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Antihypertensive Medications at Umaru Musa Yar-Adua Memorial Hospital Sabon Wuse, Niger State

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ABSTRACT: Hypertension remains one of the leading causes of death and its prevalence ranges from 12.4% to 34.8% in Nigeria. Pharmacotherapy of hypertension involves the use of various classes of medications aimed at lowering blood pressure to reduce the risk of cardiovascular complications hence, the need for rational drug use. This work aimed to evaluate the prescription patterns of antihypertensive drugs among patients attending Umar Musa Yaradua Memorial Hospital Sabon wuse in Niger State, Nigeria. The study was a descriptive retrospective assessment of prescriptions of adult patients containing one or more antihypertensive drug that visited the hospital from January to December 2023. Data were collected using data collection form and analyzed using simple tabulation. A total of 24,663 prescriptions were evaluated where only 510 (2.1%) were found to contain antihypertensive drugs. Only 68 (13.3%) of the hypertensive patients consistently follow up their medication pick-ups throughout the year, with a male-to-female ratio close to 1:1. Among these patients, 261 drugs were reviewed, averaging 3.8 drugs per encounter. Calcium channel blockers were the most commonly prescribed class of antihypertensive medications, utilized predominantly as monotherapy (52.6%) and in combination with angiotensin-converting enzyme inhibitors. The most common combination therapy consisted of two drugs (36.8), followed by three drugs (25%) and four drugs (10.3%). This study noted that the most commonly prescribed antihypertensive class for patients in the Hospital were the calcium channel blockers as monotherapy and in some cases in combination with other antihypertensive drugs.

KEYWORDS: Antihypertensive, Descriptive, Prescription, Retrospective, Therapy

INTRODUCTION

According to the recommendations of World Health Organization (WHO) and International Society of Hypertension (ISH), alongside the 7th Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7) guidelines, the definition of hypertension in adults aged 18 years and above is Systolic blood pressure of 140 mmHg or higher and/or diastolic blood pressure of 90 mmHg or higher based on the average of two or more readings taken at each of two or more visits after initial screening (WHO, 2022). Hypertension is a common chronic non-communicable condition with various complications including cardiovascular and chronic kidney disease (CKD), high morbidity and mortality (Renoy Philip *et al*., 2016). It occurs due to repeated elevated systolic blood pressure (SBP) and a diastolic blood pressure (DBP) above 140/90mmHg. Hypertension is categorized into two as primary (essential) and secondary hypertension. Primary hypertension accounts for 95% case while Secondary hypertension accounts for 5% cases and occurs as a result of consequence to another disorder or side effect of medications (WHO, 2015). Worldwide estimate of hypertension in adult is over one billion and is projected to increase to 1.56 billion by the year 2025 (Kearney *et al.,* 2005). It is a global public health problem that contributes majorly to development of noncommunicable diseases, especially cardiovascular disease (WHO, 2015). World Health Organization (WHO) in 2013 estimated noncommunicable diseases to account for 38 million out of an estimated 56 million deaths and projected its increase to 52 million by the year 2030.

Hypertension plays a vital role in the cause of heart attack, heart failure, renal failure and stroke (Daiyabu *et al*., 2017). Globally, the increase in prevalence of hypertension contributes considerably to the socioeconomic burden (Kearney *et al*., 2005). To choose the appropriate antihypertensive drug, several factors are to be considered, such as age and underlying comorbid conditions (Sang Hyuck Kim *et al.,* 2019). Therefore is important to assess prescription patterns to determine whether current prescription is reasonable, evidence-based, and cost effective for the management of hypertensive patient (Jarari *et al.,* 2015).

Management of primary hypertension involves lifestyle modifications and pharmacotherapy aimed at achieving and maintaining blood pressure within recommended targets. Lifestyle changes include dietary adjustments (e.g., reducing sodium intake, increasing

potassium intake), weight management, regular physical activity, moderation of alcohol consumption, and smoking cessation. Pharmacological interventions may include diuretics, beta-blockers, ACE inhibitors, angiotensin II receptor blockers, calcium channel blockers, and other medications tailored to individual patient needs (James *et al*., 2014).

Drug Utilization Study identify the problems caused due to irrational drug use in health care delivery system and also highlight the current approach for the rational use of drugs (Khalan *et. al*., 2012). The irrationality in drug use is cause due misuse, overuse and underuse of drugs thus failing to achieve the optimal drug therapy. Inappropriate use of drugs leads to increase medical expenses, advert effect, patient morbidity and mortality and antimicrobial resistance, hence DUS became a potential tool in evaluating health care system (Sachdera *et. al*., 2010). These studies should be conducted to decrease drug and health related treatment expenditure, to improve health related quality of life, improve medical treatment quality, decrease the number of medication related problems, decrease hospitalization, improve prescriber's practice and awareness towards appropriate prescribing (Nashra, 2022).

Although there are several studies on prescription patterns of antihypertensives in other Hospitals within the country but not relevant in the context of Umaru musa yar-adua memorial hospital sabon wuse since prescription patterns are influenced by time and region. Hypertension also termed high blood pressure (HBP) remains one of the leading causes of death in Nigeria (Akunne and Adedapo 2019). The differences in prescribing pattern among physicians exist as a result of conflict of interest among physicians, or due to the fact that some are conservative while others are early adapters of new interventions (Ikunaiye *et al*., 2015).

Most assessments of antihypertensive drug effectiveness have been drawn from studies conducted predominantly on African Americans in the United States and Europeans, potentially influenced by ethnic diversity and non-traditional lifestyles (Zhu *et al*., 2005). Given these observations, our goal is to gather local data on prescription patterns for antihypertensive drugs specifically at Umaru Musa Yar-adua Memorial Hospital Sabon Wuse.

MATERIALS AND METHOD

Study Setting

The Data were collected from patient's medical folders at Health Information Management Department of Umaru Musa Yar-adua Memorial Hospital Sabon Wuse Niger State. Sabon Wuse is the Head quarter of Tafa local government of Niger state and one of the major towns of the state with a population of 83,544 according to 2006 census. Sabon wuse is approximately 72km away from Abuja (The federal Capital) on Kaduna-Abuja express way with the indigenous tribe being Gwandara, Gbagyi and Hausa with their major occupation been peasant farmers. Umaru Musa Yar-adua Memorial Hospital Sabon Wuse is a secondary health facility of about 150 bed capacity situated in the southeastern region of Niger State. Serving a population exceeding one hundred thousand residents, the hospital features comprehensive healthcare facilities including outpatient, inpatient, pediatric, emergency, and ophthalmology departments. As a key referral center for numerous primary healthcare facilities, it houses a diverse range of medications in various classes and dosage forms suitable for managing both chronic and acute cases of hypertension.

Figure 1: Map of Nigeria showing Niger state

Study Design

The study was a descriptive, retrospective study, conducted after ethical approval from the Ethics and Research Committee of the hospital. The prescription sheets of adult patients containing one or more antihypertensive drug that visited the hospital from January to December 2023 issued at different point in the hospital were used for the study.

Research Instruments

Instruments used are validated data collection form, World Health Organization and International Network for Rational Use of Drugs (WHO-INRUD) prescribing indicators, National Standard Treatment Guideline (STG) and Niger State Essential Medicine List (EML).

Ethical Considerations

Ethical approval was sought and obtained from Ethics Committee of the Umaru Musa Yaradua Memorial Hospital Sabon Wuse before commencement of the study. The approval was conveyed via a letter signed by the Chairman Hospital Research Ethical Committee dated 13th June 2024.

Sample Size Determination

The whole population was used for the studies as the study population was less than hundred (100).

Inclusion Criteria

Eligible prescription reviewed where those for adult patients of both gender diagnosed with hypertension and attended clinic from January to December 2023 at Umaru Musa Yar-adua Memorial Hospital Sabon Wuse.

Exclusion Criteria

Hypertensive patients less than 14years and the patients whose clinic visits have not covered at least one year period

Data Collection

The study data were collected in June 2024 from the prescription sheets containing one or more antihypertensive drugs in all patients' folders at Health Information management department for January to December 2023. The identified antihypertensive were then classified. The following information such as patient age in years, sex, number of all medicines prescribed, number of medicines prescribed by generic name, number of antihypertensive medicines prescribed, were extracted from the prescription sheets into data collection form.

Data Analysis

The method of descriptive analysis was used. The data collected was analyzed using simple tabulation and the result obtained was compared with normal values.

RESULTS AND DISCUSSION

Demographic Features Demographic characteristics of hypertensive patients Sex Distribution (N= 68)

A total number of two hundred and sixty one (261) drugs were reviewed from sixty eight (68) case folders of patients who were diagnosed and treated for hypertension in the hospital within the study period. Out of the sixty eight (68) case folders, 35 (51.5%) were male and 48(48.5%) were female. The data shows a fairly balanced distribution between males and females among hypertensive patients in this sample. Males make up a slightly larger percentage (51.5%) compared to females (48.5%). The difference between male and female percentages is marginal (3 percentage points), indicating a relatively even split as shown in figure 2.

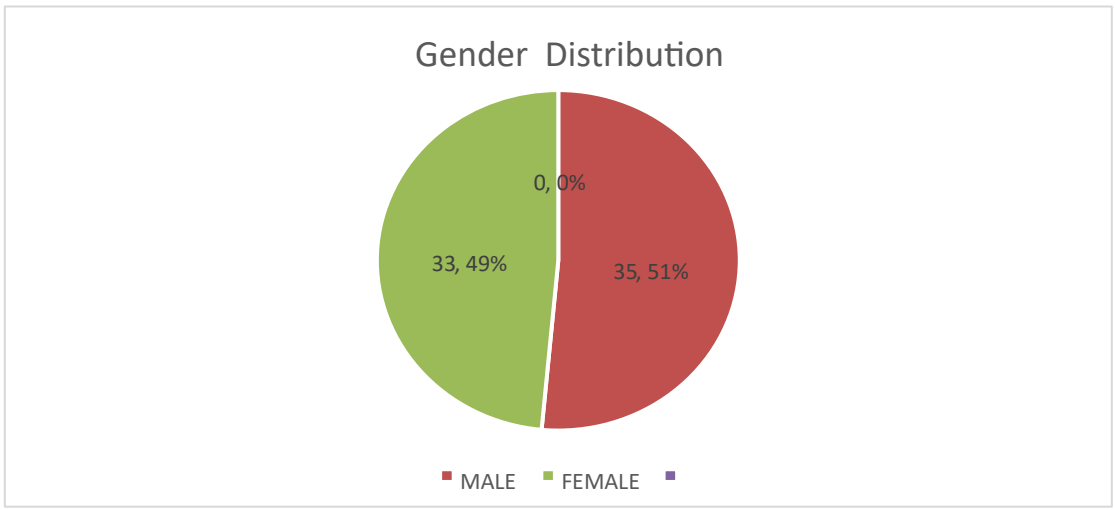

Figure 2: Demographic characteristics of hypertensive patients Sex Distribution (N= 68)

Demographic characteristics of hypertensive patients Age Distribution (N = 68)

The majority of hypertensive patients were younger, with 73.5% of them aged 59 years or younger and among younger patients (≤ 59 years), males constitute slightly more than females (50% vs. 35.3%). The older age group (≥ 60 years) comprises 26.5% of the study population, with an equal distribution between males and females (13.2% each). The higher percentage of younger patients may suggest early onset or detection of hypertension in this population as shown in table 1 below.

Table 1: Demographic characteristics of hypertensive patients Age Distribution (N = 68)

AGE (years)	MALE	FEMALE	TOTAL	PERCENTAGE (%)
≤ 59	26	24	50	73.5
≥ 60	9	9	18	26.5

Comorbidity associated with hypertension

Although more than half of the patients had no other disease coexisting with hypertension, the total number of patients having comorbidity were 28(41.1%) out of 68 patients and the leading co-morbidities recorded were diabetes mellitus (35.7%), Peptic ulcer and congestive cardiac failure (14.3%), Asthma (10.7), Chronic Kidney Disease and seizure (7.1 %) each as shown in figure 3 below:

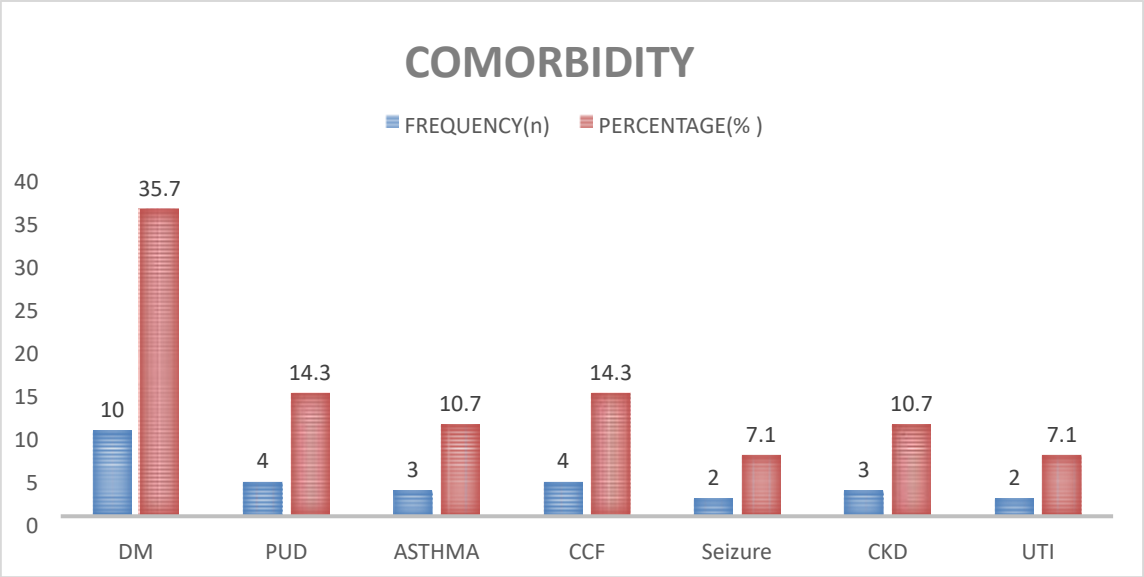

Figure 3: Comorbidity associated with hyper tension (N=28)

Categories of antihypertensive Drug therapy (N=68)

The number of patients who were prescribed only one antihypertensive drug (Monotherapy) are 19 which constitutes 27.9% of the total (N=68), while those on regimen involving two different antihypertensive drugs (Two drug therapy) were 25 patients making up 36.8% of the population. The category of patients who were prescribed a combination of three antihypertensive drugs and four different antihypertensive drugs amount to 17 and 7 which constitute 25% and 10.3% of the study population

Table 2: Categories of antihypertensive Drug therapy (N=68)

TYPES OF THERAPY	FREQUENCY(n)	PERCENTAGE (%)
Monotherapy	19	27.9
Two drug therapy	25	36.8
Three drug therapy	17	25
Four drug therapy	7	10.3

Frequencies of antihypertensive drug monotherapy (N=19)

The most prescribed class of antihypertensive monotherapy were calcium channel Blockers angiotensin receptor blocker Angiotensin converting Enzyme (ACE) inhibitors and diuretics. This study provides insight into the distribution of different classes of antihypertensive drugs prescribed singly in the study. Calcium channel blockers (CCBs) were the most frequently prescribed (52.6%), followed by beta-blockers (26.3%), ACE inhibitors (10.5%), and diuretics and methyldopa each accounting for 5.3% (Table 3).

Table 3: Frequencies of antihypertensive drug monotherapy (N=19)

DRUGS	FREQUENCY(n)	PERCENTAGE (%)
DIURETICS	1	5.3
ACEI	2	10.5
bARBs	5	26.3
CCB	10	52.6
METHYLDOPA	1	5.3

Frequencies of two antihypertensive drug combination therapy (N=25)

This demonstrates a diverse range of two-drug combinations used in managing hypertension. Each combination targets different physiological pathways involved in blood pressure regulation, Calcium channel blockers (CCBs) appear frequently followed by ACEI and beta blockers

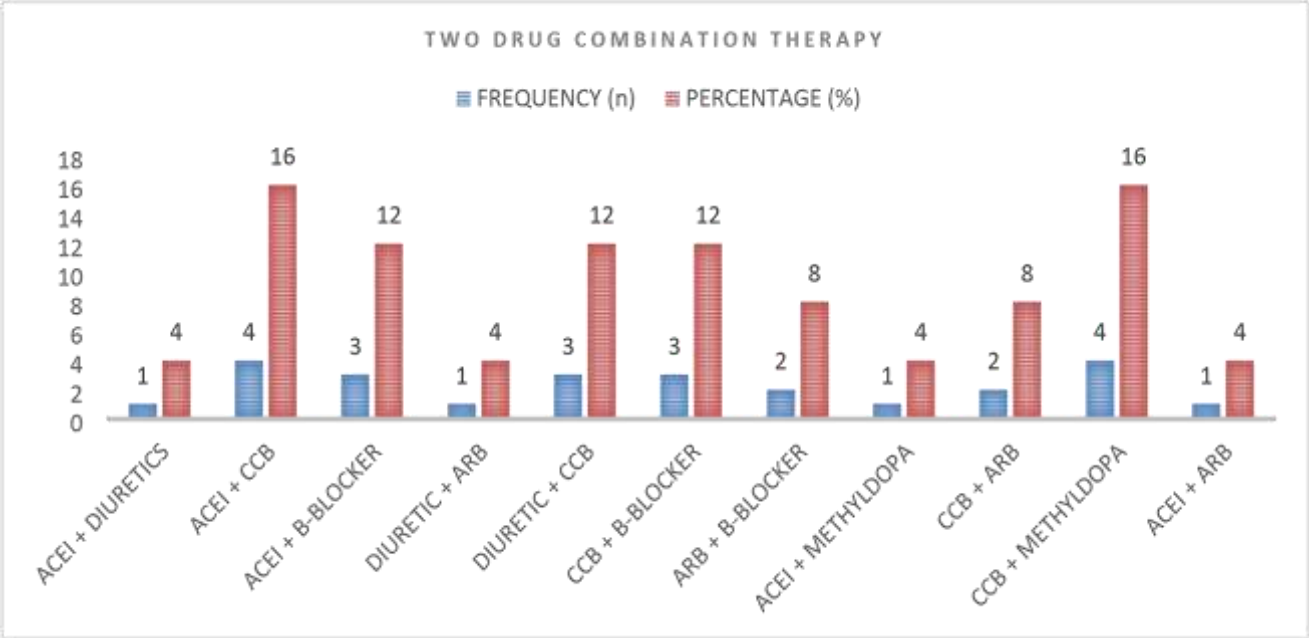

Figure 4: Frequencies of two antihypertensive drug combination therapies (N=25)

Frequencies of Three Antihypertensive Drug Combination Therapies

The diverse range of three-drug combinations ARB + B-BLOCKER + CCB (17.6),
DIURETICS + ARB + CCB: (29.4%), DIURETICS + ARB + METHYLDOPA (5.9%) and ACEI + CCBm METHYLDOPA (5.9%) used in managing hypertension to targets multiple physiological pathways involved in blood pressure regulation, and selection of these combinations likely considers factors such as the severity of hypertension, presence of comorbidities, and individual patient response to previous treatments.

Table 4: Frequencies of three antihypertensive drug combination therapies (N=17)

DRUGS	FREQUENCY(n)	PERCENTAGE (%)
DIURETICS +ACEI +CCB	3	17.6
DIURETICS + B-BLOCKER+ ARB	3	17.6
DIURETICS + B-BLOCKER+ CCB	1	5.9
ARB + B-BLOCKER + CCB	3	17.6
DIURETICS + ARB + CCB	5	29.4
DIURETICS + ARB + METHYLDOPA	1	5.9
ACEI + CCB + METHYLDOPA	1	5.9

Frequencies of Four Antihypertensive Drug Combination Therapies

This underscores the intricate and rigorous treatment approach needed to manage hypertension in patients prescribed four-drug combinations: DIURETICS + ACEI + BB + METHYLDOPA (28.6%), DIURETICS + CCB + ARB + METHYLDOPA (14.3%), DIURETICS + BB + ARB + METHYLDOPA (14.3%), and DIURETICS + ARB + BB + CCB (42.9%). These combinations are typically employed when single or dual therapies have proven insufficient in achieving effective blood pressure management, indicating the severity or resistance of the hypertension being treated.

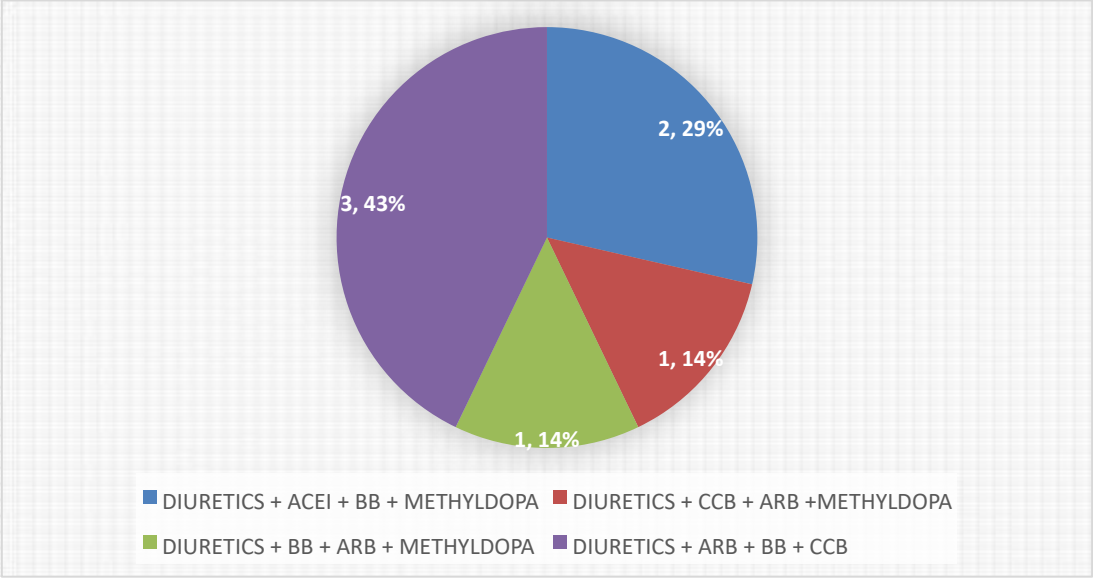

Figure 5: Frequencies of four antihypertensive drug combination therapies (N=7)

Antihypertensive drug combination and percentage Blood Pressure (BP) Control

In the management of hypertension Patients should be treated to a target systolic pressure of less than 150 mm Hg and a target diastolic pressure of less than 90 mm Hg in patients≥ 60years and ≤ 59 years (JNC-8). From the study, all the patient on monotherapy have their BP controlled while 60%, 50% and 71% of those on two drug therapy, three drug therapy and four drug therapy have their BP controlled as shown in table 5 below.

Controlled BP is When BP measurement is within normal range in the entire hospital visit.

Fluctuating BP is when the BP measurement are normal in some visit and become elevated in another visit Not controlled BP is when the BP remain elevated in all the hospital visit

Table 5: Antihypertensive drug combination and percentage Blood Pressure (BP) Control

NUMBER OF DRUG COMBINATION	CONTROLLED PATIENT	FLUCTUATING BP	UNCONTROLLED BP	BB
MONOTHERAPY	19	19 (100%)	0	0
TWO DRUG COMBINATION	25	15 (60%)	4 (16%)	6(24%)
THREE DRUG COMBINATION	17	9 (52.9%)	3(17.6%)	5(29.4%)
FOUR DRUG COMBINATION	7	5(71.4%)	0	2(28.6%)

WHO core drug prescribing indicators for the facility.

From the study, the antihypertensive drugs prescribed constituted about 56.3% of the total drugs prescribed with an average of 3.8 antihypertensive drugs per. The average number of medicine per prescription was 3.8 drugs and the proportion of medicines prescribed by generic name was 30% and 100% of the antihypertensive drugs were prescribed from the
Niger State Essential Medicines List 2nd Edition 2015 as shown in table 3.5 below

Table 6: WHO Core drug prescribing indicator for the facility

PRESCRIBING INDICATORS	VALUE (n)	REFERENCE VALUE
Average number of medicines per encounter	3.8	1.6-1.8
Percentage of drugs prescribed by generic names, n (%)	80(31)	100
Percentage of prescriptions including antibiotics n (%)	17(6.5)	20.0-25.4
Percentage of prescription including injections n (%)	24(9.2)	10.1-17.0
Percentage of drugs prescribed from EML or Formulary n (%)	241(92.3)	100

Summary of data collected

- Total Number of encounters: Sixty eight (68)
- Total Number of Drugs Prescribed: Two Hundred and sixty one (261)
- Total Number of Antihypertensive drugs Prescribed: One Hundred and forty seven (147)
- Total Number of Antihypertensive drugs Prescribed from Niger state Essential Medicine list: One Hundred and forty seven n (147)
- Total Number of Medicines Prescribed by generic name: Eighty (80)
- Total Number of Antibiotic drugs Prescribed: Seventeen (17)
- Total Number of injectable drugs Prescribed: twenty four (24)

Calculations

a. Average number of drugs prescribed per encounter = total numbers of drugs prescribed/total number of encounters surveyed: 261/68= 3.8 drugs/encounter

b. Average number of antihypertensive medicines prescribed per encounter = total number of antihypertensive medicines prescribed/total number of encounters surveyed =147/68= 2.2drugs/encounter

c. Percentage of medicines prescribed by generic name = (number of medicines prescribed by generic name/total number of medicines prescribed) X 100: 80/261 X 100= 31%

d. Percentage of antihypertensive medicines prescribed from Niger State EML = (number of antihypertensive medicines prescribed from EML/total number of antihypertensive medicines prescribed) X 100: 147/147 X 100= 100%

e. Percentage of essential antihypertensive dispensed = (number of essential antihypertensive medicines dispensed/total number of essential antihypertensive medicines prescribed) X 100: 147/147 X 100=100%

f. Percentage of antibiotics prescribed = (number of antibiotic prescribed/total number of medicines prescribed) X 100: 17/261 X 100= 6.5%

g. Percentage prescription including injection = (number of injection prescribed/total number of medicines prescribed) X 100: 24/261 X 100= 9.2%

Discussion

A prescription serves as a valuable indicator of the prescriber's approach to managing diseases and reflects the characteristics of the healthcare delivery system within the community (WHO, 1993). This study analyzed the prescribing patterns of antihypertensive medications at Umaru Musa Yar'Adua Memorial Hospital in Sabon Wuse, Niger State, a secondary healthcare facility.

The study findings indicate that hypertension prevalence among male patients (51.5%) was higher than among female patients (48.5%). This observation aligns with a previous study by (Vikas Pandey *et al*., 2014), which also noted a higher proportion of hypertension among males compared to females. This disparity could be attributed to social habits and lifestyle factors, such as higher rates of alcohol consumption and smoking among males compared to females in the population.

The age categories of the patients were analyzed. Majority of the patients were in the age group of ≤ 59 (73.5%) as compared to the age category of ≥ 60 (26.5%) years of age. The data shows a fairly balanced distribution between males and females hypertensive patients in this study. Males make up a slightly larger percentage (51.5%) compared to females (48.5%). The difference between male and female percentages is marginal (3 percentage points), indicating a relatively even split. The implication of this is by understanding the demographic distribution of hypertensive patients by sex is crucial for healthcare planning and intervention strategies. Differences in the prevalence, treatment response, and complications related to hypertension between males and females might warrant further investigation and the limitation of this is that the data is based on a specific sample of 68 patients and may not be fully representative of the broader population. Factors such as geographic location, and ethnic background, which can influence hypertension prevalence, are not detailed in the study.

The study also examined the comorbidities among hypertensive patients, revealing that a significant portion of the study population had diabetes mellitus (35.7%), Peptic Ulcer Disease (PUD) and Congestive Cardiac Failure (CCF) 14.3%, Asthma and Chronic Kidney Disease (CKD 10.7% and Seizure and Urinary Tract Infection (UTI) 7.1%. This finding is consistent with previous studies by (Onwuchekwa *et al*., 2020), which also identified diabetes mellitus as the most prevalent comorbid condition among hypertensive individuals. The findings also revealed that hypertension frequently occurs alongside other chronic conditions such as diabetes mellitus, peptic ulcer disease, and congestive cardiac failure. Diabetes mellitus emerges as the most prevalent comorbidity among hypertensive patients in this study. Additionally, the presence of asthma, chronic kidney disease, seizures, and urinary tract infections underscores the wide range of health issues that may accompany hypertension. Addressing these concurrent conditions is crucial in optimizing health outcomes for hypertensive individuals. Understanding these comorbidities enables healthcare providers to personalize treatment plans and interventions effectively. The notably high prevalence of diabetes mellitus emphasizes the importance of integrated care for patients managing multiple chronic conditions simultaneously.

Looking at the categories of antihypertensive therapy from the study, it was discovered that 19 patients, representing 27.9% of the total sample (N=68), were prescribed only one antihypertensive drug (Monotherapy). Meanwhile, 25 patients, comprising 36.8% of the population, received a regimen involving two different antihypertensive drugs (Two drug therapy). Seventeen patients, accounting for 25% of the study population, were prescribed a combination of three antihypertensive drugs, while 7 patients, making up 10.3% of the total, were on a regimen involving four different antihypertensive drugs.

Overall, combination therapies (including two, three, and four drug therapies) were more prevalent than monotherapy in this study. These combination therapies collectively made up 72.1% (36.8% + 25% + 10.3%) of the total cases, highlighting that a significant portion of hypertensive patients require multiple drugs to effectively manage their condition. And from this, as the number of drugs in the therapeutic regimen increases, the percentage of patients decreases which likely reflects the increasing complexity of managing hypertension in patients who do not respond adequately to single or dual therapy.

From this, it is understood that the majority of hypertensive subjects were on multidrug therapy, utilizing various combinations which is in line with earlier research by (Onwuchekwa *et al*., 2020). Specifically, 72.1% of the patients were receiving combination therapy, a proportion consistent with recommendations from multiple studies aiming for at least 70% of patients to achieve optimal blood pressure control (Chalmer, 2002). Notably, monotherapy was prevalent in 27.9% of cases, contrasting sharply with the

minimal 2.5% reported by Bakara *et al*., (2016). The study equally reveals significant insights into the distribution of different classes of antihypertensive drugs prescribed as monotherapy. Calcium channel blockers (CCBs) emerged as the most frequently prescribed class at 52.6%, similar to that reported by (Onwuchekwu *et al*., 2020) suggesting they are preferred within this patient cohort, possibly due to their efficacy or tolerability profiles. Following CCBs, beta-blockers accounted for 26.3% of prescriptions, highlighting their substantial utilization in hypertension management. ACE inhibitors constituted 10.5% of prescriptions, underscoring their role in treatment strategies. Diuretics and methyldopa each represented 5.3% of prescriptions, respectively, indicating their inclusion in therapeutic regimens.

This diversity in prescription patterns reflects varied therapeutic approaches tailored to individual patient needs, considering factors such as comorbidities and treatment response. The prominence of CCBs, beta-blockers, and ACE inhibitors underscores their established efficacy and suitability in addressing hypertension effectively. The most prescribed monotherapy drug in our study was a calcium channel blocker while the least monotherapy drug was diuretic as equally report by (Onwuchekwa *et al*., 2020).

Two-drug combination of Angiotensin converting enzyme inhibitors and calcium channel blocker, followed by a combination of calcium channel blocker and Beta blocker were The most prescribed combination therapy in this study contrast to the report of (Bakara *et al*., 2016) which showed the predominance of Angiotensin converting enzyme inhibitor/Angiotensin receptor blocker and diuretic combination. Furthermore, several studies have demonstrated a growing preference for calcium channel blockers. In this, the study demonstrates a diverse range of two-drug combinations used in managing hypertension. Each combination targets different physiological pathways involved in blood pressure regulation, Calcium channel blockers (CCBs) appear frequently in combinations suggesting their effectiveness and compatibility in dual therapy regimens. The prevalence of diabetes mellitus among participants led to a preference for combinations involving calcium channel blockers and Angiotensin converting enzyme inhibitors over combinations of Angiotensin converting enzyme inhibitors and diuretics. The diverse range of three-drug combinations ARB + BBLOCKER + CCB (17.6), DIURETICS + ARB + CCB: (29.4%), DIURETICS + ARB + METHYLDOPA (5.9%) and ACEI + CCB + METHYLDOPA (5.9%) used in managing hypertension to targets multiple physiological pathways involved in blood pressure regulation, and selection of these combinations likely considers factors such as the severity of hypertension, presence of comorbidities, and individual patient response to previous treatments. The most frequently prescribed triple therapy observed from this study is the DIURETICS + ARB + CCB: (29.4%) combination which is similar to report made by (Onwuchekwu *et al*., 2020). While in the case of four drug combination Its highlights the complexity and intensity of treatment required for managing hypertension in patients who are prescribed four-drug combinations DIURETICS + ACEI + BB + METHYLDOPA (28.6%), DIURETICS + CCB + ARB + METHYLDOPA (14.3%), DIURETICS + BB + ARB + METHYLDOPA (14.3%) and DIURETICS + ARB + BB + CCB (42.9). Such combinations are typically used in cases of severe or resistant hypertension where single or dual therapies have not achieved adequate blood pressure control and the most prescribed is DIURETICS + ARB + BB + CCB (42.9).

In the treatment of hypertension, individuals of African ancestry have historically shown better responses to calcium channel blockers (CCBs) and diuretics (Flack *et al*., 2010). Contrarily, a comparative efficacy study conducted in the United States between black and white hypertensive patients found that ACE inhibitor-based therapy was linked to poorer cardiovascular outcomes specifically among hypertensive blacks (Ogedegbe *et al*., 2015). As a result, the 2014 Joint National Committee-8 (JNC-8) recommended thiazide and CCB as the preferred initial therapies for African-Americans (James *et al*., 2014). From this study, it was observed that all patients on monotherapy (100%) achieved controlled blood pressure (BP) while those on combination therapies, the percentages of patients with controlled BP were 60% for two-drug combinations, 52.9% for three-drug combinations, and 71.4% for four-drug combinations. Conversely, the highest percentages of uncontrolled BP were found among patients receiving three-drug (29.4%), four-drug (28.6%), and two-drug (24%) therapies. There were also fluctuations in BP observed particularly among patients on twodrug and three-drug therapies. These variations in BP control across different multidrug therapy groups are likely influenced by adherence to treatment regimens.

The average prescription of 2.2 antihypertensive medications in this study aligns with reported usage in developed countries (1.3 to 2.2 drugs per prescription) as well as figures observed in developing countries (2.2 to 3.8 drugs per prescription) (Abdulameer *et al*., 2012). This suggests a potentially streamlined and cost-effective approach to managing hypertension at Umaru Musa Yar-adua Memorial Hospital in Sabon Wuse, Niger State, Nigeria.

In our study, the average number of drugs prescribed (3.8) exceeds the figure reported by Kannan *et al*., (2011) of 1.4 drugs per prescription but falls below the higher average reported by Okoro *et al*., (2018) of 5.9 drugs per prescription. The use of generic names in prescriptions was notably low, akin to findings by Patel *et al*., (2013), who also observed a minimal utilization of generics and drugs listed as essential. Brand-name prescriptions predominated, reflecting the popularity of specific brands among physicians and the influence of pharmaceutical companies.

This underscores the importance of reducing medication costs for patients by increasing generic prescribing and minimizing the number of drugs per prescription. Such measures can enhance patient compliance and promote rational drug use without compromising treatment efficacy, thus achieving optimal control of hypertension. Prescribing generics allows flexibility in stocking and dispensing cheaper yet equally effective alternatives to proprietary brands, aligning with principles of essential drug lists. The

high percentage (92.3%) of drugs prescribed from the national essential drug list demonstrates awareness and adherence to selecting drugs for their rational use.

Limitations of the study

This study has some limitations which warrant attention and further research. Firstly, due to its small sample size and relatively short duration of time, it is difficult to identify any association between variables within specific patient subgroups. Additionally, its retrospective nature made it difficult to ascertain any causality and adherence to medications, especially among older patients which might have influenced the clinical management of hypertension as a confounding factor.

CONCLUSION

The research found out that the most commonly prescribed antihypertensive drug class for patients in Umaru Musa Yar-adua Memorial Hospital was the calcium channel blockers both as monotherapy and in combination with Angiotensin converting enzyme inhibitors or Angiotensin receptor blockers with an optimal level of prescriber's adherence to current evidence and clinical guideline.

RECOMMENDATION

Future studies should incorporate larger sample size to provide more robust data on medication utilization in relation to hypertension management. Pharmaceutical care should be fully institutionalized to aid availability of data for researches that add values to patients care.

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