(RESEARCH ARTICLE)

Antihypertensive medication adherence among hypertensive patients in a tertiary health facility in South East Nigeria

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Abstract

Objectives: To assess antihypertensive medication adherence among hypertensive patients in a tertiary health facility in South East Nigeria

Methods: A descriptive cross-sectional study was utilized for this study. A total of 392 respondents were recruited for the study using systematic sampling technique. The study instrument was interviewer administered structured questionnaire. Data were collated and entered into SPSS spread sheet version 23.0. Results presented in Table and test of association computed for knowledge and sociodemographic variable as well as adherence and sociodemographic variable. Morisky medication adherence scale was used to classify respondents into low, medium and high adherence.

Results: About thirty three per cent (33.7%) of respondents were of the age group 41-50 years while only 7.1% were of the age group 70 years and above. Sixty point seven percent (60.7%) of the respondents were males. Most respondents had monthly income of less than #40,000 while few representing 2.7% earn above #100,000 monthly. Fifty-nine point four percent (59.4%) of respondents were aware of the drug they take for hypertension. 87% of the respondents had good knowledge of antihypertensive drug. 81.1% of respondents had low adherence, 18.9% had medium adherence while none of the respondent had high adherence. The proportion of respondents with medium medication adherence tends to decrease with increasing age while the proportion of low medication adherence increased with increasing age group but this association was not statistically significant.

Conclusion: Majority of the respondents representing 87% had good knowledge of antihypertensive drugs but this did not translate to practice as majority 81.1% of them had low adherence to antihypertensive medication with low adherence increasing as age group of respondents increased.

The factors identified to be associated with medication adherence were socio-demographic factors like age, occupation and cost of drugs.

Keywords: Adherence; Antihypertensive; Hypertensive; Patients; Medication

1 Introduction

Hypertension is the leading risk factor for mortality and the third cause of disability world-wide. [1] By the year 2025, it is estimated that there will be 1.56 billion patients with hypertension. [2] Hypertension has become a significant health problem in both developing and developed countries. Risk factors associated with the development of hypertension are family history, advanced age, gender, a lack of physical activity, poor diet (especially salty food), overweight and obesity, and increased alcohol intake. [3-5] Poor medication adherence is a major cause of failure to achieve blood pressure (BP)

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control. [6] Patients take only 50% to 70% of the prescribed doses of antihypertensive medications and up to 50% of patients discontinue their antihypertensive treatment within the first year. In addition, up to 75% of patients do not achieve target BP. [7]Oftentimes, non-adherence is attributed to patient-related barriers; however, medication taking is a complex phenomenon and responsibility for non-adherence should not be solely attributed to the patient. [7] Non-adherence can also be caused by therapy, illness, health system/ health care team, and socioeconomic related barriers. [7]

Patient self-report is an efficient and practical method for assessing medication adherence and is the only method that can be used to explore patients' perspective about adherence barriers.[8] Research using patient self-report of adherence have focused on patient related barriers (e.g, forgetting doses); however, these barriers represent only part of the problem of non-adherence. [9] Adherence to antihypertensive medication is an effective step for controlling blood pressure and preventing complications. However, certain factors affect a hypertensive patient's behaviour regarding adherence to antihypertensive treatments. These Factors can support or hinder adherence behaviour. From the available research in the field of hypertension treatment, factors influencing hypertensive patients' adherence behaviour to antihypertensive medication include patient-related factors (e.g., socio-demographic factors and the individual's knowledge and s kills), health system-related factors (such as treatment cost and patients' resources), and provider-related factors (such as patient-provider relations hips and communication). [10] Hypertension is the single most common and most important risk factor for cardiovascular disease. [11] Despite improvements in the detection and treatment of hypertension, the condition continues to contribute, significantly, to mortality and morbidity in adults and that it is often poorly controlled in clinical practice. [12] Hypertension affects 23 % of the population, 18 % of persons aged > 15 years and 33 % of adults aged > 45 years. In 2002, the WHO reported that approximately 20% of the world's adult population, approximately one billion people, are estimated to have hypertension, which contributed to more than 7.1 million deaths per year. [5] The report stated that the prevalence has dramatically increased in patients older than 60 years in a variety of countries, with 50% of individuals in this age group having hypertension. Hypertension remains a major global public health challenge that has been identified as the leading risk factor for cardiovascular morbidity and mortality as well as all-cause mortality. [2,5] Being the pivotal determinant of cardiovascular complications such as coronary heart disease, myocardial infarction, stroke or renal insufficiency, hypertension affects approximately 1 billion people worldwide (4.5% of the current global disease burden), 340million of these in economically developed and 340 million in economically developing countries. Annually, it causes 7.1 million (one- third) of global preventable premature deaths. [2,13-14] The prevalence of hypertension varies within different countries. The overall global prevalence among adults was recently estimated to be 26.6% in men and 26.1% in women. [2] Being the most rapidly rising cardiovascular disease in sub-Saharan Africa and affecting over 20 million people, hypertension prevalence has been reported to be on the increase in recent years. [15-18]Although the control of blood pressure has improved considerably, poor adherence with medication treatment remains a major problem among hypertensive patients, and has been identified as one of the main causes of failure in achieving blood pressure control. [19] Only 29% of hypertensive patients in the United Stated achieved good control, and even worse rates have been reported in Canada and European countries. [20] It is estimated that the overall adherence rates of medications were approximately 50%. [21] Among hypertensive patients who have poor blood pressure control; poor drug adherence is one of the causes, and accounts for increasingly significant and substantial public health burden. Of all avoidable hospital admissions in the United States, 33 to 69 percent are due to poor medication adherence, with expenses of approximately $100 billion a year. [22-23] Poor adherence has been attributed to unnecessary over-prescription of drugs, substantial worsening of diseases, avoidable increases in hospital admission rates, longer hospital stays, leading to a significant medical burden. [24] There is long-term absolute benefit of lowering blood pressure in hypertensive patients according to the JNC VI risk stratification of Hypertension. [25] Barriers to drug adherence consist of multiple factors that include complex medication regimens, dosing frequency, behavioral factors and side effects of treatment. [25] The patients' non-compliance to antihypertensive medication could be associated with reservations about drugs and lack of necessary knowledge on which to build an understanding of the condition and treatment. [26-28] In fact, it has been estimated that only 60% of patients take medication as prescribed. [29] A number of studies highlighted multiple issues in non-adherence, including knowledge about hypertension by patients towards hypertension; the outcomes are not encouraging as far as adherence to medication is concerned. [30] Studies suggest that the treatment's efficacy, in patients under care, is attenuated mainly by patient non-compliance with medication and lifestyle advice. [31] Nichols-English and Poirier, (2000). The last suggest that patients' non-compliance could be associated with reservations about drugs and lack of necessary knowledge on which to build an understanding of the condition and treatment. [26-28]

Antihypertensive medication adherence among hypertensive patients is key to successful blood pressure control. Though many studies have been done on antihypertensive mediation adherence among hypertensive patients in many parts of the world including Nigeria very few studies have been specifically done in the study area. Findings from this study will help to bridge this gap. Determining the knowledge of the hypertensive patients on the antihypertensive drugs they take will afford the researcher to ascertain the basis for antihypertensive medication adherence because

knowledge is key to practice. Patients who do not know the drugs he or she is taking may likely not take the drugs or if at all, as and when due. Furthermore, ascertaining the medication adherence level among the hypertensive patient attending clinic in a tertiary health facility in the south east will afford the opportunity of knowing the proportion of hypertensive patients who adhere to prescribed medication in this area. This will form the basis for recommendation to the authorities in the health institutions as well as the hypertensive patients on the need to take medication as prescribed by the physician. Moreso, this study will afford us the opportunity of knowing the factors associated with medication adherence among hypertensive patients. This will equally form the basis to health educate the patients so as to achieve a behavioural change for positive health action

General objectives

To assess antihypertensive medication adherence among hypertensive patients in a tertiary health institution in south eastern Nigeria

Specific objectives

- To determine the Knowledge of antihypertensive drugs among hypertensive patients attending clinic in a tertiary health care
- To find out the Medication adherence level among hypertensive patients attending clinic
- To ascertain the Factors associated with antihypertensive medication adherence among hypertensive patients attending clinic

2   Methodology

The study was carried out among 392 antihypertensive patients who attend a tertiary health facility in south east Nigeria using a descriptive cross-sectional study design.

The minimum sample size for the study was calculated using the Cochrane formula for minimum sample size determination in a descriptive, cross-sectional study. [32]

$$n = z^2pq/d^2$$

Where n = minimum required sample size for the workers.
Z = standard normal deviate. The value of the z-score of the standard normal deviate to be used for this study is set at 1.96 which corresponds to the 95% confidence level.
p= the proportion in the target population estimated to have a particular characteristic.

Therefore, using p = 64.6% (Adherence to antihypertensive treatment among patients on follow up at the University of Gondar Hospital, Ethiopia) [33] = 0.646

$$q = 1.0\text{-}p$$

and d = tolerable margin of error set at 5%

$$P = 0.646$$

$$q = 1\text{-} p = 1\text{-}0.646 = 0.354 \text{ and } d = 5\%, (0.05)$$

$$n = 1.96^2 X\ 0.646\ X\ 0.354$$

$$0.05^2$$

$$n = 352$$

To make adjustment for 10% non-response, the formula for non-response adjustment was used: n/ (1 - nrr)

Where n is calculated sample size,

nrr is non-response rate,

$$n = 352$$

nnr = 10% non-response rate = 0.1

Minimum sample size determined for 10% non-response:

$$n = 374/ (1 – 0.1) = 392$$

Therefore 392 respondents were recruited for the study

2.1 Sampling Technique

A systematic sampling technique was utilized in this study to recruit participants. The first participant (random start) was selected from the first five patients waiting to be seen in the clinic through simple random sampling by balloting. Thereafter, every third patient on the queue in the clinic each day were selected for the study until the entire duration of the study has elapsed or a reasonable sample size not below the calculated minimum sample size has been reached.

2.2 Study instrument

An interviewer-administered structured questionnaire adapted from the validated respiratory questionnaire was used to assess the Knowledge of antihypertensive drugs among hypertensive patients attending clinic in a tertiary health facility in south east Nigeria. The first section assessed the Socio-demographic characteristics of the respondents, the second section assessed the knowledge of antihypertensive drugs among hypertensive patients, the third section assessed medication adherence while the fourth section assessed the factors associated with antihypertensive medication adherence.

2.3 Data Management

Data from the questionnaire were coded and entered into an electronic spreadsheet. Analysis was done with the aid of the Statistical packages for scientific solution (SPSS) version 23.0 software, and discrete data was presented as tables, diagrams and proportions(percentages). Statistical test of association between proportions was done by the use of the Chi squared test. Where expected counts in each of the cells is less than 5, Fischer's exact test was utilized. Statistical level of significance was set at $p < 0.05$. Construction of 95% confidence Interval were done where appropriate. Knowledge of antihypertensive drug was assessed by a grading system developed by the researcher whereby points was awarded to a set of 20 questions. A correct answer was given 1 point, an incorrect answer or no response was graded as 0. A total points of 20 was awarded to all the questions on knowledge of antihypertensive drug. Knowledge score of 0-9 (less than 50%) = poor knowledge. Knowledge score of 10-20 (50-100%) = good knowledge. Cronbach's alpha test was used to test the reliability of the study instrument. Medication Adherence was assessed using the Morisky-8 medication adherence scale. A response of Yes to any of the question is scored 1 while a response of No is scored 0. A total score of greater than 2 was graded as low adherence, score of 1 or 2 was graded as medium adherence while total score of 0 was graded as high adherence.

2.4 Study limitation

Recall bias: Some of the patients may not have remembered the drugs they were taking or when they last took the drugs and they may be misclassified as non-adherence to prescribed medication. Also, the information provided by the patients may be difficult to verify as it was self-reported.

3 Results

A greater proportion (33.7%) of respondents were of the age group 41-50 years while only 7.1% were of the age group 70 years and above. 60.7% of the respondents are males. Most of the respondents representing 80.1% were married while a small proportion of them (1.8%) were divorced. Thirty eight point eight (38.8 %) of the respondents were professionals while a few (9.7%) were unemployed. More of the respondents (43.4%) had tertiary level of Education. The dominant ethnic group among the respondent (90.6%) were Igbos. See table 1. About half (51.9%) of the respondents had monthly income of less than N40,000 while few representing 2.7% earn above N100,000 monthly. See table 2. A larger proportion of the respondents (39.3%) were diagnosed hypertensive within the past three years while 37.5% of them were diagnosed hypertensive in the past 3-6 years. Table 3. Majority of the respondents (91.3%) indicated that the consequences of inappropriate use of medication as prescribed will lead to development of more problems while a very few of them (0.7%) replied that it will improve health. See figure 1. Majority (81.1%) of respondents had low adherence, 18.9% had medium adherence while none of the respondent had high adherence. See

table 4. The proportion of respondents with medium medication adherence tends to decrease with increasing age. However, this association was not statistically significant and the proportion of low medication adherence increased with increasing age group but this association was not statistically significant. P= 0.095. See table 5. More females had low adherence 83.1% than males 79.7% while more male had medium adherence 20.3% than females 16.9%. this association was however not statistically significant. P=0.395. See table 6. Low adherence level increased from married 79.5%, to single 82.6%, divorced 85.7% and widowed 89.6% but this association was not statistically significant. P= 0.407. See table 7. Low adherence increased from civil servant to retired workers to business man or woman to unemployed and this association was statistically significant. P=0.001. See table 8. Majority (81%) of the respondents had low adherence while 19 % of them had medium adherence. For the low adherence group, 95.1% were not educated, 91.2% had primary education while 93% of them had secondary education. This association was statistically significant. P=0.0001. See table 9. Majority of the respondents (87.0%) had good knowledge of antihypertensive medication. See figure 3. Knowledge increased as age group of respondents increased but this association was not statistically significant. P = 0.386. See table 10. A greater proportion of respondents with good knowledge had no formal education while while those with poor knowledge had secondary level of education but this association was not statistically significant. P= 0.053. see table 11. More of the respondents who were entrepreneur (96.7%) had good knowledge as compared to unemployed (86.4%) and this association was found to be statistically significant. p<0.05. see table 12.

Table 1 Sociodemographic characteristics of respondents

Variables	Frequency, n=392	Percent
Age group (Years)		
≤40	48	12.5
41-50	132	33.7
51-60	127	32.4
61-70	57	14.5
≥70	28	7.1
Sex		
Male	238	60.7
Female	154	39.5
Marital Status		
Married	314	80.1
Single	23	5.9
Divorced	7	1.8
Widowed	48	12.2
Occupation		
Entrepreneur	61	15.6
Professional	152	38.8
skilled	85	21.7
Semi-skilled	12	3.1
Unemployed	82	20.9
Level of education		
No formal	102	26.0
Primary	34	8.7
Secondary	86	21.9
Tertiary	170	43.4

Tribe		
Igbo	358	91.3
Hausa	6	1.5
Tiv	6	1.5
Yoruba	5	1.3
Bini	4	1.0
Others*	13	3.3

*Others: Urhobo 2(0.5%); Igala 3(0.8%); Esan 2(0.5%); Owan 3(0.8%); Calabar 3(0.8%)

Table 2 Monthly Income of Respondents

Monthly income [#]	Frequency	Per cent
≤40,000	190	65.3
41,000-70,000	71	24.4
71,000-100,000	22	7.6
>100,000	8	2.7
Total	291*	100.0

*out of the 392 respondents, only 291 provided information on monthly income

Table 3 Duration of hypertension since diagnosis

Duration of hypertension	Frequency	Percent
≥ 20 years	2	0.5
15-19 years	6	1.5
11-14 years	45	11.5
7-10 years	38	9.7
3-6 years	147	37.5
< 3 years	154	39.3
Total	392	100.0
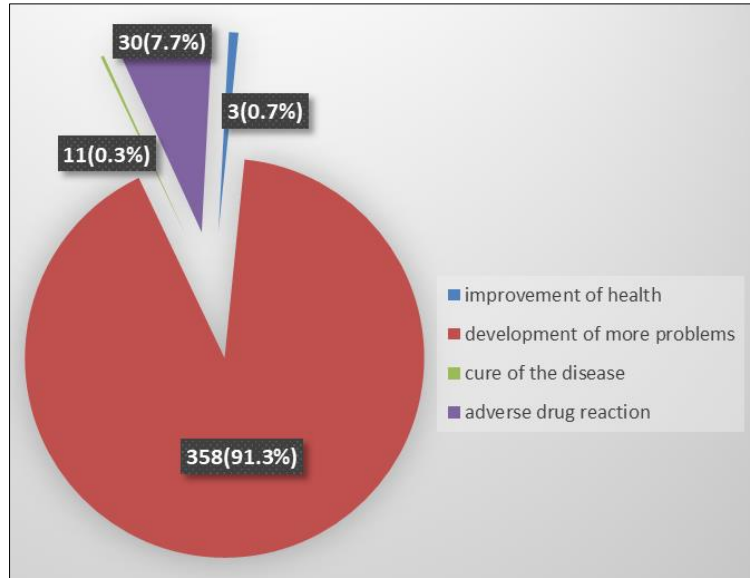
Figure 1 Consequences of inappropriate use of the medications as prescribed

Table 4 Medication Adherence of respondents

Medication adherence	Frequency	Per cent
Medium Adherence	74	18.9
Low Adherence	318	81.1
High Adherence	0	0.0
Total	392	100.0

Table 5 Respondents' Age group and medication Adherence

	Adherence (%)		Total
Age Group	Medium Adherence	Low Adherence	
≤40years	15(31.2)	33(68.8)	48(100.0)
41-50years	27(20.8)	103(79.2)	130(100.0)
51-60years	18(14.2)	109(85.8)	127(100.0)
61-70years	8(14.0)	49(86.0)	57(100.0)
>70years	6(21.4)	22(78.6)	28(100.0)
Total	74(19.0)	316(81.0)	390(100.0)

$\chi^2 = 7.896$ p = 0.095

Table 6 Sex and medication Adherence

Sex	Adherence (%)		Total
	Medium Adherence	**Low Adherence**	
Male	48(20.3)	188(79.7)	236(100.0)
Female	26(16.9)	128(83.1)	154(100.0)
Total	74(19.0)	316(81.0)	390(100.0)

$\chi^2 = 0.724$ p = 0.395

Table 7 Marital Status and medication Adherence

Marital Status	Adherence (%)		Total
	Medium Adherence	**Low Adherence**	
Married	64(20.5)	248(79.5)	312(100.0)
Single	4(17.4)	19(82.6)	23(100.0)
Divorced	1(14.3)	6(85.7)	7(100.0)
Widowed	5(10.4)	43(89.6)	48(100.0)
Total	74(19.0)	316(81.0)	390(100.0)

$\chi^2 = 2.904$ p = 0.407

Table 8 Occupation and Medication adherence

| Occupation	Adherence (%)		Total
	Medium Adherence	**Low Adherence**	
Professionals	37(24.7)	113(75.3)	150(100.0)
Unemployed	12(14.6)	70(85.4)	82(100.0)
Entrepreneur	3(4.9)	58(95.1)	61(100.0)
Semi-Skilled	22(22.2)	75(77.8)	99(100.0)
Total	74(19.0)	316(81.0)	392(100.0)

$\chi^2 = 19.158$ p = 0.001

Table 9 Level of Education and Medication Adherence

Level of Education	Adherence (%)		Total
	Medium Adherence	**Low Adherence**	
No Formal	5(4.9)	97(95.1)	102(100.0)
Primary	3(8.8)	31(91.2)	34(100.0)
Secondary	6(7.0)	80(93.0)	86(100.0)
Tertiary	60(35.7)	108(64.3)	168(100.0)
Total	74(19.0)	316(81.0)	390(100.0)

$\chi^2 = 54.091$ p = <0.000
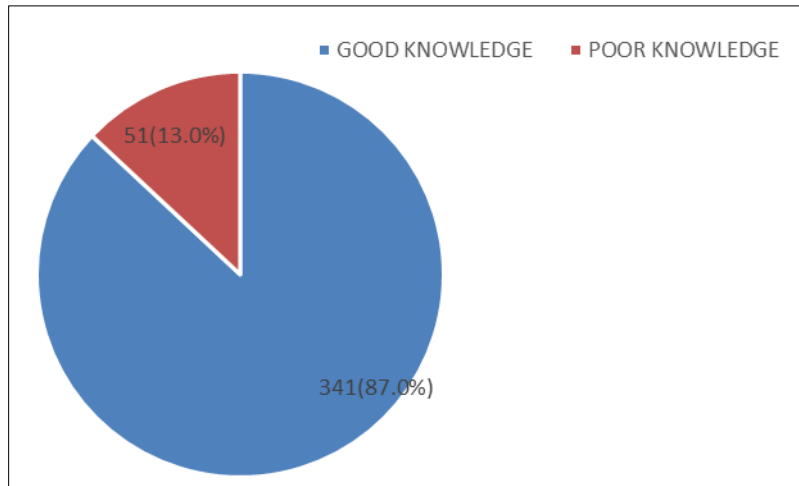
Figure 2 Aggregate knowledge of respondents

Table 10 Age Group and Knowledge of respondents

	Knowledge (%)		Total
	Poor Knowledge	Good Knowledge	
Age group ≤40years	3(6.2%)	45(93.8%)	48(100.0%)
41-50years	21(16.2%)	109(83.8%)	130(100.0%)
51-60years	18(14.2%)	109(85.8%)	127(100.0%)
61-70years	5(8.8%)	52(91.2%)	57(100.0%)
>70years	4(14.3%)	24(85.7%)	28(100.0%)
Total	5(13.1%)1	339(86.9%)	3(100.0%)90

$\chi^2 = 4.151$ p = 0.386

Table 11 Level of Education and Knowledge

	Knowledge (%)		Total
Level of Education	Poor Knowledge	Good Knowledge	
No formal	8(7.8%)	94(92.2%)	102(100%)
Primary	3(8.8%)	31(91.2%)	34(100.0%)
Secondary	18(20.9%)	68(79.1%)	86(100.0%)
Tertiary	22(13.1%)	146(86.9%)	168(100.0%)
Total	51(13.1%)	339(86.9%)	390(100.0%)

$\chi^2 = 7.665$ p = 0.053

Table 12 Occupation and Knowledge

	Knowledge (%)		Total
Occupation	**Poor Knowledge**	**Good Knowledge**	
Professional	22(14.7)	128(85.3)	150(100.0)
Entrepreneur	2(3.3)	59(96.7)	61(100.0)
Unemployed	16(13.6)	66(86.4)	82(100.0)
Semi-skilled	11(11.3)	86(88.7)	97(100.0)
Total	51(13.1)	339(86.9)	390(100.0)

$\chi^2 = 11.614$ p = 0.020

A larger proportion of the respondents representing 39.3% were diagnosed hypertensive within the past three years while 37.5% of them were diagnosed hypertensive in the past 3-6 years. Only 0.5% of the respondents were diagnosed hypertensive in the past 20 years and over.

4 Discussion

The observation that more respondents were of ages 41-50 years is congruent with findings of studies conducted in Maiduguri in which majority of the respondents in a study to assess patient's antihypertensive medication adherence level in non-comorbid hypertension in a tertiary hospital in Nigeria, in which majority of the respondents were aged group 40-49 years but differs from the finding of a study that was undertaken in Ibadan where the peak age-categories were 46-55years. [34] This age group constitutes a relatively young and economically viable work force. Accounting for this observation may be the fact that hypertension is commoner in the older age group starting from the age of 40 years. With increasing years, older people tend to develop hypertension and their medication adherence a major issue.

Majority of the respondents were married with more males among them. This is expected especially in Africa which is typical of the study area where men and women of 40 years and above are married. It is often said that a foul at forty is a foul forever. In this part of the world, it is unusual to see a man at 40 years of age not married. The finding in this study is also similar to the finding from a study in Maiduguri [35] in which majority of the respondents representing 89.5% were married.

Most of the respondents are Igbos. The reason for this could be that the area where this study was carried out is an Igbo indigenous Community with most of them visiting the teaching hospital in their locality.

More of the respondents had tertiary level of education with 38.8% as professionals but income of respondents was poor as only 2.7% of them earn above one hundred thousand naira only. This again could be attributable to the study area which is located in Nigeria being a poor under developed nation with majority of the populace not earning above one dollar a day. The implication of this is that majority of the people in the area with hypertension may have problems paying for their antihypertensive medications and follow clinic visits with resultant poor medication adherence and poor blood pressure control.

In addition, a larger proportion of the respondents representing 39.3% were diagnosed hypertensive within the past three years while only 0.5% of them were diagnosed hypertensive in the past 20 years and over. This is contrary to a study done in Maiduguri in which diagnosis of hypertension among respondents was within 2-5 years. [35] Longer duration of the disease may adversely affect medication adherence as many people tend to abandon their antihypertensive medication after a prolong use especially after assuming a blood pressure control without professional guidance.

Majority of the respondents 87% had good knowledge of antihypertensive drugs while a few 13% had poor knowledge of antihypertensive drugs. The knowledge of hypertensive drug among respondents will afford them the opportunity to adhere to antihypertensive medication.

However, eighty one percent of the respondents had low antihypertensive medication adherence, 19% medium antihypertensive medication adherence while none had a high antihypertensive medication adherence. This finding is similar to a study done in Pakistan to assess the association between knowledge and drug adherence in patients with

hypertension in which none of the respondents had good adherence. [36] The good knowledge of antihypertensive drugs by respondents did not translate to good practice of adherence to antihypertensive medication. This suggests that majority of the respondents may not know the consequences of poor blood pressure control. Hence, adequate counselling and health education on blood pressure control needs to be done for the general population irrespective of their profession. The proportion of respondents with medium medication adherence tends to decrease with increasing age, but the proportion of low medication adherence increased with increasing age group but this association was not statistically significant. This could suggest that most of the respondents did not adhere to medication which is particularly worst with increasing age.

5   Conclusion

Majority of the respondents representing 87% had good knowledge of antihypertensive drugs but this did not translate to practice as majority 81.1% of them had low adherence to antihypertensive medication with low adherence increasing as age group of respondents increased.

The factors identified to be associated with medication adherence were socio-demographic factors like age, occupation, cost of drugs i.e. Income of respondents. Younger age group was identified to be more adherent to antihypertensive medication than older age group. Male had better adherence than females. Married respondents had better adherence than single, divorced and widowed. Also, retired workers (unemployed adhered to medication better than professionals and entrepreneurs. Tertiary level of education adheres better than primary, secondary and tertiary education.

Recommendations

- The physicians who attend to hypertensive patients should educate their patients on the need to take their medications as at when due. The relatives should also been encouraged to accompany patients to the consulting room in which further emphasis should be laid by the physician to both the patients and relative on the need to adhere to medication prescribed.
- The government should institute policies that will encourage hypertensive patients to take their medications. The local, state and federal government can make antihypertensive drugs free to all diagnosed cases in the hospital. This will minimize the bias of income and occupation in accessing antihypertensive drugs.

Compliance with ethical standards

Acknowledgement

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of Ethical approval

Ethical approval to conduct this research was sought and obtained from the Federal Teaching Hospital Abakaliki (FETHA) Research Ethics Committee. Written informed consent was obtained from all the respondents before information was collected from them. All hypertensive patient found to have a serious health condition was sent to the attending physician for necessary action and were excluded from the study.

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