



ADHERENCE TO ANTIHYPERTENSIVE MEDICATIONS IN PATIENTS ATTENDING PUBLIC HOSPITALS IN KANO STATE, NIGERIA

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ABSTRACT

Hypertension is a chronic medical condition characterized by an elevated arterial blood pressure with increasing prevalence in developing countries including Nigeria. One of the integral elements in management of hypertension is adherence to medication and lifestyle modification. This study aimed to assess adherence level for anti-hypertensive medications among adult hypertensive patients attending public hospitals in Kano State, Nigeria. The study was a cross sectional prospective survey involving 600 patients from six public healthcare facilities selected by multistage sampling technique. Adherence status was assessed using Morisky medication adherence scale. Sociodemographic data and other factors that may influence adherence to hypertension medications were evaluated. Out of the 598 patients that participated in the study, only 178 (29.8%) have their BP controlled based on JNC8. Three hundred and thirty two (55.5%) out of 598 patients have good adherence, while 266 (45.5%) have poor adherence. Of the 178 patients who had good BP control, 120 (67.5%) have good adherence while 58 (32.5%) have poor adherence. BP control was significantly higher in those that adhered to antihypertensive medication compared with non-adhering patients ($\chi^2 = 14.526$; $df = 1$; p -value = < 0.001). Additionally, Chi-square test showed significant association between number of antihypertensives and blood pressure control. ($\chi^2=37.556$ $df=3$, $p<0.001$). The study established that 55.5% of the respondents have good adherence to their antihypertensive medication while 29.8% had their BP controlled. Adherence and number of antihypertensive medication a patient is taking were found to have significant relationship with BP control.

Keywords: Medication, adherence, hypertension, antihypertensive

INTRODUCTION

Hypertension (HTN), high or sustain increased blood pressure (the systolic ≥ 140 mmHg and diastolic level ≥ 90 mmHg), is a worldwide public health problem. It contributes to the burden of cardiovascular diseases, stroke, and renal failure leading to early mortality and disability (WHO, 2013). Global prevalence of adult hypertensive patients was about 22% in 2014 and was estimated to account for more than 40% of the African adult population (Juliet Addo, 2007). In Sub Saharan Africa, it varied from 6% to 48%, that is 74.7 million hypertensive individuals and projected to be 68% (125.5 million) by 2025 (Shona Dalal, 2011, Ogah and Rayner, 2013). The combined

prevalence rates of hypertension in Africa and Nigeria are 15% and 22%, respectively (Ekwunife and Aguwa, 2011).

Hypertension is a modifiable cardiovascular risk factor for which there are available medications which are effective in regulating the raised blood pressure as well as preventing complications. However, the maximal beneficial effect of an appropriate treatment plan can be achieved only if patients strictly adhere to the medications and lifestyle changes. The primary focus of antihypertensive therapy is to achieve BP target of < 140 per 90 mmHg for the general population and < 130 per 80 mmHg for special high-risk population such as patients with diabetes mellitus, renal disease and adverse

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cardiovascular events such as myocardial infarction and stroke (Chobanian *et al.*, 2003; WHO, 2003). There are various antihypertensive drugs that have been shown to effectively control blood pressure, thereby reducing the attendant risk of cardiovascular morbidity and mortality.

Blood pressure control is multifactorial (Chobanian *et al.*, 2003; WHO, 2003; Familoni *et al.*, 2003) and some of these factors relate to the patients, the health professionals and the government. One of the patient-related factors is adherence to antihypertensive medication. Adherence is one of the challenges of antihypertensive medication and is defined conceptually as the degree to which the patient conforms to treatment as prescribed (Laurelea and Roden, 2001) There is no 'gold standard' for precise measurement of adherence (Mallion & Schmitt, 2001). However, several methods of measuring adherence to medication have been described (Mallion and Schmitt, 2001; Bitter, 1997; Averbach *et al.*, 1997). Clinical measures include the use of questionnaires for 30 days of self-reported (self-administered) therapy. Pharmacological measures involve determination of serum and urinary concentrations of drugs or using biological markers integrated into the tablets. The pharmacological measures have a higher sensitivity and specificity, but are not routinely used in clinical practice (Bitter, 1997). Recently, the medication event monitoring system (MEMS) was introduced which is basically the assessment of adherence using the MEMS device which involves microprocessor-based monitoring (Averbach *et al.*, 1997). However, the MEMS device is not readily available in most facilities.

Generally, good adherence to medications is an important achievement in disease management, and it is crucial to decrease complications like cardiovascular related morbidity and mortality (Donald *et al.*, 2005; Brown and Bussell, 2011). However, to the best of our knowledge, particularly in the study areas, little is known about level of antihypertensive drug adherence among hypertensive patients. Therefore, this study aimed to assess adherence level for antihypertensive medications among adult hypertensive patients attending public hospitals in Kano State Nigeria.

MATERIALS AND METHODS

Study Population and Sample Size

The study population consists of adult hypertensive patients attending hypertension clinics and receiving treatment in the hospitals.

These patients are followed up in the hospital for regular treatment and checkup depending on high blood pressure control. Based on WHO methodology (WHO, 1993), 6 health care facilities were included in the study and in each facility, 100 participants were randomly selected and assessed.

Study Design

The study was a cross sectional prospective survey involving six public health care facilities selected by multistage sampling technique. List and addresses of all registered health care facilities operating hypertension clinic in the State was obtained from the State Ministry of Health (SMoH). Based on the list, the State was stratified into three using senatorial district as stratum. In north and south senatorial districts, one general hospital was selected, while in the central zone, 3 general hospitals were selected (because it has the highest population and more number of hospitals). In all the instances, selection was by simple random sampling using balloting system. Also the only available teaching hospitals was added to make-up the six facilities.

Inclusion Criterion

Hypertensive patients 18 years and above, patients on follow up appointments to the hospital, patients managed for hypertension for more than 6 months, patients consenting to participate in the study.

Exclusion Criterion

Sick patients on the appointment day requiring admission, pregnant hypertensive patients, individuals who were not capable of hearing and speaking, individuals with known mental disorders

Data Collection Tool and Procedure

Five pharmacy technicians were recruited as research assistants and trained on the objectives of the study as well as the data collection instruments.

Adherence status was assessed using the Morisky medication adherence scale –8 which is a self-reporting method to determine adherence. It contains eight questions with seven closed dichotomous (yes/no) answers and one Likert scale question. Each item measures specific adherence behavior. The degree of adherence was determined according to the score resulting from the sum of all the correct answers (Morisky *et al.*, 1986). The questionnaire was translated to Hausa, the local language, for respondents who do not understand English. Also, sociodemographic data and other factors that may influence adherence to hypertensive medication were evaluated.

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The questionnaire was pretested at Murtala Muhammad Specialist Hospital using 25 hypertensive respondents who were not included in the final sample of the study. Necessary adjustments to the questionnaires were made according to the findings of the pilot study to improve the reliability of the data to be collected in the study. The data collection technique was a face to face interview using the validated questionnaire. To avoid the chance of data recycling, a special mark was placed on each medical card of the respondents.

Operational definitions

Adherent: respondents who scored ≥ 6 points of the Morisky medication adherence scale - 8 (Menditto et al., 2015).

Controlled Hypertension: maintaining the average BP reading less than 140/90 mmHg at the time of data collection irrespective of measurements at other time.

Data processing and analysis

After each clinic day, data collected were entered into an excel spreadsheet where it was double checked by the principal investigator for errors and any other inconsistencies. After data collection, the entire database was exported to SPSS version 20 which was used for statistical analysis. Descriptive statistic including frequencies, means and standard deviations were calculated. Chi-square test was used to measure associations between variables.

RESULTS

In all the facilities, majority of the study participants were females except in Muhammadu Abdullahi Wase Specialist Hospital (MAWSH) where males constituted about 61% of the participants. The mean age of the participant from Murtala Muhammad Specialist Hospitals (MMSH) was the highest (61.6 ± 12.4) among the facilities while that of participants from Kura general hospital was the lowest (44.4 ± 15.5). Majority of the respondents in all the facilities were married, followed by widowed, divorced/separated and those who had never married.

Table 1: Respondents' Demographic Characteristics

Variables	KGH	DTGH	WGGH	MMSH	MAWSH	AKTH
Mean Age (\pm SD)	44.4 (15.5)	52.9 (15.3)	58.7 (14.4)	61.6 (12.4)	54.8 (11.7)	49.0 (13.2)
Gender						
Male	31	20	30	23	61	22
Female	66	77	70	76	38	78
Marital Status						
Never Married	0	0	5	1	3	5
Married	76	67	58	50	75	54
Divorced/Separated	1	0	5	7	9	7
Widowed	22	32	32	41	34	34
Address						
Rural	37	23	52	12	12	46
Urban	63	73	48	87	83	54
Employment						
Formally Employed	18	4	5	4	13	11
Unemployed	61	39	48	68	52	39
Self Employed	17	56	34	25	29	38
Pensioner	1	1	13	2	5	12
Educational Level						
No Formal Education	36	64	65	77	44	57
Primary	19	22	4	18	11	11
Secondary	24	6	19	3	24	16
Post-Secondary	18	3	12	1	20	16

Key: KGH –Kura General Hospital, DTGH – Dawakin Tofa General Hospital, WGGH – Waziri Shehu Gidado General Hospital, MMSH – Murtala Muhammad Specialist Hospital, MAWSH – Muhammadu Abdullahi Wase Specialist Hospital, AKTH – Aminu Kano Teaching Hospital.

Those without formal education constituted the majority of the participants with 36, 64, 65, 77, 44, and 57 representing Kura General Hospital (KGH), Dawakin Tofa General Hospital (DTGH), Waziri Gidado General Hospital (WGGH), MMSH, MAWSH and Aminu Kano Teaching Hospital

(AKTH) respectively. In MAWSH, 20 participants reached post-secondary school, representing the highest among the facilities under study while MMSH had only 1 participant representing the lowest as shown in Table 1.

Table 2: Level of Blood Pressure control Among the Study Participants

		B.P CONTROL		
		Controlled (%)	Not Controlled (%)	Total
Location	KGH	36	62	98
	DTGH	41 (41)	59 (59)	100
	WGGH	22 (22)	78 (78)	100
	MMSH	28 (28)	72 (72)	100
	MAWSH	25 (25)	75 (75)	100
	AKTH	26 (26)	74 (74)	100
Total		178 (29.8)	420 (70.2)	598

$\chi^2=23.743$ df=5, $p<0.001$

Out of the 598 patients that participated in the study, only 178 (29.8%) have their BP controlled. DTGH has the highest number of patients with controlled B.P (41) while WGGH has the least (22) as shown in table 2.

Table 3-Association between Adherence and B.P Control

Adherence	Controlled		Not Controlled		Total
	n	%	n	%	
Poor adherence	58	32.5	208	49.5	266
Good adherence	120	67.5	212	50.5	332
Total	178		420		598

$\chi^2=14.526$ df=1, $p<0.001$

Three hundred and thirty two (55.5%) out of 598 patients have good adherence, while 266 (45.5%) have poor adherence. Of the 178 patients who had good BP control, 120 (67.5%) have good adherence while 58 (32.5%) have poor adherence. BP control was significantly higher in those that adhered to antihypertensive medication compared with non-adhering patients ($\chi^2 = 14.526$; df = 1; p -value = < 0.001) (Table 4). Blood pressure control by number of

antihypertensive medications (Table 4). One hundred and seventy eight patients have their BP controlled of which 79 (44.4%) were on two drugs combination. Patients on more than three drugs combination have the least BP control. Chi-square test showed significant association between number of antihypertensive and blood pressure control. ($\chi^2=37.556$ df=3, $p<0.001$) (Table 4).

TABLE 4: Blood Pressure Control by Number of Antihypertensive Medications

Number of Antihypertensive Drugs	Controlled		Not Controlled		Total
	n	%	n	%	
One Drug	31	17.4	24	5.7	55
Two Drugs	79	44.4	134	31.9	213
Three Drug	58	32.6	230	54.8	288
More than Three Drugs	10	5.6	32	7.6	42
Total	178		420		598

$\chi^2=37.556$ df=3, $p<0.001$

DISCUSSION

The study established that 55.5% of the respondents were fully adherent to their antihypertensive medication while 29.8% had their BP controlled. The BP control rate in this study is higher than that reported in Port Harcourt, Rivers State, south-south Nigeria in which 24.2 % had controlled blood pressure of less than 140/90mmHg (Akpa *et al.* 2008).

However, other studies reported higher BP control of 31.4% and 33% by Ayodele *et al.*, (2004) and Sani *et al.*, (2008) respectively. The findings of this study agree with previous reports that adequate BP control rates are low in Nigeria and occur only in less than half of treated hypertensives (Ayodele *et al.*, 2004; Akpa *et al.* 2008; Sani *et al.*, 2008).

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The high percentage of unrolled blood pressure is probably due to a number of factors such as poor patients' knowledge of hypertension and its treatment, inadequate healthcare facilities, misconceptions and health beliefs about hypertensive disorder (Oke and Bandele, 2004). Good adherence rate of 55.5% in this study is higher than that of 45.0% previously reported in some part of Kano, (Sani *et al.*, 2008). The findings of this study have shown the importance of adherence in BP control amongst the study population. However, there may be other factors amongst the study population that may contribute to poor BP control despite adherence to medications.

Number of hypertension drugs the respondents were taking was associated with BP control ($p < 0.001$). Respondents who took two antihypertensive were more adherent than those who took other number of combinations. This is in contrast with the findings of a study carried out in Eastern part of the country (Iloh *et al.*, 2013). Taking three or more drugs was associated with better BP control than any other number of combination in that study. Inkster *et al.* (2006) in a study to determine adherence to antihypertensive medication and association with patient and practice factors found no significant association between adherence and number of antihypertensives taken. However, those taking more than three antihypertensives would be more likely to develop adverse effects from the

drugs, which would affect compliance to treatment as some patients opt to discontinue the drugs or skip them for a while. Higher numbers of antihypertensives also mean higher cost for the drugs thus resulting some patients' inability to purchase the prescribed drugs and consequently poor adherence.

CONCLUSION

The study established that 55.5% of the respondents have good adherence to their antihypertensive medication while 29.8% had their BP controlled. Adherence and number of antihypertensive medication a patient is taking were found to have significant relationship with BP control.

RECOMMENDATION

Healthcare providers should put more efforts to ensure that their adult hypertensive patients adhere to their antihypertensive medications. This could be through organizing regular lectures on the importance of adherence and educating the patients on hypertension and its treatments. Additionally, getting feedback from the patient about adherence and other factors that can affect the adherence is necessary to achieve target BP. Without regular feedback on medication adherence between healthcare providers and hypertensive patients, a patient with poor BP control may not achieve BP target.

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