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PRESCRIBING PATTERN OF ANTIHYPERTENSIVES AT A TERTIARY HEALTHCARE FACILITY IN NORTH EASTERN NIGERIA

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ABSTRACT

Appropriate treatment of hypertension using evidence-based guidelines significantly reduces cadiovascular mobidity and mortality. This retrospective survey was aimed at assessing the prescription pattern of antihypertensive medications in order to ascertain the appropriateness and the extent of adherence to the guidelines. Details on demorgraphy, blood pressure, prescription including number of antihypertensives and number of all medications at diagnosis and at last visit as well as documented co-morbidities/compelling indication were captured from the patients folders. The results highlight high prevalence of hypertension in females (65.69%) compared to males (34.31%). At diagnosis, most female patients presented with stage 2 hypertension while males presented with stage 1 hypertension based on Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation and Treatment of Hypertension (JNC 7) classification of hypertension. Although monotherapy with angiotensin converting enzyme inhibitors (ACEI) was considerable at both visits, polytherapy was dorminant. Thus, prescribers in this healthcare facility adhered to drug treatment guidelines for hypertension.

Keywords: Prescription pattern, Antihypertensive medication, High blood pressure

INTRODUCTION

Hypertension also termed high blood pressure (HBP) is the most frequently encountered chronic medical condition and also one of the most significant risk factors for cardiovascular morbidity and mortality.[1]
In fact, of greater concern is that cardiovascular complications of high blood pressure are on the increase, including the incidence of stroke, end-stage renal disease and heart failure.[2]
The need to improve the global control of HBP has necessitated the stipulation of numerous hypertension classification and treatment guidelines, which includes the Sixth, Seventh and lately Eighth Report of the Joint National Committee on the Prevention,

Detection, Evaluation and Treatment of Hypertension (JNC 6, JNC 7 and JNC 8) and World Health Organization/International Society of Hypertension (WHO/ISH) treatment guidelines.[3] However, variations in prescribing pattern among physicians still occur. These could be as a result of conflict of interest among physicians, or some are early adapters of new interventions while others are conservative.[4]
 It has been reported in a study[5] that the worldwide prevalence of hypertension would increase from 26.4% in 2000 to 29.2% in 2025, while another study [6] reported that the overall prevalence of hypertension in Nigeria ranges from 8% - 46.4% depending on the target population, type of

measurement and cut-off value used for defining hypertension.

The World Health Organization/ International Society of Hypertension(WHO/ISH) and JNC 7 [7,8] categorized antihypertensive medications into six major classes, which include: angiotensin converting enzyme inhibitors (ACEI), angiotensin receptor blockers (ARB's), beta-blockers (BB), calcium channel blocker (CCB), diuretics and other antihypertensive agents (α_1-blockers, central α_2 agonists and direct vasodilators).

There exist a plethoral of studies on factors thought to be responsible for poor BP control among Africans, but the extent of adherence to treatment guidelines by healthcare providers in the management of hypertension is yet to be ascertained in these environs.[3] This is particularly so in Federal Medical Centre, Yola, a tertiary healthcare facilty located in Northeastern Nigeria. Thus, this survey aims at assessing the current prescribing pattern for hypertensive patients and ascertains the extent of adherence to the recently updated international guidelines for pharmacotherapy of hypertension.

MATERIALS AND METHODS

This retrospective cross-sectional survey was carried out at Federal Medical Centre Yola, Adamawa State, Nigeria from January, 2013 to December, 2013.

The methods used by researchers [9] [10] were adopted with some modifications. Ethical clearance was granted by the ethics and research committee of the centre prior to the commencement of the survey. Data collection form was designed to collect information from patient's folder. A total of 2500 patients`folders from the medical outpatient department (MOPD) on follow up visits during January, 2013 to December, 2013, for the management of hypertension were identified for the study. Since the total patient population size is less than 10,000,the formula nf = n/1 + (n)/N (where nf = sample size for population less than 10,000, n = sample size for population greater than 10,000 and N = Estimate of the population size) for population less than 10,000 was supposed to have been used. However, a convenient sample size of four hundred and eight (408) patients` folders were randomly selected and scrutinised. Pregnant women were excluded from the study. Data on age, gender, year of first diagnosis, systolic and diastolic blood pressure at diagnosis, first prescription at diagnosis, number of antihypertensives at diagnosis, number of all medications at diagnosis, year of last visit, prescription at last visit, number of antihypertensives at last visit, number of all medications at last visit and

documented co-morbidity/compelling indications were retrieved from the folders.

These data were analyzed using Statistical Program for Social Sciences (SPSS) software version 17.0 adopting the method of analysis described in a study[11] . Continuous data were presented as mean ± standard deviation (SD), while categorical data were presented as percentage. Differences between means of two groups were compared using student t-test, while that between proportions were compared using chi-square test. P- Value < 0.05 was statisticaly considered significant.

RESULTS AND DISCUSSION

The mean age of the 408-sampled hypertensive patients is 52.52±11.9 years. The prevalence of hypertension is higher in females (65.69%) compared to males (34.31%) (Table 1). This is either as a result of poor cognizance of BP among males[3] or as reported by some researchers that males do not keep to clinic appointments.[12] Similar findings were reported by other authors.[3,13] There was no significant difference in the SBP and DBP at diagnosis (pretreatment) and at last visit for both females and males. This is in contrast to the findings from a study,[3] which DBP is significantly higher in males than females. It should be noted that the number of antihypertensive medications and number of all medications prescribed at diagnosis and at last visits do not vary significantly for the genders involved (p-value = 0.53 and 0.38 respectively). However, there was increment in the number of all medications at last visit for females and males indicating either the addition of antihypertensive medication was to adequately control blood pressure or a drug was added to treat complications secondary to hypertension.

The average blood pressure of $\frac{160.53}{99.35}$ mm Hg (stage 2 hypertension) at diagnosis was considerably managed during patients' last visit to the goal blood pressure of $\frac{140.77}{88.78}$ mm Hg. The pattern of prescribing at diagnosis also indicates that most patients were commenced on an average of 2 .1 antihypertensive medications. There is a significant (p-value = 0.00) increase in the number of antihypertensives prescribed at last visit compared to those prescribed at diagnosis. This is probably due to the fact that combination therapy is required to achieve and maintain BP goals in blacks.[14,15] In a like manner, there is a significant (p-value = 0.00) increase in the average number of all the medications prescribed (Table 2).

Therapy with multiple medications (polytherapy) appears to be prominent at diagnosis and last visits (Table 3). This is consistent with the treatment

guidelines which states that small dose of different classes of antihypertensive medication is more beneficial than a high dose of a single medication.[3] In addition, considering the fact that the average blood pressure at diagnosis falls into stage two, according to JNC 7 classification [8], starting therapy with two drugs is strongly encouraged.[1] Similar findings were reported elsewhere.[3,9,16]

The JNC 7[8] states that treatment of choice for early stage, uncomplicated, essential hypertension should be thiazide diuretics, especially among blacks. In fact monotherapy with ACEIs, ARBs and BBs was associated with lower control rates in hypertensive African American.[17] The findings in this survey (Table 4), however, revealed that ACEIs were the most prescribed antihypertensive medications followed by CCBs as monotherapy at both visits, this is consistent with the report of a study[18] that there is a striking change in the prescribing frequency of CCBs and ACEIs probably due to controlled clinical trials which highlighted that CCBs are safe and effective monotherapy for moderate to severe hypertension in Nigerians.[19,20,21] This contrasts with another report of a study,[1] which specified the first-line antihypertensive agents as ACEI, ARB, CCB and thiazide diuretic. Thus, this underscores the importance of thiazide diuretics in the treatment of hypertension in blacks.

Physicians in this health facility adhered to JNC 7[8] and other guidelines [7] in polytherapy, with a 2-medication therapy taking the lead (45.70%) for hypertensive patients at diagnosis and last visit.

Recommendation for the treatment of elevated blood pressure according to JNC 7 guidelines depends on the stage of hypertension and on whether it is associated with or without compelling indications. The compelling indications listed in JNC 7 are heart failure, post myocardial infarction, high coronary disease risk, diabetes, chronic kidney disease and recurrent stroke prevention.[4] Table 5 and 6 show the levels of adherence to JNC 7 guidelines in the treatment of essential (primary) hypertension and hypertension with compelling indication (secondary). The dominance of diabetes as the major compelling indication justifies the reason why ACEI was the most prescribed in this survey either alone or in combination which is in agreement with JNC 7 guidelines which state that ACEI or ARB based treatments favourably affect the progression of diabetic nephropathy and reduce albuminuria.

CONCLUSION

Overall, the findings in this survey are consistent with JNC 7 and other evidence-based guidelines for the treatment of both primary (stage 1) and secondary (stage 2) hypertension. However, monotherapy with thiazide diuretics should be encouraged since ACEI monotherapy is less effective in lowering BP in blacks.

ACKNOWLEDGEMENTS

Table 1: Background description of the study populations based on gender

Background variables	Female Mean ± SD (N)	Male Mean ± SD (N)	Total Mean ± SD (N)	P-value
Age	50.51±11.68(268)	56.43±11.31(138)	52.52±11.87(406)	0.00
Systolic blood pressure at diagnoses	161.41± 23.99 (269)	158.93±22.59(138)	160.53±23.51(408)	0.32
Diastolic blood pressure at diagnoses	99.91±12.11 (269)	98.25±11.30(138)	99.35±11.84(408)	0.18
No. of antihypertensive at diagnoses	2.12±0.95 (268)	2.06±0.98(136)	2.10±0.96(405)	0.53
No. of all medications at diagnoses	3.79± 1.43 (269)	3.66±1.38(137)	3.74±1.41(407)	0.38
Systolic blood pressure at last visit	140.51±22.77 (269)	141.25±21.08(138)	140.77±22.16(408)	0.75
Diastolic blood pressure at last visit	89.01± 13.79 (269)	88.25±11.78(138)	88.78±13.13(408)	0.58
No. of antihypertensive at last visit	2.35± 0.96 (263)	2.21±0.94(133)	2.30±0.96(397)	0.16
No. of all medications at last visit	4.48± 1.47 (267)	4.54±1.49(138)	4.50±1.47(406)	0.70
Duration on antihypertensive (Years)	5.42± 5.98 (245)	5.08±6.10(116)	5.31±6.02(361)	0.61

P- Value ≤0.05 is considered significant

Key: SD = Standard deviation, No. = Number, N= Number of patients.

Table 2: Description of the study populations centered on time of visit

Background variables	At diagnosis Mean ± SD (N)	At last visit Mean ± SD (N)	P-value
Systolic blood pressure	160.53±23.51(408)	140.77±22.16(408)	0.00
Diastolic blood pressure	99.35±11.82(408)	88.78±13.13(408)	0.00
No. of antihypertensive	2.10±0.96(405)	2.30±0.95(396)	0.02
No. of all medications	3.74±1.41(407)	4.48±1.49(406)	0.00

P-Value ≤0.05 is considered significant
Key: SD = Standard deviation, No. = Number, N= Number of patients.

Table 3: Frequency distribution of the number of antihypertensives prescribed at diagnoses and last visit.

Number of antihypertensive medication(s)	Frequency distribution at diagnoses (%)	Frequency distribution at last visit (%)
One (1)	126 (31.1)	74 (18.6)
Two (2)	155 (38.3)	182 (45.7)
Three (3)	83 (20.5)	96 (24.2)
Four (4) or more	41 (10.1)	45 (11.5)
Total	405 (100)	397 (100)

Table 4: Prescribing pattern of antihypertensive medication at diagnosis and last visit.

Single medication (Monotherapy)		
Class of antihypertensive	Frequency at diagnosis (%)	Frequency at last visit (%)
ACEI	67(16.7)	50 (12.5)
ARB	0(0.0)	1 (0.3)
BB	5(1.20)	1 (0.3)
CCB	41 (10.20)	20 (5.0)
DIURETICS	20 (5.0)	8 (2.0)
OTHERS	8 (2.0)	2 (0.5)
Polytherapy		
Class of antihypertensive	Frequency at diagnosis (%)	Frequency at last visit (%)
ACEI+BB	9 (2.2)	12 (3.00)
ACEI +CCB	79 (19.7)	114 (28.6)
ACEI + DIURETICS	36 (9.0)	37 (9.3)
ACEI + OTHERS	12 (3.0)	5(1.3)
ARB + CCB	1 (0.2)	4 (1.0)
ARB + DIURETICS	0 (0.0)	1 (0.3)
BB + OTHERS	1 (0.2)	0 (0.0)
CCB + BB	3 (0.7)	8 (2.0)
CCB + OTHERS	4(1.0)	1 (0.3)
DIURETICS + BB	9 (2.2)	4 (1.0)
DIURETICS + CCB	25 (6.2)	19 (4.8)
DIURETICS +OTHERS	4 (1.0)	0 (0.0)
ACEI +BB + OTHERS	0 (0.0)	1 (0.3)
ACEI + CCB + OTHERS	1 (0.2)	10 (2.5)
ACEI + DIURETICS + CCB	39 (9.7)	39 (9.8)

ARB+ DIURETICS + BB	0 (0.0)	2 (0.5)
ARB+ DIURETICS + CCB	1 (0.2)	4 (1.0)
BB +ACEI + DIURETICS	9 (2.2)	11(2.8)
BB + CCB + DIURETICS	5 (1.2)	9 (2.3)
CCB + ACEI + BB	8 (2.0)	20 (5.0)
CCB + DIURETICS + OTHERS	7 (1.70)	1 (0.3)
ACEI + DIURETICS + OTHERS	4 (1.0)	3(0.8)
ARB + DIURETICS +OTHERS	0 (0.0)	0 (0.0)
ACEI +CCB + BB+ OTHERS	0 (0.0)	1 (0.3)
ACEI+DIURETICS +CCB+ BB	1 (0.2)	5 (1.3)
ARB+BB+DIURETICS+OTHERS	2 (0.5)	4 (1.0)
ACEI+DIURETICS+CCB+BB+OTHERS	1 (0.2)	1 (0.3)
Total	402 (100)	399 (100)

Table 5: Adherence to treatment guidelines based on the disease state at last visit

Hypertension plus comobidity/ compelling indication	ADHERANCE TO GUIDELINES		Total (%)
	Following (%)	Not following(%)	
HTN	231.0 (96.7)	8.0 (3.3)	239.0 (100.0)
HTN + Diabetes	118.0 (85.5)	20.0 (14.5)	138.00 (100.0)
HTN + CKD	2.0 (100.0)	0.0(0.0)	2.00 (100.0)
HTN + HF	13.0 (100.0)	0.0(0.0)	13.00 (100.0)
HTN + Cerebrovascular Disease (Stroke)	3.0(100.0)	0.0 (0.0)	3.00 (100.0)
HTN + Dyslipidaemia	1.0 (100.0)	0.0(0.0)	1.00 (100.0)
HTN + MI	1.0 (100.0)	0.0(0.0)	1.00 (100.0)
HTN + HF + Diabetes	2.00 (100.0)	0.0(0.0)	2.00 (100.0)
HTN + Dyslipidaemia + Diabetes	2.00 (66.7)	1.0(33.3)	3.00 (100.0)
HTN + AP + Dyslipidaemia	1.00 (100.0)	0.0 (0.0)	1.00 (100.0)
Total	374.00 (92.8)	29.0 (7.2)	403.00 (100)

$X^2 = 21.16$, df = 9, P = 0.01

Key: HTN = Hypertension, CKD = Chronic kidney disease, HF = Heart failure, AP = Angina pectoris and MI = Myocardiac infarction.

Table 6: Adherence to treatment guidelines based on the type of prevention at last visit

Type of prevention	ADHERANCE TO GUIDELINES	
	Following (%)	Not Following (%)
Primary	236 (96.3)	9 (3.7)
Secondary	140 (87.0)	21 (13.0)
Total	376 (92.6)	30 (7.4)

$X^2 = 12.47$, df = 1, P = 0.00

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