

## Research Article

# Assessment of Hypertension Care in a Nigerian Hospital

Ifeanyi E Chiazor<sup>1</sup> and Azuka C Oparah<sup>2</sup>

<sup>1</sup>Pharmacy Department, University of Benin Teaching Hospital,<sup>2</sup>Department of Clinical Pharmacy & Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin City 300001, Nigeria

## Abstract

**Purpose:** To describe and compare the treatment pattern of patients with hypertension using the JNC 7 guideline, and to assess patients' body mass index (BMI) and their knowledge of hypertension in a Nigerian secondary health care facility.

**Methods:** A cross-sectional, prospective, and observational study of 200 consecutive patients was conducted. Data were gathered on the patients' demographics and clinical characteristics, including body mass index. Patients' knowledge of hypertension was assessed using a 9-item instrument. Descriptive statistics was used to compute percentage frequency distributions of the variables. Inferential statistics employed Students' t-test and one-way ANOVA at 95 % confidence interval.

**Results:** Females were 131 (65.5 %), 138 (69.0 %) were either overweight or obese, 107 (53.5 %) had blood pressure  $\geq$  160/100 mmHg (Stage 2); 150 (75 %) did not know that hypertension is chronic and 132 (66 %) were not aware of risk of non-adherence. Poor knowledge of risk factors was associated with gender, marital status, income, and level of education ( $p < 0.05$ ). Patients, 167 (83.5 %) received a combination of two antihypertensive medications with 88 (44 %) having thiazide diuretic as first line, and lifestyle modification was not an integral component of care.

**Conclusion:** Most patients received thiazide diuretic medication but not lifestyle education. Obesity was a common risk factor among the study group. Patients' knowledge of hypertension was below average and they may need to be educated on hypertension and its effective management using drugs and lifestyle changes.

**Keywords:** Antihypertensive medication, Hypertension, Lifestyle, Nigeria, Patient knowledge

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\*Corresponding author: **Email:** [oparaca@yahoo.com](mailto:oparaca@yahoo.com); **Tel:** +234 802 332 8341

## INTRODUCTION

Developing countries undergoing epidemiological transition face the double burden of communicable and non-communicable diseases. Of the latter, hypertension is one of the most important treatable causes of morbidity and mortality. Although safe and effective drugs and evidence-based treatment guidelines are available, the management of hypertension remains sub-optimal. Based on the Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) [1], the prevalence rate of hypertension in Nigeria is about 25 - 30 %. Blood pressure and cardiovascular disease (CVD) risk have a linear, continuous relationship, wherein increased blood pressure is associated with increased CVD risk [1-2]. For every 20 mmHg increase in systolic blood pressure (SBP) or 10 mmHg increase in diastolic blood pressure (DBP), risk of mortality from both ischemic heart disease and stroke doubles [1]. As a result, high blood pressure is a key component in a number of CVD risk-scoring algorithms, including the Framingham Risk Score [3]. Despite the established association between hypertension and increased heart disease risk, many patients with hypertension remain above blood pressure goals [4].

Obesity is a major risk factor for hypertension and has a complex aetiology. It is influenced by genetic, metabolic and environmental factors [5]. Globally, there are more than 1 billion overweight adults, at least 300 million of them obese [6]. Of special concern is the increasing incidence of child obesity [6]. The estimated cost of obesity to health services is 4–7 % of the total healthcare budget [1]. Obesity and overweight pose a major risk for chronic diseases, including hypertension and stroke. The health consequences range from increased risk of premature death, to serious chronic conditions that reduce the overall quality of life.

The importance of blood pressure (BP) control in preventing cardiovascular disease

and stroke is well established. However, estimates suggest that fewer than 30 % of hypertensive patients in the United States are controlled, according to JNC 7 criteria. Patient knowledge and awareness of BP play important roles in the ability to successfully control hypertension [7-8]. A previous study showed an association between hypertension knowledge and compliance in hypertensive patients [9]. Recently, lack of knowledge of target systolic BP (SBP) levels was shown to be an independent predictor of poor BP control [10].

A review of previous studies on patients' awareness of hypertension and clinicians' adherence to standard treatment guidelines carried out in developed countries indicated poor performance. We decided to conduct a similar study in a resource limited setting, to explore the need to introduce pharmaceutical care of hypertensive patients. The objectives of this study, therefore, were to describe and compare the treatment pattern of patients with hypertension using the JNC 7 guideline, and to assess patients' body mass index and their knowledge of hypertension.

## METHODS

### Setting

This study was carried out in the Outpatient Department of Central Hospital Benin, Nigeria. The hospital is a secondary public health care facility which offers comprehensive health care services to the people in the State and its environs. We obtained administrative approval from the management of the hospital and informed consent from the patients.

### Sample

The sample comprised hypertensive patients visiting the outpatient department of the hospital as at the time of the study. Patients that met criteria were consecutively recruited until a purposive sample size was attained. The criteria for inclusion were medically

diagnosed cases of patients, eighteen years and over, who gave informed consent and could communicate either in English Language or local dialect. Those patients that had psychiatric illness, who were chronically ill-looking, manifested hypertensive emergency or non-consenting were excluded from the study.

### Data collection

A cross sectional, prospective, and observational study of 200 patients was conducted. Hypertensive patients visiting the outpatient clinic were consecutively investigated from July – October, 2009. Data were gathered on the patients' demographics and clinical characteristics and their antihypertensive medications were documented. Patients' knowledge of hypertension was assessed using a validated 9-item instrument.

The questionnaire used for data collection was carefully designed and pre-tested. It consisted of three sections (A, B, and C). Section A comprised patients' demographic data including age, gender, occupation, marital status, height, weight, average monthly income, and level of education. Section B comprised patients' family history of hypertension and patients' knowledge of hypertension, while section C consisted of medication use collection format, (including past and present medication, dose, frequency and duration of course of therapy), present blood pressure reading, co-morbidity, and relevant laboratory information.

Prior to the interview, patients were assured that all information provided would be confidential and used strictly for research purposes. Thereafter, the questionnaire was administered. Interpreters were engaged during interview of patients who could not speak or understand spoken English Language.

Patients' height and weight were measured with a height meter and weight scale respectively; these were then used to compute the body mass index (Quetelet's index) for each patient, determined as weight (Kg) divided by height ( $m^2$ ). Antihypertensive medications that were prescribed for each patient were documented and patients' were asked whether or not they were prescribed lifestyle management for their hypertension. Adherence to the JNC 7 guidelines was evaluated as using thiazide diuretic as first line in conjunction with lifestyle management.

### Statistical analysis

Data gathered were fed into Microsoft Excel package and rechecked for consistency. It was then analysed using Statistical Package for Social Science (SPSS version 16.0) for descriptive and inferential statistics. Responses from patients' knowledge of hypertension were transformed to scores that ranged from 0 to 100 by assigning a score of 1 to correct knowledge and 0 to wrong knowledge. Furthermore, a subgroup analysis of the knowledge questionnaire items based on the socio-demographic variables was performed. *Students't-test* and one-way ANOVA were employed to test for significant associations at 95 % confidence interval with the aid of GraphPad InStat version 2.05a which reported exact P-values and a  $P < 0.05$  was taken to be significant.

## RESULTS

Of the 200 participants assessed, demographics revealed that 131 (65.5 %) were females, 122 (61.0 %) were below 60 years, 62.0 % were married, 139 (69.5 %) were considered low income earners (below NGN 20,000/mo); 63.5 % either received primary education or no formal education. Patients' clinical characteristics indicated that 138 (74.1 %) were either overweight or obese, 107 (53.5 %) had their blood pressure  $\geq 160/100$  mmHg (Stage 2), Table 1.

**Table 1:** Demographic and clinical characteristics of the hypertensive patients

Item	Frequency	%
<b>Sex</b>		
Female	131	65.5
Male	69	34.5
<b>Age range (year)</b>		
< 30-49	51	25.5
50-59	71	35.5
≥ 60	78	39.0
<b>Marital status</b>		
Single/Living alone	76	38.0
Married	124	62.0
<b>Average monthly income (NGN)</b>		
< 20,000	139	69.5
20,000-59,000	46	23.0
60,000-99,000	14	7.0
100,000-139,000	1	0.5
<b>Level of education</b>		
No formal education	48	24.0
Primary	79	39.5
Secondary	40	20.0
Tertiary	30	15.0
<b>Body mass index (Kg/m<sup>2</sup>)</b>		
	<b>n = 186</b>	<b>100</b>
18.5-24.9 (Normal)	48	25.8
25.0-29.9 (Overweight)	90	48.4
30.0-34.9 (Class I Obesity)	33	17.7
35.0-39.9 (Class II Obesity)	14	7.5
≥ 40.0 (Class III Obesity)	1	0.5
<b>Blood pressure classification based on JNC 7</b>		
120-139/80-89 (Pre-hypertension)	4	2.0
140-159/90-99 (Stage I)	89	44.5
≥ 160 / ≥ 100 (Stage II)	107	53.5
<b>Duration of hypertension (year)</b>		
< 1	34	17.0
1-5	114	57.0
6-10	42	21.0
≥ 11	10	5.0

Patients (N = 200) generally reported that they were not informed of lifestyle modification as an integral component of care. A total of 167 (83.5 %) patients received a combination of two antihypertensive medications, with 88 (44 %) having thiazide diuretic as first line. Regarding the pattern of drug therapy, of the 12.9 % of patients on monotherapy, 4.6 % of them were prescribed amiloride/hydrochlorothiazide combination and 5.2 % were prescribed nifedipine. Out of the 83.5 % of patients placed on two antihypertensive drugs, a combination of amlodipine + amiloride/hydrochlorothiazide accounted for 41.7 %, amiloride/ hydrochlorothiazide + nifedipine combination accounted for 15.5 %, amiloride/hydrochlorothiazide + lisinopril combination accounted for 11.3 % while amlodipine + lisinopril combination accounted for 4.6 %.

In terms of percentage distribution of antihypertensive prescriptions (N = 366), 44 % were amiloride/hydrochlorothiazide, 27.0 % were amlodipine, nifedipine accounted for 13.0 %, 3.0 % were atenolol, 2.0 % were methyldopa while carvedilol, propranolol and frusemide accounted for 0.3 %, 0.2 % and 0.2 %, respectively. Considering the percentage distribution of adjunct antihypertensive medication, low-dose aspirin accounted for 68.0 % and minor tranquilizers 32.0 % of prescriptions.

About 173 (86.5 %) of respondents were aware that they were hypertensive, and 25.0 % have had hypertension for five years and above. Results of family history of hypertension showed: father (43, 21.5 %), mother (16, 8.0 %), and brother/sister (15, 7.5 %). However, 61 (30.5 %) reported that none of their family members had a history of hypertension, while 65 (32.5 %) had no knowledge of their family history of hypertension. Majority of the respondents, (63 %) either had misconception of hypertension or were not well informed of their disease state. Seventy six percent (76.0 %) were unaware of the role of alcohol in

hypertension, 74.0 % were unaware of the role of salt intake, 68.0 % were unaware of the role of smoking in hypertension, 62.5 % were unaware of the role of weight in hypertension, and however, 56.0 % of respondents knew the role of stress in hypertension.

Only 7.5 % of respondents applied dietary approach and 8.0 % applied exercise as a way of managing their hypertension, however, 72.5 % adopted prayer as a means of management while 5.5 % applied herbal remedies. Majority of the respondents (77.8 %) however, appeared to know the reasons for checking their blood pressure regularly. This study revealed that 85 % of respondents had a wrong knowledge that hypertension could be cured and 79.5 %, had misconception that they would know when their blood pressure was rising. Three-quarters (75.0 %) of respondents were unaware that hypertension is a chronic condition that requires lifelong treatment and 66.0 % were unaware that failing to take their medications can result in complications. Most of the respondents (83 %) neither consumed alcohol nor smoked cigarette or used tobacco. The frequency distribution of responses to the hypertension knowledge questionnaire items is presented in Table 2.

Further sub-group analysis, (Table 3) to determine the relationship between demographic characteristics and patients' knowledge of hypertension showed that males were more knowledgeable (Mean score = 49.5 versus 33.5, range 0 to 100) than females ( $p < 0.0001$ ). Those patients that earned a monthly income of NGN 20,000.000 and above showed more knowledge of hypertension (Mean score = 52, range 0 to 100) than those that earned less than NGN 20,000.00 ( $p < 0.0001$ ). Patients that had tertiary education were more knowledgeable of hypertension (Mean score = 70, range 0 to 100) compared to those that had no formal education, primary education or secondary education ( $p < 0.0001$ ).

**Table 2:** Knowledge about hypertension and its care

Item	Frequency, N = 200	% Positive
<b>Risk factors</b>		
Alcohol	48	24.0
Salt intake	52	26.0
Smoking	64	32.0
Overweight/Obesity	75	37.5
Stress	112	56.0
<b>Reason for regular blood pressure (BP) check</b>		
To know when BP is rising	154	77.0
To know when to seek help	155	77.5
To know if drug is working	158	79.0
<b>Therapy of hypertension</b>		
High blood pressure can be cured	30	15.0
Your BP can rise without your feeling it	41	20.5
You may have to take drugs for life	50	25.0
Failing to take drug can result in complications	68	34.0
<b>Self-care practice</b>		
Exercise	16	8.0
Diet	15	7.5
<b>Mean score (Range: 0-100)</b>		<b>37.0</b>

## DISCUSSION

Using the JNC 7 blood pressure classification, this study revealed that more than half of the patients had systolic blood pressure  $\geq 160$  mmHg and about two-thirds had diastolic blood pressure  $\geq 100$  mmHg, this implies that majority of the patients already had stage 2 hypertension.

More than half of the patients were either overweight or obese. This trend is in congruent with a global report indicating more than one billion overweight, and over 300 million obese adults. Obesity and overweight pose a major risk for chronic diseases,

**Table 3:** Inferential statistical analysis on patients' knowledge

Item	Frequency	Mean Score	SD
<b>Sex</b>			
Female	131	33.5	27.93
Male	69	49.5	21.80
	t = 4.139; P < 0.0001*		
<b>Age range (year)</b>			
30-49	51	39.0	24.47
50-59	71	42.0	25.31
≥ 60	78	36.0	26.91
	F = 1.190; P = 0.3065		
<b>Marital status</b>			
Married	124	44.0	24.33
Single/Living alone	76	30.0	28.00
	t = 3.728; P = 0.0003*		
<b>Level of income</b>			
Low income (< NGN 20,000)	139	33.0	25.37
High income (≥ NGN 20,000)	61	52.0	26.35
	t = 4.819; P = 0.0001*		
<b>Level of education</b>			
No formal education	48	26.0	20.80
Primary	79	34.0	32.77
Secondary	40	41.0	22.13
Tertiary	30	70.0	24.86
	F = 17.781; P = 0.0001*		
<b>Duration of hypertension (yr)</b>			
< 5	118	38.5	20.33
≥ 5	81	39.5	29.80
	t = 0.2815; P = 0.7786		
<b>Turkey-Kramer Multiple Comparisons Test for Education</b>			
No formal education Vs Primary P > 0.05			
No formal education Vs Secondary P > 0.05			
No formal education Vs Tertiary P < 0.001*			
Primary Vs Secondary P > 0.05			
Primary Vs Tertiary P < 0.001*			
Secondary Vs Tertiary P < 0.001*			
Scores ranged from 0-100; SD = Standard deviation, * Significant			

including Type 2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer. The key causes are increased consumption of energy-dense

foods high in saturated fats and sugars, and reduced physical activity [6].

Reviewing the pattern of antihypertensive therapy to know the number of antihypertensive drugs mostly used in this healthcare facility, it was shown that management of hypertension was mostly based on a combination of two antihypertensive drugs of which a combination of amlodipine and hydrochlorothiazide + amiloride were mostly prescribed. About a third of the prescriptions were monotherapy, lisinopril being the most prescribed. Only about one-tenth of prescriptions were a combination of three antihypertensive drugs. The prescription pattern revealed that lisinopril was the most commonly prescribed antihypertensive drug, followed by hydrochlorothiazide + amiloride, irrespective of whether the prescription was monotherapy or a combination therapy. This pattern however reveals a partial compliance to the JNC 7 Report which strongly recommended lifestyle modification in addition to drug treatment.

Controlling systolic hypertension, which is a more important cardiovascular risk factor than diastolic hypertension, is considerably more difficult than controlling diastolic hypertension. Effective blood pressure control can be achieved in most patients using two or more antihypertensive drugs. When clinicians fail to prescribe lifestyle modifications, adequate antihypertensive drug doses, or appropriate drug combinations, inadequate blood pressure control may result [11].

Majority of adjunct antihypertensive medication was low dose aspirin. The Hypertension Optimal Treatment (HOT) study documented the efficacy of low-dose aspirin in preventing major cardiovascular events in hypertensive subjects. Although, aspirin is the most frequently used medication for the prevention of cardiovascular diseases, few reports exist about its influence on blood pressure (BP) control in hypertensive

subjects [12]. Aspirin has been found to prevent angiotensin II-induced hypertension and to induce nitric oxide (NO) release from vascular endothelium [13]. Low-dose aspirin has also been shown to reduce blood pressure (BP) when administered at bedtime, as opposed to upon awakening, in untreated hypertensive patients [12].

It was also found that a large amount of adjunct antihypertensive drugs prescribed were minor tranquilizers, lorazepam being the most common. There is no clear cut indication for the use of minor tranquilizers in the management of hypertension. These drugs produce a calming effect in patients but have no effect on the disease aetiology. It may however be helpful in stress induced hypertension but should be used as adjunct medication in patient with insomnia.

From this survey, it was shown that a large number of the respondents were petty traders, earned twenty thousand naira or below, and either had only primary education or no formal education. Low income and poor literacy would have a negative effect on treatment outcome in chronic disease state like hypertension, as they may lead to medication non-adherence due to patient's inability to regularly purchase medication. It should however be noted that a patient may be literate and have poor knowledge of hypertension and its management.

These factors contribute to the socio-economic determinants of health. Patients' level of education is crucial in making lifestyle choices that either serve as a barrier or incentive to health. The likelihood of a learned person making lifestyle decisions that would promote or maintain health is greater than that for an illiterate person. The outcome from this survey shows that a good number of the respondents were illiterate, this points to the fact that they would likely not make lifestyle decisions such as healthy eating, regular aerobic exercise, which would help to improve treatment outcome in hypertension.

About three quarters of the hypertensive patients assessed were either over-weight or obese indicating the need for lifestyle modification. There was a misconception that hypertension is a curable disease. This reveals the knowledge gap in this disease state.

Over two-thirds of the patients applied prayers as part of their therapy. This practice points to the need for evaluation of the outcome of such non-drug therapy approaches. It was however shown from this study that men appeared to be significantly more knowledgeable than women and those that had higher income significantly demonstrated more knowledge than those with lower income. Again, those that had tertiary education were significantly more knowledgeable than those that had secondary, primary or no formal education. A similar study carried out by *Sowielem et al* [14] revealed that a good number of their study participants showed knowledge of the role of stress in hypertension but were unaware that hypertension is a chronic disease and had misconception that hypertension is curable. Another study, by *Viera et al* [11] revealed that 26 % of respondents did not know that most of the time people with high BP do not feel it and a significant number of respondents either believe taking medications will cure high BP or are not sure whether it will. Several other studies [13,15-17] have been carried out, assessing patients' knowledge of hypertension and the results of these studies revealed poor knowledge as seen in this survey.

An opportunity exists to introduce pharmaceutical care as an integral component of hypertension care among these patients. In this pharmaceutical care model, clinical and humanistic outcomes including patient knowledge of hypertension and its management are pre-determined prior to the initiation of care and assessed on a continuous basis to determine if interventions achieved the desired effects.

## Limitations of the study

Some of the patient's could not understand English Language, necessitating the use of their relatives, or nurses as interpreters which were capable of producing some biased results. The attending physicians referred patients to the investigator and the data collection instruments were administered in the physician's office which could influence the responses. Furthermore, the attending physicians were aware that treatment pattern was being assessed, however, the basis for assessment was not disclosed and no effort was made to ascertain if the prescribed medications were dispensed or administered. A convenience sampling method was adopted. A random sampling method with control would have been preferable.

## CONCLUSION

Majority of the patients in this health care facility received thiazide diuretic medication but not lifestyle education, indicating partial adherence to JNC 7 guidelines. Obesity was a common risk factor among the study group. Patients' knowledge of hypertension was poor and they may need to be educated on hypertension and its effective management using drugs and lifestyle changes. An opportunity exists to introduce pharmaceutical care as an integral component of hypertension care among these patients.

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