Antihypertensive Prescription Patterns of Nonspecialist General Practitioners in Lagos, Nigeria

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Abstract

Context: Concerns have been expressed about the antihypertensive prescription patterns of nonspecialist physicians who care for the majority of patients with hypertension in developing countries. **Aims:** The aim of the study was to assess the antihypertensive prescription pattern of nonspecialist general medical practitioners in Lagos, Nigeria. **Settings and Design:** This was a cross-sectional survey carried out among nonspecialist general medical practitioners within Lagos State, Nigeria. **Subjects and Methods:** A total of 132 doctors completed questionnaires about their demographics, duration and location of practice, and antihypertensive prescription patterns. **Statistical Analysis Used:** Continuous variables are presented as means or medians while categorical variables are presented as percentages. Comparison between means was done using the Student's *t*-test, while comparison between percentages was carried out using Chi-square test. **Results:** Majority (61.2%) considered thiazide diuretics their first choice antihypertensive. The most frequently prescribed antihypertensives were calcium channel blockers (CCBs) (88.6%), thiazide diuretics (85.6%), and angiotensin converting enzyme inhibitors (ACEIs) (84.8%). These were also the most frequently combined with the CCB-thiazide diuretic combination being the most frequently prescribed (81.1%) followed by the ACEIs – thiazide diuretic combination (65.9%). The most frequently considered factors when prescribing antihypertensive medications were side effects of the medications (92.4%), additional benefits beyond blood pressure (BP) lowering (90.9%), patients' BP at the time of presentation (89.4%), dosage frequency of the drug (87.9%), and available scientific evidence for efficacy in lowering BP (87.1%). **Conclusions:** The antihypertensive prescription pattern of nonspecialist physicians practicing in Lagos aligns with current hypertension treatment guidelines.

Key words: Antihypertensive medications, nonspecialist physicians, prescription

INTRODUCTION

The last few decades have witnessed the development of several new and potent antihypertensive drugs.^[1-3] Blood pressure (BP) control, however, remains poor among a significant proportion of the hypertensive population. In many countries, the rate of BP control among patients with hypertension is <50%.^[4-10] The implication is that hypertension-related adverse outcomes continue to be a major health burden.^[11-14] Patient-related factors causing the high rates of failure to achieve BP control targets have been the most studied and reported in the literature.^[15,16] Physician-related factors, especially preferences in antihypertensive prescription affect patient outcomes since they determine the choice and dose of antihypertensive medications prescribed.^[17,18]

Majority of the studies that have assessed antihypertensive prescription patterns of physicians were carried out in tertiary care institutions.^[19-22] Not only do these institutions

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	DOI: 10.4103/1118-4647.177530			

serve a small segment of the hypertensive population but also the physicians practicing in these institutions are likely to be abreast of current concepts and treatment guidelines relating to hypertension. Nonspecialist physicians are responsible for providing care for most of the hypertensive patients in developing countries, Nigeria, inclusive and concerns have in fact been raised about the antihypertensive prescription patterns of this category of physicians in some countries.^[23] The aim of this study was to assess the antihypertensive medication prescription pattern of nonspecialist general medical practitioners in Lagos, South-West Nigeria.

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How to cite this article: Bello BT, Amadi CE, Amira CO, Mbakwem AC. Antihypertensive prescription patterns of nonspecialist general practitioners in Lagos, Nigeria. Niger J Gen Pract 2016;14:6-10.

SUBJECTS AND METHODS

This was a cross-sectional survey of nonspecialist general medical practitioners practicing within Lagos State, Nigeria. A total of 150 questionnaires were distributed with 132 doctors returning completed questionnaires giving a response rate of 88%. The sample size was determined using the formula for determining sample size for descriptive studies^[24] while taking into account the facts that there are approximately 60,000 registered doctors in Nigeria^[25] and about 6000 of them practice in Lagos^[26] and assuming a 90% response rate. Doctors were included in the study if they possessed a basic medical degree from a recognized university, had been fully registered with the Medical and Dental Council of Nigeria, had not undergone any form of residency training and consented to participate in the study. The study protocol was approved by the Health-Research and Ethics Committee of the Lagos University Teaching Hospital.

Information concerning antihypertensive prescription pattern was retrieved from the doctors using a self-administered structured questionnaire. Information retrieved included, certain aspects of the participants' biodata, institution and date of primary medical degree, location of current practice, number and type of hypertensive patients seen in their practice, and pattern of prescription of antihypertensive medications. No personal information that could be traced directly to the respondents was requested. This was to protect the anonymity of the respondents and to reassure them that they were not being audited by any agencies so that the responses reflect as much as possible their usual practice. Doctors who were in employed in hospitals run by the government or their agencies were considered as being government-employed doctors while those employed by hospitals owned by individuals or private organizations were considered as being privately-employed doctors.

The questionnaires were distributed at ten different continuing medical education programs (CMEs) organized for doctors in Lagos between January 1, 2013, and December 31, 2013. At these CMEs, doctors meeting the inclusion criteria for the study were identified, informed about the study and asked if they had participated in the study previously. Those individuals who had not previously participated in the study and consented were given a questionnaire to fill and return. Data obtained were analyzed using Epi Info® statistical software (United States Centers for Disease Control) Continuous variables are presented as means or medians while categorical variables are presented as percentages. Comparison between means was carried out using the Student's t-test, while comparison between percentages was carried out using Chi-square. Differences between groups were considered as being statistically significant when the P < 0.05.

RESULTS

Ninety-one (68.9%) of the respondents were males while the median age of the doctors was 34 years with a range of 25 years

to 73 years. The median duration since completion of primary medical training was 7 years with a range of 3–35 years. One hundred and thirty-one (99.2%) doctors admitted to directly caring for patients with hypertension routinely, while 71 (53.8%) admitted being conversant with current guidelines on the management of hypertension. Table 1 shows the location of practices of the participating doctors, an estimate of the number of patients with hypertension seen by the doctors monthly as well as the proportion of the doctors that care for hypertensive patients with various comorbid conditions.

Figure 1 shows the proportion of doctors that prescribe various classes of antihypertensive medications while Figure 2 shows the antihypertensive class considered first choice medications by the doctors. Twenty-one (15.9%) of the doctors combined antihypertensive medications from two or more classes routinely for all patients, 115 (87.1%) combined antihypertensive medications when they are unable to achieve target BP with monotherapy, 101 (76.5%) combined antihypertensive medications for patients whose initial presentation is with severely elevated BP, while 97 (73.5%) combined antihypertensive medications when there are compelling indications for the use of more than one class of medications in a patient. Figure 3 shows the antihypertensive combinations frequently prescribed by the doctors. Table 2 shows the factors taken into consideration by the doctors when prescribing antihypertensive medications as a well as a comparison of the considerations by doctors employed in government and private hospitals.

Characteristic	Frequency (%)	
Location of current practice		
Private hospital	53.0	
Federal medical center	18.9	
General hospital	15.1	
Military hospital	7.6	
Primary Health Center	3.0	
Not stated	2.3	
Estimate of the number of		
hypertensive patients seen monthly		
<10	9.9	
10-19	30.3	
20-29	19.7	
30-39	8.3	
40 or more	27.3	
Not specified	4.6	
Cares for patients with hypertension		
Diabetes	96.2	
Dyslipidemia	76.5	
Hypertensive heart disease	72.0	
Stroke	69.7	
Heart failure	55.3	
Proteinuria	37.1	
Elevated serum creatinine	25.8	

DISCUSSION

Participants in this study cover a broad spectrum of nonspecialist doctors when the spread in the location of practice, age range as well as duration since completion of primary medical training is taken into account and are likely to be representative of nonspecialist general medical practitioners in Lagos. Virtually, all participants in the study routinely cared for patients with hypertension in their practice with more than half of them seeing at least twenty hypertensive patients monthly. Furthermore, with the exception of hypertensive patients who have renal dysfunction, majority of the doctors are involved in caring for hypertensive patients with comorbid conditions such as diabetes, previous strokes, hypertensive heart disease, and dyslipidemia that put them at high risk for adverse cardiovascular outcomes.

The spectrum of antihypertensive medications prescribed by the doctors was wide and probably reflected the range of antihypertensive medications available locally. Despite this,



Figure 1: Classes of antihypertensive medications prescribed by the doctors. α -blockers: α -adrenoceptor antagonists, Loops: Loop diuretics, β -Blockers: β -adrenoceptor antagonists, CAAs: Centrally acting agents, ARBs: Angiotensin-II receptor antagonists, ACEIs: Angiotensin-converting enzyme inhibitors, Thiazides: Thiazide diuretics, CCBs: Calcium channel blockers

however, the majority of the doctors considered thiazide diuretic as antihypertensive medication of first choice. The three most commonly prescribed antihypertensive medications were calcium channel blockers (CCBs), thiazide diuretics, and angiotensin converting enzyme inhibitors (ACEIs). Considering that the patient population is likely to overwhelmingly black African, this finding is in keeping with recommendations of current hypertension treatment guidelines.^[27-30] Furthermore, it is similar to the pattern of prescription of antihypertensive medication reported for physicians in both secondary and tertiary healthcare settings in Nigeria where CCBs, thiazide diuretics, and ACEIs were reported to be the most frequently prescribed antihypertensive medications.^[20,31-33] More than half of the doctors, however, prescribe centrally acting agents routinely a finding that is not supported by current treatment guidelines and is also at variance with what obtains in tertiary care settings where the prescription of centrally active agents is low.^[20,27-33] This may be due to the fact these groups of drugs are relatively cheap and readily available.



Figure 2: View of the doctors on the antihypertensive of first choice. β -Blockers: β -adrenoceptor antagonists, Loops: Loop diuretics; CAAs: Centrally acting agents, ACEIs: Angiotensin-converting enzyme inhibitors, CCBs: Calcium channel blockers, Thiazides: Thiazide diuretics

Table 2: Factors considered by the doctors in choosing an antihypertensive						
Factors taken into consideration	All doctors (%)	Privately employed doctors (%)	Government-employed doctors (%)	Р		
Scientific evidence of efficacy in BP lowering	87.1	85.35	91.8	0.01*		
Cost of the medication	84.8	82.4	90.2	0.02*		
Additional benefits provided by the drug beyond BP lowering	90.9	95.6	88.5	< 0.01*		
Availability of the drugs in the hospital's pharmacy	59.8	61.8	59.0	0.61		
Presence of compelling indications/contraindications	79.5	79.4	82.0	0.13		
Side effect profile of the drugs	92.4	95.8	91.8	< 0.01*		
Dosage frequency of the drug	87.9	91.2	86.9	0.01*		
The patient's gender	60.6	60.3	63.9	0.08		
Patient's BP at the time of presentation	89.4	88.2	93.4	< 0.01*		
The patient's race	72.0	77.4	67.2	0.12		
Pressure from the drug manufacturer's representative	5.3	4.4	6.6	0.79		
*Statistically significant DD: Dlood program						

*Statistically significant. BP: Blood pressure



Figure 3: Most commonly prescribed antihypertensive combinations. BB: β -adrenoceptor antagonists, CAAs: Centrally acting agents, ARBs: Angiotensin-II receptor antagonists, ACEIs: Angiotensin converting enzyme inhibitors; CCBs: Calcium channel blockers

Combination therapy of antihypertensives is the rational use of two or more antihypertensive agents to achieve BP control target. Usually, such combinations reflect the multimechanistic etiology of hypertension. Current guidelines recommend that combination therapy is used in patient with stage two or higher hypertension and in those with high cardiovascular disease risk to achieve optimal BP control.^[27-30] Doctors who participated in our study frequently prescribed combination antihypertensive medications. The most frequent reasons for instituting combination therapy were failure of monotherapy to achieve BP targets, severely elevated baseline BP and presence of compelling indications for the use of more than one class of medications in a patient. These reasons align with recommendation of current hypertension management guidelines.^[27-30] The most frequently combined antihypertensives were CCBs, thiazide diuretics, and ACEIs with the CCB-diuretic combination being the most frequently prescribed followed by the ACEI-diuretic combination. Interestingly, nondiuretic-based combinations were infrequently prescribed by doctors who participated in the study. Again, this prescription pattern is in line with recommendations current guidelines and similar to those reported from secondary and tertiary healthcare facilities in Nigeria.^[20,27-33] A small proportion of the doctors who participated in the study admitted to prescribing ACEI-ARB combination. This is despite there being no current guideline supporting the use of ACEI and ARBs combination and the availability of evidence to suggest possible deleterious effects of this combination in certain patient populations.^[34,35]

Prescribing, in general, is a complex behavior that is affected by several factors. Overall, the most commonly considered factors by doctors who participated in the study when prescribing antihypertensive medications were side effect profile of the medications, additional benefits provided by the drug beyond BP lowering, the patients' BP at the time of presentation, the dosage frequency of the drug, and available scientific evidence for efficacy of the drug in lowering BP. This finding is in keeping with the suggestion by Moore^[36] that scientific data on proven efficacy, once a day dosing, benefits beyond BP reduction, and low incidence of side effects should be the primary considerations in choice of antihypertensive prescription. However, a comparison of factors considered by doctors in government-run hospitals and their counterparts in privately-run hospital revealed some subtle differences. Doctors employed in government-run hospitals were more likely to consider the patients BP at presentation, scientific evidence of efficacy of the various agents, and cost of the agents, whereas doctors in privately-run hospitals were more likely to consider additional benefits provided by the drug beyond BP reduction, dosing frequency of the drug, and side effect profile of the drugs. These differences reflect to a large extent the practice philosophy of doctors in public and private hospitals in Nigeria. In public hospitals, most of the patients accessing care are low-income earners and may not be able to afford more expensive medications and thus their doctors are bound to be persuaded on the scientific evidence of efficacy and cost in deciding which drugs to prescribe. On the other hand, doctors in private hospitals are more likely to see patients whose care is being paid for either by their employers or their healthcare insurance companies. As such, the actual cost to the patient is a less important consideration than the patient's convenience and clinical outcomes.

A major limitation of the study is the subjective nature of the information obtained. The doctors who participated in the study gave information as to which antihypertensive medications they prescribed with resultant possibility of self-reporting bias. A review of the actual pharmacy prescription sheets would provide more objective evidence of the antihypertensive prescription patterns of these doctors.

CONCLUSION

In general, the antihypertensive medication prescription patterns of nonspecialist physicians practicing in Lagos aligns with internationally accepted guidelines for the treatment of hypertension and are similar to those reported from tertiary care institutions in the country.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: Analysis of worldwide data. Lancet 2005;365:217-23.
- Hansson L. The benefits of lowering elevated blood pressure: A critical review of studies of cardiovascular morbidity and mortality in hypertension. J Hypertens 1996;14:537-44.
- Neal B, MacMahon S, Chapman N; Blood Pressure Lowering Treatment Trialists' Collaboration. Effects of ACE inhibitors, calcium antagonists, and other blood-pressure-lowering drugs: Results of prospectively

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- Bromfield SG, Bowling CB, Tanner RM, Peralta CA, Odden MC, Oparil S, *et al.* Trends in hypertension prevalence, awareness, treatment, and control among US adults 80 years and older, 1988-2010. J Clin Hypertens (Greenwich) 2014;16:270-6.
- Bersamin A, Stafford RS, Winkleby MA. Predictors of hypertension awareness, treatment, and control among Mexican American women and men. J Gen Intern Med 2009;24 Suppl 3:521-7.
- Altun B, Arici M, Nergizoglu G, Derici U, Karatan O, Turgan C, et al. Prevalence, awareness, treatment and control of hypertension in Turkey (the PatenT study) in 2003. J Hypertens 2005;23:1817-23.
- Wu Y, Huxley R, Li L, Anna V, Xie G, Yao C, et al. Prevalence, awareness, treatment, and control of hypertension in China: Data from the China National Nutrition and Health Survey 2002. Circulation 2008;118:2679-86.
- Pereira M, Lunet N, Azevedo A, Barros H. Differences in prevalence, awareness, treatment and control of hypertension between developing and developed countries. J Hypertens 2009;27:963-75.
- Salako BL, Ajose FA, Lawani E. Blood pressure control in a population where antihypertensives are given free. East Afr Med J 2003;80:529-31.
- Isezuo AS, Njoku CH. Blood pressure control among hypertensives managed in a specialised health care setting in Nigeria. Afr J Med Med Sci 2003;32:65-70.
- Iseuzo SA, Omotoso AB, Gaye A, Corrah T, Araoye MA. One year survival among sub-Saharan Africans with hypertensive heart failure. Trop Cardiol 2000;26:57-60.
- Sengul S, Erdem Y, Akpolat T, Derici U, Sindel S, Karatan O, *et al.* Controlling hypertension in Turkey: Not a hopeless dream. Kidney Int Suppl 2013;3:326-31.
- Mortality after 10 1/2 years for hypertensive participants in the Multiple Risk Factor Intervention Trial. Circulation 1990;82:1616-28.
- Morisky DE, Levine DM, Green LW, Shapiro S, Russell RP, Smith CR. Five-year blood pressure control and mortality following health education for hypertensive patients. Am J Public Health 1983;73:153-62.
- Iseuzo SA, Opara TC. Hypertension awareness among Nigerian hypertensives in a tertiary health institution. Sahel Med J 2000;3:93-7.
- 16. Jafar TH, Levey AS, Jafary FH, White F, Gul A, Rahbar MH, *et al.* Ethnic subgroup differences in hypertension in Pakistan. J Hypertens 2003;21:905-12.
- Oliveria SA, Lapuerta P, McCarthy BD, L'Italien GJ, Berlowitz DR, Asch SM. Physician-related barriers to the effective management of uncontrolled hypertension. Arch Intern Med 2002;162:413-20.
- Inui TS, Yourtee EL, Williamson JW. Improved outcomes in hypertension after physician tutorials. A controlled trial. Ann Intern Med 1976;84:646-51.
- Pai PG, Shenoy J, Sanji N. Prescribing patterns of antihypertensive drugs in a South Indian tertiary care hospital. Drug Invent Today 2011;3:38-40.
- Etuk E, Isezuo SA, Chika A, Akuche J, Ali M. Prescription pattern of anti-hypertensive drugs in a tertiary health institution in Nigeria. Ann Afr Med 2008;7:128-32.
- Almas A, Ur Rehman Iqbal S, Ehtamam A, Khan AH. Spectrum of antihypertensive therapy in South Asians at a tertiary care hospital in Pakistan. BMC Res Notes 2011;4:318.
- Axon RN, Nietert PJ, Egan BM. Antihypertensive medication prescribing patterns in a university teaching hospital. J Clin Hypertens (Greenwich) 2010;12:246-52.

- Jafar TH, Jessani S, Jafary FH, Ishaq M, Orakzai R, Orakzai S, *et al.* General practitioners' approach to hypertension in urban Pakistan: Disturbing trends in practice. Circulation 2005;111:1278-83.
- Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing Clinical Research. 4th ed. Wolters Kluwer/Lippincott Williams and Wilkins; 2013.
- Onuoha O. (Partnerships and Communications Officer-African Public Health Alliance 15%+Campaign). Media/Public Statement: Conference of African Ministers of Education Abuja; 25 April, 2012. Available from: http://www.who.int/workforcealliance/media/news/2012/African MinistersofEducation_statement.pdf. [Last accessed on 2015 Mar 17].
- 26. Ogundipe S, Obinna C, Olawale G. Shortage of Medical Personnel: Tougher Times Ahead for Nigerians (2). The Vanguard Newspapers; 3rd February, 2015. Available from: http://www.vanguardngr. com/2015/02/shortage-medical-personnel-tougher-times-aheadnigerians-2. [Last accessed on 2015 Mar 17].
- Whitworth JA, Chalmers J. World health organisation-international society of hypertension (WHO/ISH) hypertension guidelines. Clin Exp Hypertens 2004;26:747-52.
- James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, *et al.* 2014 evidence-based guideline for the management of high blood pressure in adults: Report from the panel members appointed to the Eighth Joint National Committee (JNC 8). JAMA 2014;311:507-20.
- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr., *et al.* The Seventh Report of the Joint National Committee on Prevention, detection, evaluation, and treatment of high blood pressure: The JNC 7 report. JAMA 2003;289:2560-72.
- 30. Mancia G, De Backer G, Dominiczak A, Cifkova R, Fagard R, Germano G, et al. 2007 Guidelines for the management of arterial hypertension: The Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). J Hypertens 2007;25:1105-87.
- Okonta JM, Nduka V, Idodo VE. Prescribing pattern of antihypertensive and antidiabetic agents in a secondary healthcare institution in Nigeria. J Pharm Sci Res 2013;5:12-7.
- Ukwe CV, Ubaka CM. Antihypertensive drug prescribing in a tertiary hospital in Eastern Nigeria. Trop J Pharm Res 2012;11:297-305.
- Ojji DB, Ajayi SO, Mamven MH, Alfa J, Albertino D. Pattern of prescription of anti-hypertensive medications in a tertiary health care facility in Abuja, Nigeria. Ethn Dis 2013;23:480-3.
- 34. Phillips CO, Kashani A, Ko DK, Francis G, Krumholz HM. Adverse effects of combination angiotensin II receptor blockers plus angiotensin-converting enzyme inhibitors for left ventricular dysfunction: A quantitative review of data from randomized clinical trials. Arch Intern Med 2007;167:1930-6.
- 35. Lakhdar R, Al-Mallah MH, Lanfear DE. Safety and tolerability of angiotensin-converting enzyme inhibitor versus the combination of angiotensin-converting enzyme inhibitor and angiotensin receptor blocker in patients with left ventricular dysfunction: A systematic review and meta-analysis of randomized controlled trials. J Card Fail 2008;14:181-8.
- Moore MA. Choosing initial antihypertensive drug therapy for the uncomplicated hypertensive patient. J Clin Hypertens (Greenwich) 2001;3:37-44.