KNOWLEDGE OF AND COMPLIANCE WITH THERAPEUTIC REGIMENS AMONG HYPERTENSIVE PATIENTS IN NIGERIA

Timothy A. Ehwarieme
University of Benin, Nigeria
timy4real12@gmail.com

Emmanuelson N. Chukwuyem
Edo University Iyamho, Nigeria

Cynthia O. Osayande
University of Benin, Nigeria

ABSTRACT

Hypertension is a global public health issue as it is the most common cardiovascular disease worldwide. Being one the few diseases that come with complications, this study investigated the level of compliance of hypertensive patients with treatment regimens among such patients attending outpatient departments of selected tertiary hospitals in Benin City, Edo State, Nigeria. A cross-sectional descriptive research design was used. A sample size of 309 was selected from a total population of 946. A convenient sampling technique and self-structured questionnaire were used as an instrument for data collection. Results showed that only 40.7 per cent of the respondents had a good knowledge of hypertension. The majority (90 %) (N = 270) of the respondents were not compliant with treatment regimens. There was a significant relationship between knowledge of hypertension and lifestyle modification among the respondents at (χ^2 = 0.022; < p = 0.05). There was no significant difference in the level of compliance with antihypertensive treatment between respondents in the selected hospitals (p = 0.791). The monthly income was found to have a significant relationship with compliance with treatment regimens at (χ^2 = 0.000, 0.037, 0.001, 0.008, 0.010, 0.000 and 0.000; < p = 0.05). The study also shows that there was no significant difference in knowledge and the rate of compliance among the selected hospitals (0.883 and 0.798 respectively). Therefore it is recommended that nurses engage in health education and awareness programmes to meet the needs for increased awareness and further education of the people on the advantages of adherence to their medication and treatment regimens.

Keywords: knowledge; compliance; hypertensive patients; hypertension; non-compliance; therapeutic regimen

Introduction/Background of Study

Hypertension is a common but treatable public health problem globally. It is estimated to cause 7.5 million deaths annually, about 12.8 per cent of all deaths worldwide (WHO 2009). Globally, the prevalence of hypertension in adults was approximately 40 per cent in 2008 (Danaei, Finucane, and Lin 2011, 570). The burden of hypertension is particularly high in sub-Saharan African countries; studies have shown that the prevalence of hypertension in Nigeria rural areas ranges from 21 to 25 per cent (Hendriks et al. 2012; Ulasi, Ijoma, and Onodugo 2010, 71) while in semi-urban and urban areas the prevalence ranged from 27 to 46 per cent (Adedoyin, Mbada, and Balogun 2008, 685; Awobusuyi et al. 2011, 6; Oghagbon, Okesina, and Biliaminu 2008, 344; Ulasi et al. 2011, 5). The increasing rates of hypertension in sub-Saharan Africa have been attributed to a rapid epidemiologic transition from an agrarian lifestyle to a more westernised lifestyle, associated with increasing rates of obesity, an unhealthy diet, and physical inactivity as well as lack of compliance with treatment regimens (Bosu 2010, 418).

Ensuring patient compliance with treatment regimens to prevent complications of hypertension remains a major challenge to public health in many developing countries. Song et al. (2011) reported that out of the 308 patients who participated in their study, 27.9 per cent were classified as reporting perfect adherence and 72.1 per cent were classified as non-perfect adherence. Similarly Mugwano et al. (2016) in Kampala, Uganda, revealed that only 17 per cent of participants were adherent to antihypertensive medication, and the main cause of non-adherence appeared to be a lack of knowledge. Akoko et al. (2017) in a study in the Bamenda health district of Cameroon, revealed that 14.0 per cent, 53.4 per cent, and 32.6 per cent of participants had adequate, average, and poor knowledge of hypertension, respectively, and the antihypertensive compliance rate was 43.9 per cent. In another study by Amonov et al. (2014, 255–60) in Samarkand, Uzbekistan, the study showed that overall, 10.0 per cent of patients had good knowledge, 54.6 per cent had adequate knowledge, and 35.5 per cent had inadequate knowledge of hypertension. Patients' knowledge levels were significantly associated with the control status of blood pressure and drug adherence compared to those with an inadequate knowledge level, the odd ratio of controlled hypertension was 2.9 (95% CI 1.3–6.5) for the adequate level and 5.4 (95% CI 1.7–16.2) for a good knowledge level. The odd ratio of drug adherence was 2.1 (95% CI 1.1–4.1) and 3.8 (95% CI 1.4–10.8), respectively.

Furthermore, Nnodimele, Olanrewaju and Akinbolajo (2010, 144–49) in a study in Ogun state, Nigeria, showed that 56 (54.4%) males and 47 (45.6%) females with a mean age of 62.2 ± 12.19 years participated in the study, on a 42-point aggregate scale measuring adherence to treatment, the participants scored a mean of 29.12 ± 5.70 (95% CI: 28.01 to 30.22). The adherence rate in this study translates to 69.3 per cent. Kabir et al. (2014, 16) in a study in Kano, Nigeria, reported that 54.2 per cent of the respondents had good compliance with treatment whereas the remaining 45.8 per cent had poor compliance. Iloh et al (2013) in a study in Umuahia, Abia State, Nigeria, also reported

similar findings. According to them, the age of the hypertensive patients ranged from 32 to 83 years with a mean age of 52 ± 7.4 years. There were 56 (40.0%) males and 84 (60.0%) females, 60 (42.9%) out of the 140 patients were adherent, while 80 (57.1%) were not adherent.

Similarly, Boima et al. (2015, 8–11) in a study in Ghana and Nigeria, reported that non-adherence to medications was present in 66.7 per cent of the participants. Port Harcourt had the highest prevalence of medication non-adherence (95.9%), while Ibadan had the lowest (45.1%). In addition, Bello (2012) in a study in Ilorin, Kwara State, revealed that 123 (67.7%) of the patients adhered strictly to their medications while only 44 (32.3%) were poor adherents.

Statement of the Problem

Hypertension is the leading cause of mortality and the third largest cause of disability; it is poorly controlled worldwide. It is estimated that almost one-half of patients drop out entirely from treatment with failure to control hypertension and this takes an unacceptable toll on patients and their families. In addition to the personal cost to the individual patients, uncontrolled hypertension creates a huge, avoidable economic burden when viewed in terms of the general population (Sit et al. 2010, 461–66). Even with the advances in medical technology and treatment of hypertension one still wonders why patients with hypertension still come down with severe complications and death. Studies are abound in this area but there is a dearth of empirical literature especially in Edo State. Hence the need for this study.

Purpose of the Study

The purpose of this study is to assess the level of compliance of hypertensive patients with treatment regimens in the outpatient department of selected hospitals in Benin City, Edo State, Nigeria.

Objectives of the Study

In order to attain the above-mentioned purpose of study, the researchers formulated the following research objectives:

- assessing the level of knowledge on hypertension among hypertensive patients attending the outpatient department of the selected hospitals in Benin City, Edo State, Nigeria; and
- determining the level of compliance with therapeutic regimens among the respondents attending the outpatient department of the selected hospitals in Benin City, Edo State, Nigeria.

Research Hypotheses

The researchers formulated the following hypotheses:

- There is no significant relationship between the level of compliance with hypertension therapeutic regimens and the socio-demographic data such as educational status and economic status.
- There is no significant difference between the levels of compliance with hypertensive therapeutic regimens among patients attending the selected hospitals.
- There is no significant difference in the knowledge of hypertension among patients attending the outpatient department of the selected hospitals.
- There is no significance relationship between compliance and lifestyle modification among the respondents in the selected hospitals.

Significance of the Study

The results of the study will contribute to increase the awareness of healthcare providers, particularly nurses and physicians, on the issues of compliance and might help in the development of strategies to improve compliance with treatment regimens among hypertensive patients. Recommendations from this study will assist policymakers and stakeholders in the healthcare sector in developing context-specific and relevant policies capable of improving the management of hypertension. Ultimately the implementation of effective strategies would lead to improved compliance, increased levels of controlled blood pressure and reduced morbidity and mortality.

Materials and Method

Research Design

The researchers adopted a cross-sectional research design.

Research Setting

The University of Benin Teaching Hospital (UBTH) and Central Hospital Benin City were purposely selected for this study. The UBTH is located in the Egor local government area of Edo State, which came into being in 1973 as the sixth of the first-generation teaching hospitals in Nigeria. Central Hospital Benin City is a government hospital located in the serene centre of Benin, on Sapele Road, in the Oredo local government area of Edo State.

Target Population

The target population comprised all hypertensive patients attending the consultant outpatient clinics in the UBTH and Central Hospital Benin City, which were 946. The population was obtained from a retrospective review of an average monthly attendance from January to July 2017 in both hospitals which was 435 and 511 respectively. See Table 1.

Table 1: Representation of target population

Setting	Average monthly attendance from January to July 2017	Percentage proportion of sample size
University of Benin Teaching Hospital Central Hospital Benin City	435 511	45.9% = 142 54.1% = 167
Total	946	100% = 309

Sample Size Determination

A sample size of 309 was used for the study. This was obtained from the total population of 946, using the Taro Yamane formula as shown below.

$$n = \frac{N}{1 + N(d)^2}$$

where

n = sample size; N = population size; d = level of precision (confidence interval)

N = 946, d = 0.05

Thus n = 946/1 + 946(0.05)2

n = 946/1 + 946 × 0.0025

n = 946/1 + 2.365

n = 946/3.365

n = 281

10% Attrition rate = 28 = 281 + 28 = 309

Inclusion Criteria

Adult hypertensive patients aged 18 and above attending the outpatient department of both hospitals stated.

Exclusion Criteria

All hypertensive patients below the age of 18 years.

Sampling Technique

The researchers used the convenient sampling technique in selecting the respondents to participate in the study.

Instrument for Data Collection

The instrument for the research was a self-structured close-ended questionnaire. It consisted of three sections.

- Section A: consisted of six demographic data items regarding participants.
- Section B: consisted of eight close-ended knowledge items. The knowledge was classified as poor (1–3), good (4–6) and very good (6–8).
- Section C: consisted of eight items on compliance with hypertensive therapeutic regimen medication using a four-point Likert scale. Compliance was classified as poor compliance and good compliance.

Validity

The validity of the instrument was ensured as it was structured by the researchers in relation with the research topic and the project supervisor was consulted to scrutinise the questionnaire. Due corrections were made before it was distributed. The questionnaire measured what it was supposed to measure and this ensured its validity.

Reliability

The reliability of the instrument was ensured by conducting a pretest study using patients with similar characteristics from another hospital. Ten questionnaires were administered initially and after one week another ten questionnaires were administered. The reliability was analysed using the product moment correlation coefficient and a value of 0.88 was achieved, which shows that the instrument was reliable for use in the study.

Ethical Consideration

Ethical clearance with number ADM/E22/A/VOL VII/1455 was obtained from the ethical and research committee of the UBTH, Benin City, after a thorough review of the research proposal by the ethics committee. Informed consent was obtained from the respondents before proceeding with the study and confidentiality was held in high esteem.

Data Collection

Two research assistants, a male nurse and a female nurse from the outpatient department of each of the selected hospitals were recruited for the study. The research assistants were trained by the principal researcher on how to administer the instrument. The data were collected each day in the morning. The questionnaires were left with the patients for a few minutes and then collected.

Method of Data Analysis

Data were analysed using descriptive statistics. The researchers used the Statistical Package for Social Sciences (SPSS) version 21.0.

Results

Table 2 gives the socio-demographic characteristics of the respondents.

Table 2:   Socio-demographic characteristics of respondents

Variable	Frequency	Percentage
Age		
1–20 years	33	11.0
21–40 years	95	31.7
41–60 years	94	31.3
61–80 years	66	22.0
81 years and above	12	4.0
Mean ± SD	45.75 ± 18.42	
Gender		
Male	138	46.0
Female	162	54.0

Marital status		
Married	161	53.7
Single	94	31.3
Divorced	14	4.7
Widowed	24	8.0
Separated	7	2.3
Level of education		
Primary	1	0.3
Secondary	22	7.3
Tertiary	260	86.7
No formal education	17	5.7
Occupation		
Government employee	148	49.3
Non-government employee	28	9.3
Self-employed	54	18.0
Student	57	19.0
Unemployed	13	4.3
Lifestyle changes		
Yes	68	22.7
No	232	77.3
Monthly income (naira)		
Below 10 000	72	24.0
10 000–30 000	41	13.7
30 000–50 000	50	16.7
50 000–100 000	81	27.0
100 000 and above	56	18.7

Table 2 shows that the majority 95 (31.7%) of the respondents are between the ages of 21 to 40 with a mean age of 45.75 ± 18.42. The majority 162 (54.0%) of the respondents are female, and 161 (53.7%) of the respondents are married. A total of 260 (86.7%) of the respondents have tertiary education, 148 (49.3%) are civil servants, 57 (19.0%) are students and 13 (4.3%) of the respondents are unemployed. A total of 81 (27.0%) of the respondents have a monthly income of between 50 000 and 100 000 naira, followed

by 72 (24.0) who have a monthly income below 10 000 naira, and 41 (13.7%) with a monthly income of between 10 000 and 30 000 naira.

Objective 1

Assess the level of knowledge on hypertension among hypertensive patients attending the outpatient department of the selected hospitals.

Table 3a: General knowledge of hypertension by respondents

Item	Variable	Yes	No	Mean	SD
1	High blood pressure means the same as hypertension	284 (94.7%)	16 (5.3%)	1.05	0.225
2	High blood pressure usually comes with symptoms	277 (92.3%)	23 (7.7%)	1.08	0.267
3	High blood pressure can cause strokes	286 (95.3%)	14 (4.7%)	1.05	0.211
4	High blood pressure can cause kidney problems	141 (47.0%)	159 (53.0%)	1.53	0.500
5	High blood pressure can cause heart attacks	268 (89.3%)	32 (10.7%)	1.11	0.309
6	High blood pressure can cause blindness	107 (35.7%)	193 (64.3%)	1.64	0.480
7	High blood pressure can cause asthma	56 (18.7%)	244 (81.3%)	1.81	0.390
8	High blood pressure can be controlled with medicine	283 (94.3%)	17 (5.7%)	1.06	0.232
9	High blood pressure cannot be cured	136 (45.3%)	164 (54.7%)	1.55	0.499
10	Stress is a cause of hypertension	275 (91.7%)	25 (8.3%)	1.08	0.277
11	A person with high blood pressure should eat less salt	252 (84.0%)	48 (16.0%)	1.16	0.367
12	A person with high blood pressure should eat more fruit and vegetables	271 (90.3%)	29 (9.7%)	1.10	0.296
13	Eating more fruits and vegetables helps to reduce a person's blood pressure	150 (50.0%)	150 (50.0%)	1.50	0.501
14	Exercise can help lower a person's blood pressure	149 (49.7%)	151 (50.3%)	1.50	0.501

Table 3a shows the general knowledge of the respondents concerning hypertension.

Table 3b: Level of knowledge on hypertension of respondents

Variable	Score	Frequency	Percentage
General knowledge			
Poor knowledge	1–5	4	1.3
Average knowledge	6–9	174	58.0
Good knowledge	10–14	122	40.7
UBTH			
Poor knowledge	1–5	2	1.4
Average knowledge	6–9	82	57.7
Good knowledge	10–14	58	40.8
Central Hospital Benin City			
Poor knowledge	1–5	2	1.3
Average knowledge	6–9	92	58.0
Good knowledge	10–14	64	40.5

Table 3b shows the level of knowledge on hypertension of the respondents. A total of 4 (1.3%) respondents had poor knowledge, 174 (58.0%) had average knowledge and 122 (40.7%) had good knowledge. A similar trend was followed by the UBTH with 2 (1.4%) respondents with poor knowledge, 82 (57.7%) with average knowledge and 58 (40.8%) with good knowledge, and Central Hospital Benin City with 2 (1.3%) respondents with poor knowledge, 92 (58.0%) with average knowledge and 64 (40.5%) with good knowledge.

Objective 2

Determine the level of compliance with therapeutic regimens among the respondents attending the outpatient department of the selected hospitals in Benin City.

Table 4:   General level of compliance with therapeutic regimens by respondents

	Variable	SD	D	A	SA	Mean	Std. D	Remark*
1	I feel I should not take my blood pressure medication according to the doctor's prescription	50 (16.7)	145 (48.3)	39 (13.0)	66 (22.0)	2.40	1.009	Non-compliance
2	I don't always take my medicines because I always forget to take them	30 (10)	156 (52.0)	58 (19.3)	56 (18.7)	2.47	0.908	Non-compliance
3	I don't always take my medicines because I get tired of taking them	36 (12.0)	141 (47.0)	65 (21.7)	58 (19.3)	2.48	0.938	Non-compliance
4	There is no need to go for check-up when you don't have any symptoms	40 (13.3)	151 (50.3)	54 (18.0)	55 (18.3)	2.41	0.937	Non-compliance
5	I can't do without putting a lot of salt in my food because it's good for my health	45 (15.0)	143 (47.7)	67 (22.3)	45 (15.0)	2.37	0.915	Non-compliance
6	They said I should be eating fruits and vegetables and stay away from food that contains fat, I am not sure I can do that	36 (12.0)	149 (49.7)	68 (22.7)	47 (15.7)	2.42	0.894	Non-compliance
7	I don't take some of the drugs because I don't need them	52 (17.3)	150 (50.0)	70 (23.3)	28 (9.3)	2.25	0.849	Non-compliance
8	It's always good to take your medicine only when your blood pressure is very high	53 (17.7)	81 (27.0)	57 (19.0)	109 (36.3)	2.74	1.130	Compliance

9	It's good to add some herbal medicine to the one the doctor prescribed for it to work	54 (18.0)	138 (46.0)	56 (18.7)	52 (17.3)	2.35	0.969	Non-compliance
10	The period I take my blood pressure medication is too long so I have stopped taking it	40 (13.3)	147 (49.0)	68 (22.7)	45 (15.0)	2.39	0.899	Non-compliance

* 2.5 and above = compliance; 2.49 and below = non-compliance

Table 4 shows the general level of compliance with antihypertensive drugs as given verbatim by respondents. From the analysis, it is revealed that only in item 8, 2.74 ± 1.130 was found compliant. All other items showed non-compliance values. The ratio is 9:1 compliance to non-compliance, which means that 270 (90%) of the respondents are non-compliant with treatment regimens.

Hypothesis 1

There is no significant relationship between the level of compliance with hypertension therapeutic regimens and the socio-demographic data such as educational status and economic status.

Table 5a: Respondents' level of education and compliance with therapeutic regimens

	Variable	Response*	Level of education				Total	χ²
			Primary	Secondary	Tertiary	No formal education		
1	I feel I should not take my blood pressure medication according to the doctor's pre-scription	C	1 (100)	18 (81.8)	168 (64.6)	8 (47.1)	195	
		NC	0 (0.0)	4 (18.2)	92 (35.4)	9 (52.9)	105	0.127
2	I don't always take my medicines because I always forget to take them	C	1 (100)	12 (54.5)	164 (63.1)	9 (52.9)	186	
		NC	0 (0.0)	10 (45.5)	96 (36.9)	8 (47.1)	114	0.604
3	There is no need to go for check-up when you don't have any symptoms	C	1 (100)	12 (54.5)	167 (64.2)	11 (64.7)	191	
		NC	0 (0.0)	10 (45.5)	93 (35.8)	6 (35.3)	109	0.704
4	I can't do without putting a lot of salt in my food because it's good for my health	C	0 (0.0)	12 (54.5)	169 (65.0)	7 (41.2)	188	
		NC	1 (100)	10 (45.5)	91 (35.0)	10 (58.8)	112	0.100
5	I don't take some of the drugs because I don't need them	C	0 (0.0)	16 (72.7)	176 (67.7)	10 (58.8)	202	
		NC	1 (100)	6 (27.3)	84 (32.3)	7 (41.2)	98	0.403

6	It's always good to take your medicine only when your blood pressure is very high	C	1 (100)	12 (54.5)	110 (42.3)	11 (64.7)	134	
		NC	0 (0.0)	10 (45.5)	150 (57.7)	6 (35.3)	166	0.141
7	The period I take my blood pressure medication is too long so I have stopped taking it	C	0 (0.0)	12 (54.5)	164 (63.1)	11 (64.7)	187	
		NC	1 (100)	10 (45.5)	96 (36.9)	6 (35.3)	113	0.508

*N = compliance; NC = non-compliance

Table 5a shows the relationship of the level of education and compliance with treatment regimens as given verbatim by the respondents. The level of education was found not to have a significant relationship with the level of compliance with treatment regimens at (χ^2 = 0.127; 0.604; 0.704; 0.100; 0.403; 0.141; and 0.508 > p = 0.05) respectively for all items.

Table 5b: Respondents' economic status and compliance with therapeutic regimens

| | Variable | Re-sponse* | Income | | | | | Total | χ^2 |
			<10 000	10 000–30 000	30 000–50 000	50 000–100 000	>100 000		
1	I feel I should not take my blood pressure medi-cation according to the doctor's pre-scription	C	60 (83.3)	30 (73.2)	34 (68.0)	45 (55.6)	26 (46.4)	195	
		NC	12 (16.7)	11 (26.8)	16 (32.0)	36 (44.4)	30 (53.6)	105	0.000

2	I don't always take my medicines because I always forget to take them	C	49 (68.1)	22 (53.7)	35 (70.0)	54 (66.7)	26 (46.4)	186	
		NC	23 (31.9)	19 (46.3)	15 (30.0)	27 (33.3)	30 (53.6)	114	0.037
3	I don't always take my medicines because I get tired of taking them	C	55 (76.4)	20 (48.8)	26 (52.0)	52 (64.2)	24 (42.9)	177	
		NC	17 (23.6)	21 (51.2)	24 (48.0)	29 (35.8)	32 (57.1)	123	0.001
4	There is no need to go for check-up when you don't have any symptoms	C	52 (72.2)	20 (48.8)	38 (76.0)	43 (53.1)	38 (67.9)	191	
		NC	20 (27.8)	21 (51.2)	12 (24.0)	38 (46.9)	18 (32.1)	109	0.008
5	I can't do without putting a lot of salt in my food because it's good for my health	C	49 (68.1)	24 (58.5)	24 (48.0)	61 (75.3)	30 (53.6)	188	
		NC	23 (31.9)	17 (41.5)	26 (52.0)	20 (24.7)	26 (46.4)	112	0.010
6	They said I should be eating fruits and vege-tables and stay away from food that contains fat, I am not sure I can do that	C	59 (81.9)	29 (70.7)	21 (42.0)	50 (61.7)	26 (46.4)	185	
		NC	13 (18.1)	12 (29.3)	29 (58.0)	31 (38.3)	30 (53.6)	115	0.000

| 7 | It's always good to take your medicine only when your blood pressure is very high | C | 19 (26.4) | 19 (46.3) | 24 (48.0) | 34 (42.0) | 38 (67.9) | 134 | |
| | | NC | 53 (73.6) | 22 (53.7) | 26 (52.0) | 47 (58.0) | 18 (32.1) | 166 | 0.000 |

N = compliance; NC = non-compliance

The monthly income of the respondents was found to have a positive relationship with the items in Table 5b. The monthly income was found to have a significant relationship with compliance with treatment regimens at (x^2 = 0.000, 0.037, 0.001, 0.008, 0.010, 0.000 and 0.000; $< p = 0.05$) respectively.

Hypothesis 2

There is no significant difference in the level of compliance with hypertensive therapeutic regimens among patients in the selected hospitals.

Table 6:   Difference in level of compliance between respondents of the UBTH and Central Hospital

Variable	Hospital	Mean	SD	F	Sig.	t
Compliance	UBTH	2.3690	0.11723	0.072	0.791	1.868
	Central Hospital	2.4850	0.15750			

Table 6 shows the difference in the level of compliance with antihypertensive drugs between respondents in the UBTH and Central Hospital. The result shows that there is no difference in the level of compliance between the two hospitals (Sig. = 0.791).

Hypothesis 3

There is no significant difference in the knowledge of hypertension among patients attending the outpatient departments of the selected hospitals.

Table 7: Difference in knowledge of hypertension between respondents of UBTH and Central Hospital

Variable	Hospital	Mean	SD	F	Sig.	t
Knowledge	UBTH	2.39	0.519	0.022	0.883	0.033
	Central Hospital	2.39	0.515			

Table 7 shows the difference in the knowledge of hypertension between respondents in the UBTH and Central hospital. The result shows that there is no difference in the knowledge of hypertension between the two hospitals (Sig. = 0.883).

Hypothesis 4

There is no significant relationship between compliance and lifestyle modification among the respondents in the selected hospitals.

Table 8: Relationship between level of compliance with therapeutic regimens and the lifestyle modification of respondents

	Variables	Response	Lifestyle Changes		Total	χ^2
			Yes	No		
1	I feel I should not take my blood pressure medication according to the doctor's prescription	Compliant	46 (67.6)	149 (64.2)	195	0.603
		Non-compliant	22 (32.4)	83 (35.8)	105	
2	I don't always take my medicines because I always forget to take them	Compliant	35 (51.5)	151 (65.1)	186	0.042
		Non-compliant	33 (48.5)	81 (34.9)	114	
3	I don't always take my medicines because I get tired of taking them	Compliant	36 (52.9)	141 (60.8)	177	0.248
		Non-compliant	32 (47.1)	91 (39.2)	123	
4	There is no need to go for check-up when you don't have any symptoms	Compliant	39 (57.4)	152 (65.5)	191	0.218
		Non-compliant	29 (42.6)	80 (34.5)	109	
5	I can't do without putting a lot of salt in my food because it's good for my health	Compliant	34 (50.0)	154 (66.4)	188	0.014
		Non-compliant	34 (50.0)	78 (33.6)	112	
6	They said I should be eating fruits and vegetables and stay away from food that contains fat, I am not sure I can do that	Compliant	28 (41.2)	157 (67.7)	185	0.000*
		Non-compliant	40 (58.8)	75 (32.3)	115	

7	I don't take some of the drugs because I don't need them	Compliant	46 (67.6)	156 (67.2)	202	0.950
		Non-compliant	22 (32.4)	76 (32.8)	98	
8	It's always good to take your medicine only when your blood pressure is very high	Compliant	34 (50.0)	100 (43.1)	134	0.314
		Non-compliant	34 (50.0)	132 (56.9)	166	
9	It's good to add some herbal medicine to the one the doctor prescribed for it to work	Compliant	39 (57.4)	153 (65.9)	192	0.194
		Non-compliant	29 (42.6)	79 (34.1)	108	
10	The period I take my blood pressure medication is too long so I have stopped taking it	Compliant	31 (45.6)	156 (67.2)	187	0.001
		Non-compliant	37 (54.4)	76 (32.8)	113	

* Sig. at 0.001

Table 8 shows the relationship between the level of compliance with antihypertensive treatment regimens and changes in lifestyle. Items 2, 5, 6 and 10 were found to have a significant relationship with lifestyle changes at (χ^2 = 0.042, 0.014., 0.000 and 0.001; < p = 0.05). There were no significant relationships in items 1, 3, 4, 7, 8 and 9 with lifestyle changes at (χ^2 = 0.603, 0.248, 0.218, 0.950, 0.314 and 0.194; > p = 0.05). This suggest a ratio of 4:6, which means that in 120 (40%) of the respondents there is a significant relationship between the level of compliance with antihypertensive treatment regimens and lifestyle changes, while in 180 (60%) there is no significant relationship in the level of compliance with treatment regimens and lifestyle changes.

Discussion of Findings

The study was conducted to assess the level of compliance of hypertensive patients with antihypertensive treatment regimens. Findings from the study show that 162 (54.0%) of the respondents are female while 138 (46.0%) were male. The study revealed the mean age of the respondents as 45.75 ± 18.42 years and 95 (31.7%) are between the ages of 21 to 24, which is the highest. The majority, 148 (49.3%), of the respondents are civil servants (government employees), 232 (77.3%) do not observe any lifestyle change, and only 81 (27.0%) had a monthly income of between 50 000–100 000 naira.

The percentage of male to female of respondents that participated in this study is similar to the finding of a study by Nnodimele, Olanrewaju and Akinbolajo (2010, 144–46) in Ogun state, who reported 56 (54.4%) male respondents and 47 (45.6%) female respondents, however, the mean age is far younger compared with the mean age of 62.2 ± 12.19 years of respondents who participated in the study. Okwuonu et al. (2015, 6–11) in a study in southern Nigeria also reported similar findings of 143 (56.7%) male respondents and

109 (43.3%) female respondents with a mean age of 56.6 ± 12.7 years. However, the findings of Iloh et al. (2013) in a study in Umuahia, Abia State, Nigeria, as reported are similar to the age range of 32 to 83 years and a mean age of 52 ± 7.4 years, but differs in the gender of respondents which recorded fewer male respondents; 56 (40.0%) male respondents and 84 (60.0%) female respondents.

This study revealed that the majority of the respondents, 58.0 per cent, had average knowledge, 40.7 per cent had good knowledge, and 1.3 per cent had poor knowledge of hypertension. This is in line with the study of Akoko et al. (2017) in Cameroon, who, in their study, reported the majority of the respondents with average knowledge of hypertension (53.4%), while those with poor knowledge were 42.6 per cent and those with adequate knowledge were 14.0 per cent. On the other hand, this study is in contrast with the study by Mugwano et al. (2016) in Kampala, Uganda who revealed that the majority of the patients had poor knowledge with only 17 per cent having good knowledge. Also reporting poor knowledge was Amonov et al. (2014, 255) in Uzbekistan who showed that overall, only 10.0 per cent of patients had good knowledge, 54.6 per cent had adequate knowledge, and 35.5 per cent had inadequate knowledge of hypertension. This is probably owing to the level of education and the rate at which awareness is being created through cinemas, hand bills, posts, and advertisements in this part of the country, especially in Benin City.

This study found a relationship between the knowledge of hypertension and demographic characteristics of the respondents such as the age of respondents ($p = 0.000$), marital status ($p = 0.000$), occupation ($p = 0.002$), lifestyle changes ($p = 0.022$), and monthly income ($p = 0.004$). Similar findings were also reported by Chiazor and Oparah (2012), on the relationship between knowledge and gender of ($p < 0.0001$), marital status ($p = 0.0003$), the level of income ($p = 0.0001$), and the level of education ($p = 0.0001$).

The study revealed poor compliance of the respondents in both hospitals; the majority of the respondents 270 (90%) are not compliant with treatment regimens. This is in line with the study of Okwuonu et al. (2015) which revealed that the majority (52%) of the respondents had poor compliance with their medication. Collaborating the findings further is Iloh et al. (2013) in a study in Umuahia, Abia State, eastern Nigeria, who reported that 60 (42.9%) out of 140 patients were adherent, while 80 (57.1%) were not adherent. Of the 49 patients who had good control of blood pressure, 45 (91.8%) were adherent while 4 (8.2%) were not adherent. Control of blood pressure was significantly higher in those that adhered to antihypertensive medication compared with non-adhering patients. Similarly, Boima et al. (2015, 41) in a study in Ghana and Nigeria revealed that non-adherence to medications was present in 66.7 per cent of the participants; Port Harcourt had the highest prevalence of medication non-adherence (95.9%), while Ibadan had the lowest (45.1%). Furthermore, Okwuonu et al. (2015, 5), in a study in a semi-urban community of southern Nigeria revealed that only 31.8 per cent of the respondents were adherent to prescribed medications.

However, Nnodimele, Olanrewaju and Akinbolajo (2010, 144–48) in a study in Ogun state, Nigeria, reported a good level of compliance, using a 42-point aggregate scale measuring adherence to treatment, the participants scored a mean of 29.12 ± 5.70 (95% CI: 28.01 to 30.22). The adherence rate in this study translates to 69.3 per cent. Findings from another study that also differ from the findings of this index study are those of a study by Kabir et al. (2014, 16–19) in Kano which showed that 54.2 per cent of respondents had good compliance with treatment whereas the remaining 45.8 per cent had poor compliance. Furthermore, similar contrasting findings were also reported by Bello (2012) in a study in Ilorin, Kwara State, which revealed that 123 (67.7%) of the patients adhered strictly to their medications while only 44 (32.3%) were poor adherents.

A significant relationship was found between the level of compliance with treatment regimens and the level of education at ($\chi^2 = 0.127$; 0.604; 0.704; 0.100; 0.403; 0.141; and 0.508; $> p = 0.05$) for all items. Similarly, the monthly income was found to have a significant relationship with compliance with treatment regimens at ($\chi^2 = 0.000$, 0.037, 0.001, 0.008, 0.010, 0.000 and 0.000; $< p = 0.05$). This study is in line with a study by Akintunde and Akintunde (2015, 125) which revealed that respondents who were adherent to treatment were likely older, had a higher level of education and a higher average monthly income with a frequency of 23.9 per cent, 39.5 per cent, and 3.8 per cent respectively. This implies that the more educated and economically buoyant these respondents are the more they comply with their treatment regimens. This stressed the importance of education and financial empowerment among hypertensive patients. Further findings show there is no significant difference in the level of compliance between the two hospitals (Sig. = 0.791), also there is no significant difference in the knowledge of hypertension between the two hospitals (Sig. = 0.883). A significant relationship with lifestyle changes and compliance was only found in 120 (40%) of the respondents at ($\chi^2 = 0.042$, 0.014, 0.000 and 0.001; $< p=0.05$), while there was no significant relationship between compliance and lifestyle changes in 180 (60%) of the respondents at ($\chi^2 = 0.603$, 0.248, 0.218, 0.950, 0.314 and 0.194; $> p = 0.05$).

Nursing Implication

Owing to the important role nurses play in the provision of healthcare, they are in the best position to educate and provide enlightenment interventions to these patients so as to enhance adherence to and compliance with antihypertensive treatment regimens, which include drugs, their lifestyle and diet, for a better management of the illness.

Conclusion

The respondents have average knowledge of hypertension, but have poor compliance with their treatment regimens. There is therefore a need for active education programmes to encourage adherence to treatment regimens for proper control of hypertension.

Recommendations

Government should subsidise the cost of hypertensive drugs to make them affordable to patients. Government in conjunction with the health facility should ensure that the pharmacies of the government-owned hospitals are well stocked to reduce the burden of searching for prescribed medications in private pharmacies at exorbitant prices. Nurses and other healthcare professionals should regularly carry out sensitisation workshops on hypertension educating the populace on the cause, symptoms and complications of hypertension.

Limitation of the Study

This research was conducted in only two tertiary institutions in Edo State; more tertiary hospitals could have been included to allow for generalisation in Edo State.

References

Adedoyin, R. A., C. E. Mbada, M. O. Balogun, T. M. Rasaaq, A. Adebayo, A. Akintomide, and P. O. Akinwusi. 2008. "Prevalence and Pattern of Hypertension in a Semiurban Community in Nigeria." *European Journal of Preventive Cardiology* 15 (6): 683–7. https://doi.org/10.1097/HJR.0b013e32830edc32.

Akintunde, A. A., and T. S. Akintunde. 2015. "Antihypertensive Medications Adherence among Nigeria Hypertensive Subjects in a Specialist Clinic Compared to a General Outpatient Clinic." *Journal of Epidemiology and Global Health* 5 (2): 125–32.

Akoko, B. M., P. N. Fon, R. C. Ngu, and K. B. Ngu. 2017. "Knowledge of Hypertension and Compliance with Therapy among Hypertensive Patients in the Bamenda Health District of Cameroon: A Cross-Sectional Study." *Cardiology and Therapy* 6(1): 53–67. https://doi.org/10.1007/s40119-016-0079-x.

Amonov, M., Y. Yoshitoku, E. Toirov, S. Davlatov, and H. Nobuyuki. 2014. "Hypertension-Related Knowledge, Practice and Drug Adherence among Inpatients of a Hospital in Samarkand, Uzbekistan." *Nagoya Journal of Medical Sci*ence 76 (3–4): 255–63.

Awobusuyi, J. O., O. O. Kukoyi, M. A. Ibrahim, and M. Atiba. 2011. "Indices of Kidney Damage and Cardiovascular Disease Risk Factors in a Semiurban Community of Iloye, South-West Nigeria." *International Journal of Nephrology*. http://dx.doi.org/10.4061/2011/564050.

Bello, S. I. 2012. "Adherence and Generic Substitution among Hypertensive Patients in a Specialist Hospital Nigeria." *Global Journal of Medical Research* 12 (2).

Boima, V, A. D. Ademola, A. O. Odusola, F. Agyekum, C. E. Nwafor, H. Cole, B. L. Salako, G. Ogedegbe, and B. O. Tayo. 2015. "Factors Associated with Medication Nonadherence among Hypertensives in Ghana and Nigeria." *International Journal of Hypertension*. http://dx.doi.org/10.1155/2015/205716.

Bosu, W. K. 2010. "Epidemic of Hypertension in Ghana: A Systematic Review." *BMC Public Health* 10 (1): 418. https://doi.org/10.1186/1471-2458-10-418.

Chiazor, I. E., and A. C. Oparah. 2012. "Assessment of Hypertension Care in a Nigeria Hospital." *Tropical Journal of Pharmaceutical Research* 11 (1): 137–45. https://doi.org/10.4314/tjpr.v11i1.18.

Danaei, G., M. M. Finucane, and J. K. Lin, G. M. Singh, C. J. Paciorek, M. J. Cowan, F. Farzadfar, G. A. Stevens, S. S. Lim, L. M. Riley, and M. Ezzati. 2011. "National, Regional, and Global Trends in Systolic Blood Pressure since 1980: Systematic Analysis of Health Examination Surveys and Epidemiological Studies with 786 Country-Years and 5.4 Million Participants." *The Lancet* 377 (9765): 568–77. https://doi.org/10.1016/S0140-6736(10)62036-3.

Hendriks, M. E., F. W. Wit, T. L. Roos, L. M. Brewster, T. M. Akande, I. H. de Beer, S. G. Mfinanga, A. K. Kahwa, P. Gatongi, G. van Rooy, W. Janssens, J. Lammers, B. Kramer, I. Bonfrer, E. Gaeb, J. van der Gaag, T. F. de Wit, J. M. Lange, and C. Schultsz. 2012. "Hypertension in Sub-Saharan Africa: Cross-Sectional Surveys in Four Rural and Urban Communities." *PLoS ONE* 7 (3): e32638. https://doi.org/10.1371/journal.pone.0032638.

Iloh, G. U. P., J. N. Ofoedu, P. U. Njoku, A. N. Amadi, and E. U. Godswill-Uko. 2013. "Medication Adherence and Blood Pressure Control amongst Adults with Primary Hypertension Attending a Tertiary Hospital Primary Care Clinic in Eastern Nigeria." *African Journal of Primary Health Care and Family Medicine* 5 (1): a446. https://doi.org/10.4102/phcfm.v5i1.446.

Kabir, M., Z. Iliyasu, I. S. Abubakar, and M. Jibril. 2014. "Compliance to Medication among Hypertensive Patients in Murtala Mohammed Specialist Hospital, Kano, Nigeria." *Journal of Community Medicine and Primary Health Care* 16 (1): 16–20. http://dx.doi.org/10.4314/jcmphc.v16i1.32401.

Mugwano, I., M. Kaddumukasa, L. Mugenyi, J. Kayima, E. Ddumba, M. Sajatovic, C. Sila, M. DeGeorgia, and E. Katabira. 2016. "Poor Drug Adherence and Lack of Awareness of Hypertension among Hypertensive Stroke Patients in Kampala, Uganda: A Cross Sectional Study." *BMC Res Notes* 9:3. https://doi.org/10.1186/s13104-015-1830-4.

Nnodimele, O. A., M. F. Olanrewaju, and O. Akinbolajo. 2010. "Treatment Adherence and Risk of Non-Compliance among Hypertensive at a Teaching Hospital in Ogun State, Southwest Nigeria." *Journal of Life and Science* 3 (2): 143–49.

Oghagbon, E. K., A. B. Okesina, and S. A. Biliaminu. 2008. "Prevalence of Hypertension and Associated Variables in Paid Workers in Ilorin, Nigeria." *Nigerian Journal of Clinical Practice* 11 (4): 342–46.

Okwuonu, C. G., N. V. Uwanurochi, O. J. Chimezie, O. S. Ogah, A. U. Mbanaso, and C. O. Odigwe. 2015. "Adherence to Antihypertensive Medication and Its Correlates among Individuals with Hypertension in a Semi-Urban Community of Southern Nigeria." *Journal of Medicine and Biomedical Research* 14 (1): 5–17.

Sit, J. W. H., S. Li, E. M. Y. Wong, Z. Yanling, W. Ziping, J. Jianqiang, C. Yanling, and T. K. Wong. 2010. "Prevalence and Risk Factors Associated with Prehypertension: Identification of Foci for Primary Prevention of Hypertension." *Journal of Cardiovascular Nursing* 25 (6): 461–69. https://doi.org/10.1097/JCN.0b013e3181dcb551.

Song, Y., H. Han, H. Song, S. Nam, T. Nguyen, and M. T. Kim. 2011. "Psychometric Evaluation of Hill-Bone Medication Adherence Subscale." *Asian Nursing Research* 5 (3): 183–88. https://doi.org/10.1016/j.anr.2011.09.007.

Ulasi, I. I., C. K. Ijoma, and O. D. Onodugo. 2010. "A Community-Based Study of Hypertension and Cardio-Metabolic Syndrome in Semi-Urban and Rural Communities in Nigeria." *BMC Health Services Research* 10 (1): 71. https://doi.org/10.1186/1472-6963-10-71.

Ulasi, I. I., C. K. Ijoma., B. J. Onwubere, C. E. Arodiwe, O. Onodugo, and C. Okafor. 2011. "High Prevalence and Low Awareness of Hypertension in a Market Population in Enugu, Nigeria." *International Journal of Hypertension*. http://dx.doi.org/10.4061/2011/869675.

WHO (World Health Organization). 2009. *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks.* Geneva: WHO. http://www.who.int/iris/handle/10665/44203.