Pattern of Prescription of Anti-Hypertensive Medications in a Tertiary Health Care Facility in Abuja, Nigeria

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Introduction: Marked changes have been made in the pharmacotherapy of hypertension over the years. In sub-Saharan Africa, hypertension pharmacotherapy is often thought to include only thiazide diuretics, beta blockers and centrally acting medications and, it is unclear if and how often calcium channel blockers, angiotensin converting enzyme inhibitors and angiotensin receptor blockers are used.

Objective: To examine the anti-hypertensive prescription pattern in a tertiary health centre in Nigeria to determine how it conforms to current guidelines.

Method: 590 newly diagnosed hypertensive patients presenting at the Cardiology Unit of University of Abuja Teaching Hospital over a three-year period were studied.

Result: Calcium channel blockers were the most frequently prescribed anti-hypertensive medications (66.9% of all cases) and centrally acting medications were prescribed in only 5.01% of cases. Single-pill combination either alone or in combination with other anti-hypertensive medications were prescribed in 17.3% cases. Of these, calcium channel blocker-based combinations constituted the most frequently used multiple drug combinations. 94.6% of the patients required more than one medication for blood pressure control.

Conclusion: Anti-hypertensive pharmacotherapy in Abuja, Nigeria, compares favorably with the current recommendations in the prescription pattern of anti-hypertensive medications. (*Ethn Dis*. 2013;23[4]:480–483)

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We examined the anti-hypertensive prescription pattern in a tertiary centre in Abuja, Nigeria, to determine how anti-hypertensive pharmacotherapy in this region conforms to current guidelines.

Introduction

Marked changes have been made in the pharmacotherapy of hypertension over the years. The Joint National Committee VII guidelines[1] favored the use of thiazide-type diuretics as initial therapy for most hypertensives either alone or in combination, while more recent guidelines such as the 2007 European Hypertension guidelines[2] favor a trend toward increased use of calcium channel blockers, angiotensin converting enzymes and angiotensin receptor blockers. In sub-Saharan Africa, hypertension pharmacotherapy is often thought to include only thiazide diuretics, beta blockers and centrally acting medications and, it is unclear if and how often calcium channel blockers (CCB), angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARB) are used. We, therefore, decided to examine the anti-hypertensive prescription pattern in a tertiary centre in Abuja, Nigeria, to determine how anti-hypertensive pharmacotherapy in this region conforms to current guidelines.

Methods

Patients

Five-hundred and ninety (590) hypertensive participants aged ≥18 years and newly presenting at the Cardiology Unit of University of Abuja Teaching Hospital during a three-year period (2006–2009) were studied. Patients were referred from both primary and secondary health centers from neighboring towns and states. Reasons for referral ranged from poor blood pressure control to suspected target organ damage, especially left atrial enlargement and left ventricular hypertrophy, as shown by electrocardiography.

Measurements

Baseline clinical and demographic characteristics were obtained from the participants using a structured questionnaire. Information obtained were age, sex and type of anti-hypertensive medications. Patients' height was measured with patients wearing no shoes or headgear. Body mass index was calculated using the formula weight/height^2. Blood pressure measurements were obtained according to standard guidelines with a mercury sphygmomanometer (Accouson, London). Systolic and diastolic blood pressures were measured at Korotkoff sounds I and IV, respectively. Blood pressure was measured from the right arm three times after a 5-minute rest with patient in sitting position, and the average of the three measurements was obtained.

All patients gave written informed consent before they were enrolled into the study. Ethical clearance was obtained

Table 1. Demographic characteristics of patients

Variable	Values
Age (years)	49.74±12.21
Body mass index (kg/m^2)	28.81±6.73
Systolic blood pressure (mm Hg)	148.38±25.06
Diastolic blood pressure (mm Hg)	93.50±16.69
Pulse pressure (mmHg)	54.77±18.45
Mean arterial pressure (mm Hg)	111.59±18.50

from the University of Abuja Teaching Hospital Ethical committee.

Statistical Analysis

Statistical analysis was performed using SPSS version 15 and numerical values were presented as mean ± standard deviation. Categorical data were presented as percentages.

RESULTS

Demographic Characteristics

Table 1 shows the demographic characteristics of the patients in our study. Almost half were male (49.7%) and the mean age of all patients was 49.74±12.21 years. Mean systolic and diastolic blood pressure, along with pulse pressure and mean arterial blood pressure are also shown in Table 1.

Pattern of Anti-Hypertensive Prescriptions

Figure 1 shows that CCBs were the most frequently prescribed anti-hypertensives (66.9% of the study population) followed by low-dose thiazides (54%), ACE inhibitors (47.8%) and beta blockers (34.2%). Angiotensin receptor blockers were prescribed in 10.7% of cases while centrally acting medications and vasodilators were prescribed in only 5.01% of cases. These medications were often concurrently prescribed.

Pattern of Combination Therapy

Table 2 and Figure 2 show the pattern of combination anti-hypertensive therapy. Single-pill combination either alone or in combination with other anti-hypertensive medications were prescribed in 17.3% of cases, with lisinopril and low-dose thiazide combination in 12.5% and ARBs and low-dose thiazide combination in 5.01% of cases. CCB-based combinations constituted the most frequently used multiple drug combinations with thiazides in 39.4% of cases, with ACE inhibitors in 18.2%, with beta blockers in 9.48% and with ARBs in 5.72% of cases. 94.6% of the participants required more than one medication. These percentages reflect drug category combinations shown in Table 2.

DISCUSSION

We found that CCBs were the most commonly prescribed (66.9%) group of anti-hypertensives among our patient study group. CCB-based combinations also constituted the most frequently used multiple drug combinations among this study population. Of the 18 different anti-hypertensive combinations used in patients presenting with BP >160/100 mmHg, 17 (94.4%) were prescribed a CCB. This is not surprising as CCBs have been found to be efficacious in native African hypertensives both as monotherapy or combination therapy.[3,4] Previous studies in the United States found CCBs to be the single most efficacious anti-hypertensive drug class in African Americans[5–7] and CCBs have been previously shown to be safe and effective monotherapy for moderate-to-severe hypertension in a controlled clinical trial in Nigeria.[4]

Thiazide-type diuretics were prescribed in 54%, of cases making them

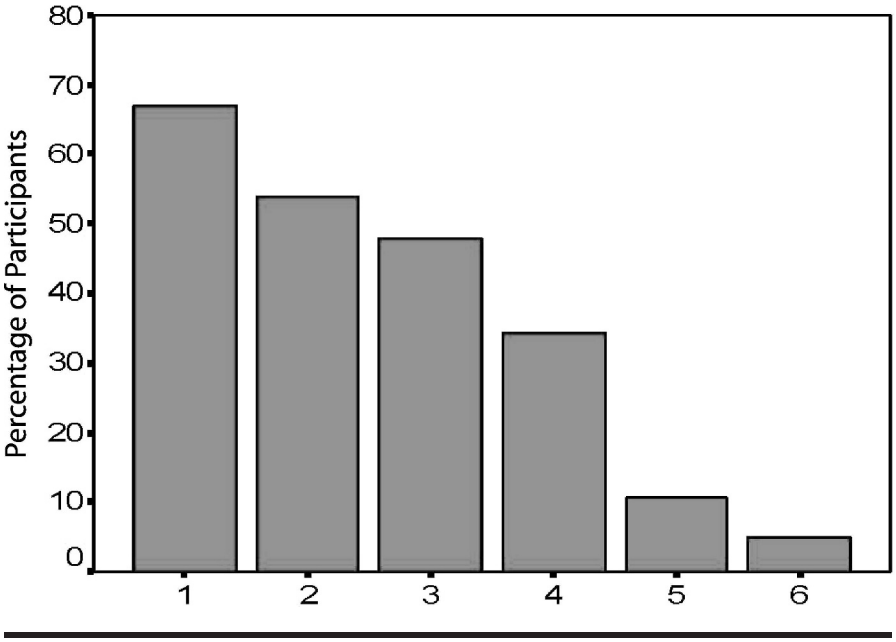

Fig 1. Pattern of anti-hypertensive prescriptions

1=CCBs; 2=THZ; 3=ACEIS; 4=BB; 5=ARBS; 6=CAM
CCB=Calcium Channel Blockers, THZ=Thiazide diuretics, ACEIs=Angiotensin Converting Enzyme Inhibitors. BB=Beta Blockers, ARBs=Angiotensin Receptor Blockers, CAM=Centrally Acting Medications

Table 2. Distribution of number of anti-hypertensive medications used by patients

Anti-Hypertensive Combinations	Medications, *n*	Patients Using, *n* (%)
NIF+HCT	2	9(7.1%)
NIF+LIS	2	7(5.5%)
AML+HCT	2	8(6.3%)
AML+LIS	2	6(4.7%)
AML+ATEN	2	5(3.9%)
ATEN+MOD	2	6(4.7%)
NIF+HCT+LIS	3	20(15.7%)
NIF+ATEN+HCT	3	21(16.5%)
NIF+ATEN+LIS	3	7(5.5%)
AML+HCT+LIS	3	8(6.3%)
AML+ATEN+HCT	3	8(6.3%)
NIF+ATEN+HCT+LIS	4	10(7.9%)
NIF+ALD+ATEN+HCT	4	3(2.4%)
NIF+ATEN+COD	4	4(3.1%)
NIF+ALD+HYDR+HCT	4	3(2.4%)
NIF+ALD+ATEN+HCT+LIS	5	2(1.6%)

ALD=Aldomet, AML=Amlodipine, ATEN=Atenolol, HCT=Hydochlorothiazide, LIS=Lisinopril, NIF=Nifedipine.

the second most commonly prescribed anti-hypertensive for our patients. This agrees with the JNC VII guidelines,[1] which favored the use of thiazide-type diuretics as initial therapy either as single-pill or combination pill. Also, thiazide-type diuretics have been found to be very efficacious in Blacks; this has been attributed to the pathogenesis of hypertension, which is mainly salt- and water-dependent among Blacks.[8] In Nigeria, thiazide diuretics were found to be the second most efficacious anti-hypertensives as monotherapy after CCBs,[4] similar to findings among Black South Africans.[3] In our study, ACE inhibitors were prescribed in 47.8% of cases while ARBs were prescribed in 10.7% of cases. This is a remarkable improvement; previous studies in this region have shown that ACE inhibitors were prescribed in just 15.7% of cases[9] and combination ACE inhibitors and ARBs were prescribed totally in 16.8% of cases.[10] This improvement is likely due to the fact that many physicians in our setting are getting more conversant with current trends in hypertension management and may also be due to the fact that these medications are getting more accessible and affordable for our patients. As ACE inhibitors have been found to be very useful in preventing cardiovascular events and target organ damage in patients with hypertension,[11,12] this increased use is a good trend in hypertension management in our setting. Although ACE inhibitor as monotherapy in the treatment of hypertension in Nigerians and other Black patients is of poor efficacy,[13] combination of ACE inhibitors and thiazide diuretic has been shown to control blood pressure and reverse proteinuria in both hypertensive-diabetic patients and chronic kidney disease.[14] Also, ACE inhibitors have also been found to reduce mortality in Nigerians with hypertensive heart failure.[15]

17.3% of the patients studied were on single-pill combination therapy in keeping with current hypertension management guidelines, which favour single-pill combination therapy as it improves compli-

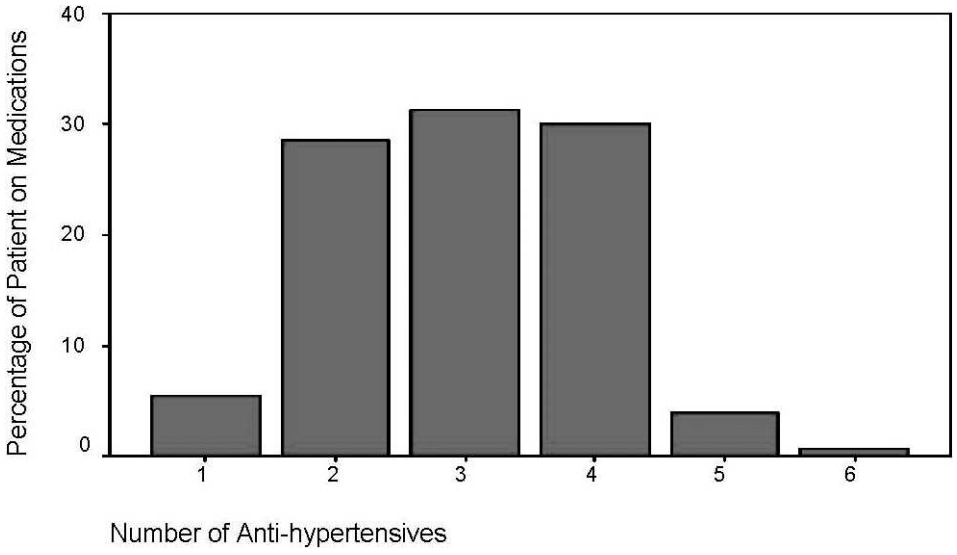

Fig 2. Percentage of patients receiving combination anti-hypertensive medications

We found that CCBs were the most commonly prescribed (66.9%) group of anti-hypertensives among our patient study group.

ance, reduces cost and tends to reduce the side effect profile of the individual medications.[16] More than 94% of our patients needed combination therapy for blood pressure to be controlled, similar to previous findings in Nigerian hypertensive patients.[10,17] The high number of patients needing combination therapy is likely due to the high prevalence of patients with severe-to-moderate hypertension in our own setting. It has been previously reported that Black patients tend to run higher blood pressures compared to age-matched Caucasians.[18]

The use of beta- blockers in more than 34% of cases is mainly due to the combination of beta-blockers like atenolol with CCBs to ameliorate reflex tachycardia which is sometimes associated with CCBs. Only 5.01% of the entire study population were on centrally acting medications and vasodilators unlike the original belief that anti-hypertensive therapy in almost every part of sub-Saharan Africa still centers around centrally acting medications. Centrally acting medications and vasodilators were added on to more conventional medications because of poor or sub-optimal blood pressure control.

CONCLUSION

Anti-hypertensive pharmacotherapy at the University of Abuja Teaching Hospital, Nigeria, compares favorably with the current trends in the prescription pattern of anti-hypertensives worldwide.

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AUTHOR CONTRIBUTIONS

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Manuscript draft: Ojji, Albertino
Statistical expertise: Ojji, Alfa
Administrative: Ojji, Mamven, Alfa, Albertino
Supervision: Ojji, Ajayi, Alfa