



Hypertension related practices and compliance to anti-hypertensive therapy among hypertensive patients in tertiary health care facilities in Jos, North-Central Nigeria

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ABSTRACT

The study sought to assess hypertension related practices and to determine the level of compliance to antihypertensive therapy among hypertensive patients attending tertiary healthcare facilities in Jos, Nigeria. The study was conducted among consenting patients in Plateau State Specialist Hospital and Bingham University Teaching Hospital, both in Jos with the aid of a pretested structured questionnaire. It was a descriptive cross sectional survey of 275 hypertensive patients and systematic random sampling method was adopted. Data was analyzed with the aid of Statistical Package for Social Science (SPSS) V. 20.0 to compute simple percentage, mean and standard deviation related to study objectives. Chi-square test was employed to investigate relationships among variables. The study had 50% with high hypertension-related practice levels with gender, religion, marital status, education level, and occupation showing probabilities of 0.622, 0.583, 0.900, 0.288, and 0.923 respectively. Patient compliance to antihypertensive therapy had a significantly high percentage (82%; P=0.0005). However, only 7.30% owned a personal blood pressure measuring machine. Hypertensive patients in the tertiary healthcare facilities in Jos demonstrated high level of knowledge of lifestyle practices and compliance to antihypertensive therapy. There is therefore need to maintain the health education and promotion practices of these hospitals to further improve the practice and compliance to antihypertensive therapy in patients through proper education by healthcare professionals.

Key words: Hypertension, Hypertension Related Practice, Compliance to Anti-Hypertensive Therapy, Hypertensive Patients

INTRODUCTION

Hypertension is the commonest preventable cause of cardiovascular disease in the world [1]. It remains a major global public health challenge that has been identified as the leading risk factor for cardiovascular morbidity and mortality [2]. According to the World Health Organization (WHO) Global Brief on hypertension [3], hypertension is defined as a systolic blood pressure equal to or above 140 mmHg and /or diastolic blood pressure equal to or above 90mmHg. Normal levels of both systolic and diastolic blood pressure are particularly important for the effective function of vital organs such as heart, brain and kidneys as well as for overall health and well – being [3]. Essential hypertension constitutes about 95% of all cases of hypertension and according to Carretero and Oparil [4] the following are known etiological

factors of essential hypertension: obesity, insulin resistance, high alcohol intake, high salt intake (in salt-sensitive patients), aging, sedentary lifestyle, stress, dyslipidemia, low potassium and low calcium intake.

Hypertension has been documented as a threat to the health of people in sub-Saharan Africa and a major contributor to morbidity and mortality in the sub-region [5]. According to Familoni et al [6], systemic hypertension is the commonest non-communicable disease and public awareness about hypertension and its determinants are poor in Nigeria. Population studies have put the prevalence of hypertension at about 25% in the adult population in Nigeria [7]. Hypertension places stress on several target organs including the kidneys, the eyes, and the heart, causing them to deteriorate over time. High blood pressure

contributes to 75% of all strokes and heart attacks. Other risk factors combined with significantly high blood pressure can increase the likelihood of complications. These risk factors included increasing age, smoking, abnormal cholesterol levels, family history of premature heart disease, obesity, diabetes, coronary artery disease or other evidence of vascular disease [8]. Therefore, the prevention, detection, treatment, and control of this condition demand high priority [9]. In many cases, failure to achieve blood pressure goals may be attributed to the poverty of the patient's knowledge, perception, attitude, and lifestyle practice. Assessing compliance and practices of hypertensive patients is vitally important to achieving hypertension control goals at the population level as well as for meeting quality standards in health care delivery [10]. Many studies on hypertension-related practice and compliance to anti-hypertension therapy among patients have been reported globally and in Nigeria but none have been reported in Plateau state, North-Central Nigeria though hypertension-related practices and compliance might have geographical influence.

In the study by Eugene and Bourne [11], 66% of the patients took medication daily as prescribed by their doctor. Eighty-two percent agreed that they cut down the amount of salt in their daily meals and the majority agreed that they made effort to cut down alcohol consumption. Many people with hypertension are unaware of their condition and among those with hypertension, treatment is infrequent and inadequate [1]. Unhealthy lifestyle practices have increased the prevalence of hypertension in the world including Nigeria which culminates into high cases of death; unfortunately, most adults due to ignorance of knowledge of hypertension engage in excessive consumption of alcohol, sedentary lifestyles, excessive consumption of sodium, tobacco intake and cigarette smoking, obesity, reduced intake of fruits and vegetables, stress, and consumption of foods rich in cholesterol [2]. A study by Ike *et al* [12], showed a level of willingness of patients in University of Nigeria Teaching Hospital to adopt practices of lifestyle modification measures.

Iyalomhe and Iyalomhe [10] found that on practice, 33% of the 120 study participants were adherent with taking of medication and follow up, but 67% were not. 48% took drugs only when they had symptoms while 52% took their drugs regularly. 82% took much table salt and 63% used a lot of condiments in cooking. On the other hand, only 21% of the participants regularly took plenty vegetables while 13% adhered to dietary advice to lose weight. 41% were heavy alcohol drinkers, 28% smoked or used tobacco excessively while 9%

did regular exercises. This study concluded that in Auchu, Nigeria, patient lifestyle practices were grossly inadequate for proper blood pressure control.

In the study, 'Knowledge, Awareness, Attitude and Practice about Hypertension in Hypertensive Patients Referring to Public Health Care Centers in Khooi and Biabarak', carried out in Iran by Sabouhi *et al* [13] 234 patients participated. 30% used one beta – blocker drug, 58% of the participants did not own their own sphygmomanometer and 54% monitored their blood pressure with their own sphygmomanometer once a week. While 44% believed that hypertension is manageable with medication, 73% reported that taking medication was the most important factor to control hypertension, 64% lowering stress, 62% diet, 59% quitting smoking, 55% to losing weight and 46% exercise. There was also a significant relationship between the knowledge score and the age of the participants but the patients practice score was high. 70% of the participants mentioned that they referred monthly to a doctor or health care provider for blood pressure check-up. 80% took their prescribed medication as ordered and 54% never stopped their hypertensive medication when they felt better. 47% reported that they adhered often to the doctor or health care provider's recommendation about hypertension management. 44% rarely forgot to take their drugs while 45% reported that they had regular exercise, 37% always had a low salt diet and 36% of the respondents were able to decrease their stress according to their health care provider's recommendation. Also, there was no significant relationship between age and practice score and none between educational level and practice score. The study concluded that patient practice was very good, however patient blood pressure was not under control and it was linked to physician turnover, none adherence to fixed protocol or guidelines i.e. prescribing antihypertensive drugs from one category, choosing two drugs from the same category, the drug side effects, combining the drugs inappropriately and lack of consistent or a personal regular physician.

In another study: 'Knowledge and Practice of Hypertension Patients as seen in a Tertiary Hospital in the Middle Belt of Nigeria' by Katibi *et al* [14] in the University of Ilorin Teaching Hospital, Nigeria, with a sample size of 224 hypertensive patients, 44% were males and 44.5% were either traders or business men or women. 21.5% retirees or unemployed, and 12.5% were full time housewives. 39% of the respondents had been hypertensive over 5 years, 29% had been hypertensive between 2-5 years, and 32% for less

than 2 years. According to these authors, majority of the patients (52%) checked their blood pressure once a month at the hospital on appointment, 20% checked it more often albeit sporadically as they came across a BP measurement apparatus and 25% checked it once every three months. 4% checked even more than three months apart while less than 5% had automated electronic machines or oscillometers for self-assessment at home. Concerning smoking, only 2% volunteered history of smoking. 48% believed that smoking has no effect on propensity to develop complications from high blood pressure. It concluded that blood pressure control is still unacceptably poor among hypertensive Nigerians and this may be connected to the adverse practices. Boule [8], opined that treatment should always start with lifestyle modifications, which should continue even when medications becomes necessary. According to him, major lifestyle practices shown to lower blood pressure include the adoption of the Dietary Approach to Stop Hypertension (DASH)-eating plans and dietary sodium reduction; weight reduction in overweight or obese hypertensive individuals; regular physical activities; social habits such as moderation of alcohol consumption and cessation of smoking; dietary fruits and vegetable consumption; and the reduction of saturated fat intake. In another study by Eugene and Bourne [11] 66% of the patients took medication daily as prescribed by their doctor, 82% agreed that they cut down the amount of salt in their daily meals, and the majority agreed that they made effort to cut down alcohol consumption.

The study by Busari *et al* [15] titled 'Impact of Patient Knowledge, Attitudes, and Practices on Hypertension and Compliance with Antihypertensive Drugs in a Resource-Poor Setting', carried out on 240 hypertensive patients at the cardiology clinic of the Federal Medical Centre in Ido-Ekiti, Nigeria observed that compliance to medication regimens were good in only 32.1% of the patients. The reasons were attributed to poor knowledge of the disease and ignorance of the need for long-term treatment. As seen in 32.6% of the study group; high cost of medications (21.7%), religious practices and cultural beliefs (12.5%), adverse drug reaction (6.5%), inadequate access to medical care (6.2%) and the use of complimentary medications (20.5%) also had an impact on compliance. The study concluded that hypertensive patients have poor compliance to antihypertensive drugs and knowledge of their disease with a significant negative impact on compliance with medication and thus there is need to invent more effective education strategies directed towards the public in general and the patients in particular.

Osamor and Owumi [16] in a study on factors associated with treatment compliance in Hypertension in Southwest Nigeria studied 440 community residents with hypertension and investigated the factors associated with good compliance, including demographic factors, beliefs about hypertension, and the availability of social support. Educational status and religion were two other factors that often influence the knowledge, beliefs, attitudes, and practices relating to compliance. The study showed that high self-reported compliance was not associated with the religion professed by the respondent, as 57.8% of Muslims and 59.2% showed high self-reported compliance. Those with primary education however, showed a higher frequency of high self-reported compliance when compared with respondents with other categories of educational levels. Beliefs about the perceived cause of hypertension were not significantly associated with treatment compliance, but having a family member with hypertension and support from family members and friends were associated with compliance. In the study, the reasons given for poor compliance in the focus groups were "feeling better," "forgetting to take medication," and "cost." The study concluded that by emphasizing the importance of social support networks in long-term management of chronic conditions such as hypertension, which requires a radical and life-long change in the lifestyle of the affected person. Regular clinic attendance, not using non-western prescription medication, and having social support from family members or friends were some of the factors associated with high compliance with treatments. However, beliefs about the cause of hypertension were not associated with compliance. This present study sought to assess hypertension-related practices and compliance to antihypertensive therapy among patients at two tertiary health care facilities in Jos metropolis, North-Central Nigeria that can guide the design of strategy to improve compliance and effective hypertensive-related practices among patients at these settings. This in turn can contribute to optimizing patients' and public benefits of hypertension management.

METHODS

Settings: This survey was done at two tertiary health care facilities in Jos metropolis, Plateau state. Plateau state is one of the 36 states in Nigeria and it is located in North-Central geo-political region of Nigeria. It has a population of about 836,910 according to the 2006 census report of the National Population Commission (NPC) [17] and there are more than 50 ethnic groups in Plateau state. Jos, the capital of Plateau state has a unique

geographical features makes it a mosaic of socio-cultural activities in Nigeria. Patients with chronic hypertensive are managed in medical outpatient department (MOPD) of healthcare facilities used for this study and other canters not involved in the survey.

Study Design: The design employed for this study was a descriptive cross sectional survey that utilized a researcher-administered questionnaire.

Inclusion and Exclusion Criteria: All hypertensive patients aged 18 years and above attending the medical outpatient department (MOPD) who gave consent were included in the study while Patients under 18 years of age, pregnant women and those who declined to give their consent were excluded from the study.

Study Instrument: Data was collected with the aid of a pre-tested questionnaire that consisted of three sections: demography, hypertension-related practices, and compliance to antihypertensive therapy. The questionnaire was adapted from a prior study by Iyalomhe and Iyalomhe [10].

Validation and Pretesting: To ensure that the instrument actually measured what was desired, content and face validity were carried out. Ten experts, including doctors, pharmacists and nurses reviewed the questionnaire before it was administered. Reliability test of the instrument was carried out using Cronbach alpha. The overall Cronbach alpha of the instrument is 0.741.

Sampling/Procedure for Data Collection: In each of the health care facility systematic random sampling was used to select participants in the study. During survey, patients who could not understand English language had questionnaire items explained to them Hausa and Mwaghavul based on which of these two they could understand very well. In each healthcare facility trained personnel administered the questionnaire to respondents.

Ethical Clearance: Approval for carrying out the study was obtained from Health Research and Ethics Committees of Plateau State Specialist Hospital and Bingham University Teaching Hospital, both in Jos. Respondents' informed oral consent was obtained before participating in survey. Respondents' identity was not required in filling or analyzing the data.

Data Analysis and Presentation: Data generated from survey were analyzed with the aid of Statistical Package for Social Sciences (SPSS) version 20.0 software to generate descriptive

statistics. The data collected was analyzed with frequency, simple percentage, mean and standard deviation. Chi-square test was employed to investigate relationship among variables. The results presented in texts, tables and figures.

RESULTS

A total of 275 questionnaires were administered to patients of the two hospitals with the overall mean age of participants being 60.57 ± 12.94 years. The minimum age was 28 years while the oldest participant was 90 years. There were a total of 146 (53%) males and 129 (47%) females. A total of 228 (83%) were Christians and 47 (17%) were Muslims with 226 (82%) married while the rest were either singles 4 (2%) or divorced/ widowed 45 (16%).

The study participants had 35% having no formal education, 15% had primary education, 14% had secondary education and a further 31% had tertiary education while 6% had vocational training. 23% of the study participants were civil servants, 17% were farmers, 26% were engaged in business and 34% had other occupations. The study revealed that about two-third of respondents (66%) indicated that they had a history of hypertension in their family.

Table 1 shows results of hypertensive-related practice among participants. The results showed proportion of respondents who reported observing hypertension related practices higher than those who did not and the difference for each practice was statistically significant ($P < 0.05$). Only on the use of drugs not recommended by their doctors were the responses about evenly split (136 (49.5%) said no, while 139 (50.5%) said yes), which Chi-square testing revealed to be not significant statistically.

Regarding blood pressure machine, 93% of the study population does not own a blood pressure machine while 7% indicated that they owned a personal blood pressure machine. The results are shown in figure 1.

Figure 2 shows the distribution of the percentage of frequency of attending hypertension clinic. Majority, 34% and 29% attend hypertension clinic once every four months and once every five months respectively.

Blood Pressure: The mean systolic blood pressure of 275 participants was 148mmHg (SD = 15.69) and the mean diastolic was 86.82mmHg (SD = 9.86).

One hundred and eleven participants (40%) had low hypertension related practice and 164 (60%) of

the study population had high hypertension related practice levels. Chi – square analysis revealed that there was a significant high number of study population with high hypertension related practice levels ($\chi^2 = 10.215$, $p = 0.001$). The results are shown in table 2.

Table 3 shows the level of compliance of participants. Table 4 shows the overall level of compliance to anti-hypertensive therapy by the study participants. Results revealed that 49 (17.8%) of the participants had low level of compliance to anti-hypertensive therapy, while 226 (82.2%) of the study participants had high level of compliance to anti-hypertensive therapy. Further chi-square analysis indicated that there was a significant high level of compliance to anti-hypertensive therapy by study participants ($\chi^2 = 113.924$, $p = 0.0005$). Table 3 shows the summary of the results.

DISCUSSION

This study showed an overall mean age of participants to be 60.57 ± 12.94 years. According to Carretero and Oparil [4] aging is one of the numbers of factors that increases blood pressure. The older the individual become, the higher the risk of developing cardiovascular disease such as hypertension. According to WHO [3], the risk of hypertension increases with age due to the stiffening of blood vessels although aging of blood vessels can be slowed through healthy living including having a healthy diet and reducing salt intake. The higher incidence of males with hypertension in this study compared to females agrees with the study by Iyalomhe and Iyalomhe [10] and Ekwunife et al [18] that reported a higher incidence of male hypertension cases than female. The higher number of males in the study may be due to the fact that more often than not, they are in control of family income and obligations. There is also the issue of gender bias where the health of males is given more preference compared to that of the females because they are deemed as more important. Majority of the participants in the study (82%) were married and this is similar to the findings by Iyalomhe and Iyalomhe [10] which recorded 89%. Thirty-four per cent of the study population had an occupation that was listed under “Other” which agrees with findings by Katibi et al [14] where quite a number of the respondents were retirees, unemployed or full time housewives. Twenty-three per cent in this study were civil servants; this is similar to the study by Iyalomhe and Iyalomhe [10] where 28% of participants were government workers. Seventeen percent were farmers and quite a number of locals are involved in farming activities while majority were engaged in business. The involvement in business is not

surprising since most businesses are within the cosmopolitan city and therefore they have greater access to tertiary hospitals.

Majority of the study participants (66%) indicated a history of hypertension in their family. This result is consistent with the previous study of Sanne et al [19] where 92% of the participants reported a family history of hypertension. One of the risk factors for hypertension is a family history of high blood pressure [8].

Majority of the study population admitted that they checked their blood pressure reading and this was irrespective of the fact that only a very small percentage (7.3%) of respondents owned a personal blood pressure machine. This agrees with the similar study by Katibi et al [14] where less than 5% owned their own automated electronic machines or oscillometers for self-assessment at home.

Majority of the participants reduced salt in their food and/or instructed persons who cooked for them to reduce salt in their food. In the management of hypertension, major lifestyle practices shown to lower blood pressure include the adoption of Dietary Approach to stop Hypertension (DASH)-eating plans and dietary sodium reduction; weight reduction in overweight or obese hypertensive individuals, regular physical activities, social habits such as moderation of alcohol consumption and cessation of smoking, dietary fruits and vegetable consumption [8]. Majority of the health talk given during clinic days as observed during data collection stressed a healthy lifestyle practices which explains why quite a number of the study participants actually knew quite a number of right practices pertaining to the disease.

A very few number admitted to drinking of alcohol, smoking cigarettes as well as using traditional medicines for hypertension. This agrees with findings by Katibi et al [14] in Ilorin where patients practice regarding life style was very poor. In this study a high percentage admitted that they obtained their drugs from registered pharmacies as well as undertook regular exercise and kept to their hypertensive clinic schedules. Majority of participants attended clinic once every four months followed by those who attended clinic less than once a month. The fact that majority attended the clinic once every four month is actually not healthy for proper patient management but this could be as a result of the number of patients seen by a physician and possible work overload. This could explain the mean systolic and diastolic blood pressure reading (148/86.82mmHg) achieved in the

study population indicating that for majority in the study, their blood pressure was not under control and should be improved upon in order to attain the standard and target blood pressure of less than or equal to 140/80mmHg.

The study showed the overall hypertension related practice level to be significantly high. This agrees with findings by Sabouhi *et al* [13]. However, it does not agree with findings by Katibi *et al* [14], where hypertension practice levels were shown to be poor among hypertensive patients in Ilorin. The study showed that a high number of participants made sure their hypertensive drugs were available, took their drugs as recommended and complied with antihypertensive therapy despite the cost or side effects of the drugs. Overall level of compliance to antihypertensive therapy was significantly high. This could be because patients are well educated by their health care givers on the consequence of not keeping to their antihypertensive therapy and the complications that could arise there from. This could be because a high number of participants were aware of the complications that could arise due to hypertension. Busari *et al* [15] noted that the reasons for lack of compliance to antihypertensive therapy were attributed to poor knowledge of the disease and ignorance of the need for long-term treatment. Good compliance to antihypertensive therapy could also be due to the fact that a large number of participants in this study had a family history of hypertension. Osamor & Owumi [16] mentioned the availability of a social support as one of the factors that is associated with treatment compliance in hypertensive patients. Concerning self-

assessment of blood pressure control, majority of the participants admitted that their blood pressure was not under control which could possibly spur patients up to have better control of their blood pressure.

The impacts of this study are: that previous studies of high hypertension related practice among hypertensive patients were confirmed and in addition the problem of some hypertensive patients stopping treatment or medication in the absence of hypertension related symptoms was also confirmed.

This study was constrained by language most especially in areas where technical words had to be translated appropriately to participants in Hausa, Mwaghavul or Pidgin English.

CONCLUSION

The study showed that hypertension related practice levels were significantly high among hypertensive patients attending tertiary health care facilities in Jos. The study also showed that there was a significantly high level of compliance to antihypertensive therapy by hypertensive patients attending tertiary health care facilities in Jos. From the findings, hypertensive patients should be counseled every time they visit the hospital on their clinic days to improve their practice and compliance to antihypertensive therapy. While Health care providers should stress to patients that they cannot stop antihypertensive medication regardless of the absence of hypertension related symptoms unless their physicians advise otherwise.

Table 1: Practice among hypertensive patients in the study

	Frequency of responses		Chi-Square (χ^2)	p-value
	No (%)	Yes (%)		
I check my blood pressure reading	1 (0.4)	274 (99.6)	271.015	0.0005
I instruct the person who cooks for me to reduce salt	9 (3.3)	266 (96.7)	240.178	0.0005
I reduce salt in my food	6 (2.2)	268 (97.8)	251.524	0.0005
I take plenty of vegetables	11 (4.0)	264 (96.0)	232.760	0.0005
I drink alcohol	256 (93.1)	19 (6.9)	204.251	0.0005
I smoke cigarettes	263 (95.6)	12 (4.4)	229.095	0.0005
I use traditional medicines for hypertension	208 (75.6)	67 (24.4)	72.295	0.0005
I obtain my drugs from registered pharmacies	27 (9.8)	248 (90.2)	177.604	0.0005
I use drugs not recommended by my doctor	136 (49.5)	139 (50.5)	.033	0.856
I undertake physical exercise	60 (21.8)	215 (78.2)	87.364	0.0005
I keep hypertension clinic schedules	9 (3.3)	266 (96.7)	240.178	0.0005

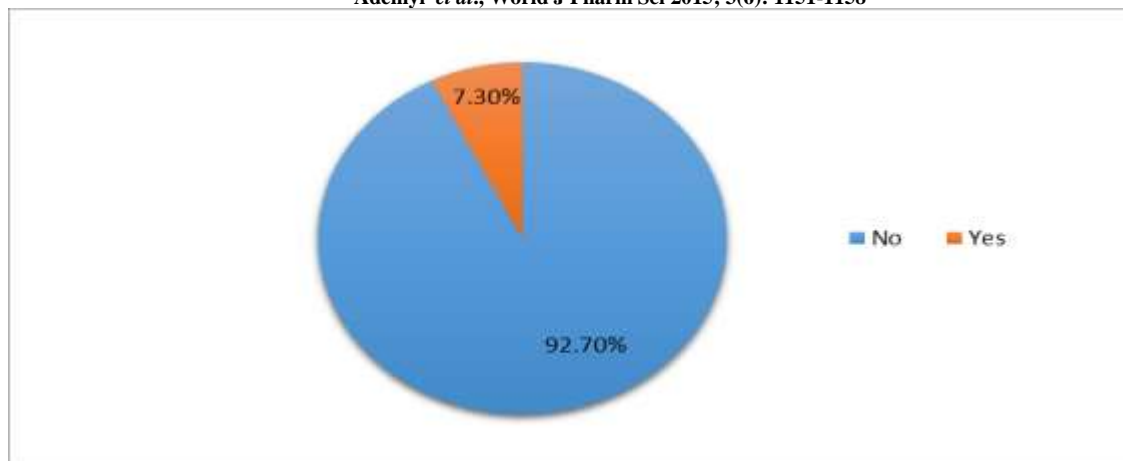


Figure 1: Distribution of ownership of personal blood pressure machine

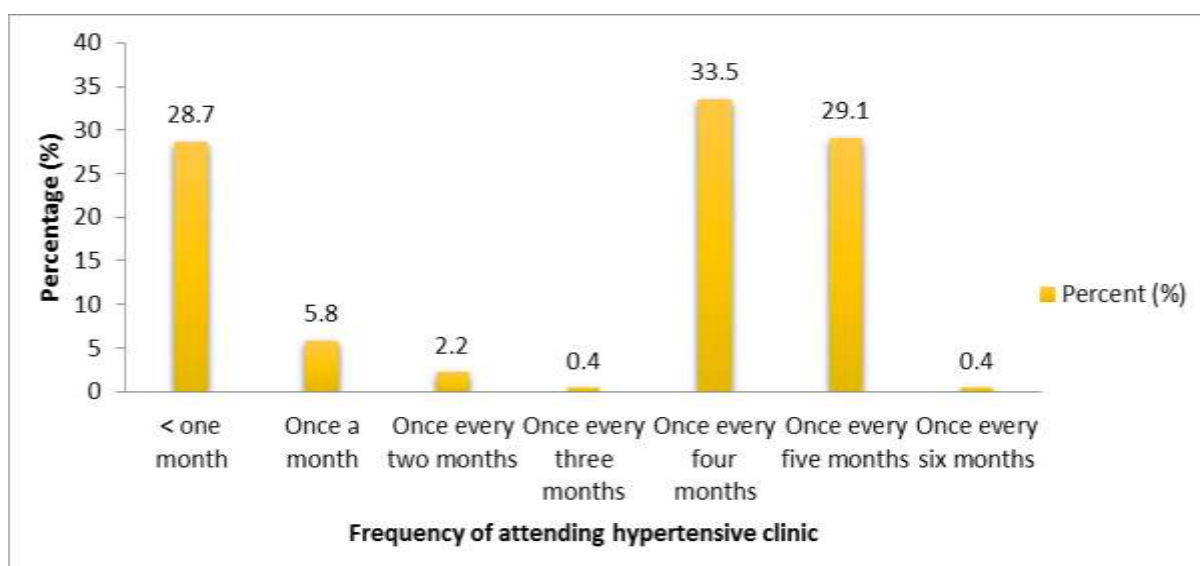


Figure 2 shows the frequency of participants attending hypertension clinic.

Table 2: Hypertension related practice level

Hypertension Related Practice Levels	Observed N	Expected N	Chi-square χ^2	p-value
Low	111	137.5	10.215	0.001
High	164	137.5		
Total	275			

Table 3: Compliance of participants

	Frequency of responses		Chi-Square (χ^2)	p-value
	No (%)	Yes (%)		
I make sure that my hypertensive drugs are available.	5 (1.8)	270 (98.2)	255.364	0.0005
I take my hypertensive drugs as recommended.	5 (1.8)	270 (98.2)	255.364	0.0005
The cost of my drugs prevents me from following the recommendation of my doctor	191 (69.5)	84 (30.5)	41.633	0.0005
The side effects of my drugs prevent me from taking my drugs as required	198 (72.0)	77 (28.0)	53.240	0.0005
Would you say your blood pressure is under control?	214 (77.8)	61 (22.2)	85.124	0.0005

Table 4: Overall level of compliance to antihypertensive therapy

Hypertension Related Practice Levels	Observed N	Expected N	Chi-square χ^2	p-value
Low	49	137.5	113.924	0.0005
High	226	137.5		
Total	275			

REFERENCES

1. Ulasi II et al. Blood pressure variability and its implications in people of African descent, *Hypertension Research* 2011; 34 (10): 1076-7.
2. Onyekwere OK et al. Knowledge of hypertension among adults in Owerri Senatorial Zone of Imo state, Nigeria. *Mediterranean Journal of Social Sciences* 2013; 4 (5): 69-79.
3. World Health Organization (WHO) A Global brief on Hypertension, Geneva: World health Organization 2013.
4. Carretero O, Oparil S. Essential Hypertension. Part 1: Definition and Etiology. *Circulation* 2000; 101(3):329-35.
5. Ogah OS et al. Blood pressure, prevalence of hypertension and hypertension related complications in Nigerian Africans: a review. *World Journal of Cardiology* 2012; 4(12):327-340.
6. Familoni BO et al. Knowledge and awareness of hypertension among patients with systemic hypertension. *Journal of the National Medical Association* 2004; 96(5):620-624.
7. Awobusuyi JO et al. Prevalence and socio-demographic profile of hypertensive patients in a Nigerian General Out-Patients' Department, *The Internet Journal of Third World Medicine* 2012; 10(1).
8. Boulle A. Knowledge of the Hypertensive Person Regarding Prevention Strategies for Coronary Heart Disease. Unpublished Dissertation, University of South Africa, 2009.
9. Kearney PM et al. Global burden of hypertension: analysis of worldwide data. *The Lancet* 2005; 365:217-223.
10. Iyalomhe GBS, Iyalomhe SI. Hypertension related knowledge, attitudes and life-style practices among hypertensive patients in a sub-urban Nigerian community. *Journal of Public Health and Epidemiology* 2010; 2(4):71-77.
11. Eugene V, Bourne PA. Hypertensive Patients Knowledge, self-care management practices and challenges. *Journal of Behavioural Health* 2013; 2(3): 255-268.
12. Ike S et al. Knowledge, perceptions and practices of lifestyle-modification measures among adult hypertensives in Nigeria. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 2010; 104(1):55-60.
13. Sabouhi F et al. Knowledge, awareness, attributes and practice about hypertension in hypertensive patients referring to public health care centers in Khor & Brabanak Iran. *J Nars Midwifery res* 2011; 16 (1):34-40.
14. Katibi IA et al. Knowledge and practices of hypertensive patients as seen in a tertiary hospital in the middle belt of Nigeria. *Nigeria. Journal of Clinical practice* 2010; 13(2):159-162.
15. Busari, OA et al. Impact of patients Knowledge Attitude and practices on hypertension on the compliance with antihypertensive drugs in a resource poor setting. *TAF Preventive Medicine Bulletin* 2010; 9(2):87-92.
16. Osamor PEA, Owumi BE. Factors associated with treatment compliance in hypertension in Southwest Nigeria. *Health Popul Nuts*. 2011; 29(16): 619-628.
17. National Population Commission (NPC). 2006 Population and Housing Census: Priority Table Volume III: Population Distribution by Sex, State, LGA & Senatorial District, Abuja: National Population Commission 2010.
18. Ekwunife OI et al. Prevalence, awareness, treatment and control of hypertension in a Nigeria population. *Health* 2010; 2:731-735.
19. Sanne S et al. Hypertension knowledge among patients from an urban clinic. *Ethnicity and Disease* 2008; 18:42-47.