ORIGINAL ARTICLE

BLOOD PRESSURE CONTROL: A COMPARISON OF PATIENTS MANAGED IN SECONDARY AND TERTIARY HEALTH CARE INSTITUTIONS IN SOKOTO, NORTHWEST NIGERIA.

Chika Animu*, Isezuo SA, 'Etuk EU, Bello SO

Departments of Pharmacology and Medicine, College of Health Sciences,
Usmanu Dafodiyo University, Sokoto.

ABSTRACT

Purpose: *This study is aimed at comparing blood pressure control (BP) of hypertensive patients managed in a tertiary health center and that of their counterparts in secondary health institutions.*

Methods: *One hundred and fourteen outpatients managed for hypertension in a tertiary hospital and 146 patients visiting 2 secondary health care institutions were selected by simple random sampling during their clinic visits. Information such as demographic data, baseline blood pressure, comorbidities and antihypertensive treatment were obtained from case notes. Anthropometric parameters including heights, weights and blood pressures at last clinic visit were measured. BP<140/mmHg was regarded as controlled.*

Results: *Patients managed in the 2 levels of health care were not significantly different in age, Body mass index and baseline BPs. Higher rate of blood pressure control and adherence were found in tertiary than Secondary hospitals (14.7% versus 21.9%, $P<0.0001$ and 60.5% versus 41.8%, $P<0.005$), But the variation in the rate of blood pressure control was persistent even among adherent Patients ($P<0.01$). Stepping down therapy of patients with adequate BP control was Practiced more in the secondary care hospitals (38.7.7%, $P=0.001$) and such practice was found to be independently associated with poor BP control.*

Conclusion: *Hypertensive patients in hospitals providing generalized care had worse BP control rate and were more likely to experience a step down in therapy after achieving BP control. There is need for continuing education of generalist officers involved in the management of hypertension.*

Key words: *Blood pressure, control, secondary, tertiary.*

Introduction

Hypertension is a common risk factor for cardiovascular disease globally^(1,2,3,4). In spite of availability of effective drugs and data on the benefits of lowering blood pressure (BP), achieving adequate BP control remains elusive for most patients with hypertension including those on regular treatment⁽⁵⁾. Clinical inertia- defined as unwillingness of physicians to intensify treatment when needed⁽⁶⁾ – has been associated with poor control of hypertension^(7,8).

Based on definition from online medical dictionary, a health centre was considered

tertiary if the different units are run and supervised by specialists and secondary if the different units are run by generalists. It has also been documented that physicians providing generalized care (as in secondary health care institutions) are more prone to risk aversion and are less aggressive compared to their counterparts providing specialized care^(9,10). Such clinical inertia in managing hypertension has been associated with lower blood pressure control. Based on this evidence, the authors hypothesized that the rate of blood pressure control may be significantly lower in the secondary compared to the tertiary level of health care. Therefore, this study compares BP control

Correspondence: Dr. Chika Aminu
Department of Pharmacology,
Usmanu Danfodiyo University, Sokoto.

hypertensives managed in secondary (with clinics run by generalists) and tertiary (clinics run and supervised by specialists) health care institutions. Findings from the current study, the first of its kind, may be useful in making evidence-based decision on effective intervention strategy for increasing the rate blood pressure control by targeting the hospitals with lower rates.

Materials and Methods

The current study is a clinic-based descriptive cross-sectional study conducted at 3 hospitals, consisting of a tertiary (Usman Danfodio University Teaching Hospital) and 2 secondary health care institutions (Specialist and Maryam Abacha hospitals). The hypertension clinic in the tertiary hospital is staffed by house officers and residents under the supervision of a cardiologist, while those in the 2 secondary care hospitals are run exclusively by general practitioners.

Based on previous average monthly clinic visits in the studied hospitals (266 patients monthly), an estimated number of 798 hypertensive patients was considered as the target population for the 3 months during which the study was designed to be conducted. Sample size determination was conducted using a statistical software (Decision Analyst STATS™ 2.0). Since the actual rates are not known, 50% was assumed as the estimated blood pressure control and antihypertensive treatment adherence rates for the studied patients, with 95% confidence level and 5% margin of error considered acceptable. The computation produced a minimum sample of 259 patients. A total of 260 outpatients were selected by simple random sampling of the chronologically listed files of patients coming for clinic visit using random number generator (Decision Analyst STATS™ 2.0). Proportional allocation (based on previous records of the number as well as the gender of the patients attending clinics in the 3 hospitals), was used to arrive at the number of patients (114 for the tertiary and 146 for the 2 secondary care hospitals) as well

as the ratio of male : female (1:2 in the tertiary hospital and 1:4 in the secondary hospitals) to be assigned to the respective hospitals. The higher proportion of females in the secondary hospitals is reflective of the pattern of clinic attendance in the 2 selected hospitals and it is also due to the fact that one of the hospitals (Maryam Abacha hospital) provides care only to women and children.

All the patients selected have been diagnosed as hypertensives, and were on treatment on out-patient basis for at least 3 months. They also had a minimum of 2 previous visits excluding the outcome visit (the last clinic visit), with the first clinic being not more than 6 month away from the outcome visit. The study was conducted between March and June, 2007 following ethical clearance from Usmanu Danfodiyo University ethical committee.

Data on variables including age, sex, baseline blood pressure, co-morbidities such as diabetes mellitus, and renal disease were obtained from the case notes and documented.

After about 10 minutes of rest, measurement of patient' blood pressure (BP) was done at the outcome clinical visit during the study period using the same mercury sphygmomanometer (containing a cuff with a size appropriate to majority of arms) and standard procedures⁽¹¹⁾.

Blood pressure readings corresponding to the first and fifth Korotkov sounds were recorded as systolic and diastolic blood pressures, respectively. The BP measurement was conducted for each patient after the patient was seated for at least 10 minutes. Three reading were taken with at least 1minute of rest in between. The averages of the last two measurements were recorded. Blood pressure control was defined as blood pressure less than 40mmHg systolic and 90mmHg diastolic except in patients with

diabetes mellitus or renal disease when a BP level less than 130mmHg systolic and 80mmHg diastolic was used⁽¹²⁾.

Adherence was assessed by interviewing patients using 30day self reports based on previous studies^(13,14,15). The interview was either in English or Hausa language as applicable. Adherence was defined as taking at least 90% of the prescribed drugs in the past 30 day⁽¹³⁾.

Results

Table 1: Characteristics of patients visiting outpatient clinic in secondary and tertiary health institutions in Sokoto

Characteristics	Secondary Health Institutions (n=146)	Tertiary Health Institution (n=114)	P-value
Age (years)	49.9 + 11.7	51.6 + 10.8	0.2304*
Female (%)	79.5	65.8	0.0133**
Co-existing diabetes			
Mellitus (%)	14.4	14.0	0.9364**
BMI (kg ^{m2})	27.3+5.5	28.3+5.6	0.1502*
Baseline BP (mmHg)			
Systolic	162.7+27.6	160.3+27.3	0.4851*
Diastolic	99.3+15.3	100.9+15.3	0.4035*
JNC VII Grade II			
Hypertension(%)	77.4	73.7	0.4807**
Latest BP (mmHg)			
Systolic	147.1+21.4	139.6+27.1	0.0133*
Diastolic	88.9+14.4	87.5+17.2	0.4759*

Key: BMI = Body mass index; BP= Blood pressure; JNC = Joint National Committee on prevention, Detection, Evaluation and treatment of high blood pressure.

*Using student test; ** using^{x2} test. All values are mean + SD except where otherwise indicated.

Intensification of therapy- defined as increasing the dosage of a particular or adding another drugs to patients with poor BP control (BP>140/90mmHg) was used as a measure of clinical inertia. Step down therapy was defined as reducing the dosage or stopping one or more drugs from a particular drug regimen for patients who has achieved an adequate BP control (BP<140/90mmHg).

Chi-square test and Fisher's exact test, where appropriate, were used to compare proportions and test to compare means, using Stats and Instat statistical software. P values less than 0.05 were considered significant.

Baseline characteristics

The studied population were predominantly females (male: female ratio = 1.3) with their ages ranging between 25-92 years (mean = 50.71 + 11.33). There was no significant difference in age ($t=1.20$; $P=0.2304$; $df=1$; 95% CI= -16.42 to 13.02), baseline systolic ($t=0.70$; $P=0.4851$; $df=1$; 95% CI= -11.14 to 15.95) and diastolic ($t=0.84$; $P=0.4035$; 95% CI= -5.4 to 8.6) BPs between the tertiary and secondary health centers under study.

Blood pressure control

Blood pressure was controlled in 31.9% of the studied population. However, BP control was achieved in only 21.9% of patients attending the 2 secondary health care institutions as compared with the control rate of 44.7% achieved at the tertiary health center ($\chi^2=15.34$; $df=1$; $P=0.00008$; Odds ratio= 2.884).

A significant difference between patients visiting the tertiary health center and those visiting the 2 secondary care hospital was found in systolic ($t=2.49$; $P=0.0133$) but not diastolic BP ($t=0.71$; $P=0.4759$) at outcome visit.

Figure 2 shows that the rate of adherence to antihypertensives among patients visiting tertiary hospital was significantly higher than that of their counterparts managed in secondary hospitals. ($\chi^2=8.80$; $P=0.0034$).

Figure 1: Level of adherence to drugs in the 2 levels of health care using 30 days self reports.

However, even among adherent patients, BP control rate was higher in those visiting tertiary compared to those visiting secondary care hospitals (59.4% for tertiary versus 34.5% for secondary hospitals; Chi-square=7.85; $P<0.01$).

No significant difference was found between the two levels of health care in the rate of intensification of therapy at index visit for the patients with uncontrolled BP ($\chi^2=5.47$; $P=0.02$). The proportion of patients with adequately controlled BP who experienced a step down in antihypertensive therapy at index visit (defined as the clinic appointment preceding the outcome visit) was found to be significantly lower in tertiary than secondary hospitals ($P=0.001$; figure 2).

Figure 2: Practice of step down therapy among patients visiting tertiary and secondary health centers.

Also, a significantly higher proportion of those patients whose therapy were stepped-down during index visit had uncontrolled blood pressure subsequently when assessed during outcome visit compared to those whose therapy not stepped-down at index

visit (81.3% versus 40.3%, $P < 0.005$ using

Fisher's Exact Test; Odds ratio=6.42).

Chika Animu, Isezuo SA, Etuk EU, Bello SO*

Discussion

Although some studies conducted in Nigeria have documented blood pressure control rates for individual hospitals⁽²¹⁾, to the best of our knowledge, this is the first to compare BP control rates in tertiary and secondary health care institutions in Nigeria. Blood pressure control rate was higher in the tertiary hospital providing specialized patient care than in the other two hospitals that provide a generalized patient care. This discrepancy is disturbing considering the fact that most patients with hypertension are managed in the generalized care providing hospitals. One factor which may have contributed to this picture is the difference in the level of adherence between the 2 levels of health care. However, the differed BP control in the 2 levels of health care even among adherent patients, is an indication that non-adherence to therapy could not have been solely responsible for our observation. Step down therapy could be an additional factor.

Physicians in the tertiary hospital were found to be less eager to step down or completely stop antihypertensive therapy for their patients whose BP is judged to be at goal. These contrast the physicians in the 2 secondary health institutions who seem to lose momentum and step down the dosage of the prescribed drugs minimization of perceived risk (i.e. adverse effects of the drugs). These findings agree with previous reports indicating that generalists are more prone to risk aversion behavior and are less willing to adopt new ideas compared with specialists^(9,10). Generalists have also been found to over-estimate potential risks of a specific therapy compared to the specialists^(16,17).

The difference in blood pressure control between the 2 levels of health care is reflected mainly in systolic BP rather than diastolic BP control. This still important, since evidence has shown that controlling isolated elevation of systolic BP is associated

with a reduction in the risk of cardiovascular mortality and morbidity^(18,19,20).

However, one limitation of this visit-based method of selecting patients which is likely to oversample clinic adherent patients with consequential overestimation of BP control rate as clinic visit has been found to be positively correlated with BP control⁽²¹⁾.

In conclusion, our data suggest that hypertensive in centers providing generalized care have lower rate of BP control than their counterparts in a center providing a specialized care. Differences in the practice of step down therapy appear to be a major contributory factor for this variation. Continuing medical education on the subject of hypertension is recommended for the generalists.

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