

Antihypertensive Medications Adherence Among Nigerian Hypertensive Subjects in a Specialist Clinic Compared to a General Outpatient Clinic

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Abstract

Background: Poor adherence to antihypertensive medications has been linked with increased cardiovascular risk and mortality in many population. Africans have been shown to have a worse prognosis from hypertension, poorer blood pressure control, and increased risk of complications arising from hypertension compared to Caucasians. **Aim:** The aim was to describe the level of adherence to antihypertensive medications, its determinants and whether any difference exist between those attending specialty clinic or general outpatient department (GOPD) Clinic in a Nigerian University Teaching Hospital. **Subjects and Methods:** An analytical cross-sectional study. The Morisky scale was used to assess for adherence to antihypertensive medications. Clinical and demographic data were taken. Statistical analysis was performed using SPSS 17.0. (Chicago, IL, USA). $P < 0.05$ was taken as statistically significant. **Results:** A total of 114 hypertensive subjects were recruited for this study. Seventy-nine were from the cardiology clinic whereas 35 were from the GOPD. They consisted of 60 males (52.6%, 60/114) and 54 females (47.4%, 54/110). The mean age was 63.6 (14.1) years. High adherence, low adherence and medium adherence as defined by Morisky scale was found in 36.8% (42/114), 23.9% (27/114) and 39.5% (45/114), respectively. Adherence level was higher among those attending specialty clinic despite shorter duration of hypertension and use of more medications. More than four-fifth of those attending cardiology clinic had at least medium level of adherence compared to a little bit over half of those attending GOPD clinic. Those with good adherence were likely to be older, had a higher level of education and higher average monthly income than those with poor adherence. **Conclusion:** Poor adherence to medications is very common in the hypertensive Nigerians. Hypertensive subjects attending specialty clinic seems to have a better adherence to antihypertensive medications possibly due to the level of health education and information provided to patients. Effective health education and regular screening for compliance and adherence is a potential way to reduce cardiovascular risk associated with uncontrolled hypertension.

Keywords: Antihypertensive drugs, Determinants, General outpatient department clinic, Medication adherence, Nigeria, Specialist clinic

Introduction

Adequate control of blood pressure remain a significant

way to reduce the morbidity and mortality associated with hypertension.^[1,2] Hypertension is the most common cardiovascular risk factor in Nigeria.^[3] A large percentage of hypertensive subjects have poor blood pressure control due to many reasons.^[2-4] One major reason is due to poor medication adherence. Treatment adherence is the degree of compliance with prescribed therapeutic measures, which can be medicinal or not, aiming at maintaining blood pressure levels.^[5] The term adherence is comprehensive and reflect both taking the medicine as directed (compliance) and continuing to take the medication for the duration required (persistence).^[6]

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The prevalence of hypertension in Nigeria is at an alarming rate and up to 40–45% of adults have been reported among various studies across Nigeria.^[1,2,7-9] Control of blood pressure remain the most significant way to reduce the complications associated with hypertension such as heart failure, renal failure, and stroke.^[10] Hypertension among Nigerians is often associated with cluster of other cardiovascular risk factors, which often increase the cardiovascular risk of affected individuals.^[10,11] Medication adherence is related to many factors. These include patient history, demographic characteristics, clinical variables, knowledge, beliefs, behavior, health care provider relationships, and health system influence.^[12] Studies have shown a relationship between low antihypertensive medication adherence, uncontrolled blood pressure and increased risk of cardiovascular morbidity and mortality.^[12-15]

Social, psychological, physical and economic factors have a significant impact of antihypertensive medication adherence.^[13] The level of information provided to patients may also impact on the level of adherence to medications. There are other important determinants of medication adherence among Nigerian hypertensive subjects, and there are few studies to that effect.^[13,15] A typical specialty clinic offers focused condition-based care and possibly a higher level of risk stratification and treatment of associated factors than general outpatient care. Hypertensive subjects attend specialty clinic, general outpatient department (GOPD) clinic and other clinics in Nigeria. In this study, we referred to the cardiology clinic as the specialist clinic where consultant cardiologists and cardiology residents take care of hypertensive subjects based on conventional guidelines. In the general outpatient GOPD, however, there are family physicians and general practitioners seeing many patients from almost all specialties.

Whether antihypertensive medication adherence differs among patients attending a specialty clinic and a GOPD clinic in Nigerian Teaching Hospital is not well-known. This study aims to describe the level of adherence to antihypertensive medications using the Morisky medication adherence scale among hypertensive subjects attending a cardiology specialty clinic and a GOPD clinic in a Nigerian University Teaching Hospital and to describe associated determinants of medication adherence among study participants.

Subjects and Methods

This was an analytical cross-sectional study carried out at the Cardiology and GOPD Clinic of Ladoke Akintola University of Technology Teaching Hospital, Ogbomoso, Nigeria. The study duration was from June to November 2013.

A total of 114 hypertensive subjects who were already on medications and already attending clinic for at least 3 months were recruited consecutively into this study. They consist of thirty-five participants from the GOPD clinic and seventy nine from the cardiology clinic of Ladoke Akintola University of

Technology Teaching Hospital, Ogbomoso, who were willing to participate. Inclusion criteria include adult hypertensive that are already on medications for at least 1-year and has been attending the clinic from which they were recruited for at least 3 months before the recruitment and who are willing to participate. Exclusion criteria include any subjects with any behavioral or social issues that might affect medication adherence, subjects who declined to participate and those with serious medical or surgical issues requiring admission into the hospital.

The 8-parameter Morisky scale was used to assess for adherence to antihypertensive medications. The scale consists of 8-item adherence measure designed to evaluate medication adherence in patients with hypertension and it has been validated and found to be reliable in a variety of medication-adherence studies.^[16-18]

Clinical and demographic data were taken using a data form. The data taken include age, gender, marital status and duration of hypertension. Clinical and laboratory variables taken include weight, height, waist circumference, systolic, and diastolic blood pressure. The body mass index was determined using the weight (kg) and height (m). Other parameters taken include total number of antihypertensive medications being taken at the moment, average total monthly income, highest educational status, occupation, history of smoking and/or alcohol intake and quantity when present. The fasting blood sugar, electrolytes, urea and creatinine and fasting serum lipid were done on the participants.

Echocardiography was done according to the American Society of Echocardiography guideline.^[19] Assessment of systolic and diastolic functions were made. Among the parameters taken include left ventricular end diastolic dimension, left ventricular end systolic dimension, posterior wall thickness in diastole, interventricular septum in diastole, aortic root dimension, left atrial dimension and right ventricular dimension. The ejection fraction and the fractional shortening were determined.

Medication adherence was categorized into as low, medium and high adherence when the Morisky score were >2, 1–2 and 0, respectively. Statistical analysis was done using SPSS 17.0. (Chicago, IL, USA) Qualitative data were summarized as frequencies and percentages while quantitative data were summarized as means \pm standard deviation. Comparism between continuous variables was done with the Student's *t*-test while Chi-square was used to compare nominal variables. $P < 0.05$ was taken as statistically significant. Institutional ethical approval was obtained for this study. All participants gave informed consent before participating in the study.

Results

The frequency of occurrence of low, medium and high adherence in this study were 27/114 (23.9%), 45/114 (39.5%)

and 42/114 (36.8%), respectively, in this study. Only about a third of the participants were assessed to have high medication adherence among the study participants. The mean age among those with low adherence was significantly lower compared to those with medium and high medication adherence (57.7 [19.8] vs. 65.7 [12.5] vs. 62.7 [11.5] years, respectively). Those with low adherence were also more likely to be using more antihypertensive medications than those with medium and high adherence (2.8 [1.2] vs. 2.4 [1.0] vs. 2.1 [1.0] drugs, respectively), although only that of the difference between low and high adherence achieved statistical significance. Those with high adherence were more likely to be using the least number of medications among hypertensive Nigerians [Table 1]. Hypertensive subjects with high adherence were more likely to be using fewer medications compared to those with low adherence. Those with medium and high adherence were also more likely to have had hypertension for a longer time than those with low adherence although it did not achieve statistical significance (6.2 [6.3] vs. 6.4 [11.4] vs. 4.9 [6.8] years, $P = 0.35$, respectively, as shown in Table 1).

The average monthly income was more likely to be significantly lower among those with low adherence compared to medium and high adherence, and they were much less likely to have acquired at least a university degree.

Table 2 shows the distribution of adherence pattern among those recruited from the cardiology and GOPD clinic of a teaching hospital. High adherence was documented in 30/79 (38.0%), among those attending specialty clinic compared to 12/35 (34.3%) of those attending GOPD clinic. Medium and low adherence were found in 37/79 (46.8%) versus 8/35 (22.9%) and 12/79 (15.2%) versus 15/35 (42.9%), respectively, among those attending specialist and GOPD clinics as shown in Table 2. Those attending cardiology clinic were more likely to have at least medium adherence compared to those attending the GOPD clinic in our hospital.

Hypertensive subjects recruited from both clinics were not different significantly in the average age. The average total monthly income, mean serum triglycerides, serum total cholesterol, and low density lipoprotein were also similar between the two groups. Hypertensive subjects attending specialist cardiology clinic were more likely to be on significantly more medications than those attending GOPD clinic (2.6 [1.1] vs. 2.3 [0.8], respectively, $P = 0.02$), although those attending cardiology clinic had a significantly shorter duration of hypertension than those attending GOPD clinic (4.3 [6.1] vs. 7.6 [12.9] years, respectively, $P < 0.001$). Mean fasting blood sugar was also significantly lower compared to those attending GOPD clinic (5.2 [1.1] vs. 6.9 [4.1] mmol/l, respectively, $P = 0.02$). The Morisky score which was used to estimate the level of adherence to antihypertensive medications was significantly lower among subjects attending specialty cardiology clinic compared to those attending the GOPD clinic (1.6 [1.6] vs. 2.5 [2.3], respectively, $P < 0.01$) as shown

Table 1: Clinical and demographic profile between subjects with low, medium and high adherence to antihypertensive medication

Variable	Low adherence	Medium adherence	High adherence
Frequency (%)	27 (23.9)	45 (39.5)*	42 (36.8) ^a
Age	57.7 (19.8)	65.7 (12.5)*	62.7 (11.5) ^a
Average number of antihypertensive medications	2.8 (1.2)	2.4 (0.99)	2.1 (0.98) ^a
Duration of hypertension	4.9 (6.8)	6.2 (6.34)	6.44 (11.4)
Average monthly income (n)	35,230.8	80,264.7*	69,930.6 ^a
At least University degree	8/27	16/45*	22/42 ^a
Fasting blood sugar (mmol/l)	5.3 (1.0)	5.7 (1.1)	5.7 (3.5)
Total cholesterol (mmol/l)	4.9 (1.5)	5.4 (1.5)	4.7 (1.4)
LDL (mmol/l)	2.9 (2.0)	3.4 (1.6)	2.8 (1.1)
HDL-cholesterol (mmol/l)	1.42 (0.5)	1.4 (0.4)	1.4 (0.4)

^a $P < 0.05$ when those with high adherence were compared to those with low adherence.

* $P < 0.05$ When those with medium adherence were compared to those with low adherence.

LDL: Low-density lipoprotein, HDL: High-density lipoprotein

Table 2: Frequencies of medication adherence levels among participants attending specialty clinic versus general outpatient clinic

Clinics	Level of adherence (%)			Total (%)
	High	Medium	Low	
Cardiology clinic	30 (38.0)	37 (46.8)	12 (15.2)	79 (100.0)
GOPD	12 (34.3)	8 (22.9)	15 (42.9)	35 (100.0)
Total	42	45	27	114

Chi-square 7.255, df=2, $P = 0.03$. GOPD: General outpatient department

in Table 3. Furthermore, as shown in Table 3, the mean systolic and diastolic blood pressure were significantly lower among those attending specialty clinic compared to those attending GOPD clinic.

Discussion

This study revealed that overall self-reported high medication adherence is low among Nigerian hypertensive subjects. However, at least three-quarters of the participants in this study could be said to have at least medium adherence with Morisky score of ≤ 2 . This study also revealed that medication adherence is significantly different between the two participating clinics in this study. Those attending the cardiology clinic had at least a higher level of medium medication adherence than those attending GOPD clinic. More than four-fifth, (84.8%) of those attending cardiology clinic had at least medium level of adherence compared to a little bit over half (57.2%) of those attending GOPD clinic. This was also evident in the fact the mean Morisky score was significantly lower among those attending specialty clinic compared to those attending the GOPD clinic. The level of adherence reported in this study among the attendants at GOPD is similar to what has been reported from other family practice reports.^[20,21] Mukora-Mutseyekwa and Chadambuka reported adherence rate of 40.2% in a study in a family practice clinic in Zimbabwe while Lee *et al.* reported a prevalence of good adherence of 65.1%.^[21,22] The study by Lee *et al.* included those with

Table 3: The clinical and demographic distribution between participants attending cardiology clinic compared to the general outpatient clinic

Variables	Cardiology clinic (79)	GOPD (35)	P
Age (years)	62.9 (14.6)	65.3 (12.9)	0.38
Average monthly income (n)	62,896.1 (96,930.5)	54,776.2 (94,903.7)	0.48
Average number of antihypertensive medications (n)	2.6 (1.1)	2.3 (0.84)	0.02*
Duration of hypertension (years)	4.3 (6.1)	7.6 (12.9)	<0.001*
Fasting blood sugar (mmol/l)	5.2 (1.1)	6.9 (4.1)	0.02*
Triglycerides (mmol/l)	1.10 (0.8)	0.9 (0.1)	0.26
Total cholesterol (mmol/l)	4.9 (1.4)	6.3 (1.6)	0.98
HDL (mmol/l)	1.4 (0.4)	1.4 (0.4)	0.94
LDL cholesterol (mmol/l)	3.0 (1.4)	4.2 (1.9)	0.55
Mean Morisky score	1.6 (1.6)	2.5 (2.3)	<0.01*
Average systolic blood pressure (mmHg)	138.3 (16.6)	146.0 (23.4)	0.03*
Diastolic blood pressure (mmHg)	81.6 (11.2)	84.3 (11.0)	0.03*

*Statistical significance. GOPD: General outpatient department, LDL: Low-density lipoprotein, HDL: High-density lipoprotein

medium adherence as it was dichotomized into two variables of adherence level.

This study also revealed that medication adherence to antihypertensive therapy is affected by age, average total income and number of medications. When the participants were looked into as a single uniform group, high/medium medication adherence seems to be associated with increasing age, use of fewer medications, longer duration of hypertension and use of antihypertensive drugs. However, the mean medication adherence score for those attending cardiology specialty clinics was significantly lower compared to those attending GOPD clinic despite the fact that they were younger, were more likely to be using more medications and they had significantly shorter duration of hypertension and use of drugs. Medication adherence is a complex issue and relates to many factors including psychological, social, economic and physical. We suggest that the level of information provided for this patients at the specialty clinic, the thoroughness of investigation, the homogeneity of conditions and encouragement of seeing people who are treating such chronic conditions for several years, the focused health education provided at the specialty clinic about treatment and prevention of non-communicable diseases provided at the specialty clinic are likely important reasons for these differences observed in medication adherence in this study.

Many studies have reported that adherence improves with increasing age.^[21-23] Why advanced age might be associated with higher adherence level may be due to many reasons. Advanced age might likely be associated with presence of comorbid cardiovascular risk factors, which might make the subjects felt sicker and therefore be more committed to taking their medication much more regularly. A similar thing may be proposed for the increased adherence level among participants in this study attending a specialty clinic and who are more likely to be investigated to have other clusters of cardiovascular risk factors. Akintunde *et al.* has shown up to 80% of hypertensive subjects had other clusters of other CV

risk factors in a Nigerian University Teaching Hospital.^[24-26] In another light, other researchers have shown an inverse relationship between age and adherence level.^[27,28] Other factors that may affect the relationship between age adherence level include cognitive ability, economic factors, physical mobility and level of information. We strongly suggest that the focused health education provided in the specialty clinic and the information provided patients at the specialty clinic in this study were the main factors associated with a higher level of adherence.

A similar pattern was identified with a history of hypertension as it relates to adherence level in this study. Most of the studies have linked increasing adherence to longer duration of hypertension.^[29,30] These subjects are likely to have more information about the diseases and established stronger patient-doctor relationship than those with a shorter history of hypertension. This was true in the general setup but became inversely related when those attending specialty clinic were compared to those attending GOPD clinic. Oftentimes subjects with resistant hypertension, difficult to control hypertension, secondary hypertension are referred to specialty clinic to see hypertension specialists/cardiologists where focused history to identify causes are treated, and more drugs are likely added to achieve good blood pressure control are done. This might be evident in the fact that the mean fasting blood sugar, systolic and diastolic blood pressures were significantly lower among those attending specialty clinic compared to those attending GOPD clinic. However, adherence level is not necessarily the only factor that has to do with the level of blood pressure control. A systematic review done in 2004 that covered 25 studies revealed that there was not enough convincing empirical evidence to support the hypothesis that poor drug adherence accounted for the inadequate control of BP in most patients.^[31] These may be specific reasons why adherence was still higher among those attending specialty clinics, although with a mean duration of hypertension shorter than those attending GOPD clinic. Other researchers have also documented this inverse relation among their patients.^[20]

One important reason for poor blood control in the hospital is physician's inertia.^[32] This refers to the inability of the managing doctor to adjust upwards the dosage of drugs or add more drugs in the event that good pressure control is not yet achieved. How that may contribute to the present finding may not be too farfetched. However, we suggest that in a specialty clinic where current up to date guideline concerning the treatment of hypertension might be more frequently used, it might be less of a problem than in a generalist clinic.^[33]

This study has many limitations: First, the level of adherence reported in this study was self-reported, and there might be recall bias by participants. Furthermore, the unequal number recruited from the two clinic might be biased against the GOPD clinic, although due to the inclusion and exclusion criteria and multiplicity of patients with almost all conditions in the GOPD clinic, it is much more difficult to get a large number of similar patients over a period of time unlike in a specialty clinic where there are specific days for such clinics. This also a hospital based and may not be totally accurate for the population when adherence to antihypertensive medications is concerned. Another limitation is the relatively small size of the sample size due to the size of the participating clinics. Another limitation of this study is that adverse effect of these drugs were not taken into consideration when evaluating the adherence to medications among the study participants as adverse drug effects can greatly affect the level of adherence to any medications whatsoever. The consecutive recruitment of participants in this study may also be another limitation.

Conclusion

Adherence to antihypertensive medication is generally low and is related to advanced aged, increasing duration of hypertension and socio-economic factors, the specialty clinic seems to be associated with a better adherence level despite shorter duration of hypertension, higher number of drugs prescribed and younger age. This might possibly due to the focused care and the level of information available in a specialty clinic for the management of such chronic conditions. We therefore recommend that chronic disorders such as hypertension can better be managed if focused and aggressive care is provided together with provision of qualitative health education to improve drug adherence level in the community and reduce the cardiovascular burden associated with hypertension in the long run. In the future, it is hoped that statistical models containing variables noted to affect medication adherence can be translated into clinical practice to improve drug compliance, reduce cardiovascular risk associated with hypertension and reduce the worldwide burden of cardiovascular diseases.

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