



Blood pressure Control among Outpatients in Enugu. A report of the ESUT Medical Research Group

¹Ezeala-Adikaibe BA*, ²Okafor H, ²Orjioko C, ²Okpara T, ²Aneke E, ²Chime P, ¹Mbadiwe N, ¹Nwosu N, ²Nwobodo N, ²Onyebeke G, ²Nwobodo M, ²Okudo G

¹Department of Medicine, University of Nigeria Teaching Hospital Ituku/Ozalla, Enugu

²Department of Medicine, Enugu State University of Science and Technology, Parklane, Enugu

Received: 21-10-2014 / Revised: 04-11-2014 / Accepted: 21-11-2014

ABSTRACT

Hypertension is the principal driver of the cardiovascular disease epidemic in Africa and the major reason for the eventual development of complications is poor blood pressure control. In sub-Saharan Africa, poor funding, poverty and lack of awareness contribute to poor blood pressure control. To the best of our knowledge this is the first study from South East Nigeria to address blood pressure control in a hospital setting. The main objective of this study is to assess the control of hypertension in outpatients attending a tertiary hospital in Enugu South East Nigeria. This is a cross sectional study conducted in the medical out-patient clinic of the Enugu State University of Science and Technology Teaching Hospital (ESUTH) in Enugu, Enugu State, South East Nigeria. Two hundred and ten (102 women, 108 men) consenting subjects were recruited for the study. Seventy one (37.8%) were also diabetic and 22(10.5%) had stroke. The mean systolic blood pressure was 142.3±21.2mmHg (143.0±20.8mmHg women, 141.6±21.6mmHg men, p=0.64) and diastolic blood pressure was 84.3±13.6mmHg (83.2±13.5mmHg women, 85.5±13.3mmHg men p=0.25). Systolic blood pressure was normal (<140mmHg) in 34.5% of the subjects, (38.9% men, 29.4% women p=0.148.) Diastolic blood pressure was normal in 54.3%; (49.1% men, 59.8% in women. p=0.119.) Overall, blood pressure (SBP/DBP <140/90mmHg) was controlled in 28.1% of the subjects (women 23.5%, men 32.4%). p= 0.15. Hypertension remains poorly controlled among patients attending a tertiary health care facility in Enugu South East Nigeria. The growing prevalence of cardiovascular disease subsequent to poor blood pressure control calls for measures for increasing awareness and the need for complete adherence to medications.

Keywords: Hypertension; Antihypertensive drugs; Nigeria



INTRODUCTION

Hypertension has increased in prevalence for individuals of all races and ethnicities¹. Most cardiovascular complications of hypertension in Africans occur at younger ages compared to that in the developed countries². The prevalence of hypertension in Nigerian general population is about 14.5% (14.7% men and 14.3% women)³ and may be higher in high risk populations⁴. Hypertension is the principal driver of the cardiovascular disease epidemic and the major reason for the eventual development of complications is poor blood pressure control. In sub-Saharan Africa (SSA), health care is extremely underfunded which may pose a limitation to public health educational measures promoting primary and secondary prevention of hypertension. Other factors that contribute to the burden of

hypertension includes but not limited to poverty⁵ and lack of awareness^{6,7}. In the elderly with multiple pathologies there is the added burden of polypharmacy and high rates of adverse drug reactions⁸, thus the greater likelihood of non adherence. To the best of our knowledge, this is the first study from South East Nigeria to address blood pressure control in a hospital setting.

Objectives: The main objective of this study is to assess the control of hypertension in outpatients attending a tertiary hospital in Enugu South East Nigeria.

METHODS

This is a cross sectional study conducted in the medical out-patient clinic of the Enugu State University of Science and Technology Teaching

*Corresponding Author Address: Ezeala-Adikaibe B A, Department of Medicine, University of Nigeria Teaching Hospital Ituku/Ozalla, Enugu. PM B 01129 Enugu; Email: birinusadikaibe@gmail.com

Hospital (ESUTH) in Enugu, Enugu State, South East Nigeria. All consecutive consenting patients being managed for hypertension were recruited. Exclusion criteria were refusal to participate, history of chronic renal failure, less than 3 clinic visits in the last 6 months, use of steroids, endocrine disorders (except diabetes) and connective tissue diseases.

Ethical clearance was obtained from the ethics committee of the hospital. Informed consent was obtained from each study participant. Ethical conduct was maintained during data collection and throughout the research process. Study duration was 6 months (June –November 2013).

Blood pressure measurement: To ensure steady state, participants were interviewed in the clinic. After they had rested in a sitting position for 2-5 minutes, we recorded the blood pressure twice by means of mercury sphygmomanometer according to the guidelines of the European Society of Hypertension⁹. Blood pressure was measured by one of the investigators or a doctor not below the rank of a registrar in the department of medicine using mercury sphygmomanometers and stethoscopes (Kris-Alloy®, Wuxi Medical Instrument Factory, Wuxi City Jiangsu, China). All blood pressure measurements were obtained at the non-dominant arm. A standard cuff with an inflatable bladder of 22 × 12 cm was used if arm circumference is less than 32 cm and cuffs with a 35 × 15 cm bladder on larger arms. High blood pressure was defined using the WHO/ISH criteria of systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg⁹. Using a standardised questionnaire, we obtained information on each subject's smoking and drinking habits, and use of herbal medications. Current anti hypertensive drugs and other cardiovascular co-morbidity were recorded from the case file. Blood pressure measurements from two previous clinic visits were obtained from the case notes. For analysis, these 2 blood pressure measurements and that of the two previous visits were averaged. Fasting venous blood was collected to measure the blood glucose, and total cholesterol. Weight was measured using a standard bathroom scale in kilograms. Height was measured in centimetres using a straight centimetre ruler with the patient standing erect on a flat surface.

Statistical methods: For database management and statistical analyses, we used the SPSS version 17 (IBM Corporation, New York, USA). Data were presented in tables. The central tendency and spread of the data are reported as mean±SD. Our statistical methods also included Student's t-test for unpaired observations. In all, p value of < 0.05 was regarded as statistically significant. Conclusions

were drawn at the level of significance. The confidence level was kept at 95%.

RESULTS

Two hundred and ten (102 women, 108 men) consenting subjects were recruited for the study. The characteristics of the studied population are shown in table 1. The mean age was 59.7±7.6 years. There was no significant difference between the mean ages and Body mass indices of women and men (p=0.77 and 0.14 respectively). Most of the subjects were married (74.8%) and came from within the metropolis (70.5%). At the time of study, the majority of the subjects was in business or civil servants (41.9%) and had completed at least primary school education. Regular use of tobacco, alcohol and herbal medicine were found in 12.9%, 31.4% and 76.2% respectively. See table 1. Seventy one (37.8%) were also diabetic (HBP/DM) and 22 (10.5%) had stroke (HBP/Stroke). See table 2. The prescription pattern of antihypertensives and number of antihypertensives used are shown in table 2. Angiotensin converting enzymes inhibitors/blockers (70.5%) were the most prescribed medication. Alpha methyl dopa was the least prescribed. About 61.9% of the subjects were on combination therapy.

Blood pressure control: The age and gender distribution of blood pressure is table 2. The mean systolic blood pressure was 142.3±21.2mmHg (143.0±20.8mmHg women, 141.6±21.6mmHg men, p=0.64) and diastolic blood pressure was 84.3±13.6mmHg (83.2±13.5mmHg women, 85.5±13.3mmHg men p=0.25). See table 1. Systolic blood pressure was normal (<140mmHg) in 34.5% of the subjects, (38.9% men, 29.4% women p=0.148.) Diastolic blood pressure was normal in 54.3%; (49.1% men, 59.8% in women. p=0.119.) Overall, blood pressure (SBP/DBP <140/90mmHg) was controlled in 28.1% of the subjects (women 23.5%, men 32.4%). p= 0.15. The distribution of blood pressure and other variables is shown in table 2. The percentage of normal blood pressure was higher in subjects on monotherapy. Widows and rural dwellers had lower rates. Subjects with diabetes/stroke had the lowest rates of control (20%), however their number was small.

DISCUSSION

Control of blood pressure to recommended target levels below 140 mmHg systolic and 90 mmHg diastolic remains a major worldwide challenge^{2,4}. The major finding in this study are; normal blood pressure was achieved only in 58 (28.1%) subjects (32.4% men, 23.5% women). Diastolic blood pressure was controlled in 114 (54.3%) and systolic

blood pressure in 72(34.2%). Subjects less than 45 years, widows, rural dweller and business people/civil servants had poorer blood pressure controls. The proportion of men and women with normal SBP/DBP was 32.4% and 23.5% respectively.

Epidemiological data show that 0.9%-47.8% of hypertensive patients in SSA achieve blood pressure control^{6,7}. The low rate of control may suggest non adherence¹⁰ among the patients. Furthermore, the effect of center bias cannot be totally ruled in a teaching hospital where patients with severe forms of hypertension may be referred. The blood pressure control rate of 28.1% in the current study is similar to 30.5% by Etuk *et al*¹¹ and 29% obtained in Ibadan¹². Studies in South East Nigeria show that blood pressure control ranged from 24.7% in males and 40.3% in males¹³. Apart from poverty which is rampant, many community dwellers may not accept hypertension as a lifelong disorder, hence may feel that they are 'cured' as soon as the blood pressure drops and come to hospital soon after it rises. The availability of cheap but poor quality drugs is a problem as well. Many people still seek care from spiritual and herbal healers as also seen in this study where 76% were using herbal medicine; most of which have doubtful efficacy. Undoubtedly, cost containment is important in the management of a common disease, such as hypertension, especially in resource poor settings where out-of-pocket medical expenditure is the usual practice hence the high patronage gives to cheap unbranded drugs.

Satisfactory blood pressure achieved in subjects with diabetes was similar to reports by Arije *et al* in Ibadan¹⁴.

Another important observation in this study is the proportion of rural dwellers, widows and people <45 years with normal blood pressure. The reasons for this is not so clear, however, it may reflect the effect of poverty as these patients may have less disposable incomes. The rural urban differences observed were in keeping with previous studies⁷. In subjects less than 45 years adherence may be a problem as many find it unacceptable to be on a lifelong medication. However the number of subjects in the group is small which may overestimate the exact frequency. The proportion of business people and civil servants with normal blood pressure were lower than in other professions. Although the exact nature of work was not elucidated, one may assume that civil servants/traders unlike artisans and farmers are

more likely to live sedentary lifestyles and have higher body mass index and thus higher blood pressure levels.

Patients on monotherapy had lower blood pressure levels than those on combination therapy. This finding is similar by findings by Etuk *et al*¹¹ One possible explanation for this may be the use of combination therapy for people with severe forms of hypertension. However, the fact that the pill burden may worsen adherence, hence blood pressure control has been noted in previously¹⁵. Most of the patients had stage I hypertension which may suggest white coat hypertension indicating that blood pressure control may be higher than suggested (table not shown). People on herbal medications had lower rates of control indicating a greater possibility of non adherence.

This study is the first in South east Nigeria to evaluate blood pressure control in a hospital setting. Equal number of men and women were selected and a relatively large sample size for a hospital based study was used. There is little or no possibility of recruiting non hypertensives as the investigators had access to the case notes and exclusion criteria strictly followed. However, the sample may not strictly be representative, as most patients in the community do not attend government hospitals due to long waiting time. This limitation makes it difficult to generalize our findings to other populations. Rate of control in some categories such as those with co-morbid diabetes and stroke may have been overestimated and normal blood pressure underestimated because the possibility of white coat hypertension. Other limitations of the study were the teaching hospital setting which is likely to make subjects with severe hypertension to be over represented.

CONCLUSION

Hypertension remains poorly controlled among patients attending a tertiary health care facility in Enugu South East Nigeria. The growing prevalence of cardiovascular disease subsequent to poor blood pressure control calls for measures for increasing awareness and the need for complete adherence to medications. Because control using drugs is difficult to achieve at population level, optimizing primary preventive approaches is important and should be the focus for the national policy.

Conflict of interest: The authors have no conflict of interest.

Table 1 Characteristics of participants

Characteristic	Total	Women	Men	P-value
<i>Anthropometrics</i>				
N(%)	210(100)	102(48.6)	108(51.4)	0.68
Age, years	59.7±7.6	59.5 ± 7.6	59.8 ± 7.6	0.77
Height, cm	160.4±7.9	157.8 ± 0.06	163.3 ± 0.83	<0.0001
Weight, kg	74.4±15.4	74.2 ± 16.5	74.7 ± 14.3	0.81
Body mass index, kg/m ²	29.0±6.5	29.7 ± 5.7	28.3±7.1	0.14
<i>Marital Status</i>				
Single/divorced, n(%)	4(1.9)	1(1)	3(2.8)	0.32
Married, n(%)	157(74.8)	55(53.9)	102(94.4)	<0.0001
Widowed, (%)	49(23.3)	46(45.1)	3(2.8)	<0.0001
<i>Occupation</i>				
Civil servants/Business, n(%)	88(41.9)	47(46.1)	41(38)	0.52
Unemployed/Retired, n(%)	68(32.4)	29(28.4)	39(36.1)	0.23
Farmers/Artisans, n(%)	54(25.7)	26(25.5)	28(25.9)	0.79
<i>Residence</i>				
Urban	148(70.5)	62(41.9)	86(58.1)	0.05
Rural	62(29.5)	40(64.5)	22(35.5)	0.02
<i>Level of Education</i>				
None/Primary	84(40)	40(47.6)	44(52.4)	0.67
Secondary	73(34.8)	23(31.5)	50(68.5)	0.02
Tertiary	53(25.2)	39(73.6)	14(26.4)	0.001
<i>Peripheral haemodynamics</i>				
Systolic pressure, mm Hg	142.3±21.2	143.0 ± 20.8	141.6 ± 21.6	0.64
Diastolic pressure, mm Hg	84.3±13.6	83.2 ± 13.5	85.5 ± 13.3	0.25
<i>Measurements on blood</i>				
Glucose, mmol/l	132.8±45.0	140.5 ± 51.8	123.9± 33.8	0.08
Total cholesterol	4.9±1.2	5.0±1.0	4.8±1.4	0.5
<i>Lifestyle</i>				
Current tobacco use, n (%)	46(21.9)	6 (5.9)	40 (37)	<0.0001
Drinking, n (%)	66(31.4)	37 (36.3)	29 (26.9)	0.14
Herbal medicine n(%)	160(76.2)	73(71.6)	87(80.6)	0.06

Table 2. Blood pressure control and other variables.

Variable	SBP (mmHg)	DBP(mmHg)	SBP/DBP(mmHg)
	(<140mmHg)	(<90mmHg)	(<140/90 mmHg)
<i>Age group (years)</i>			
<45	2(18.2)	6(54.5)	2(18.2)
45-54	15(40.5)	18(48.6)	11(29.7)
55-64	32(33.7)	53(55.8)	25(26.3)
≥65	23(34.3)	41(61.2)	21(31.3)
<i>Gender</i>			
Males	42(38.9)	53(49.1)	35(32.4)
Females	30(29.4)	61(59.8)	24(23.5)
<i>Marital Status</i>			
Single/Divorced	2(50)	1(75)	2(50)
Married	59(37.6)	79(50.3)	48(30.6)
Widowed	11(22.4)	32(65.3)	9(15.3)
<i>Occupation</i>			
Civil servants/ Business	27(30.7)	40(45.5)	18(20.5)
Unemployed/Retired	29(42.6)	43(63.2)	25(36.8)
Farmers/Artisans	16(29.6)	31(57.4)	16(29.6)
<i>Residence</i>			
Urban	55(37.2)	78(52.7)	45(30.4)
Rural	17(27.4)	36(58.1)	14(22.6)
<i>Occupation</i>			
Civil servants/ Business	27(30.7)	40(45.5)	18(20.5)
Unemployed/Retired	29(42.6)	43(63.2)	25(36.8)
Farmers/Artisans	16(29.6)	31(57.4)	16(29.6)
<i>Level of Education</i>			
None/Primary	25(29.8)	43(51.2)	20(23.8)
Secondary	30(41.1)	38(52.1)	23(31.5)
Tertiary	17(32.1)	33(62.3)	16(30.2)
<i>Lifestyle</i>			
Use Tobacco	18(39.1)	22(47.8)	14(30.4)
No Tobacco	54(32.9)	92(56.1)	45(27.4)
Use Alcohol	24(36.4)	37(56.1)	18(27.3)
No Alcohol	48(33.3)	77(53.5)	41(28.5)
<i>Herbal medication(HM)</i>			
Use(d) HM	56(35)	87(54.4)	44(27.5)
No HM	16(32)	27(54)	15(30)
<i>Co-morbidity</i>			
HBP	32(29.9)	55(51.4)	26(24.3)
HBP+diabetes	28(39.4)	44(62)	22(31)
HBP+stroke	10(45.5)	10(45.5)	9(40.9)
HBP+diabetes+stroke	2(20)	2(20)	5(50)
<i>Prescription</i>			
Monotherapy	37(46.3)	50(62.5)	30(37.5)
Combination therapy			
Two drugs	30(32.3)	53(57)	26(28)
Three drugs+	5(13.5)	11(29.7)	3(8.1)
Total	72(34.3)	114(54.3)	59(28.1)

REFERENCE

1. Health Systems in Africa Community Perceptions and Perspectives. The Report of a Multi-Country Study. The World Health Organization. 2012
2. Alwan A, Armstrong T, Bettcher D, Branca F, Chisholm D, Ezzati M et al. Global status report on noncommunicable disease 2010. Geneva, Switzerland, World Health Organization, 2010.
3. Akinkugbe OO (Ed), Non communicable Disease in Nigeria. Final Report of National Survey, Federal Ministry of Health and Social Services, Lagos, 1997; pp. 64-90.
4. Damasceno A, Azevedo A, Silva-Matos C, Prista A, Diogo D, Lunet N. Hypertension prevalence, awareness, treatment, and control in Mozambique: urban/rural gap during epidemiological transition. *Hypertension* 2009; 54:77–83.
5. Odeniran O, Adebisi and Samali A. Poverty and hypertension in Nigerian adults: A barrier to its control and treatment. A review. *Unique Res. J. Med. Med. Sci.* 2013;1(3):014-020.
6. Kayima J, Wanyenze RK, Katamba A, Leontsini E, Nuwaha F. Hypertension awareness, treatment and control in Africa: a systematic review. *BMC Cardiovascular Disorders* 2013; 13:54. Available at <http://www.biomedcentral.com/1471-2261/13/54>. Accessed July 23, 2014.
7. Addo J, Smeeth L, Lean DA. Hypertension In Sub-Saharan Africa: A Systematic Review. *Hypertension*. 2007;50:1012-1018.
8. Cunningham G, Dodd TR, Grant DJ, Murdo ME, Richards RM. Drug-related problems in elderly patients admitted to Tayside hospitals, methods for prevention and subsequent reassessment. *Age Ageing*. 1997;26:375–82.
9. O'Brien E, Asmar R, Beilin L, Imai Y, Mancia G, Mengden T et al. on behalf of the European Society of Hypertension Working Group on Blood Pressure Monitoring. Practice guidelines of the European Society of Hypertension for clinic, ambulatory and self blood pressure measurement. *J Hypertens*. 2005; 23:697-701.
10. Isezuo SA, Opara TC. Hypertension awareness among Nigerian hypertensives in a Nigerian tertiary health institution. *Sahel Medical Journal*. 2000; 3:93-97.
11. Etuk E, Isezuo AS, Chika A, Akuche J, Ali M. Prescription pattern of Anti-hypertensive drugs in a Tertiary Health Institution in Nigeria. *Ann of Afri Med*. 2008;17(3):128 – 132
12. Yusuff KB, Balogun OB. Physicians' prescribing of antihypertensive combinations in a tertiary care setting in southwestern Nigeria. *J Pharm Sci*. 2005; 8:235-242.
13. Ekwunife OI, Udeogaranya PO, Nwatu IL: Prevalence, awareness, treatment and control of hypertension in a Nigerian population. *Health* 2010; 2(7):731–735.
14. Arije A, Kuti M, Fasanmade A, Akinlade A, Ashaye A, Obajimi M, Adeleye J. Control of hypertension in Nigerians with Diabetes Mellitus: A report of the Ibadan Diabetic / Kidney Disease Study Group. *Int J Diabetes & Metabolism* 2007; 15: 82-86.
15. Kalogianni A. Factors affect in patient adherence to medication regimen (editorial) *Health Science Journal*.2011; 5(3):157-158.