

Blood Pressure Control among Treated Hypertensives in a Tertiary Health Institution

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Abstract

Background: Goal blood pressure (BP) was defined by the JNC VI and the World Health Organization-International Society of Hypertension (WHO/ISH) as <140 mm Hg systolic and <90 mm Hg diastolic for the general and <130 mm Hg systolic and <85 mm Hg diastolic for special high-risk populations. It is well established that adequate BP control characterizes only a fraction of treated hypertensive patients. The importance of tight BP control has been established in preventing cardiovascular morbidity and mortality.

Methods: We performed cross-sectional studies on the current status of BP control among treated hypertensive in our center. One hundred consecutive patients with essential hypertension who have been attending the out patient hypertension clinic and have been on treatment for at least 6 months were recruited. The pre treatment BP and BP records in the previous 2 visits were noted. Patients were said to have good BP control if their BPs are < 140/90 mmHg (<130/80 mmHg for high risk patients) at the time of the study and in the last visit.

Results: There were 49 males and 51 female (M: F; 1:1), aged 26 to 85 (mean 52.33 +/- 12.29) years. The duration of hypertension ranged 6 months to 30 (mean 7.37 +/- 7.1) years. The duration of treatment in our centre was 6 months to 10 (mean 3.22 +/- 2.23) years. Blood pressure was controlled in 33 (33%) of the patients. Pre-treatment mean blood pressure was significantly higher than the BP value at the time of the study (155.87 +/- 26.02/97.81 +/- 11.89 mmHg versus 143.40 +/- 24.14/86.53 +/- 12.71 mmHg) ($p < 0.05$). Diuretics were the commonest antihypertensive prescribed either alone or in combination (69%), followed by a calcium antagonist (56%) and centrally acting drugs (38%). Twenty seven were on single antihypertensive, 43 (43%) on 2, 25 (25%) on 3 and 5 (5%) on 4 classes of antihypertensive. Blood pressure control was associated with taking more than one antihypertensive medication and compliance.

Conclusion: Control of BP in patients receiving antihypertensive drugs is still far from optimal in the study population in Nigeria just as in other countries. Many patients had multiple cardiovascular risk factors. Adherence to medication should be encouraged.

Key Words: Blood pressure, Control, Adherence, Hypertension

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Introduction

Hypertension is a very important public health problem world wide and approximately 1 billion people are affected worldwide¹. It is the most prevalent cardiovascular (CV) risk factor and a gateway to CV risk management².

As the population ages, the prevalence of hypertension will increase even further unless broad and effective preventive measures are implemented. Extrapolations from the non communicable disease survey (NCD) data and from other studies suggest urban prevalence rates of hypertension in Nigeria of around 20% if the current cut-off point of 140/90 mmHg is used³⁻⁵. The NCD survey also showed that Kano has the highest age adjusted hypertension prevalence rate of 23.8% in men and 17.7% in women in Nigeria³.

Extrapolations from studies in Nigeria and elsewhere indicate that 5% of deaths could be due to hypertension and that the reduction in attributable risk associated with treatment could be 2%, over 10 times higher than in the United States.⁶

The relationship between blood pressure (BP) and risk of CVD events is continuous, consistent, and independent of other risk factors⁷. The higher the BP, the greater is the chance of heart attack, heart failure, stroke, and kidney disease. Hypertensive heart disease was responsible for 47% of all cases referred for echocardiography in our centre⁸. For individuals 40-70 years of age, each increment of 20 mmHg in systolic BP (SBP) or 10 mmHg in diastolic BP (DBP) doubles the risk of CVD across the entire BP range from 115/75 to 185/115 mmHg⁹.

In clinical trials, antihypertensive therapy has been associated with reductions in stroke incidence averaging 35-40 percent; myocardial infarction, 20-25 percent; and heart failure, more than 50 percent¹⁰.

Goal blood pressure (BP) was defined by the Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-VI) and the World Health Organization and International Society of Hypertension (WHO/ISH) as <140 mm Hg systolic and <90 mm Hg diastolic for the general and <130 mm Hg systolic and <85 mm Hg diastolic for special high-risk populations¹¹. Various epidemiological surveys from different countries have documented the unsatisfactory control of arterial hypertension¹². As part of a quality assessment for improvement; we evaluated blood pressure (BP) control in treated hypertensive patients in Aminu Kano Teaching Hospital (AKTH), Kano, a tertiary health institution in north western Nigeria.

Patients and Methods

This is a cross - sectional study carried out at hypertension clinic of AKTH, Kano, Nigeria in October 2005, aimed at determining the current status of BP control among treated hypertensive patients.

One hundred consecutive patients with essential hypertension who have been attending the clinic and have been on treatment for at least 6 months were recruited.

The pre treatment BP, current BP and BP records in the previous 2 visits were noted.

Patients were said to have good BP control if their BPs are < 140/90 mmHg (<130/80 mmHg for high risk patients) at the time of the study and in the last visit.

Those with established cause of hypertension were excluded. Eligible patients were consecutively recruited. Demographic data and clinical history were obtained. The patients' knowledge and practice of lifestyle modification as well as compliance to antihypertensive medication were documented. Other variables obtained included history of cigarette smoking and alcohol consumption as well as the class and number of antihypertensive drug the patient is taking.

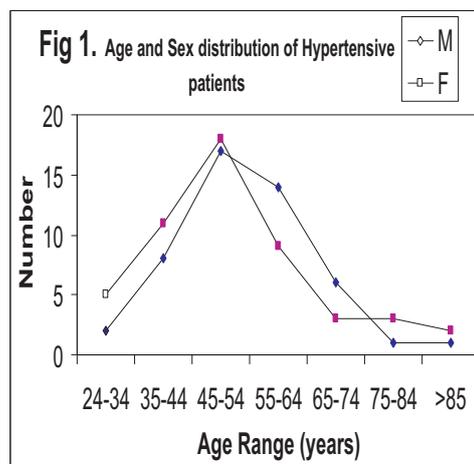
Height and weight were measured to get the body mass index (BMI) recorded as weight in kilograms divided by height in meters squared (kg/m²). Peripheral pulses were palpated. BP measurements were taken on the right arm using a standard Sphygmomanometer (ACCOSON) with appropriate adult cuff size. BP recordings were done twice and the mean was taken.

The systolic BP was recorded at phase I Korotkoff sounds while the diastolic blood pressure was recorded at phase V Korotkoff sounds or at phase IV Korotkoff sounds when difference between phase IV and phase V is more than 10mmHg. Evidence of cardiac decompensation was sought.

Blood samples of all the patients were taken for determination of serum urea, electrolytes and creatinine, fasting blood sugar, lipid profile and uric acid. The urine sample was also taken for chemical analysis. Statistical analysis was done with the Statistical Package for the Social Sciences (SPSS) version 10. Means with standard deviations of continuous variables were generated. The analysis of continuous variables was carried out using the procedures of descriptive statistics and later, to identify any differences we used Student's "t" test. Categorical variables were compared using the Chi-square test. Statistical significance was set at the conventional p<0.05.

Results

A total of 320 hypertensive patients were seen in AKTH hypertension clinic in October 2005. One hundred consecutive patients with essential hypertension who satisfy the inclusion criteria were recruited. There were 49 males and 51 females (ratio 1:1); and their ages ranged from 26 - 85 (mean 52.33 ± 12.29) years. Figure 1 showed the age and sex distribution of the study subject.



That the higher the salt intake, the higher the blood pressure, particularly the diastolic BP, in hypertensive patients²². Reduced salt intake might, therefore, be beneficial in black hypertensive patients, in the setting of common presentation at the stage of cardiac decompensation.

Adherence to drug in take is shown to be an important factor for BP control in this study. Control of BP was achieved in 45% of those who were considered to be regular with their drug intake, similar to 43% in patients with high adherence found in Lake City, USA²³. It was seen in 1% and none of those who were considered to be erratic or those who take their drugs when symptomatic respectively. Patient's perception and

Table I - Clinical/Laboratory Parameters of the Patients

Parameter	Range	Mean	SD
Age(years)	26- 85	52.33	12.29
Duration of BP (years)	0.5 – 30	7.37	7.1
Duration of treatment (years)	0.5 -10	3.22	2.23
BMI (Kg/m ²)	19.0 -42.4	27.74	5.12
Total Cholesterol (mmol/l)	3.8 – 9.0	5.49	1.17
LDLc (mmol/l)	2.96 – 6.09	3.59	1.09
Triglycerides (mmol/l)	0.5 – 3.5	1.28	0.6
HDLc (mmol/l)	0.7 – 2.4	1.30	0.46
Uric acid (umol/L)	210- 729	404.9	146.1
Heart rate	56 - 104	81.5	17.7
Current SBP (mmHg)	110-220	143.41	24.14
Current DBP (mmHg)	68-130	86.53	12.72
Pre treatment SBP (mmHg)	140-230	155.87	16.02
Pre treatment DBP (mmHg)	88-130	97.81	11.89

BP; blood pressure, BMI; body mass index, LDLc; low density lipoprotein cholesterol, HDLc; high density lipoprotein cholesterol, SBP; systolic blood pressure, DBP; diastolic blood pressure

Table II. Blood Pressure control by number of antihypertensive drugs

Compliance category	Regular with Drugs	Miss a few doses	Erratic with drugs	Take drugs when symptomatic	Total
BP Controlled	25	7	1	0	33
BP not controlled	31	8	9	19	67
Total	56	15	10	19	100

BP; blood pressure. $X^2 = 20.97$, degree of freedom (df) = 3, $P < 0.05$

Table III. Blood Pressure control by number of antihypertensive drugs

Number of antihypertensive used	One Drug	Two Drugs	Three or More Drugs	Total
BP Controlled	3	12	18	33
BP not controlled	24	31	12	67
Total	27	43	30	100

BP; blood pressure. $X^2 = 16.2$, degree of freedom (df) = 2, $P < 0.05$

Blood pressure was controlled in 33 (33%) of the patients (20F:13M). The duration of hypertension ranged 6 months to 30years (mean 7.37 +/- 7.1 years). The duration of treatment in our centre was 6 months to 10 years (mean 3.22 +/- 2.23 years). Pre-treatment mean blood pressure was significantly higher than the BP value at the time of the study (155.87 +/- 26.02/97.81 +/- 11.89 mmHg versus 143.40 +/- 24.14/86.53 +/- 12.71 mmHg) ($p < 0.05$). Table 1 showed clinical and laboratory parameters of the study subjects

There were 9 patients (6F, 3M) with type 2 diabetes mellitus (DM), 4 of whom had good BP control. These are

already on treatment for the DM. Thirty seven (37%) of the patients are overweight (BMI 25 -29.9 Kg/m²) while 31(31%) are obese (BMI > 30 Kg/m²). Forty five (45%) had family history of hypertension in first degree relations, 12(12%) had history of cigarette smoking and 7 (7%) had history of alcohol consumption. Knowledge of lifestyle modification was found in 59 (59%) to a varying degree. Forty one (41%) practice dietary modification in terms of reduced salt intake and 13 (13%) perform regular physical exercise

Table II showed blood pressure control by adherence to antihypertensive medication. Compliance was defined arbitrarily into 4 categories as shown in the table. Fifty six percent claimed to take their hypertensive medications regularly, of whom only 25 (45%) are controlled. BP was controlled in none and 1% of those who were considered to be erratic or those who take their drugs when symptomatic respectively.

Diuretics were the commonest antihypertensive prescribed either alone or in combination (69%), followed by a calcium antagonist (56%), centrally acting drugs (38%), ACEI/ARBs (31%), Beta blockers 16% and direct vasodilator (9%).

Twenty seven were on single antihypertensive, 43 (43%) on 2, 25 (25%) on 3 and 5 (5%) on 4 classes of antihypertensive. Table 3 showed blood pressure control by number of antihypertensive medication. The commonest double combination is a diuretic and calcium antagonist, seen in 24/43 (56%) and the commonest triple combination is a diuretic, calcium antagonist and Angiotensin converting enzyme inhibitor (ACEI)/ Angiotensin 2 receptor blocker (ARB) seen in 12/25 (48%).

The laboratory parameters revealed that 36 (36%) had raised low density lipoprotein cholesterol (LDLc) (>3.38mmol/l), 23% had raised total cholesterol (>6.2mmol/l), 15% had low high density lipoprotein cholesterol (HDLc) (<1mmol/l). Hyperuricaemia was present in 42% of the patients.

Discussion

Controlling BP in patients with hypertension can reduce complications such as nephropathy, cerebrovascular disease, and cardiovascular disease. Blood pressure control rates vary between and even within countries. This study revealed that only 33% of the patients achieved BP control as at the time of the study. Elsewhere in Nigeria, different workers reported varying rates. A control rate of 31.4% was found in Osogbo, south western Nigeria¹³, 19% in Ilorin, north central

beliefs on hypertension and benefit of treatment also affects their adherence to medications²⁴. Similarly, the asymptomatic nature of hypertension and the unrecognized benefits of treatment contribute to the low adherence to antihypertensive medication.

It has also been shown that competing problems such as poverty and/or more immediately threatening diseases such as diabetes interfere with adherence to hypertension treatment²⁵. In a study on misconception of hypertension among Nigerians, it was found that 10% were anxious about the heavy financial burden imposed by hypertension management, 65% feel that they will require no more medication once they achieve control of their blood pressure and 21% are of the opinion that they will achieve a permanent cure only from alternative medical practitioners and will consider using alternative medicine in future²⁶.

Diuretics were the commonest antihypertensive prescribed either alone or in combination (69%), followed by a calcium antagonist (56%), centrally acting drugs (38%), ACEI/ARBs (31%), Beta blockers 16% and direct vasodilator (9%). This pattern is similar to that found in other parts of the country with slight variation^{14, 27, 28}. Whereas in Nigeria, like in many developing countries, the major determinant of drug prescribed is the cost, the situation is different in the developed world where prescription is based on compelling indications²⁹.

Monotherapy was found in 27% of the patients while 43%, 25% and 5% were on 2, 3 and 4 antihypertensive drugs respectively. The control rate increased with increase in the number of drugs taken. Of the 27% of the patient who take a single antihypertensive, only 3 (11%) were controlled. On the contrary, 15 out of the 25 patients (60%) on 3 drugs were controlled. Control of blood pressure has been shown to be better with a combination therapy compared to monotherapy^{12,29}.

In general, poor BP control among hypertensives is considered to be due to multiple factors. While white coat effect has been shown to play a role, it has not been looked at in this study. In one study, a significant difference (>40 mmHg) was found between clinic blood pressure and day time ambulatory blood pressure in 78% of the patients³⁰. Another factor is to do with the health care

providers who are often overloaded with patients and have insufficient time for patient education. In our setting, the bulk of the work of patient education and counseling on adherence to medication is left to the doctor who usually is busy. Studies have shown that involvement of pharmacists in patient counseling on drug compliance and life style modifications has reduced the uncontrolled BP from 92% to 36.2% within days after enrollment³¹.

There is also widespread resistance to therapeutic guidelines among clinicians, a phenomenon referred to as clinical inertia by O' Connor and colleagues³². Additionally, Steinman reported that clinicians have a lower level of adherence to treatment guideline than they believe they do³³. Some practitioners tend to underestimate the level of cardiovascular risk of their patients and so do not intensify the therapy of their patients³⁴.

Blood pressure control in hypertensives is an objective yet to be achieved in most countries. Updates for clinicians on treatment guideline as well as sensitizing them on the need to give intense therapy will help in improving the control rate. Patient education by doctors and other health care providers such as pharmacists will improve compliance which will in turn improve control rate.

Conclusion

Control of BP in patients receiving antihypertensive drugs is still far from optimal in the study population in Nigeria just as in other countries. Adherence to drug intake is shown to be an important factor for BP control in this study. Control of blood pressure has been shown to be better with a combination therapy compared to monotherapy.

Limitations

This study is limited by the small sample size of 100 and the fact adherence to medication was obtained from the patient history, which might not be reliable. In addition office BP measurements were used and therefore white coat effect could not be ruled out.

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