Effects of medication knowledge on medication adherence among hypertensive patients at Matero level one hospital, Lusaka City, Zambia: A cross sectional study

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Abstract

Background: Medication adherence is the mainstay to good treatment outcomes. Failure to adhere to medication in hypertensive patients may lead to considerable deterioration of the disease resulting in increased costs of healthcare and mortality. Knowledge about the name of the drug, indications and side effects may enhance medication adherence. Therefore, the aim of this study was to assess effects of medication knowledge on medication adherence among hypertensive patients.

Methods: This was a cross-sectional study that involved 120 hypertensive patients. A structured questionnaire was used to collect data on demographic characteristics. Adherence was assessed using the 8-item Morisky Medication Adherence Scale while patient's medication knowledge was assessed using a 7-item scale. Multiple logistic regression was used to assess factors associated with medication adherence.

Results: The mean age of participants was 59 years (SD ± 14.9) and 10 (8.3%), 42 (35%) and 68 (56.7%) had adequate, average and poor medication knowledge respectively. The prevalence of adherence in this study was 37.5%. In multivariable logistic regression analysis, uncontrolled blood pressure (BP) (AOR: 0.38, CI: 0.16-0.90) was associated with lower likelihood of adhering to medication.

Conclusion: The adherence level to treatment was low and medication knowledge of hypertensive patients was generally poor. Uncontrolled BP was associated with non-adherence. Patients with uncontrolled hypertension should be given health education and counselling regarding their condition to improve medication adherence.

Background

Medication adherence is the mainstay to good treatment outcome while poor adherence to medication has been established as a cornerstone contributor to morbidity and mortality in hypertensive patients[1, 2]. Medication adherence is defined as: "the degree to which the person's behaviour matches with the agreed recommendations from a health care provider[3]. Studies has shown that the prevalence of high blood pressure is on the rise especially in sub-Saharan Africa despite the availability of various effective class of antihypertensive medications, uncontrolled BP has kept on surging worldwide[2].

The proportion of adherence is usually high among patients with acute ailments compared to patients with chronic conditions [4]. Hypertension (HTN) mostly turns out to be chronic in the majority and hence calls for a lengthy or lifetime period of treatment with maximum adherence[5, 6] . There are many factors which lead to poor patient adherence to their prescribed medications. One study reported that a significantly higher proportion of the group that was adherent named their drugs correctly and could also mention indication, dosage, timing, and duration of its use[6]. Furthermore, issues like not having somebody to help keep track of when to take medications, having the urge to take medication only when in discomfort and fear of side effects such as dizziness and headache have also been recorded as drivers to poor adherence to antihypertensive medications [7].

Medication knowledge has also been found to be a determinant of medication adherence in hypertensive patients. The ability to remember the names of drugs, its timing, the correct dose and indications have been shown to be associated with non-adherence [6], also, some have reported that knowledge about HTN and its treatment influence adherence [8] .

While the knowledge of hypertension as a condition and its effect on medication adherence has been well investigated, effects of the knowledge of antihypertensive medication on the adherence to medication have not been extensively studied. Therefore, this study aimed at assessing the effects of medication knowledge on the medication adherence among hypertensive patients at Matero Level 1 Hospital, Lusaka, Zambia.

Methods

Study setting

This was a cross-sectional study carried out in Lusaka City at outpatients' department at Matero level 1 hospital, in Lusaka Zambia. The study was conducted from February to March 2018. The hospital attends to an estimated 300 hypertensive patients per month and is a referral for patients from clinics and health centres in its vicinity.

Inclusion and exclusion criteria

The study included hypertensive patients of age 18 years and above receiving antihypertensive treatment for at least 6 months. We excluded patients that were mentally retarded and those who did not sign informed consent form.

Sample size

Using the single population proportion formula $[n = \frac{(1-P)}{d^2}]$, n =Sample size, $Z=1.96$, factor from normal distribution. P = prevalence is 0.094(based on hypertension prevalence in a study done by (Doulougou *et al.*, 2014)[9] d =Absolute sampling error. The sample size was calculated to be 130.

Data collection

At the beginning of the study, the participants were informed about the objective of the study and that their participation was voluntary. Confidentiality was assured by using codes rather than names. Data collection about medication knowledge was done using a pretested self-administered questionnaire which was a standard questionnaire adopted from the previous study[6] and modified to suit our setting.

The questionnaire contained closed ended questions and was divided into three sections; Section A aimed at obtaining demographic information about the participants including age, sex, marital status, occupation, residence and education level. Section B focused on getting information on the hypertensive medication knowledge and a score of 1 was given for each correct answer and otherwise zero score was

given. For the purpose of this study, medication knowledge consisted of seven specific items of information which included medication name, purpose, side effects, duration of therapy, goals of therapy, expiry date and dose. A score of 0-7 was used. A score of 0-3 was considered as poor knowledge, a score of 4-5 moderate knowledge and a high score of 6-7 adequate knowledge. In order to assess the association between knowledge and patients' medication adherence, participants were clustered into those who had adequate knowledge and those who had poor knowledge.

Section C was designed to obtain information about the patients' medication adherence. The (Morisky Medication Adherence Scale), an 8-score scale containing 8 questions was used to obtain this information. Each incorrect response was given a score of 1. A score of 0 meant that the patient was adherent and a score of 1-8 meant that the patient was non-adherent. Blood pressure control was classified based on Eighth Joint National Committee(JNC 8)[10].Systolic blood pressure of <140 and diastolic of < 90 mmHg showed good blood pressure control in patients less than 60 years old while systolic blood pressure of ≥ 140 and diastolic of ≥ 90 mmHg showed poor blood pressure control in patients less than 60 years old. Systolic blood pressure of <150 and diastolic of <90 mmHg showed good blood pressure control in patients aged 60 years and above while ssystolic blood pressure of ≥ 150 and diastolic of ≥ 90 mmHg showed poor blood pressure control in patients aged 60 years and above.

Data analysis

Data was first cleaned up and checked for accuracy and consistency then entered and analysed using STATA version 13 (Stata Corp., College Station, Texas, USA). Frequencies, proportions and summary statistics were used to describe the study population in relation to relevant variables. Unadjusted regression was carried out to see the putative associations of each independent variable with the dependent variable. Independent variables with p-value < 0.2 in the unadjusted logistic regression were transferred into the adjusted logistic regression model and variables with P-value < 0.05 in the final model were regarded as associated factors of medication adherence. Odds ratio and 95% confidence interval were also used to identify the presence and strength of association.

Results

Socio-demographic characteristics

In this study, a total of 130 questionnaires were circulated, of which 120 were filled resulting in a response rate of 92.3%. The mean age of the participants was 59 years (SD ± 14.9), with above half 62 (51.7%) being over 60 years old. Under three-quarters 86 (71.7%) of the participants were female and majority 66 (55%) of the participants were single. Most participants 75 (62.5%) were unemployed, half were leaving in high density populated areas and 84 (70%) had uncontrolled high BP. The socio-demographic characteristics of the 110 participants in the study are presented in Table 1.

Table 1. Baseline characteristics of hypertensive patients (N= 120)

Variable	Frequency	Percentage
Age		
< 60 years	58	48.3
≥ 60 years	62	51.7
Sex		
Male	34	28.3
Female	86	71.7
Education Level		
Primary	72	60.0
Secondary	38	31.7
Tertiary	10	8.3
Marital status		
Single	66	55.0
Married	54	45.0
Employment Status		
Employed	45	37.5
Unemployed	75	62.5
Residence		
Medium density	60	50
High density	60	50
Treatment outcome		
Controlled BP	36	30
Uncontrolled BP	84	
		70

Patient's knowledge about their medications

In this study regarding the medication knowledge as shown in Table-2, most participants were aware about the purpose of medication 100 (83.3%), expiry date 105 (87.5%) and duration of treatment 73 (60.8%). Low medication knowledge awareness was observed regarding the name of medication 51 (42.5%) dose 15 (12.5%), goal of therapy 9 (6.7%) and side effects 8 (6.7%). Overall, the percentage of medication knowledge in this study was as poor, moderate and adequate were 68 (56.7%), 42 (35%) and 10 (8.3%) respectively.

Table 2: Patient's knowledge about their medications

Knowledge item	Frequency	Percentage
knows name of medication	51	42.5
Knows purpose of medication	100	83.3
Knows dose of medication	15	12.5
Knows duration of medication	73	60.8
Knows goals of therapy	9	6.7
Knows expiry date	105	87.5
Knows Side effects	8	6.7
Total knowledge		
Poor	68	56.7
Moderate	42	35
Adequate	10	8.3

Factors associated with medication adherence

Based on unadjusted analysis, uncontrolled high BP (COR: 0.44, CI: 0.20-0.98) and poor level of medication knowledge (COR: 0.23, CI: 0.06-0.93) were associated with lower likelihood of medication adherence while knowing the goal of therapy (COR: 6.72, CI: 1.33-33.9) showed higher likelihood of medication adherence (Table 3). After transferring the variables into the adjusted regression analysis, uncontrolled high BP (AOR: 0.38, CI: 0.16-0.90) was the only factor that significantly associated with lower likelihood of medication adherence as shown in Table 4.

Table 3. Bivariate analysis of factors associated with medication adherence

Variable	Category	COR	95% CI	P. value
Age	< 60 years old	Ref		
	≥ 60 years old	0.89	0.43, 1.88	0.777
Gender	Male	Ref		
	Female	0.73	0.32, 1.69	0.465
Marital Status	Single			
	Married		0.33, 1.48	0.359
Education Level	Primary	Ref		
	Secondary	1.46	0.64, 3.35	0.371
	Tertiary	1.01	0.26, 3.90	0.987
Employment Status	Employed	Ref		
	Unemployed	1.01	0.48, 2.18	0.961
Residence	Medium Density	Ref		
	High Density	0.52	0.25, 1.10	0.091
Treatment outcome	Controlled BP	Ref		
	Uncontrolled BP	0.44	0.20, 0.98	0.045*
Knows medication name	Yes	Ref		
	No	0.98	0.46, 2.07	0.962
Knows medication purpose	Yes	Ref		
	No	0.54	0.20, 1.42	0.210
Knows medication dose	Yes	Ref		
	No	2.10	0.71, 6.25	0.182
Knows medication duration	Yes	Ref		
	No	0.61	0.29, 1.29	0.194
Knows goal of therapy	No	Ref		
	Yes	6.72	1.33, 33.9	0.021*
Knows Side effects	Yes	Ref		
	No	1.73	0.41, 7.30	0.454
Knows expiry date	Yes	Ref		
	No	0.65	0.23, 1.93	0.435
Medication knowledge	good	Ref		
	poor	0.23	0.06, 0.93	0.039*

COR: Crude old ratio, CI: Confidence interval, Ref: Reference category, * P-value < 0.05

Table 4: Multivariable logistic regression to determine factors associated with medication adherence

Variable	Category	AOR	95% CI	P. value
Residence	Medium Density	REF		
	High Density	0.53	0.21, 1.97	0.177
Treatment outcome	Controlled BP	Ref		
	Uncontrolled BP	0.38	0.16,0.90	0.029*
Knows medication purpose	Yes	Ref		
	No	0.64	0.21,1.97	0.440
Knows medication dose	Yes	Ref		
	No	1.67	0.38 ,7.47	0.499
Knows medication duration	Yes	Ref		
	No	0.76	0.29, 1.94	0.563
Knows goal of therapy	No	Ref		
	Yes	5.02	0.86,29.3	0.073
Level of knowledge	good	Ref		
	poor	0.39	0.06,2.47	0.317

AOR: Adjusted old ratio, CI: Confidence interval, Ref: Reference category, * P-value < 0.05

Discussion

We assessed the effects of medication knowledge on medication adherence in hypertensive patients at Matero level-1 hospital, in Lusaka City Zambia. We found that hypertensive patients had low level of medication adherence and poor knowledge about antihypertensive drugs. Uncontrolled high blood pressure (BP) was found to be significantly associated with adherence to medication.

The effectiveness to treatment is lowered due to non-adherence to medication and places a significant cost burden on healthcare systems[11, 12]. Therefore, non-adherence to medication is a problem in the management of patients with long-lasting diseases such hypertension requiring long-term treatments [13, 14].

In this study, only 37.5% of patients adhered to their antihypertensive medications. The proportion of adherence to antihypertensive medications in this study was lower than those reported in Pakistan 62.5% [15], Ghana 41.4% [16], Egypt 73.2% [6], Ethiopia 67% [14], 65.1% China [17] and England 79% [18]. The lower level of adherence in our study could be probably attributed to low level of education and old age among the participants as more than half had only attained primary level and above 60 years. Some studies have reported that insufficient patient education influenced medication compliance especially in older patients [19]. However, contrary to this study, other studies have reported much lower levels of adherence. For example, in France 33.6% [20], Ethiopia 31.4% [21], China 27.5% [22] and Cameroon 32.3% [23]. Although we cannot offer a plausible explanation for such a finding, it is surprising that France and

China which are developed countries and expected to have more educated people had lower levels compared to this study.

This study reviewed that most of the participants had good medication knowledge about the purpose of medication but had poor medication knowledge regarding side effects. This is supported by three previous studies that were conducted in Denmark, USA and Jordan which also reported similar findings [24-26]. Additionally, our study observed that less than half (42.5%) of the participants correctly named their medication. This is conflicting to the finding of a previous study which reported more than half (69.5%) of respondent named their medications correctly[6].The difference in study findings regarding correctly naming the medication could be attributed to the age because the majority of the participants in our study were elderly patients who could easily forget the name of the medicines. Additionally, level of education could have contributed as the majority of participants in our study had attained only primary education.

Generally, our study found that only 8% of the participants had adequate medication knowledge. The medication knowledge score in this study was very poor when compared to medication knowledge reported in Jordan (62.3%) [26] and Turkey (64.5%)[27].The high medication knowledge levels observed in the previous two studies done in Jordan and Turkey could be ascribed to high literate levels of participants as most of them had attained high education as well as relatively young age. High literate levels as well as relatively young age have been reported in some studies to significantly predict the medication knowledge [26-28].

Our study also assessed the independent valuables associated with medication adherence. In the adjusted logistic regression analysis, Individuals with uncontrolled high BP were significantly more likely to have lower medication adherence. This finding is in keeping with other studies [8, 29].In this study, the age, education level and gender were not associated with medication adherence. This is in contrast with some studies which reported that individuals with younger age [8, 30] , high education level [26, 31] and male patients [6] are more likely to adhere to medication. However, some studies have reported that advanced age [13, 32] and female patients [28] are more likely to adhere to medication .

This study found no association between medication knowledge and medication adherence. In disagreement to this study, some studies have found increased medication knowledge to be associated with medication adherence[26, 28]. Regarding the contents of medication knowledge, a study that was conducted in Turkey reported that patients who knew the names, the purpose and side effects of their medications were likely to adhere to treatment [27]. Also, Karaeren *et al.* (2009) reported that knowing the duration and the purpose of medicine significantly increased the adherence rates while knowing the side effects of medicine reduced the adherence to medication [33] . The findings of the above studies regarding the contents of medication knowledge does not support the findings of the present study in which we found no association between contents of medication knowledge and medication adherence.

The nature of our study may have encountered several study limitations. The inherent nature of the cross-sectional studies are prone to social desirability bias[34]. However, we assured the participants that

their responses were not going to be tied to them and the questionnaire was self-administered. The nature of our study may also be predisposed to recall bias and subsequently affect true adherent level[35] . Nevertheless, we adopted the widely accepted Morisky Medication Adherence Scale of measuring adherence which contains carefully selected questions.

Conclusion

The adherence level to treatment was low and medication knowledge of hypertensive patients was generally very poor. In this study, uncontrolled BP was associated with non-adherence. Patients with uncontrolled hypertension should be given health education and counselling regarding their condition to improve medication adherence.

Declarations

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Authors' contributions

M.K, the primary author, was involved in design of the study, conducted the research, performed the data analysis and interpretation, and drafted the manuscript. K.S. assisted in data analysis and drafting the manuscript and provided critical edits to the manuscript. S.M. was involved with study conception, study oversight, and provided critical edits to the manuscript. C.N.H. was involved in data interpretation and provided critical edits to the

manuscript. P.K. assisted in data analyses and interpretation of the data. F.A was involved in the conception and design of the study as well as data acquisition. The final version of the manuscript has been approved by all authors.

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Availability of data and materials

Not applicable

Ethics approval and consent to participate

Ethical approval was sought from the University of Zambia Research Ethics Committee (UNZABREC) approval number 20171226142. Written permission to conduct the study was obtained from the District Health Office of Lusaka and Matero level 1 hospital management where the study was conducted. The

nature and objectives of the study were explained to the patients who agreed to participate and written informed consent was formally obtained. The patients were not subjected to any kind of risks at any point during the study and were allowed to withdraw from the study at any point during the study which did not affect the quality of health care services they received. All the methods used in this study were performed in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable

Competing interests

The authors affirm declare that they have no competing interests.

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