured to the nearest 0.5m using a stadiometer. The Body Mass Index (BMI) was calculated by dividing the weight by the square of the height in meters (Quetelet, 1994). The WHO diagnostic criteria were used in classifying the subjects as overweight and obese (World Health Organization Technical Report Series 894, 2000). Three blood pressure readings were taken in the sitting position at five minute intervals after five minutes rest in the morning using appropriate cuff size Accoson brand of mercury sphygmomanometer. This is in accordance with the seventh report of the Joint National Committee on the Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 7) (Chobanian et al., 2003). The systolic blood pressure (SBP) and the diastolic blood pressure (DBP) were the first and fifth korotkoff sounds respectively.

The first reading was discarded and the average of the last two measurements used for data analysis. Hypertension was defined as SBP \geq 140mmHg and/or DBP \geq 90mmHg. Awareness of hypertension was measured among hypertensive individuals based on the participant's report of a prior diagnosis of hypertension made by a health professional (Burt et al., 1995). Information was also obtained about when last the participants checked their blood pressure.

The data was analyzed using the Statistical Packages for Social Sciences (SPSS) version 19 statistical software (SPSS Inc.Chicago, Illinois, USA). For continuous variables, means and standard deviations were calculated and the means compared using the independent samples t test. Pearson Chi-Square test was used to analyze the relationship between hypertension and sociodemographic variables. Pearson correlation coefficient test was used to determine the relationship between blood pressure, age and anthropometric variables. Values of $p < 0.05$ were considered statistically significant.

RESULTS

Demographic characteristics of the study population

The total number of participants in the study was 417. Males were 315 and females were 156. The mean age of the males was 28.83 ± 9.38 and that of the females was 28.30 ± 8.5 . There was no significant difference in the mean age of the participants by gender. However, the height, SBP and DBP were significantly higher in the males than females. This is shown in table 1. BMI was significantly higher in females than males ($p < 0.001$).

Table 1. Characteristics of the study population by gender

Variable	Male	Female	t – test	p – value
	n=315 Mean (SD)	n=156 Mean (SD)		
Age	28.83(9.38)	28.30(8.53)	0.60	0.551
Weight	67.76(10.77)	66.03(13.39)	1.51	0.131
Height	1.69(0.08)	1.64(0.33)	2.59	0.010*
BMI	23.85(3.39)	25.17(4.63)	4.89	0.001*
SBP	118.99(15.60)	111.91(13.02)	2.52	<0.001*
DBP	76.56(11.07)	73.85(10.82)	-3.50	0.012*

*statistically significant, BMI = Body Mass Index
SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure

Table 2. Characteristics of the study population by blood pressure group.

Variable	Normotensive	Hypertensive	t – test	p – value
	n = 397 Mean(SD)	n = 74 Mean(SD)		
Age	27.58(8.05)	34.38(11.87)	-6.13	<0.001*
Weight	66.30(10.60)	71.92(15.69)	-3.85	<0.001*
Height	1.67(0.22)	1.67(0.06)	0.20	0.843
BMI	23.93(3.60)	26.19(4.81)	-4.69	<0.001*
SBP	113.40(12.27)	134.09(17.30)	-12.41	<0.001*
DBP	72.45(7.13)	92.86(12.44)	-19.69	<0.001*

* = statistically significant, BMI = Body Mass Index
SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure

Table 3. Prevalence, awareness of Hypertension and last blood pressure check by Hypertensives.

Variable	Frequency(%)
Blood Pressure Group	
Normotensive	397(84.3)
Hypertensive	74(15.7)
Awareness of Hypertension	
Yes	16(21.6)
No	58(78.4)
Last BP check by Hypertensives	
<6months	22(30.1)
>6months	52(69.9)

BP = Blood Pressure

There were 397 normotensives in the study population and 74 hypertensives. The mean age of the normotensives was 27.58 ± 8.05 while that of the hypertensives was 34.38 ± 11.87 . There was significant difference in the mean age, weight, BMI, SBP, DBP of the hypertensives and normotensives ($p < 0.001$). This is shown in table 2.

The majority of the population were unmarried (66.4%) had tertiary education (86.3%) and of the younger age group (92.1%). These are shown in table 4.

Prevalence, awareness of hypertension and last blood pressure check by hypertensives

The overall prevalence of hypertension in the study population was 15.7%. It was more prevalent in males than females with rates of 16.5% and 14.1% respectively but the difference was not statistically significant ($p = 0.500$). The awareness of hypertension was 21.6% while the majority of the hypertensives were unaware of their hypertensive status (78.4%) and 69.9% of the

Table 4. Relationship between Hypertension and sociodemographics

Variable	Total (%) n = 471	Hypertensive n = 74	Normotensive n = 397	Chi- Square (χ^2)	p-value
Male	315(66.9)	52(16.5)	263(83.5)	0.456	0.500
Female	156(33.1)	22(14.1)	134(85.9)		
Unmarried	313(66.4)	33(10.6)	280(89.4)	18.684	<0.001*
Married	158(33.6)	41(25.9)	117(74.1)		
L- income	121(25.4)	29(24.6)	94(75.4)	9.416	0.002*
H- income	350(74.6)	45(12.7)	303(87.3)		
Secondary	64(13.7)	16(20.3)	51(79.7)	1.480	0.224
Tertiary	307(86.3)	58(14.4)	346(85.6)		
Younger	430(92.1)	57(13.3)	373(86.7)	27.302	<0.001*
Older	41(7.9)	17(45.9)	24(54.1)		

*=statistically significant, L = low, H = high

Table 5. Correlation between blood pressure, age and anthropometric variables.

Variable	SBP r(p-value)	DBP r(p-value)
Age	0.241(<0.001)*	0.326(<0.001)*
Weight	0.281(<0.001)*	0.263(<0.001)*
Height	0.009(0.843)	-0.19(0.683)
BMI	0.257(<0.001)*	0.247(<0.001)*

*=statistically significant

hypertensives had not checked their blood pressure for more than 6months. This is shown in table 3.

Relationship of Hypertension with sociodemographic variables

Hypertension was not significantly associated with male sex ($\chi^2 = 0.456$; $p=0.500$) or lower educational status ($\chi^2 = 1.480$; $p=0.224$). However, it was significantly associated with marriage ($\chi^2=18.684$; $p<0.001$), low socioeconomic status ($\chi^2=9.416$; $p=0.002$) and older age ($\chi^2=27.302$, $p <0.001$). These are shown in table 4.

Correlation between Blood Pressure, Age and Anthropometric Measures

Systolic and diastolic blood pressure showed significant correlations with age, weight and BMI ($p<0.001$). There was no correlation between blood pressure and height. This is shown in table 5.

DISCUSSION

The present study found the prevalence of hypertension in this tertiary institution to be 15.7%. It was more prevalent in males than females though the difference was not statistically significant ($p=0.500$). This prevalence rate differs from that found in a South Western Nigerian university community with a rate of 21% (Erhun et al., 2005).

Higher prevalence rates have been found in population non tertiary institutionalized studies. A study carried out in Benin City, Nigeria revealed a prevalence of 25% amongst motor bike riders (Ibhazehiebo et al., 2007) and another study in Kumasi Ghana revealed a prevalence of 28.7% (Cappucio et al., 2004).

These non-institutionalized studies are expected to have higher mean age of participants and thus a higher prevalence of hypertension (Franklin et al., 1997) since a tertiary institution constitutes mainly of young people as noted in our study. To underscore this point our study revealed also that the mean age of the hypertensives was significantly higher than that of the normotensives.

The awareness of hypertension in our study was low at 21.6%. This means that 78.4% of hypertensives were not aware that they had the condition and were incidentally diagnosed. This finding agrees with that of the national survey where only about a third of hypertensives were aware of their condition (Akinkugbe, 2000). There is therefore, an urgent need for pragmatic strategies to increase the level of awareness of hypertension in the society. A tertiary institution would have been expected to have a higher level of awareness so as to be able to teach the general population. This level is lower than that of a study carried out in Ghana where 34% were aware of their hypertensive state (Cooper et al., 1997). For hospital based studies, our finding is similar to a study conducted in hypertensive patients seen in a tertiary hospital in the middle belt Nigeria where about 61% were diagnosed for the first time to be hypertensive in a teaching hospital (Katibi et al., 2010).

Amongst the respondents who had hypertension, 69.9% had not checked their blood pressure for more than 6 months. This means that effort need to be intensified to alert hypertensives of need for regular clinic attendance and follow up.

Hypertension was not significantly associated with male sex or lower educational status in our study. However, it was significantly associated with being married, low socioeconomic status and older age. The association of hypertension with low socioeconomic status in our study agrees with the 2030 projections by Mathers (2006) (Mathers and Loncar, 2006) that mortality from CVD would occur mostly in low and middle income countries. Blood pressure also showed significant correlations with age and BMI in our study.

Several studies have shown that blood increases with age and BMI (Ejike et al., 2008; Mutunda et al., 2006). The age related rise in systolic blood pressure is due to cardiovascular changes associated with aging (Franklin et al., 1997; Lloyd et al., 2006). The fundamental hemodynamic fault is an elevated systemic vascular resistance coupled with an inappropriately normal cardiac output. Vasoconstriction at the level of the arterioles results from increased neurohormonal drive and an autoregulatory reaction of vascular smooth to an expanded plasma volume. The latter because of impairment of the kidney's ability to excrete sodium (Ronald and Norman, 2008). Isolated diastolic hypertension is more common in men and is often associated with middle age weight gain (Franklin et al., 2005).

It has also been reported that there is a direct relationship between BMI and blood pressure (Kadire et al., 1999). Some studies with high prevalence of high blood pressure have attributed this to obesity (Ulasi et al., 2010). It has been said that marriage is associated with obesity as married people have the tendency to consume lots of food due to shared meals in association with sedentary life style thereby becoming obese (Jeffery and

Rick, 2002). This predisposes them to hypertension. Individuals with low socioeconomic class are likely to have lower educational status. Our study showed that hypertension was more prevalent amongst those with secondary education than tertiary education though the difference was not statistically significant. Thus they are likely to be ignorant about a healthy diet and may thus become obese by consuming excess of high calorie food and be predisposed to hypertension.

CONCLUSION AND RECOMMENDATION

This study reveals that in a tertiary institution in Sub-Saharan Africa, the level of awareness and control of hypertension is still far less than results obtained in developed countries (Wyatt et al., 2008). This calls for concern as hypertension is associated with significant morbidity and mortality from cardiovascular disease (CVD) if undetected or controlled. The low level of awareness in a tertiary institution is quiet discouraging as these are expected to know better. Preventive strategies aimed at educating the society on the risk factors for hypertension such as obesity and excessive salt intake should be encouraged. Health education needs to be carried out at all levels of the society to increase the level of awareness of hypertension by health care professionals.

REFERENCES

- Akinkugbe OO (1999) (ed). Non-communicable disease in Nigeria – Final Report of a National Survey. Federal Ministry of health Expert Committee on Non-communicable Diseases. Lagos. pp.2 – 5.
- Akinkugbe OO (2000). Non-communicable disease, the next epidemic: Nigeria's preparedness. *Nig. J. Clin. Pract.* 3(2):37 – 42.
- Amoah AGB (2003). Hypertension in Ghana: a cross-sectional community prevalence study in Greater Accra *Ethn Dis* 13: 310 – 315.
- Burt VL et al (1995). Trends in the prevalence, awareness, treatment and control of hypertension in the adult US Population. Data from the health examination surveys, 1960 to 1991. *Hypertension.* 26: 60 – 69.
- Burt VL, Whelton P, Recella EJ, Brown C, Cutler JA, Higgins M, et al (1995). Prevalence of hypertension in the US adult population. Results from the Third National Health and Nutrition Examination Survey 1988 – 1991. *Hypertension.* 25(3): 305 – 313.
- Cappuccio FP, Micah FB, Emmett L, Kerry SM, Antwi S, Martin Peprah R, Phillips RO, Plange-Rhule J, Eastwood JB (2004). Prevalence, Detection, Management and control of Hypertension in Ashanti, West Africa. *Hypertension.* 43(5):1017 -1022.
- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Amateron BJ, Oparil S, Wright JT Jr, Rocella EJ (2003). Seventh report of the Joint National committee on Prevention, Detection, Evaluation and Treatment of High blood pressure. *Hypertension* 12(6): 1206 – 1252.
- Cooper R, Rotimi C, Ataman S, McGee D, Osotmehin B, Kadiri S, Muna W, Kingue S, Fraser H, Forrester T, Benne HF, Wilks R (1997). The prevalence of hypertension in seven populations of West African origin. *Am. J. Public health.* 87:160 – 168.
- Cressman MD, Gifford RW (1983). Hypertension and stroke. *J. the Am. College of Cardiol.* 1:521 – 527.

- Damansceno A, Azevedo A, Silva – Matos C, Pista A, Diogo D, Lunet N (2009). Hypertension prevalence, awareness, treatment, and control in Mozambique. Urban/rural gap during epidemiologic transition. *Hypertension*. 54: 57 – 83.
- Ejike CEC, Ugwu CE, Ezeanyika LUS, Olayemi AT (2008). Blood pressure patterns in relation to geographic area of residence: A cross-sectional study of adolescents in Kogi State, Nigeria. *BMC public Health*. 8(1):411.
- Ekwunife O, Udeogaranya P, Nwatu I (2010). Prevalence, awareness, treatment and control of hypertension in a Nigerian population. *Health*. 2:731 – 735.
- Erhun WO, Olayinwola G, Agbani EO, Omotosho NS (2005). Prevalence of hypertension in a University Community in South West Nigeria. *Afr. J. Microbiol. Res*. 8(1):15 – 19.
- Franklin SS, Gustin W, Wong ND, Larson MG, Weber MA, Kannel WB (1997). Hemodynamic Patterns of age related changes in blood pressure. The Framingham Heart study. *Circulation* 96(1): 308 315.
- Franklin SS, Pio JR, Wong ND, et al (2005). Predictors of new onset diastolic and systolic hypertension. The Framingham Heart Study. *Circulation* 111 : 1121.
- Ibhazehiebo K, Iyawe VI, Ighoroje ID (2007). Epidemiologic studies of the prevalence of Arterial Hypertension among commercial Motor Bike Riders in Benin City, Nigeria. *Niger. J. Health and Bio-med. Sci*. 6(2): 26 – 29.
- Jeffery RW, Rick AM (2002). Cross sectional and longitudinal Associations between body mass index and marriage related factors. *Obesity Res*. 10(8): 809 – 815.
- Kadiri S, Walker O, Salako BL, Akinkugbe O (1999). Blood pressure, hypertension and correlates in urbanized workers in Ibadan, Nigeria: a revisit. *J. Hums. Hypertens*. 13: 23 – 27.
- Katibi IA, Olainoye JK, Kuranga SA (2010). Knowledge and practice of hypertensive patients seen in a tertiary hospital in the middle belt of Nigeria. *Niger. J. Clin. Pract*. 13(2): 159 – 162.
- Lloyd-Jones D, Evans J, Levy D (2005). Hypertension in adults across the age spectrum. Current outcomes and control in the community. *JAMA* 294 : 466 – 472.
- Mathers CD, Loncar D (2006). Projections of global mortality burden of diseases from 2002 to 2030. *Plosmed*.3:e442.
- Mutunda j, Mebrahtu G, Usman A, Nyarango P, Kosia A, Ghebat Y, Ogbamarim A, Masjuan M, Gebremicheal A (2006). The prevalence of hypertension and its relationship with obesity: results from a national blood pressure survey in Eritrea. *J. Hums. Hypertens*. 20:59 – 65.
- Ogah OS (2006). Hypertension in Sub-Saharan African populations: the burden of Hypertension in Nigeria. *Ethnic Disparities*. 16(4): 765.
- Quetelet AD (1994). *Physique De L'Homme*, quoted by Pengelly CDR. Body mass index and abdominal girth in the diagnosis of obesity. *Proc R Col. Physicians, Edinburg*. 24:174 – 180.
- Ronald GV, Norman MK (2008). Systemic Hypertension : Mechanisms and Diagnosis. In (eds) Braunwald's Heart Disease : A text book of Cardiovascular Medicine 8th Edition. Philadelphia, Elsevier Inc. pp. 1029 – 1030.
- Ulasi II, Ijoma CK, Onoduju OD (2010). A community based study of hypertension and cardiometabolic syndrome in semi-urban and rural communities in Nigeria. *BMC health Services research*. 10:71.
- World Health Organization (2008). Prospects of Research on non-communicable diseases in the African Sub-region. <http://www.afro.who.int/dpm/rpc/publications/ncdwok.pdf>
- World Health Organization Technical Report series 894: obesity: preventing and managing the global epidemic. Geneva: World Health Organization 2000.
- World Health Report (2002). Reducing risks, promoting healthy life style. World Health Organization, Geneva, Switzerland http://www.who.int/whr/2002/en/whr02_en.pdf
- Wyatt SB, Akyzbekora EL, Wofford MR, Coady SA, Walker ER, Andrew ME, et al (2008). Prevalence, awareness, treatment and control of Hypertension in the Jackson Heart Study. *Hypertension* 51(3): 650 – 656.