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Prescription Pattern of Antihypertensives And Factors Associated With The Control of Blood Pressure Among Hypertensive Patients Receiving Care In A Nigerian Tertiary Hospital.

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Abstract- Hypertension undoubtedly is the leading cause of cardiovascular death worldwide. The study aimed to identify the prescription pattern of antihypertensive and factors associated with the control of blood pressure among hypertensive patients receiving care in a Nigerian Tertiary Hospital. The study was a retrospective cross sectional study carried out at the University of Nigeria Teaching Hospital Ituku/Ozalla, Enugu State Nigeria. A well Structured Pro-forma was used to extract variables from patient folders. These variables include Age, gender, marital status, religion, state of origin, educational level, occupation, Blood Pressure, age at first dose of antihypertensive, co-morbidities (diabetes, CKD), antihypertensive(s) used, duration of therapy, reasons for stopping (if stopped). Quantitative data was managed using Microsoft office excel and statistical product and services solution (SPSS) for windows. Continuous variables were expressed as mean ± SD and categorical variables as percentages with 95% confidence intervals. The students't-test and the paired sample t-test were used to compare continuous variables while the pearson chi square test and fishers exact test will be used to compare categorical variables. All statistical test will be considered significant when the 2- sided p-value is <0.05.Three hundred and Ninety patient Folders were used for the study. About 174 (42.4%) of the patients were male while 216 (52.7%) were female with a mean age of 62 years. Amlodipine with a frequency of 182 (64%) was the most prescribed antihypertensive in this study followed by losartan 182 (46.43%) and the least being atenolol and nebivolol with frequency of 4 (1.03%) each. 302 (94.4%) patients had hypertension and an existing comorbidity while 88(22.6%) had no comorbidities. The most common comorbidities were diabetes mellitus and chronic kidney disease.About 197 (50.3%) of the patients had their blood pressure under control while 193(49.7%) had uncontrolled blood pressure. Age, Monthly income, educational status and presence of comorbidity were the major predictors of uncontrolled blood pressure. Amlodipine was the most frequently prescribed antihypertensive. About half of the patient had their blood pressure uncontrolled. Age and monthly income were associated with uncontrolled blood pressure.

Keywords: prescription pattern, hypertension, Blood pressure control

I. INTRODUCTION

Hypertension is often called "the silent killer" because it generally has no symptoms until serious complications develop [1]. It is estimated that hypertension affects about one billion people worldwide and is a major risk factor implicated in cardiovascular diseases [2]. This figure is projected to increase to 1.56 billion by the year 2025, which is an increase of 60 % from 2000 [2]. According to WHO 2013 "Cardiovascular diseases and Hypertension are accounting for loss of 4 % gross domestic product for low and middle income countries annually which is amounting 500 billion USD" [3]. However globally, the burden of hypertension and other non-communicable diseases (NCDs) is rapidly increasing, and the African continent may be the most affected region in the world [4]. Africa has the highest prevalence of hypertension in the world as 46% of adults aged 25 years and above have their blood pressure raised [5].

Nigeria, currently with a population of over 160 million, is the most populous African country, and the prevalence of hypertension in the country hugely contributes to the overall burden in Africa [5]. In 2008, the WHO estimated hypertension prevalence of 42.8% in Nigeria and a study in Eastern Nigeria found a prevalence of 40.3% among the males [6]. This could be as a result of increasing adult population, rapid urbanization and uptake of western lifestyles, including high consumption of processed foods (with high salts and fats), tobacco and alcohol products [6].

Majority of the studies that have assessed antihypertensive prescription patterns of physicians were carried out in tertiary care institutions [7]. Cost of drugs has been identified as one of the factors that could also affect patient's adherence to treatment in chronic non communicable diseases such as hypertension [8]. Expectedly, cost of treatment of hypertension will vary in

accordance with the number of drugs in a particular treatment regimen. In general, the more complex the regimen is the higher the cost of treatment [7].

A study carried out at University of Benin teaching hospital showed that the most commonly prescribed antihypertensive medications in that study were thiazide diuretics, CCBs and ACEIs [9]. Studies from another tertiary health care facility found that out of six classes of drugs prescribed as monotherapy, CCBs were found to be prescribed most frequently followed by beta blockers and ARBs. Also diuretics were prescribed more often as FDC in that study [10].

In identifying the prescription patterns of antihypertensive and direct cost of therapy in Lagos state university teaching hospital it was observed that Diuretics were the most commonly prescribed antihypertensive either alone or in combination and accounted for 64% of the drugs prescribed [11]. The use of drug combination therapy in that was in about 95.0% representing 195 prescriptions and that co morbidities affected prescription patterns [11].

Also in a study carried out in Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria in 2006 showed that the proportion of patients on combination therapy was (80%) and 56% reported by Isezuo and Njoku in Sokoto [12]. The high prescription rate of combination therapy was due to the high prevalence of patients with severe and moderate hypertension, and the presence of co-morbid diseases, particularly diabetes mellitus [12]. Patients on combination therapy had significantly higher reduction in systolic and diastolic blood pressures than those on monotherapy [11]. And that diuretic was the first choice of drug prescribed in the study [11]. They observed low frequency of prescription of ACEI or centrally acting agent such as alpha methyldopa as monotherapy and none of the patients in the study population was on beta-blocker monotherapy. The frequency of prescription of ACEI was however high, in patients with co-morbid conditions [12]. It has also been previously observed that in spite of the benefits of combination therapy, too many drug combinations may adversely influence patients' adherence and also blood pressure control [13]. This may explain the apparent lack of significant further blood pressure reduction observed among patients on 3 or more drugs compared to those on 2 drug combinations in the current reports too [14]

II. OBJECTIVE

The Objective of the study was to determine the prescription pattern of antihypertensives and factors that could affect the control of blood pressure in a Nigerian tertiary health institution.

III. METHODS

Study design: This study was a Cross sectional retrospective study using patient folders conducted in the University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu State, Southeast, Nigeria.

Ethical committee approval : This study was conducted after obtaining ethical approval from the Health Research and Ethics of the University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, and Enugu State.

Sample size: All patients who meet the study criteria from January 2018 to December 2018 will be used for the study.

Eligibility criteria:

Inclusion criteria

a) Availability of patient demographic data on the patient folder
b) Patient folder having prescriber's information (signature and/or name)
c) Patient folders with ages > 18 years
d) All patient folders having at least a single antihypertensive drug

Study procedure: A total of 390 patient folders were retrieved from the medical record units in UNTH by using the random sampling method over period of 4 weeks between September 2019 and October 2019. In each patient's folder, demographic and clinical information including age, gender, occupation, religion marital status, employment status, smoking status and pattern of prescribed drugs for hypertension, the existing co morbidity of the patient were retrieved using a well prepared proforma and data form. For each folder used, drug name, number of drugs, dosage form, and frequency of administration and duration of treatment was obtained, 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.

Data analysis: The data cleaning was conducted in Microsoft excel after which information will exported and analysed 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 while categorical data were presented as percentages and frequencies. CHI square and correlation test was also used to examine association between the variables in the data collected. For all analysis, P values <0.05 were considered statistically significant.

IV. RESULTS

Table1 shows the demographic pattern of patients attending the tertiary hospital. A total of 390 patient folders were used. 174 (42.4%) were male while 216 (52.7%) female. The age range of 56-65 had the highest number of patients with an average mean age of 62 years. 99.2% of the patients were Christians, 95.9% non-smokers and 56.2% self-employed and 74% married

TABLE 1: Patient Demographic Patterns

DEMOGRAPHICS	FREQUENCY	PERCENTAGE (%)
GENDER		
MALE	174	42.4
FEMALE	216	52.7
AGE		
24-35	11	28.0
36-45	37	9.5
46-55	59	15.1
56-65	143	36.7
66-75	84	21.5
>75	56	14.4
Mean age	62years	
RELIGION		
CHRISTIAN	387	99.2
OTHERS	3	0.80
SMOKING STATUS		
SMOKING	16	4.10
NOT SMOKING	374	95.9
EMPOLYMENT STATUS		
CIVIL SERVANT	63	16.2
SELF EMPLOYED	219	56.2
UNEMPOLYED	27	6.90
RETIRED	81	20.8
MARITAL STATUS		
MARRIED	287	74.0
SINGLE	25	6.40
WIDOWED	70	18.0

Table 2 presents the percentage of controlled BP versus uncontrolled blood pressure using mean arterial blood pressure. MAP (ranges from 60 to 100). Of the 390 patients involved in the study, 197 (50.3%) had their blood pressure under control and 193(49.7%) had uncontrolled blood pressure.

Table 2. Distribution of Blood pressure control using JNC-8 guideline

	Frequency	**Percentage %**
CONTROLLED BP	197	50.3
UNCONTROLLED BP	193	49.7

The relationship of how the patient demographics affects blood pressure is shown in table 3. The female patients were found to have more controlled blood pressure (107) compared to the male patients (90). 76 patients out of 143 Patients within the ages of 56-65 were not controlled while 68 were controlled. 188 patients who do not smoke had controlled blood pressure. 111 self-employed patients who are majorly farmers and traders had controlled blood pressure.

Table 5 further explains table 4 showing the individual drugs in each class. The most prescribed antihypertensive in this study was shown to be amlodipine with a frequency of 182 (64%) followed by losartan with a frequency of 182 (46.43%) and the least being atenolol and nebivolol with frequency of 4 (1.03%) each respectively in the total population sample(Table 6).

Table 3: Relationship between patient demographics and blood pressure control.

DEMOGRAPHICS	**CONTROLLED BP**	**UNCONTROLLED BP**	**P VALUE**
GENDER			
MALE	90	82	
FEMALE	107	111	
AGE			
24-35	10	1	
36-45	20	17	
46-55	34	24	0.018
56-65	68	76	
66-75	44	40	
>75	21	35	
RELIGION			
CHRISTIAN	192	193	
OTHERS	5	0	
SMOKING STATUS			
SMOKING	9	7	
NOT SMOKING	188	186	
EMPOLYMENT STATUS			
CIVIL SERVANT	34	29	
SELF EMPLOYED	111	108	0.910
UNEMPOLYED	13	14	
RETIRED	39	42	
MARITAL STATUS			
MARRIED	149	136	
SINGLE	13	12	0.010
WIDOWED	26	46	
P value <0.05			

The most prescribed class of antihypertensive is the calcium channel blocker (68.7%) and the least being the beta blocker 8.2%(Table 4).

Table 4. Prescription Pattern Antihypertensive Drugs By their Classes

Drug class	Frequency	Percentage (%)
Diuretic	182	46.7
Calcium channel blocker	267	68.7
Angiotensin converting enzyme inhibitor	102	26.2
Angiotensin receptor blocker	188	48.2
Beta blocker	32	8.2

Table 5: Prescription pattern of Antihypertensives

ANTIHYPERTENSIVE	FREQUENCY	PERCENTAGE %
Lorsatan	182	46.63
Amlodipine	250	64.40
Spironolactone	97	24.80
Furosemide	93	23.85
Lisinopril	102	26.15
HCTZ	79	20.26
Nifedipine	17	4.36
Carvedilol	24	6.15
Torsemide	10	2.56
Nebivolol	4	1.03
Atenolol	4	1.03
Temisartan	6	1.54

Table 6: Comorbidity Distribution. N = 302

Comorbidity	Frequency	Percentage (%)
Acute kidney disease	2	0.66
Congestive cardiac failure	72	19.46
Cardiovascular disease	3	0.99
Cerebrovascular accident	30	9.93
Chronic kidney disease	20	6.62
Chronic obstructive pulmonary disease	4	1.32
Diabetes mellitus	87	28.8
Eclampsia	2	0.66
Obesity	4	1.32
Peptic ulcer disease	9	2.98
Lumbar, pelvic and cervical spondylosis	10	3.31
Others (osteoarthritis, cerebral malaria, obstructive sleep hyponea, retrovial disease, bowel obstruction etc.)	59	19.5

V. DISCUSSION

In this study uncontrolled blood pressure increased with increasing age and more single and widowed patients had uncontrolled blood pressure. This may be due to the emotional instability in such patients. Also more of unemployed patients and retired patients had uncontrolled blood pressure though this finding was not statistically significant. In this study the most prescribed drugs were the calcium channel blockers, the diuretics, angiotensin receptor blockers, the angiotensin converting enzyme inhibitors. This is in correspondence with a similar study which assessed the antihypertensive prescription patterns of non specialist practitioners in Lagos Nigeria [15]. The calcium channel blocker, amlodipine was the most commonly prescribed antihypertensive. Amlodipine accounted for 64. 4% of the drugs prescribed. This correlates with works from other studies that suggest that amlodipine is well tolerated in blacks than any other race [16-18]. On other hand, the ARB losartan which was the second most prescribe antihypertensive, is in line with other studies which suggest it as a drug of choice for patients with diabetes and chronic heart failure as comorbidities [19]. About 94% of the patients in this study had co morbidities, this accounted for the high prescription of drugs such as losartan, spironolactone and furosemide. Most of the patients who had comorbidities in this study had either diabetes (28.8%) or chronic heart failure (19.46%). The comorbidities found in this study included congestive heart failure, diabetes, stroke and chronic kidney disease. Diuretics were also highly used in this study. This high use of diuretics in this study agrees with the recommendations of the 7th report of the national committee on high blood pressure (JNC 7) as first line in treatment of hypertension [20]. The prevalence of hypertension is increasing and this continually increases the cost of its treatment and also influences the prescribing patterns among physicians and patients compliance [20] and cost of prescriptions has always been a barrier in effective antihypertensive treatment [21].

VI. CONCLUSION

Amlodipine was the most frequently prescribed antihypertensive. About half of the patients had their blood pressure uncontrolled. Age and monthly income were associated with uncontrolled blood pressure.

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