

Antihypertensive use, prescription patterns, and cost of medications in a Teaching Hospital in Lagos, Nigeria

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Abstract

Introduction: Hypertension has been reported as the strongest modifiable risk factor for cardiovascular morbidity and mortality.

Aims: The aim of the study was to identify the most prescribed antihypertensive drugs, its patterns, comorbidities, cost of medications, and laboratory investigations.

Settings and Design: This study was a cross-sectional, descriptive study of hypertensive patients conducted at the Lagos State University Teaching Hospital, Ikeja.

Subjects and Methods: A total of 200 case notes were retrieved from the medical records unit over a period of 8 weeks. Information on antihypertensive prescriptions and comorbidities was retrieved. The average cost of medications and laboratory investigations was calculated.

Statistical Analysis Tool Used: SPSS software version 16.

Results: The mean age of the patients was 58.44 ± 12.65 years. Of the 200 patients, 5 (2.5%) were on monotherapy and 195 (97.5%) were on combination therapy. One hundred and twenty (60%) patients had comorbidities which included congestive heart failure 55 (27.5%), diabetes mellitus 22 (11%), hyperlipidemia 15 (7.5%), and cardiovascular disease 13 (6.5%). The various classes of antihypertensive drugs prescribed were diuretics 128 (64.0%), beta-blockers 126 (63.0%), calcium channel blockers 106 (53.0%), angiotensin-converting enzymes inhibitors 103 (51.5%), angiotensin receptor blockers 33 (16.5%), alpha blockers 9 (4.5%), and fixed drug combinations 2 (1.0%). The average cost per month of the antihypertensive medications was ₦ 2045 (US\$10.2).

Conclusions: Antihypertensive prescription pattern was in accordance with the seventh report of Joint National Committee on Prevention, Detection, Evaluation, and Treatment of high blood pressure. Community-based insurance scheme should be encouraged and effective implementation of integrated noncommunicable diseases screening into the primary health care services would be helpful.

Key words: Antihypertensive drugs, comorbidities, costs, prescription patterns

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Introduction

Hypertension has been reported to be the strongest modifiable risk factor for cardiovascular morbidity, mortality,

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and health burden.^[1,2] Worldwide, the prevalence of hypertension has been estimated to be as much as 1 billion individuals and approximately 7.1 million deaths per year may be attributable to hypertension.^[3] It is estimated that the worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025.^[4] Epidemiological studies also demonstrate that the prevalence of hypertension is increasing rapidly among Indian urban and rural populations.^[5]

Africa has the highest prevalence of hypertension in the world as 46% of adults aged 25 years and above have a raised blood pressure,^[6] and a study in Eastern Nigeria found a prevalence of 40.3% among the males.^[7] The primary goal of antihypertensive therapy is to prevent morbidity and mortality associated with hypertension. Many studies have demonstrated that lifestyle modifications and adherence to appropriate drug treatments are sufficient to maintain blood pressure at optimal levels.^[8,9] However, available evidence has also shown that about 75% of hypertensive patients do not have optimal blood pressure control.^[10,11]

Various classes of antihypertensive drugs are used in the management of hypertension, and they include diuretics (D), beta-blockers (BB), calcium channel blockers (CCB), angiotensin-converting enzyme inhibitors (ACEIs), and angiotensin II receptor blockers (ARB).^[10] In 2003, the Joint National Committee (JNC) published a series of guidelines which recommend the appropriate antihypertensive therapy based on the best available evidence. The guidelines recommend thiazide diuretics to be prescribed alone or as a part of combination therapy for most hypertensive patients without compelling indications.^[3] However, recent published data showed an increasing use of the more expensive CCBs and ACEIs despite the inadequate evidence to support their superiority to diuretics and BB in reducing morbidity and mortality of cardiovascular diseases.^[12]

The treatment of hypertension requires spending money and time over many years to prevent complications of the disease among those affected. In developing countries, there is an enormous financial and health burden associated with the disease; thus, the economic burden of the long-term therapy limits the ideals of attaining the optimal blood pressure control.^[13,14] Studies have reported the direct costs in the treatment of hypertension (cost of medication, consultation, laboratory investigations) and indirect costs (increased absenteeism from work, decreased productivity, and disease-related disabilities).^[15,16]

Management of hypertension is for life and antihypertensive medications are relatively expensive. In a study conducted in a rural community in Ibadan, it found that the economic burden of hypertension treatment was significant and that half of the patients were spending a tenth or more of their income on health care-related

expenses.^[17] Similarly, in a study conducted in a tertiary hospital in Lagos, the mean monthly cost of antihypertensive prescriptions was ₦ 6611.47 (US\$44). The lowest cost per month was ₦ 300.00 (US\$2) while the highest cost per month was ₦ 27,030.00 (US\$180) depending on the range of prescribed drugs (US\$1 = ₦ 150).^[18] In Nigeria and some developing countries, the cost of treatment of hypertension is borne almost entirely by the individual as the method of health-care financing is still mostly from out-of-pocket payment.^[19,20] The cost of medications has always been a barrier in effective treatment. With the prevailing economic conditions and the value of the dollar appreciating against the Naira (US\$1 = ₦ 200), it presupposes that the amount expended on antihypertensive treatment by the patients will increase which may invariably affect compliance. It is pertinent to note that the average minimum wage in Nigeria is ₦ 18,000.00 (US\$90). The continually rising expense of hypertension treatment influences the prescribing patterns among physicians and compliance to the drugs by the patients.^[21] The laboratory investigations such as electrolytes, urea, creatinine, and blood lipid profile are usually conducted to rule out the comorbidities, but the costs are not included in most studies.

This study was therefore carried out to identify the most prescribed antihypertensive drugs, its prescription patterns, associated comorbidities, cost of medications, and laboratory investigations among patients attending the hypertension outpatient clinic at the Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos, Nigeria.

Subjects and Methods

This study was a cross-sectional, descriptive study of hypertensive patients conducted at LASUTH, a government-owned (tertiary) healthcare facility providing referral services for more than 15 million residents in Lagos State. Ikeja, the capital of Lagos State, is located in the rain forest belt of Southwest Nigeria. The study was carried out by reviewing case notes of hypertensive patients seen at the clinic. Approval was obtained from the Health Research Ethics Committee of LASUTH. Case notes for the hypertension outpatients clinics were provided by the Medical Records Department of the hospital.

Inclusion criteria

- Case notes of hypertensive outpatients treated between January 2011 and December 2014
- Hypertensive outpatients, male and female, between 20 and 90 years of age.

Exclusion criteria

- Patients whose case notes recorded <3 visits to the clinic
- Patients whose case notes did not record laboratory investigations.

A total of 200 case notes (total number of case notes that met both criteria) were retrieved by simple random sampling technique from the medical records unit over a period of 8 weeks between March and April 2015. The record of the drugs prescribed and laboratory costs was derived from the first and last visits before the survey was conducted.

In each patient's folder, demographic and clinical information including age, gender, occupation, and pattern of prescribed drugs for hypertension were retrieved. For each prescription, drug name, number of drugs, dosage form, class and combinations of anti-hypertensive, frequency of administration, duration of treatment, and cost of drugs were retrieved. Other information retrieved included the stages of hypertension at diagnosis according to the seventh report of the JNC.^[3] The cost of antihypertensive drugs was obtained from the price list in the hospital pharmacy. The monthly cost of drugs based on recommended daily dose was calculated. The cost of laboratory investigations conducted was also obtained from the hospital laboratory and computed together with the drug costs. Official exchange rate at the period of study was \$1 to ₦200.

Data were analyzed using the Statistical Package for Social Sciences (SPSS for windows. Version 16.0. SPSS Inc. 2007. Chicago, USA) software. Continuous data were presented as mean ± standard deviation (SD) while categorical data were presented as percentages.

Table 1: Sociodemographic characteristics of the patients

Variable	Frequency (n=200)	Percentage
Age range (years)		
20-39	19	9.5
40-59	75	37.5
60-79	98	49.0
80-99	8	4.0
Sex		
Male	70	35.0
Female	130	65.0
Marital status		
Single	1	0.5
Married	62	31.0
Separated	2	1.0
Divorced	1	0.5
Widowed	1	0.5
No records	133	66.5
Occupational level		
Professionals (doctors, lawyers)	0	0.0
Nurses, teachers, bankers	3	1.5
Skilled (printers, carpentry)	1	0.5
Semi-skilled (drivers, petty drivers)	3	1.5
Unskilled (vendors, cleaners)	30	15.0
Unemployed/students	26	13.0
No records	137	68.5
Total	200	100.0

Results

A total of 200 case notes were included in the analysis. The mean age of the patients was 58.44 ± 12.67 years. The male:female ratio was 1:1.9. About 30 (38.0%) patients were mainly traders [Table 1]. The findings from the study showed that at the first visit of the patients, the mean systolic blood pressure was 158.82 ± 21.18 SD and mean diastolic blood pressure was 94.00 ± 14.39 before the commencement of antihypertensive drugs while the mean SBP and mean DBP were 130.62 ± 17.30 and 80.00 ± 12.32, respectively, during the last visit before the study.

Of the 200 case notes, 120 (60%) patients had comorbidities which include congestive heart failure 55 (27.5%), diabetes mellitus 22 (11.0%), hyperlipidemia 15 (7.5%), hypertensive heart disease 14 (7.0%), obesity 13 (6.5%), cardiovascular disease 13 (6.5%), and others 19 (9.3%) comprising stroke, left ventricular hypertrophy, bradycardia, cardiomegaly [Table 2].

The antihypertensive drugs prescribed belonged to the following classes: Diuretics, BB, CCBs, ACEIs, ARBs, alpha receptor blockers, and fixed drug combinations.

Table 2: Clinical profile of the patients

Variable	Frequency (n=200)	Percentage
Blood pressure stage		
Prehypertension	24	12.0
Stage 1	99	49.5
Stage 11	77	38.5
SBP		
100-139	194	98.5
140-179	0	00.0
180-219	6	1.5
>220	0	0.0
DBP		
60-89	183	91.9
90-99	0	0.0
100-109	11	5.6
109-140	5	2.5
Comorbidity		
Yes	120	60.0
No	80	40.0
Comorbidities		
Diabetes	22	11.0
Cardiovascular disease	13	6.5
Obesity	13	6.5
Hyperlipidemia	15	7.5
Congestive heart failure	55	27.5
Renal disease	3	1.5
Stroke	7	3.5
Hypertensive heart disease	14	7.0
Others	19	9.3

Others include sickle cell disease, hepatic failure. SBP=Systolic blood pressure; DBP=Diastolic blood pressure

Table 3: Pattern of antihypertensive drugs prescriptions

Variable	Frequency (n=200)	Percentage (%)
Number of prescriptions		
Monotherapy	5	2.5
Two drugs combination	57	28.5
Three drugs combination	73	36.5
Four drugs combination	65	32.0
Drug classes		
Diuretics	128	64.0
CCB	106	53.0
Beta-blockers	126	63.0
ARB	33	16.5
ACEI	103	51.5
Alpha blockers	9	4.5

CCB=Calcium channel blockers; ARB=Alpha receptor blockers; ACEI=Angiotensin-converting enzyme inhibitor

Table 4: Cost pattern

Variable	(Frequency N)
Mean monthly cost per prescription (₦)	
Lowest cost per month	360
Highest cost per month	6780
Mean cost per month	2045
Median cost per month	1950
Range of cost of antihypertensive drugs (₦), frequency (%)	
360-3000 (low)	164 (82.0)
3001-6000 (medium)	33 (16.5)
>6000 (high)	3 (1.5)
Cost of laboratory tests (₦)	
Lowest cost	400
Highest cost	23,400
Mean cost	8,434
Median cost	6000

Almost all the prescriptions 195 (99.5%) had more than one antihypertensive drugs [Table 2]. The frequency of prescription of the various classes of antihypertensive drugs was diuretics 128 (64.0%), BB 126 (63.0%), CCBs 106 (53.0%), ACEIs 103 (51.5%), ARBs 33 (16.5%), alpha blockers 9 (4.5%), and fixed drug combinations 2 (1.0%) [Table 3].

The mean monthly cost of the prescriptions was ₦ 2045.00 (\$10.2). The lowest cost per month was ₦ 360 (\$2) while the highest cost per month was ₦ 6780.00 (\$34) [Table 4]. The mean cost of laboratory tests was ₦ 8434.38 (\$42), with a minimum cost of ₦ 400 (\$2).

Discussion

Hypertension is a frequently encountered chronic medical condition and is one of the most significant risk factors for cardiovascular morbidity and mortality. The mean age of the patients in this study was 58.44 ± 12.67 years. This is consistent with other studies that hypertension is mostly a

disease of middle-aged and elderly people.^[22,23] The higher proportion of females in this study is in agreement with other studies.^[24,25] This may be due to the rather poor health-seeking behavior of males expressed by their not accessing health care early and not keeping clinic follow-up appointments. Diuretics were the most commonly prescribed antihypertensive either alone or in combination in this study. Diuretics accounted for 64% of the drugs prescribed which is higher compared to other studies.^[26-30] This high use of diuretics in this study agrees with the recommendations of the JNC.^[3] This also reflects the effectiveness of diuretics in this environment and the quality of training of the physicians for adhering to the guidelines. The use of drug combination therapy was in about 95.0% representing 195 prescriptions. This is also in consonance with the recommendations of the JNC on Prevention, Detection, Evaluation, and Treatment of high blood pressure guidelines which state that low dose of different classes of antihypertensive drugs is more beneficial than a high dose of one. Several studies have shown that the stage of hypertension, presence of comorbidities, and end organ damage demand the use of multidrug antihypertensive therapy, which are usually used at lower doses to avoid the adverse effects that may occur with higher doses of a single drug.^[18] The comorbidities found in this study included congestive heart failure, diabetes, hypertensive heart disease, and obesity. The rising prevalence of hypertension and the continually increasing expense of its treatment influence the prescribing patterns among physicians and patients compliance.^[21] The cost of prescriptions has always been a barrier in effective antihypertensive treatment. In this study, the mean monthly cost of antihypertensive prescriptions was ₦ 2045 (equivalent of US\$10) representing about 11.4% of the minimum wage. However, this cost is lower than that of a similar study conducted in another tertiary hospital in Lagos.^[24] The difference observed in the mean monthly costs could be attributable to the relatively lower cost of drugs at the state-owned teaching hospital compared to the Federal Health Facility. Considering the country's minimum wage of ₦ 18,000 (US\$90) per month, this monthly cost is still rather high because there are other direct and indirect costs involved in the management of hypertension. The mean cost of laboratory results was ₦ 8434.38, with a minimum cost of ₦ 400. However, the available journals cited did not include the cost of laboratory investigations as part of the cost of hypertension management. Lifestyle modifications were largely unavailable in the case notes and hence not included in the study.

Conclusions

The pattern of antihypertensive medications prescribed at LASUTH hypertension clinic is in close agreement to the seventh report of JNC on Prevention, Detection, Evaluation, and Treatment of high blood pressure. There is however a high proportion of comorbidities. Lifestyle modifications

as discussed with the patients should be indicated on the case notes as part of the management of hypertension to limit the development of comorbidities. Cost of laboratory investigations should be included as part of the cost of hypertension management. Screening of noncommunicable diseases including hypertension should be integrated into the primary health care services at the local government area level. The populace should also be encouraged to key into the community-based health insurance scheme to mitigate the burden of out-of-pocket payment.

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Conflicts of interest

There are no conflicts of interest.

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