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Pattern of Medication Use among Hypertensives Attending a Specialist Outpatients Clinic in North-Central Nigeria

Umar G. Adamu[1*], Aisha Abdulahi[2], Fatima K. Ibrahim[1] and Indogesit O. Ibok[1]

[1]Department of Medicine, Federal Medical Centre, Bida, Niger State, Nigeria.
[2]Department of Nursing Services, General Hospital, Minna, Niger State, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Authors UGA and AA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AA, FKI and IOI managed the analyses of the study. Authors IOI and FKI managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Hypertension is the commonest cardiovascular risk factor encountered in Cardiology Clinics in Nigeria. The aim of this study was to assess the prescribing pattern of antihypertensive medications and conformity to guidelines by physicians at the Cardiology Clinic of Federal Medical Centre, Bida North-Central Nigeria.
Study Design: Cross-sectional, hospital-based study.
Place and Duration of Study: Cardiology clinic of Federal Medical Centre, Bida, North-Central Nigeria, between October and December 2016.
Methodology: We recruited 271 hypertensives (202 women, 69 men; age range 20-90 years) to assess the prescribing pattern of antihypertensive medications among hypertensive patients by Physicians. Data collection was done using a semi-structured questionnaire. The age, sex, occupation, level of education and hypertensive medications were noted.

**Corresponding author: E-mail: ugadamu@gmail.com, ugadamu@yahoo.com;*

Results: The mean number of drugs used by the patient was 2.26 ± 0.81. The most commonly prescribed antihypertensive drug either alone or in combination was diuretics (78.2%). Others include calcium channel blockers (CCBs) (60.1%), angiotensin converting enzyme inhibitors (ACEI) (57.6%), β blockers (13.7%), centrally acting drugs CAD (13.3%) and angiotensin receptor blockers ARBs (3.3%).42.8% were rseceiving two drugs, 35.4% three drugs, 3.7% four drugs, and 0.4% five drugs. Most of the hypertensives were on more than one drug (82.3%) compared to 17.7%).

Conclusion: The most commonly prescribed class of antihypertensive drug was diuretics alone or in combination. Most of the hypertensive patients received more than one drug and the prescription pattern conforms to the guidelines.

Keywords: Hypertension; antihypertensive drugs; prescription pattern; combination therapy; Nigeria.

1. INTRODUCTION

Systemic hypertension is one of the most prevalent preventable risk factor for cardiovascular disease in Nigeria [1]. The current global burden of hypertension is estimated to be more than one billion of the World adult population, and a 60% increment is projected by 2025 [2]. With the increasing adult population and changing lifestyle of Nigerians, the burden of hypertension may continue to increase and contribute a substantial proportion of the total burden in Sub-Saharan Africa [3,4].

Several epidemiological studies have suggested that the appropriate use of antihypertensive medications would reduce the risk of heart failure, myocardial infarction and other hypertension related complications [5]. However, despite the availability of numerous and effective antihypertensive medications, a significant proportion of people with hypertension still present with some of these complications partly due to poor blood pressure control [6-9]. The reasons for inadequate blood pressure control may among others be due to the prescription pattern of the attending Physicians [10,11]. Hence, periodic review of the prescribing patterns would help in ensuring rational use of antihypertensive drugs that are tailored to patients' requirements, promote compliance and adherence to guidelines including those in developing countries.

There are several classes of antihypertensive medications that are used in Nigeria. They include thiazide type diuretics (TTDs), angiotensin converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), beta-blockers (BBs), calcium channel blockers (CCBs), and centrally acting drugs (CADs). Etuk et al. [12] opined that 80% (116) of the 145 hypertensives studied were on combination therapy and only 20% (29) were on monotherapy. Similarly, Out of the 212 hypertensives patients that were studied by Busari et al in a rural tertiary hospital in Southwestern Nigeria, most of them required more than one drug and the prescription were done according to international guidelines [13]. The most commonly prescribed drugs in both studies was diuretic either singly or in combination and diuretics and calcium channel blockers were the most frequently prescribed combination therapy [13]. There are few studies on the pattern of prescription anti-hypertensive drugs in North-Central Nigeria. Most of the studies were carried out in other part of the country and often in urban hospitals [12,14,15]. This study was therefore designed to determine the pattern of anti-hypertensive medication prescription for hypertensive patients attending a rural out-patient specialist clinic in Bida, North-Central Nigeria.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

This was a cross-sectional study of hypertensive patients attending the Cardiology clinic of Federal Medical Centre, Bida North-Central Nigeria from October to December 31st 2016. The case notes of the patient were retrieved after obtaining approval from the Ethical review committee of the hospital. Informed consent was secured as the study involved analysis of records. Two hundred and twenty (220) hypertensive patients were recruited using the convenient random sampling technique. A standardized pretested semi-structured questionnaire was used to collect information that included the age, sex, history of smoking and drinking, systolic and diastolic blood pressure, current antihypertensive medications and co-morbid conditions.

Blood pressure was recorded by a physician in the left arm with the patient in a seated position with legs uncrossed for at least 5-minute using Accosons mercury sphygmomanometer. Systolic blood pressure (SBP) was recorded as first Korotkoff sounds whilst diastolic blood pressure (DBP) was the disappearance of the sounds. The average of three readings was taken as the SBP and DBP.

2.2 Inclusion Criteria

Adults hypertensives aged 18 years and above.

2.3 Exclusion Criteria

Excluded from the study were hypertensives with complications like heart failure, chronic kidney disease, cerebrovascular accident, myocardial infarction, patients with neoplasm, incomplete medical history and those who refused giving consent.

2.4 Definition of Terms

Hypertension was defined as SBP of ≥ 140 mmHg and DBP ≥ 90 mmHg or patients on antihypertensive drugs.

Classes of antihypertensive medications – thiazide type diuretics (TTDs), beta-blockers (BB), angiotensin converting enzyme inhibitors (ACEI), angiotensin II receptor antagonists (ARBs), calcium channel blockers (CCBs), and centrally acting drugs.

Monotherapy was defined as a prescription of one agent while combination therapy was defined as a prescription of more than one agent from two classes as well as two agents in one formulation.

2.5 Data Analysis

Data were analyzed using SPSS version 23 (IBM, Armonk, New York, USA).Continuous variables were expressed as means ± standard deviation while categorical variables were as frequencies and percentages. Comparisons of categorical data were performed using Pearson's $_{X}^{2}$ test. The significance level was set at *P* less than .05, and all were two tailed.

2.6 Ethical Consideration

Ethical clearance was obtained from the Ethical review committee of Federal Medical Centre, Bida. The participants enrolled in the study gave informed consent. Confidentiality was maintained throughout the study.

3. RESULTS

A total of 295 patients were recruited between October to December 31st, 2016, but 271 were included in the final analysis. The main characteristics of the hypertensives are as displaced in Table 1. Out of the 271 hypertensives studied, 69 (25.5%) were males and 202 (74.5%) were females with a male to female ratio of 1: 0.34.The age range is between 20-90 years and most of them were in the age group between 45-65 years. The mean age in men was higher than in women (57.25 ± 10.11 years vs. 52.14 ± 12.15 years; P = 0.002). More than half of the male hypertensives (50.7%) had postsecondary education while 115 (51.5%) of the females had no formal education. 25% each of the male and female hypertensives had diabetes.

The commonly prescribed class of antihypertensive drug was the thiazide type diuretics (TTDs). 78.2% of the hypertensive patients received a drug from this class. TTDs use were followed by calcium channel blockers (CCBs) (60.1%), angiotensin converting enzyme inhibitors (ACEI) (57.6%), β-blockers (βB) (13.7%), centrally acting drugs (CAD) (13.3%), angiotensin receptor blockers(ARBs) (3.3%), and α adrenergic blockers (αB) (0.37%) were rarely prescribed for our hypertensives as shown in Fig. 1.

The mean number of drugs used by the hypertensives was 2.26 ± 0.81 and did not differ significantly between men and women (2.11 ± 0.81 versus 2.31 ± 0.80 X^2 = 3.045 P = 0.082). Most of the hypertensives studied were on more than one drug, 223 (82.3%) while 48 (17.7%) on monotherapy (males, 23.2% and females 15.8%). Of these, one hundred and sixteen (42.8%), 96 (35.4%), 10 (3.7%) and 1 (0.4%) of the hypertensives were on 2-drugs, 3-drugs, 4-drugs and 5- drugs therapy respectively (Table 3). A two-drug combination appeared to be the most frequent dose combination, of which the TTDs and CCBs, TTDs and ACEI are the most common.

4. DISCUSSION

There are three main findings of the present study. First, there are more females than male

Table 1. Socio-demographic characteristics of patients on antihypertensive drugs

Variables	Males n=69	Females n=202	P valve	
Age years	57.25 ± 10.11	52.14 ± 12.15	-0.691	0.002
Ranges				
≤44 years	6 (8.7)	50 (24.8)		
45-64 years	41 (59.4)	112 (55.4)		
≥ 65 years	22 (31.9)	40 (19.8)		
Diabetics	17 (24.7)	50 (24.8)		
Alcohol	9 (13.0)	8 (4.0)		
Smoking	4 (5.8)	0 (0)		
Occupation				
Nil	2 (2.9)	128 (63.4)		
Civil servants/retired	43 (62.3)	47 (23.3)		
Business	13 (18.8)	22 (10.9)		
Others	11 (15.9)	5 (2.5)		
Marital status				
Nil	1 (1.4)	2 (1.0)		
Married	61 (88.4)	176 (87.1)		
Widow(er)	7 (10.1)	24 (11.9)		
Education				
Nil	8 (11.6)	104 (51.5)		
Primary	15 (21.7)	39 (19.3)		
Secondary	11 (15.9)	17 (8.4)		
Post-secondary	35 (50.7)	42 (20.8)		

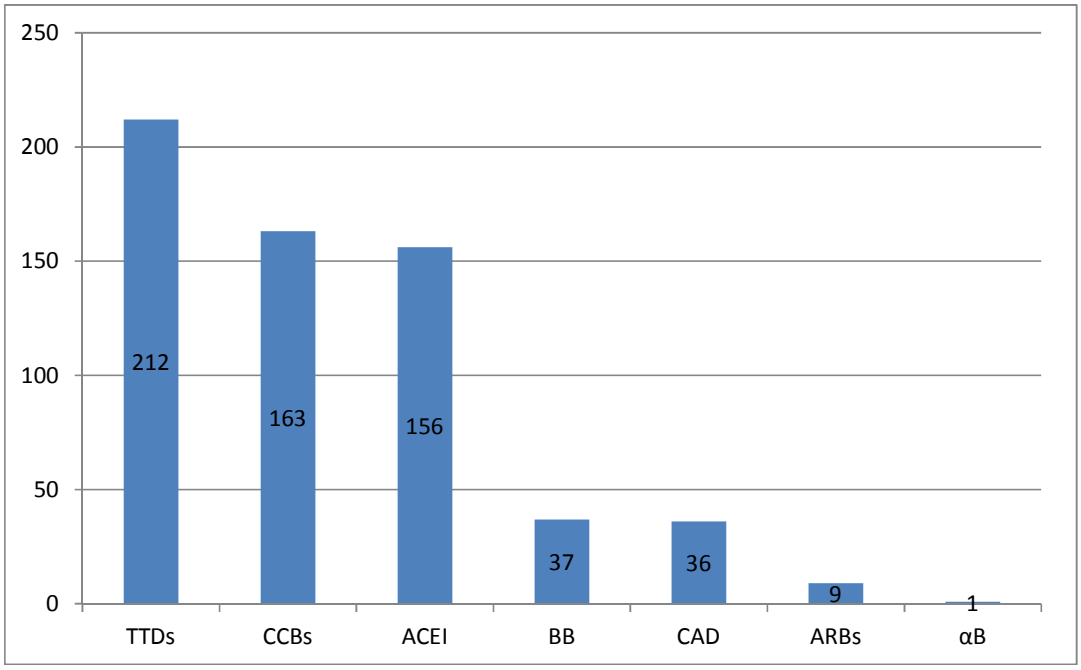

Fig. 1. Classes of drug use among hypertensive patients in Federal Medical Centre, Bida
TTDs, Thiazide type diuretic; CCBs, Calcium Channel Blockers; ACEI, Angiotensin Converting Enzyme Inhibitors; βB, Beta-Blockers; CAD, Centrally-Acting Drugs (α-Methyldopa); ARBs, Angiotensin Receptor Blockers; αB, Alpha blockers

with systemic hypertension. Second, the most commonly prescribed class of antihypertensive drug either alone or in combination is the thiazide type diuretics. Third, most of the hypertensives were on more than one drug therapy. The present study extend previous findings of high

prevalence of hypertension among females in hospital setting in Nigeria [12,13,16-18]. Among the various possibilities is the non-chalant attitude of males in seeking health care as well as not keeping to clinic follow-up. The study by Shukrala et al. on the prescribing, dispensing, and pattern of antihypertensive drugs use by patients attending outpatient department Specialized Hospital in Ethiopia, also found 63.5% of the patients to be females [19]. This was adduced to be due to lack of awareness of hypertension and control of hypertension in older age. Furthermore, despite the fact that more males were educated, their attendance in clinic was poorer compared to the females. The most common comorbid condition in our hypertensives was diabetic mellitus.

Table 2. Pattern of monotherapy among hypertensives in Federal Medical Centre, Bida

Variable	Male n (%)		Female n (%)	
	Yes	No	Yes	No
TTDs	54 (78.3)	15 (21.7)	158 (78.2)	44 (21.8)
CCBs	36 (52.1)	33 (47.8)	127 (62.9)	75 (37.1)
ACEI	44 (63.8)	25 (36.2)	112 (55.4)	90 (44.6)
βB	7 (10.1)	62 (89.9)	30 (14.9)	172 (85.1)
ARBs	2 (2.9)	67 (97.1)	7 (3.59)	195 (96.5)
CAD	2 (2.9)	67 (97.1)	36 (16.8)	168 (83.2)
αB	0	69 (100)	1 (0.5)	201 (99.5)

TTDs, Thiazide type diuretics; CCBs, Calcium channel blockers; βB, blockers; ACEI, Angiotensin converting enzyme inhibitors; ARBs Angiotensin receptor blockers; CAD, central acting drugs (α-methyldopa); αB, Alpha blockers

Table 3. Combination antihypertensive medication use in Federal Medical Centre, Bida

Variables	Male n (%)	Female n (%)
Monotherapy	16 (23.2)	32 (15.8)
2-drug therapy	31 (44.9)	85 (42.1)
TTDs +CCBs	15	37
TTDs + ACEI	14	29
TTDs + CAD	0	5
TTDs + BB	1	3
TTDs + ARBs	1	1
3-drug therapy	20 (29.0)	76 (37.6)
TTDs + CCBs + ACEI	11	45
TTDs + CCBs + CAD	1	14
TTDs + BB + ACEI	2	7
TTDs + ACEI + CAD	1	3
CCBs + ACEI + CAD	1	2
TTDs + BB + ARBs	1	1
TTDs + CCBs + ARBs	1	2
CCBs + BB + ACEI	0	1
BB + ARBs + CAD	1	0
TTDs + CCBs + BB	1	1
4-drug therapy	2 (2.9)	8 (4.0)
TTDs +CCBs + BB +ACEI	1	6
TTDs + CCBs + ACEI + CAD	1	1
TTDs + CCBs + BB + ARBs	1	1
5-drug therapy	0	1 (0.5)
TTDs + CCBs + ACEI + BB + CAD	0	1
Total	69 (100)	202 (100)

TTDs, Thiazide type diuretics; CCBs, Calcium channel blockers; βB, blockers; ACEI, Angiotensin converting enzyme inhibitors; ARB, Angiotensin receptor blockers; CAD, central acting drugs (α-methyldopa); αB, Alpha blockers

Thiazide type diuretics alone or in combination were the most commonly prescribed antihypertensive drug class among our patients. This finding corroborates earlier hospital based studies among outpatient hypertensives in other parts of the country [6,12-14]. Conversely, however, in a series by Ojji et al. [16] in Abuja, calcium channel blockers were the most frequently prescribed antihypertensive. The seventh report of Joint National Committee (JNC VII) on the detection, evaluation, prevention and treatment of hypertension, recommends that in the absence of any specific indications, a thiazide type diuretic alone or in combination should be selected as the initial therapy for hypertension [20]. Furthermore, TTDs are highly effective in Blacks as the pathogenesis of hypertension in them is mainly salt and water dependent [21]. In addition, they are among the cheapest of the first line drugs in the country. Hence, the pattern of prescription by our Physicians is in conformity with the recommendations of the JNC VII and Nigerian hypertension society guidelines.

Our study showed that 223 (82.3%) of the patients were on more than one drug. This was comparable to the study by Etuk et al. on the pattern of antihypertensive prescription by Physicians in Sokoto (88.8%) [12], Busari et al. (84.9%) [13], Adedapo et al. in Ibadan (75%) [22]. The outcome of the study by Shukrala et al. and Odili et al. however differed from our finding where only 34.5% and 49% respectively of their hypertensives were on combination therapy [19,23]. The differences might be due to early presentation, stage of hypertension and fewer co-morbid conditions among others in their patients. Furthermore, this pattern has been noted by guidelines, that the BP of more than two-third of the hypertensives cannot be controlled by one drug but will require two or more antihypertensive drugs [20]. In addition, hypertensive patients in who lower BP target is required or have significantly elevated BP would require more than one antihypertensive drug. It has also been shown that Black hypertensives tend to run higher blood pressures compared to age matched Caucasians and hence the need for more drugs to achieve BP control [24].

The commonly used dual therapy were thiazide type diuretics (TTDs) and calcium channel blockers (CCBs) (44.8%) and TTDs and angiotensin converting enzyme inhibitors (ACEI) (37.1%) while TTDs, CCBs and ACEI and TTDs, CCBs and centrally acting drugs (CAD)were the most frequent triple therapy. Our study is in agreement with the study by Bello et al and Shukrala et al. [14,19]. In the study by Bello et al, the attending Physicians reported the commonly prescribed combination antihypertensive drugs to be CCBs-diuretics, and ACEIs‑diuretics either singly or as fixed single pill combinations [14]. It should be noted that combination therapy is aimed at using drugs that possesses complementary modes of action to achieve a preferred therapeutic goal or for the treatment of co-morbid conditions. Combination therapy also reduces the side effect profile of the individual medications. It was also noted that the prescription of ARBs and CAD such as alpha methyldopa as monotherapy among our hypertensives was low as in other studies.

This study had some limitations. Data were collected from only one institution making the population relatively homogenous, hence generalizing the finding to other places might not be appropriate. Larger studies involving heterogeneous population are therefore required.

5. CONCLUSION

This study showed that thiazide type diuretics is the most commonly prescribed antihypertensive drug either alone or in combination and most of the hypertensives received dual therapy Antihypertensive drug prescription is consistent with treatment guidelines for hypertension.

CONSENT

All authors declare that written informed consent was obtained from all the patients for publication of this paper.

ETHICAL APPROVAL

A written approval by the Ethical and Review Committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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