

BLOOD PRESSURE CONTROL AMONG HYPERTENSIVE SUBJECTS IN DUTSE, NORTHWESTERN NIGERIA

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ABSTRACT

Background: High blood pressure is an independent risk factor for cerebrovascular, renal and cardiovascular disease. According to World Health Organization treatment to target Blood Pressure (BP) of <140/90 mmHg has been associated with decrease in morbidity and mortality. Despite this BP control has been very poor even in developed economies.

Objective: We set to assess level of BP control among hypertensive patients on treatment in Dutse, Jigawa state, and to identify treatable causes of failure to achieve target for better management.

Methods: It is a cross sectional study of all hypertensives for more than one year attending medical out patients clinic who have consented. An interviewer administered questionnaire was used to obtain information from the patients.

Results: A total of 123 patients of which 45% were females with mean age, duration of hypertension of 51.9 and 5.9 years respectively and BMI of 40.9Kg/m². Eighty-three per cent, 91% and 94% were aware of salt restriction, cessation of smoking and alcohol moderation as lifestyle modifications respectively. The mean Systolic and Diastolic BP were 142mmHg and 86mmHg respectively. Fifty-two per cent were on two drugs combination including a diuretic while 4.87% were on three drugs or more. Less than a third (27.6%) had their BP controlled at <140/90mmHg. There was no significant difference in the demographic and clinical data between patients with controlled and uncontrolled BP.

Conclusion: This study found that control of BP is still poor in our setting. This could be due to physician inertia in the treatment, use of inappropriate combination of anti hypertensives or failure to reinforce lifestyle modifications.

Keywords: Blood pressure, Hypertensives, Control, Blacks

INTRODUCTION

According to the 2016 global status report, there were 40.5 million deaths due to non communicable diseases, and about 31.5 million occurred in low- and middle-income countries.¹ Cardiovascular diseases accounted for 44% (17.9 million) of the total NCDs mortality. Hypertension is an important modifiable risk factor for cerebrovascular, renal and cardiovascular diseases. Hypertension affects about 44% of Western Europe and 28% of the United States population.^{2,3} The overall hospital-based prevalence is about 10% to 15%, higher prevalence rates have been reported in middle-income urban and rural areas.⁴ Despite availability of effective treatment for hypertension, treatment to target BP is a universal problem in both developing and developed countries.

Uncontrolled BP is responsible for 62% of death from cerebrovascular diseases (CVD) and 49% of death from Ischemic Heart Disease (IHD). These increased risks are present in individuals ranging from 40 to 89

years. For every 20 mmHg systolic or 10 mmHg diastolic increase in B.P, there is doubling of mortality from both IHD and CVD.³ The Higher the BP the greater the chance of heart attack, Heart Failure (HF), Stroke and kidney diseases. According to the National Health and Nutrition Examination survey (NHANES) between the year 1999 to 2000 about 34% of Hypertensive Americans achieved controlled blood pressure (less than 140/90mmHg).^{2,3} Mansia G et al reviewed 2775 hypertensives aged 60.6±16.1 years followed up in 131 specialist centers in Italy and found that only 37.5% achieved optimal blood pressure (defined according to ESH/ESC 2003 guideline as BP less than 140/90mmHg).⁵ In an extensive review of 8001 hypertensive patients in Japan, Nakado K et al observed achievement rate for treatment goals (as defined by JSH 2014) of 60.2% among young and early phase elderly without Diabetes and chronic kidney disease (CKD).⁶

In a community survey conducted between October and December 2015 in a town of Aksum northern Ethiopia, Teklay AG *et al* studied 521 patients and found a control rate of 18.2%.⁷ In an urban hospital in Nairobi Kenya Achieng⁷ and colleagues studied 575 hypertensives attending outpatient clinic and found a control rate of 24% which they attributed largely to non-adherence.⁸ In Ghana a community survey conducted between June 2001 and June 2002 showed that only 22% of the respondents were aware of their hypertension status out of which 11.3% were on treatment with only 2.8% having controlled BP.⁹ In a clinic-based assessment of BP control in Port Harcourt, Nigeria, Akpa MR and colleagues found a control rate of 33.3% among 207 hypertensive/diabetics reviewed attending cardiology clinic.¹⁰ A control rate of 34.5% was found by Igbis *et al* among 200 randomly selected patients attending Hypertension clinic in Kano.¹¹

This study was conducted to assess the level of blood pressure control, pattern of anti-hypertensive prescription and to determine factors that affect blood pressure control in Rasheed Shekoni Specialist hospital (RSSH Dutse), Northwest Nigeria.

MATERIALS AND METHODS

This is a cross sectional study of Hypertensive patients attending Cardiology clinic of Rasheed Shekoni Specialist Hospital (RSSH) Dutse, Jigawa state in North West Nigeria. It is a state-owned tertiary health institution that is a major referral center from all parts of Jigawa state, some parts of Kano, Bauchi, yobe states and occasionally from Niger republic. The study was conducted from 2nd May 2016 to 2nd November 2016.

The study participants were all patients attending the cardiology clinic of RSSH Dutse who were receiving treatment for hypertension. Patients who gave informed consent were recruited consecutively as subjects. Patients who refused consent, or admitted to non-compliance with anti hypertensives were excluded from the study. Subjects were seen at least three times during the course of the study.

Using a structured questionnaire, biodata, as well duration of hypertension, circumstances leading to the diagnosis and current anti-hypertensive medications were recorded. Likewise, complications of Hypertension such as Heart failure, retinopathy, cerebrovascular disease, nephropathy and encephalopathy were also recorded. Knowledge of lifestyle modification and its application were also recorded. Height was measured to the nearest meter with a stadiometer barefooted while weight was measured in kilogram using a standard weighing scale

with light clothing. Body mass index (BMI) was calculated as weight (Kg) divided by the square of the height (m) as defined by world health organization (WHO).¹²

Blood pressure was measured during first visit with an Accouson's mercury sphygmomanometer with a standard cuff size (12-13cm wide and 35cm long) on both arms after the subject has rested for at least 5 minutes. The cuff was maintained at heart level and Korotkoff phase I and V were used as the systolic and diastolic BP respectively.¹³ The arm with the higher reading was used subsequently. On each visit 2 BP measurements separated by at least 2 minutes were taken and the average used. Control was considered adequate when the BP based on the JNC 8 criteria was less than or equals 140/80 mmHg.³ Five milliliter (5ml) of blood was collected in the fasting state for the estimation of fasting blood glucose, lipid profile and electrolytes, creatinine and urea. Hyperglycemia was defined according to WHO criteria¹⁴, while lipid abnormalities were defined based on the NCEP criteria.¹⁵ Urine was also collected for urinalysis. Proteinuria, and hematuria were graded according to combi-9 urine dipstick test and proteinuria was as 1+ (300mg/L), 2+ (1.5g/L), 3+ (3g/L) and 4+ (20g/L) and hematuria defined as >1+ blood.

Data was analyzed using statistical package for social sciences version 20 (SPSS V20), numerical data were reported as means \pm SD, while student t-test was used to compare means. Pearson correlation was used to compare relationship between variables and multiple regression analysis was applied to identify independent predictors of uncontrolled hypertension. Chi square test was used to compare categorical variables. A P value of <0.05 was considered statistical significance. Ethical approval was obtained from the ethics committee of RSSH Dutse and each participant gave an informed consent after proper explanation of the study.

RESULT

A total of 123 hypertensives were seen during the study period. Fifty five (44.7%) were males and 68 (55.3%) were females, with a female to male ratio of 1.2 to 1, table 1 summarizes the demographic and clinical characteristics of the respondents. The mean age of the respondents was 51.99(\pm 12.49) years with a range from 25 to 85 years. Male respondents were statistically older than females (P =0.03). The mean duration of hypertension was 5.9 (\pm 5.1) years with a range from 1 year to 30 years. Twenty nine (23.6%) were diagnosed following routine medical check, 37 (30.1%) were diagnosed secondary to persistent headache while

Table 1: Showing demographic and clinical features of the subjects.

Variables	Male (N=55)	Female (N=68)	P Value
Age (years)	54.58±12.43	49.9±12.23	0.03
Duration of Hypertension (years)	4.96±5.04	6.71±5.07	0.06
Systolic Blood Pressure (mmHg)	143.56±17.9	142.09±21.74	0.68
Serum Creatinine (µmol/L)	166.8±103.97	119.54±68.53	0.004
Family History of Hypertension			
Yes	38 (55.1%)	31 (44.9%)	0.009
No	17 (31.5%)	37 (68.5%)	
Complications of Hypertension			
Yes	20 (62.5%)	12 (37.5%)	0.019
No	35 (38.5%)	56 (61.5%)	
Salt Reduction			
Yes	46 (44.7%)	57 (55.3%)	0.978
No	9 (45%)	11 (55%)	
Knowledge of Exercise			
Yes	38 (60.3%)	25 (39.7%)	0.001
No	17 (28.3%)	43 (71.7%)	
Knowledge of Smoking			
Yes	11 (91.7%)	1 (8.3%)	0.001
No	44 (39.6%)	67 (60.4%)	
Knowledge of Analgesics			
Yes	18 (52.9%)	16 (47.1%)	0.257
No	37 (41.6%)	52 (58.4%)	

12.2%, 8.1% and 4.1% were diagnosed following pregnancy, heart failure and stroke respectively.

Thirty-two (26%) of the patients have one form of hypertensive complication, with heart failure (12.2%), retinopathy (4.9%) and encephalopathy (4.1%) being the most common. Proportion of patients with knowledge of lifestyle modification was 83.7% for reduced salt intake, 51.2% for exercise, 94.3% for alcohol moderation, 91.2% for smoking abstinence and 27.6% for analgesic usage. About half of the patients (56.1%) have family history of Hypertension and it attains statistical significance in the males (P=0.009). The mean BMI of the respondents was 40.9±28.6 Kg/m², with 40 (32.5%) having normal BMI, 28 (22.8%) were overweight, 16 (13%), 10 (8.1%) and 28 (22.8%) have class I, II and II obesity respectively. The mean fasting blood sugar was 5.1±1.3mmol/L with thirty five (28.5%) of the subjects being diabetic, the mean serum total cholesterol was 4.3±1.05mmol/L and mean serum uric acid 411±118µmol/L. Male respondents have statistically significant higher serum creatinine (P=0.004).

Majority of the respondents were on two drugs combination 64 (52.03%), with ACE inhibitor +

Diuretic been more commonly prescribed, while 51 (41.4%) were on 3 drugs combination, with ACE I +CCB + Diuretic been prescribed in about a quarter of the patients (25.2%), 6 (4.87%) of the subjects were on four drugs combination and 2 patients were on single agent, 34 (27.6%) and 15 (12.2%) were on anti-platelets and statins respectively. The mean systolic and diastolic BP was 142.75±20 and 86.1±12mmHg respectively. There was no statistically significant correlation between SBP and fasting blood sugar (P=0.31), BMI (P=0.9), and duration of hypertension (P=0.41), however there was positive correlation between SBP and advancing Age (P=0.005). There was a positive correlation between DBP and serum uric acid (P=0.05).

The proportion of patient with controlled blood pressure (<140 over 90 mmHg) was 34 (27.6%) while 89 (72.4%) had uncontrolled blood pressure. There was a trend toward poor blood pressure control with increasing age although the difference was not statistically significant (P=0.06), there was no significant difference in the demographic and clinical characteristic between patients with controlled blood pressure and those whose blood pressure was uncontrolled. Uncontrolled BP was seen more frequently in subjects

on one or two antihypertensive drugs, those on ACE-I compared to CCB and among subjects with other co morbidities such as retinopathy, heart disease and obesity. In patients on three antihypertensive drugs the BP was controlled in those on combinations containing a diuretics and/or CCB. Among the patients with uncontrolled blood pressure, 48 (53.9%) had stage 1 hypertension while 41 (46.1) had stage 2 hypertension.

literature, Kayima *et al* found that the control rates were uniformly low and never exceeded 45% in 38 community based cross-sectional studies from 23 African countries within 1993 to 2013.²¹ This suggested that control of BP is generally poor in Africans. In contrast, in a study by Joffres and colleagues who reviewed national surveys from Britain and North America, control rate of 34%, 50% and 66% in

Table 2: Showing the characteristics of patients based on control of Blood Pressure

Variables	Control (N=34)	Uncontrolled(N=89)	P value
Age (years)	55.32±14.99	50.72±11.23	0.067
Duration of Hypertension	5.38±4.46	6.13±5.34	0.468
Gender			
Male	15 (27.3%)	40 (72.7%)	0.934
Female	19 (27.1%)	49 (72.1%)	
Family History of Hypertension			
Yes	18 (26.1%)	51 (73.9%)	0.663
No	16 (29.6%)	38 (70.4%)	
Reduced Salt in diet			
Yes	27 (26.2%)	76 (73.8%)	0.421
No	7 (35%)	13 (65%)	
Analgesic usage			
Yes	6 (17.6%)	28 (82.4%)	0.126
No	28 (31.5%)	61 (68.5%)	
Complication of Hypertension			
Yes	11 (34.4%)	21 (65.6%)	0.322
No	23 (25.3%)	68 (74.7%)	
Fasting Blood Sugar (mmol/L)			
Normal	26 (30.2%)	60 (69.8%)	0.413
Diabetes	8 (27.9%)	27 (77.1%)	
Total cholesterol (mmol/L)	4.2±1.2	4.3±1.0	0.702

DISCUSSION

This study was conducted to assess the level of blood pressure control and associated risk factors among hypertensives who were regular on follow-up for at least one year in a semi urban town. The sex distribution showed a female predominance of 55.3% which is similar to that reported from Northern Ethiopia,⁷ Nairobi,⁸ and Kano,¹¹ this could be attributed to a better health seeking behavior of the female as well as the higher female population in the country.¹⁶ The mean age of the patients was 51.99 years similar to that reported from other studies,^{7,8,10,11} however it was lower than that reported from Italy.⁵ This could be due to longer life expectancy and ageing population in Europe.

Our study revealed a BP control rate of 27.6% which is far below the recommended target by WHO of 50%.¹⁷ Nonetheless, this is similar to reported control rate of 20.4% to 33.3% in other parts of the country.^{11,18,19,20} Similarly, in a systematic review of the

England (2006), United states (2007-2010) and Canada (2007-2009) respectively were found.²²

The WHO reports that suboptimal BP control is responsible for 62% of cerebrovascular disease and 49% of Ischemic Heart disease.²³ In addition suboptimal BP is the single most important attributable risk factor for death throughout the world.³ In developed countries, the improved control of hypertension has led to considerable reduction in overall morbidity and mortality over the last fifty years.²⁴ In addition suboptimal BP can accelerate the progression chronic complications such as Nephropathy, and retinopathy. Therefore in order to decrease the current burden of uncontrolled hypertension co-ordinated and concerted efforts are needed. Local as well as National programs to improve detection, treatment and control of hypertension taking in to consideration various socio-cultural and economic influences needs to be initiated.

Many factors could be responsible for the poor BP control in Africa. Genetic or environmental factors may be involved. Adequate education is lacking in most African countries which lead to poor health seeking behavior. Even though more than half of the subjects were aware of the beneficial effect of exercise in the management of hypertension, the knowledge of other forms of lifestyle changes such as salt restrictions was low among the subjects. In contrast, in a small community survey in Umuahia, southeast Nigeria, Okwonu CG *et al.* evaluated knowledge and practice of lifestyle modification among 101 participants and concluded that 87% of their patients have knowledge of salt restriction as a measure to control hypertension, however few patients were aware of the role of exercise in BP control.¹⁸

Our study failed to show significant correlation between blood pressure and certain patients' factors, this is in contrast to Akpa *et al.* that found significant negative correlation between systolic and diastolic BP with fasting blood sugar, total cholesterol and triglycerides.⁹ This may be due to the small sample size in our study and/or other unidentified factor such concomitant use of drugs known to increase BP (such as analgesics that are widely abused), fake and substandard anti hypertensives, etc. Further, our study did not identify statistically significant risk factors that could lead to uncontrolled BP, this is in agreement with the work of Achieng *et al.*⁸ in Nairobi that found no significant difference between various factors such as age, gender, duration of hypertension and knowledge of lifestyle modifications among patients with control or uncontrolled BP.

The prescription pattern may also play a role, whereas more than 90% of the patients were on diuretics, 46.2% were on two drugs combination of a diuretic and Angiotensin converting enzyme inhibitors (ACE-I). This is in disagreement with the JNC 8 recommendation of the use of a calcium channel blocker (CCB) instead of ACE-I in black hypertensives. The presence of other cardiovascular risk factors such as Diabetes mellitus, obesity, dyslipidemia etc may also affect BP control. In this study there was low usage of statins and anti platelets whose beneficial effect has been well known among hypertensives.

CONCLUSION

This study found that control of BP among hypertensive subjects is poor in our setting. In order to achieve the recommended target for BP control it has become pertinent on all physicians to follow international guidelines and to strive hard in creating more awareness among hypertensive on the need to treat to target.

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