Evaluation of Prescribing Pattern of Antihypertensives and Adherence to JNC-8 Guidelines in A Tertiary Care Hospital in Southern Nigeria

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Abstract

Background*: Hypertension is a significant public health concern globally, particularly in Nigeria, where its prevalence is rising sporadically. Effective management of hypertension requires adherence to evidence-based guidelines, such as those provided by the Eighth Joint National Committee (JNC-8). This study aimed to evaluate the prescribing pattern of hypertensive medications and their adherence to JNC-8 guidelines in a tertiary care hospital in Southern Nigeria.*

Methods*: A retrospective study was conducted on 194 prescriptions for a period of 6 months (October,2023 to March,2024) from two cardiologists and four general practitioners. Baseline characteristics, including age distribution and blood pressure readings, were assessed. Medication classes prescribed for hypertension were categorized, and adherence to JNC-8 guidelines was evaluated.*

Results*: The mean age of the study population was 54.7 years, with a majority falling into the age groups of 41-60 and >60. The mean systolic and diastolic blood pressure readings were 151 mmHg and 94.6 mmHg, respectively. While 62.89% of the subjects had controlled blood pressure according to JNC-8 guidelines, 37.11% belonged to the uncontrolled group (blood pressure >140/90 mmHg). The gender distribution showed a slight predominance of males (52%) over females (45%). The most commonly prescribed antihypertensive medication classes were CCBs (72.16%), BBs (58.76%), diuretics (45.26%) and ARBs (42.24%). Adherence to JNC-8 guidelines was higher among prescriptions with controlled blood pressure (group 2) compared to uncontrolled (group 1)*

Conclusion*: The factors affecting prescribing patterns and guideline adherence in hypertension management include the complexity of treatment decisions, variations in physician experience and knowledge, and challenges such as managing resistant hypertension and addressing patient-specific factors. While a significant proportion of patients achieve controlled blood pressure levels, deviations from guideline recommendations indicate opportunities for improvement. Addressing*

these factors through targeted interventions aimed at enhancing guideline adherence and optimizing prescribing practices is crucial for improving hypertension management outcomes in Southern Nigeria and reducing the burden of cardiovascular diseases in the region.

KEYWORDS; *antihypertensives, hypertension, JNC-8, guidelines, prescription, prescribing pattern, evaluation, southern, Nigeria, adherence, tertiary, hospital*

INTRODUCTION

Despite intensive efforts at control, hypertension continues to be a major global cause of cardiovascular disease morbidity and mortality.(1) In sub-Saharan Africa, hypertension and its consequences continue to be major causes of adult morbidity and mortality even with the availability of a wide range of antihypertensive medicines.(2,3)

A key component of medical review is the analysis of prescribing patterns, which aids in the tracking, assessment, and development of necessary changes to prescribing practices in order to achieve logical and economical medical treatment.(4)

A medication therapy regimen is often chosen by the clinician from a range of therapeutic techniques once a patient with a health issue has been assessed and diagnosed. A written prescription for the medication is needed for this. writing prescriptions is a talent that requires years of practice, dedication, and solid understanding of the fundamentals of the subject. It is not as simple as writing down a few drug names.(4,5) . The most recent updated guideline for the prevention, diagnosis, and treatment of hypertension is the Eighth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 8) guidelines, which is derived from JNC reports, which have shown to be a significant source of evidence-based, achievable and practical guidelines. It incorporates changes to JNC 7 about therapeutic goals, thresholds for therapy, and drugs or combinations of drugs with varying advantages for specific patient populations.(6)

A number of factors have been proposed to explain the high prevalence of uncontrolled hypertension, including poverty, ignorance, and poor adherence to treatment regimens. (7) However, recent research highlighted the contribution of healthcare providers to subpar antihypertensive medication adherence. (8,9) Thus, it has been noted that following accepted practices can help doctors prescribe antihypertensive medications in an efficient manner. In this study, outcome in the trends of physicians' prescription patterns were identified and compared to the adherence with JNC 8 guidelines of prescribing antihypertensives.

METHOD

This study is a retrospective cross-sectional one that was conducted in Nigeria from October to February of 2024. Data was collected from the pharmacy department of the Goodheart Medical Consultant hospital, records of 194 patients, ages 16 to 94 mean ± SD; 55 ± 15.5. The prescriptions of 2 cardiologists and 4 general practitioners. 36 clinical records were deemed incomplete and so

eliminated. patients who passed away during the study due to hypertension-related complications were not included in the computation of treatment outcomes, such as blood pressure management. Age, gender, recorded blood pressure at the time of first clinic attendance or hospitalization, blood pressure at follow-up visits, and the anti-hypertensive medication are examples of demographic and clinical data. A medication prescription with a set dosage combination was regarded as monotherapy. The maintenance of blood pressure readings less than 140/90 mm Hg for at least two consecutive appointments was referred to as blood pressure control.(7)

The prescription patterns were compared to these JNC 8 guidelines; which markedly altered the way that hypertension was managed. The guideline recommended using some antihypertensive drugs more sparingly and placed more emphasis on setting higher blood pressure objectives for specific patient populations.

Among the JNC 8 guidelines' main points are:

1. Blood Pressure Goals: The target blood pressure reading was increased to <150/90 mm Hg for individuals 60 years of age or older who did not have diabetes or chronic renal disease. The target blood pressure level was set at <140/90 mm Hg for patients with diabetes, chronic renal disease, or both who were 60 years of age or older and did not have significant comorbidities.(10)
2. Suggested Medication: The guidelines restricted the use of four kinds of drugs for first- and second-line treatments: thiazide-type diuretics, calcium channel blockers (CCBs), angiotensin-converting enzyme (ACE) inhibitors, and angiotensin receptor blockers (ARBs). Later-line alternatives included beta- and alpha-blockers, loop diuretics, aldosterone antagonists, and other drugs.(9,10)
3. Considering Ethnicity: Patients of African descent who did not have chronic renal disease were recommended to start with CCBs and thiazide-like diuretics rather than ACE inhibitors. Regardless of ethnicity, the use of ARBs and ACE inhibitors was advised for all patients with chronic renal disease.(10)
4. Particular Suggestions: It was advised against using ARBs and ACE inhibitors in the same patient at the same time. Due to the possibility of adverse effects, patients over 75 years old with reduced renal function were advised to use CCBs and thiazide-type diuretics instead of ACE inhibitors and ARBs.(9,10)

RESULTS

This retrospective study on assessment of prescription pattern for hypertension and comparison with JNC 8 Guideline was conducted in Goodheart Medical Consultant Hospital, Port-Harcourt, Rivers state.in which 194 prescriptions were screened for the study from 2 cardiologists and 4 general practitioners and compared to the prescribing JNC-8 guidelines. Table 1 indicates the baseline characteristics of the study, mean ± SD of these characteristics including the age 54.7 ± 15.1, the age of these subjects was grouped into three, 0-40,41-60,>60. Most patients fell in the group of 41-60 and >60. Blood pressure (BP) of these subjects was grouped into two groups according to the JNC-8 guidelines, group 1 showing bp ranges >140/90 and group 2 with bp ranges <140/90. The mean ± SD of systolic readings was 151 ± 13.5 and diastolic readings was 94.6 ± 84. Findings from this study showed that 62.89% of the subjects had controlled BP readings according to the guideline an 37.11% in group 1. Figure 1. shows the gender distribution amongst the patient's prescriptions. 45% of the subjects were female and 52% were male. The

antihypertensive medications were represented according to their various classes; Angiotensin Converting Enzyme Inhibitors (ACEIs) at 21.66%, Angiotensin Receptor Blockers (ARBs) at 42.24%, Calcium Channel Blockers (CCB) at 72.16%, Beta Blockers (BB) at 58.76% and diuretics at 45.26%. Figure 3 showed the comparison between the adhered and non-adhered prescriptions among the different BP groups with group 1 having 35.05% of prescriptions and 51.55% of group 2 prescriptions adhered to the JNC-8 guidelines.

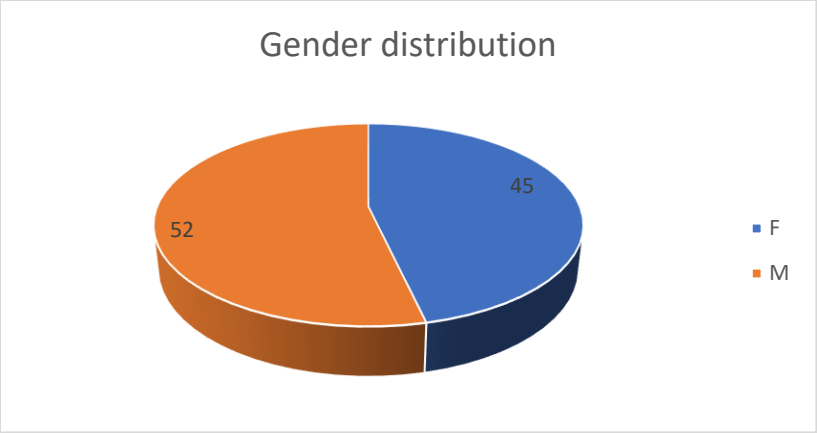

FIG 1: GENDER DISTRIBUTION.

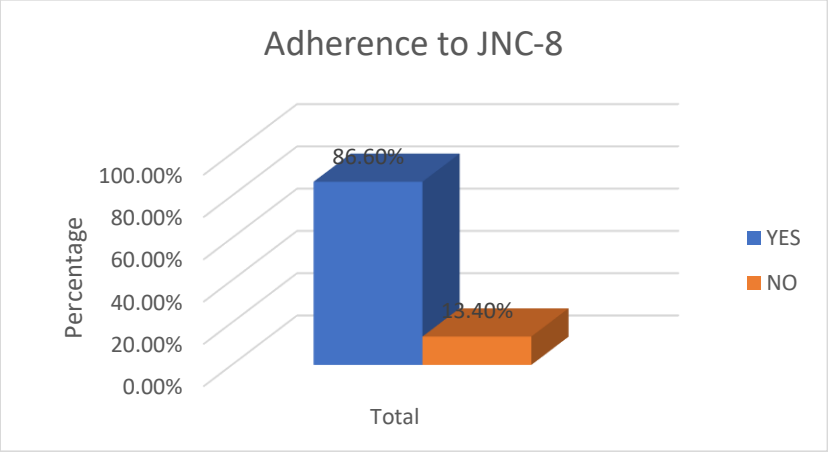

FIG 2: PERCENTAGE OF ADHERENCE TO JNC-8 GUIDELINE

TABLE 1; BASELINE CHARACTERISTICS

VARIABLES	
MEAN ± SD	
AGE	**54.7 ± 15.1**
SYSTOLIC	**151 ± 13.5**
DIASTOLIC	**94.6 ± 84**
GENDER (%)	
MALE	**45 (46.39)**
FEMALE	**52 (53.61)**
MEDICATIONS (%)	
ACEIs	**21 (21.65)**
ARBs	**41 (42.27)**
CCB	**70 (72.16)**
BB	**57 (58.76)**
DIURETICS	**44 (45.26)**
BP GROUPS (%)	
GROUP 1	**87 (86.60)**
GROUP 2	**13 (13.40)**
ADHERENCE TO JNC-8 (%)	
YES	**87 (86.60)**
NO	**13 (13.40)**

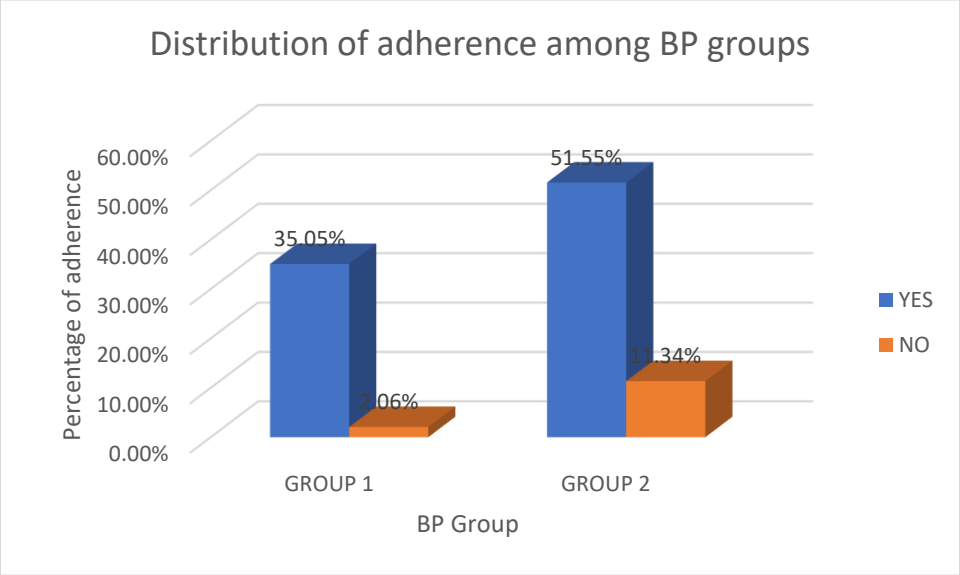

FIG 3: DISTRIBUTION OF PRESCRIPTIONS AMONG BP GROUPS

TABLE 2; Title: Concordance between JNC 8 Guidelines and Hypertension Prescribing Patterns

JNC 8 GUIDELINE	STUDY RESULT
1. Blood Pressure Goals	
<150/90 mm Hg for individuals aged 60+ without diabetes or chronic renal disease.	62.89% patients aged 60+ had controlled BP (<150/90 mmHg).
2. Suggested Medication	
Thiazide-type diuretics, CCBs, ACE inhibitors, and ARBs as first- and second-line treatments.	CCBs were most commonly prescribed (72.16%), followed by ARBs (42.24%), diuretics (45.26%) and ACEIs (21.66%),
3. Considering Ethnicity	
CCBs and thiazide-like diuretics recommended for African descent without chronic renal disease.	Ethnicity-specific prescribing patterns were considered as 98% of subjects were of African origin.
4. Particular Suggestions	
Avoid using ARBs and ACE inhibitors simultaneously.	Majority of patients received either (21.65%) ACE inhibitors or (42.65%) ARBs

DISCUSSION

In line with recent studies, poorly controlled hypertension contributes to significant target organ damage and increases mortality(11). The prescribing patterns of antihypertensive medications and their adherence to the JNC-8 guidelines among hypertensive patients in Southern Nigeria. The mean age of the subjects was 54.7 ± 15.1 years, with the majority falling in the age groups of 41-60 and >60 years in line with a retrospective study in the south-western region of Nigeria.(12) This distribution reflects the higher prevalence of hypertension among older adults(4,12). Blood pressure (BP) measurements showed a mean systolic reading of 151 ± 13.5 mmHg and a mean diastolic reading of 94.6 ± 84 mmHg. These values indicate elevated blood pressure levels among the study population in opposition to the prevalence of blood pressure in the study population a Nigerian study.(13,14) In other reports, the crude prevalence of hypertension has been documented as 11.2% with basis of bp threshold of 160/95mmhg which is in close range with this study.(11,14,15) West African reports on the epidemiology of hypertension have surfaced.(15) By comparison, most of the earlier epidemiological reports on hypertension are either on a particular sector of the population.(15,16)

In comparison to JNC-8 guidelines, 62.89% of the subjects had controlled BP readings (<140/90 mmHg), while 37.11% fell into the uncontrolled BP group (>140/90 mmHg).(7,17,18) These findings suggest that a significant proportion of hypertensive patients in the study population have achieved target BP levels as in some studies(19), although there is still room for improvement,

particularly among those with uncontrolled hypertension. The gender distribution among the patient's prescriptions showed that 45% were female and 52% were male. This balanced distribution indicates that hypertension affects both genders equally in the study population.

The study analyzed the prescribing patterns of various classes of antihypertensive medications. Angiotensin-Converting Enzyme Inhibitors (ACEIs) accounted for 21.66% of prescriptions, while Angiotensin Receptor Blockers (ARBs) were prescribed in 42.24% of cases. Calcium Channel Blockers (CCBs) were the most commonly prescribed class at 72.16%, followed by Beta Blockers (BB) at 58.76%, and diuretics at 45.26% in concordance to various studies. (20–22) Similar to other studies, most patients were prescribed fixed-dose combination, with the most commonly used combination being CCB + ARB + DIURETIC. (20)

These results show the variation in prescription choices, reflecting the availability of different classes of antihypertensive drugs and individual patient characteristics influencing prescribing decisions. The comparison between adhered and non-adhered prescriptions among different BP groups show different levels of adherence to evidence-based guidelines among healthcare providers, with a considerable proportion of prescriptions in the uncontrolled BP group deviating from recommended practices.

The difference in adherence to hypertension treatment guidelines, with 86.60% of prescriptions adhering and 13.4% not adhering, can be attributed to several factors including; the experience and knowledge of physicians in managing hypertension which may influence adherence, with some physicians relying more on clinical experience while others closely adhere to evidence-based guidelines. Additionally and in concordance with several African studies, patient-specific factors such as comorbidities, medication tolerability, and socioeconomic status may necessitate deviations from guidelines to tailor treatment plans.(23) Cases of resistant hypertension, where blood pressure remains high despite optimal medication regimens, present a particular challenge and may require alternative treatment approaches.(24,25) Access to resources, including medication availability can also impact adherence rates.(23,26) Furthermore, patient adherence to prescribed medications and lifestyle modifications plays a crucial role in achieving optimal blood pressure control.(23,26) The timing of guideline updates relative to the study period may influence physician familiarity and adherence rates. (27)

CONCLUSION

The prescribing patterns of antihypertensive medications and their adherence to the JNC-8 guidelines in a tertiary care hospital in Southern Nigeria showed a significant proportion of patients achieved controlled BP levels, with enough room for improvement in adherence to guideline-recommended practices. A significant proportion of patients achieved controlled blood pressure levels, with 62.89% meeting the target recommended by JNC-8 guidelines. However, 37.11% of patients still had uncontrolled blood pressure, indicating room for improvement in hypertension management practices. The study also highlights the predominant use of ACE inhibitors and ARBs among prescribed antihypertensive medications, with other classes such as calcium channel blockers, beta-blockers, and diuretics also commonly prescribed. Interestingly, the adherence rate to the JNC-8 guidelines was relatively high at 86.60%, suggesting a generally favorable adherence

among healthcare providers. However, 13.4% of prescriptions deviated from guideline recommendations, indicating areas of improvement.

Possible reasons for non-adherence include complex patient-specific factors, challenges in managing resistant hypertension cases, and variations in physician experience and knowledge. Addressing these factors through ongoing education, guideline dissemination, and multidisciplinary collaboration may help improve adherence to evidence-based guidelines and ultimately enhance hypertension management outcomes in Southern Nigeria. Further research is warranted to explore the underlying reasons for non-adherence and to implement targeted interventions aimed at optimizing prescribing practices and improving patient care in the region. The current study emphasizes the value of regular prescription analysis and the necessity of incorporating prescription writing and the essential drug list concepts into medical curricula and continuing medical education programs seem like sensible ways to encourage rational drug prescribing.

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