<u>Research Article</u>

Predictors of non-adherence to antihypertensive therapy in a rural health facility in Kenya

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Background: The effectiveness of antihypertensive medicines depends on whether the patient uses the drugs as instructed by the health care provider. Failure to adhere to therapy may lead to uncontrolled blood pressure and possibly preventable complications. The factors which may impact on adherence to medicines among patients in rural health facilities have not been adequately documented.

Objective: To determine the predictors of non- adherence to antihypertensive therapy in Murang'a South Sub-county Hospital.

Methods: A descriptive cross-sectional study design was used. One hundred and sixty-seven adult hypertensive patients who were on therapy at Murang'a South Sub-county Hospital were included. Participants who satisfied the inclusion criteria were selected using simple random sampling. Data was collected using a researcher administered questionnaire. Analysis was carried out using STATA version 14 statistical software and p</=0.05 was considered statistically significant. Permission to conduct the study was granted by the Kenyatta National Hospital-University of Nairobi Ethical and Research committee and the management of the hospital.

Results: There was female predominance (124, 74.3%).One hundred and twelve (67.5%) participants were adherent to medications. The independent predictors of non-adherence were; lack of finances (p=0.000), inadequate knowledge on treatment (p=0.005), long duration of treatment (p=0.001), forgetfulness (p=0.003), side effects of drugs (p=0.019) and fear of dependence (p=0.008).

Conclusion: Patient factors were major contributors to non- adherence. Clinicians should be encouraged to provide adequate counseling to improve adherence.

Keywords: adherence, antihypertensive therapy, predictors

1. Introduction

Adherence is defined as the extent to which a person's behavior such as taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider(World Health Organization,2003). It is further described as the extent to which a patient acts in accordance with prescribed interval, dose and the dosing regimen and is measured over time and reported as a percentage. Non-adherence to medications occur in almost half of the patients with hypertension. Adherence is influenced by the interplay of socio -economic as well as the health care team and system-related factors. It is also

influenced by the severity of symptoms, level of disability, rate of progression, the severity of the disease, and the availability of effective treatments. Therapy-related factors include types of drug regimens, dosages, and adverse effects.

Studies have shown that a combination of the above factors influence adherence and consequently blood pressure (BP) control (Ambaw et al, 2012; Esposti et al, 2011). Adherence is a primary determinant of successful BP management. Poor adherence hinders optimum clinical benefits. Good adherence improves the effectiveness of interventions aimed at promoting healthy lifestyles, such as dietary modification, increased physical activity, positive behavioral characteristics and pharmacological-based benefits (World health organization,2003). Comorbidities such as diabetes, ischemic heart disease and dyslipidemia have an association with the rate of adherence. This study sought to find out the predictors of non-adherence to antihypertensive therapy in a rural health facility located in the central part of Kenya where hypertension is common (Shukri et al, 2018).

2. Methods

2.1 Study design

A descriptive cross-sectional study design was used which entailed extracting relevant information from patients' records using customized data collection tools and interview guides. This design was suitable because there were several variables of interest which could be evaluated at one point in time. The outcome variable was rate of adherence to medicines. Explanatory variables were socio-demographic characteristics, types of drugs and reasons for non-adherence.

2.2 Study population and area

The study involved adult hypertensive patients at least 18 years old, who were on treatment for hypertension at Murang'a South Sub-County Hospital. The participants were on at least one antihypertensive drug and had attended the Medical Outpatient Clinic actively for at least three months at the time of the study. Only those who consented to participate in the study were included.

The hospital had an inpatient bed capacity of 124 distributed across adult, maternity and pediatrics wards. The outpatient department served about 3027 patients in a month. The MOPC was one of the outpatient clinics and offered service to about four hundred and ten patients with hypertension. Therefore, this facility was a suitable site because it provided the number and quality of desired study participants.

2.3 Sample

The sample size calculation was determined using Cochran formula (Kasiulevičius et al, 2006).This formula was ideal for this purpose since it is probabilistic and uses known results from previous studies to determine the minimal sample size. Four hundred and ten patients who attended the outpatient clinic provided the sampling frame. One and sixty-seven of them were selected using simple random sampling. This was accomplished using computer generated random numbers. The patient records that coincided with the selected random numbers were tagged and the respective patients potentially included in the study. The process of selecting the patients continued until the desired sample size was achieved.

2.4 Data collection

Before collecting the data, pilot testing involving fifteen patients was carried out to ensure the validity and reliability of the questionnaire. These respondents were not included in the study sample. Internal validity was enhanced by having questions that were easily understood by the participants. The questionnaire was also subjected to review by three experts who gave their input. Both English and Kiswahili languages were used and in some cases the questions were interpreted in the vernacular language during the interview. Those questions that proved difficult to understand were revised. External validity was achieve by having adequate sample size thereby enabling the results to be generalized. Reliability of the questionnaire was ensured using test-retest method. This involved subjecting the same questionnaire to participants twice during pilot testing at different times and the response correlated yielding a coefficient of 0.8.

After the pilot testing, the principal investigator and the assistant visited the Medical Outpatient Clinic during the normal working hours and retrieved the tagged records. They proceeded to request the attending nurses and physicians to direct the patients whose records were tagged to where they were seated for an exit interview. During this time, the potential participants were taken through the consenting process. Those who agreed to participate and satisfied the inclusion criteria were weighed, height taken and body mass index computed. They were then interviewed and responses filled in the questionnaire by the researcher accordingly. Data on the type of drugs used was abstracted from the records. Among the data collected were the sociodemographic characteristic (age, sex, body mass index, highest education level, marital status, and monthly income), classes of drugs used and aspects of medication taking behavior and reasons for non-adherence. Adherence was determined using a self-reporting tool that assessed whether the participants were taking medicines as recommended by the health care providers.

2.5 Data analysis

Stata Version 14 (StataCorp, USA) was the statistical software used for data analysis. Both descriptive and inferential statistics were used to analyze the data. Categorical data was summarized in frequencies and percentages. Logistic regression analysis was used to identify the predictors of non- adherence to drugs. The level of significance was 0.05.

2.6 Ethical considerations

The study was carried out after clearance from Kenyatta National Hospital/University of Nairobi Ethical and Research Committee (KNH/UoN-ERC- /A/88). Approval from Murang'a South Sub-County Hospital management

team was also sought to conduct the study. The participants were assured of the confidentiality of their information and recruited after obtaining informed consent from each one of them.

3. Results

The mean age of study participants was 61.7years (± 12.1) and, 124 (74.3%) were females. Majority (125, 74.8%) were overweight. Other characteristics are summarized in **Table 1**.
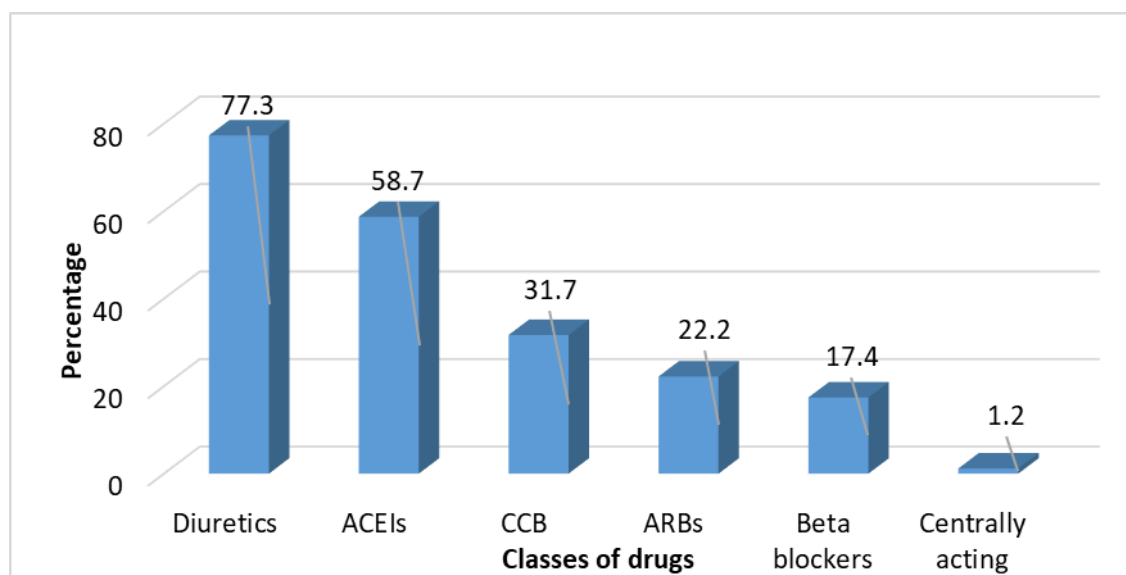
The classes of antihypertensive drugs investigated revealed that most patients (120, 77.3%) had a diuretic in their treatment regimens, followed by Angiotensin converting enzyme inhibitors (ACEIs) (**Figure 1**).

The patients who were adherent to antihypertensive medication were 112(67.5%). The leading causes of non-adherence were lack of finances (59, 35%) and forgetfulness (38, 23%) as shown in **Table 2.**

Table 1: Socio-demographic characteristics of the study population (n=167)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18-65	98	58.7
	≥65	69	41.3
Sex	Male	43	25.8
	Female	124	74.3
Body Mass Index	< 18.5	3	1.8
	18.6 - 24.9	39	23.4
	25 - 29.9	73	43.7
	≥ 30	52	31.1
Education level	Informal	37	22.2
	Primary	94	56.3
	Secondary	36	21.6
Marital status	Single	6	3.6
	Married	161	96.4
Monthly income (KES)	< 5000	138	82.6
	>5000	29	17.4

KES=Kenya shillings

ACEIs-Angiotensin converting inhibitors, CCB- Calcium channel blockers, ARBs- Angiotensin receptor blockers

Figure 1: Classes of antihypertensive drugs prescribed

Logistic regression was carried out to determine the predictors of non-adherence to medications. The status of non-adherence was the dependent variable. Socio-demographic characteristics, classes of the drugs and reasons for non-adherence were the explanatory variables. The predictors of non- adherence to therapy are summarized in **Table 3**. Lack of finances (AOR= 12.65 95% CI=4.72-33.9, P<0.001) was a strong predictor and those who were deficient were 12.65 likely not to adhere to drugs. Inadequate knowledge of treatment (AOR=11.11, CI=2.05-60.24, P=0.005) resulted in 11.11 times more chances of not adhering to treatment. Other predictors included long duration of treatment (AOR=14.03, 95% CI=3.02- 65.1, P=0.001), side effects of drugs (AOR=7.68, 95%CI=1.39-42.2, 0.019) forgetfulness (AOR=4.6, 95% CI=1.65- 12.86, P=0.003) and fear of dependence (AOR= 22.38, 95% CI = 2.3- 2.81, P=0.008).

Table 2: Reasons for non-adherence to medicines

Reason for non-adherence	Frequency (n)	Percentage (%)
Lack of finances	59	35.3
Forgetfulness	38	22.8
Long duration of treatment	15	9.0
Side effects of medication	13	7.8
Inadequate knowledge of treatment	12	7.2
Fear of dependence	10	6.0
Severity of disease	4	2.4
Level of disability	1	0.6
Misunderstanding of treatment	1	0.6

Table 3. Predictors of non-adherence to drugs

Variable	Bivariable analysis		Multivariable analysis	
	COR (95% CI	P -value	AOR (95% CI)	P-value
Lack of finances	11.96 (5.55-25.75)	**0.000***	12.65 (4.72-33.9)	**0.000***
Inadequate knowledge of treatment	4.7 (1.34-16.37)	**0.015***	11.11 (2.05-60.24)	**0.005***
Long Duration of therapy	6.91 (2.09-22.8)	**0.002***	14.03 (3.02 -65.1)	**0.001***
Side effects of drugs	5.52 (1.61-18.87)	**0.006***	7.68 (1.39-42.2)	**0.019***
Forgetfulness	4.8 (2.23-10.32)	**0.000***	4.6 (1.65-12.86)	**0.003***
Fear of dependence	22.2 (2.73-180.35)	**0.004***	25.38 (2.3-2.81)	**0.008***

=Statistically significant p values, COR=crude odds ratio, AOR= adjusted odds ratio

4.0   Discussion

The majority of the study participants were females. This finding is similar to other studies where women have been observed to seek medical help more compared to men (Mutua et al, 2014: Tesema et al, 2016. In Bangladesh, males have predominated in seeking health care services because of their lifestyle practices such as smoking and alcohol consumption (Hasan, 2016; Dhanaraj et al, 2012). The mean age of the participants was 62 years suggesting that majority of patients were elderly as has been revealed elsewhere (Mutua et al, 2014). Old age is associated with hypertension due to decreased elasticity of blood vessels arising from atherosclerosis, reduced physical activity and other comorbidities. With regard to education level, most participants had been educated up to primary level concurring with previous studies (Joshi et al, 2014; Hulzebosch et al, 2015). Literacy affects the ability to understand the information provided and to ask appropriate questions to the health care provider. This may negatively affect compliance to treatment. The majority of the subjects had a diuretic in their regimen (Mutua et al, 2014). The findings are in line with current guidelines that advocate for a diuretic as a first-line drug (James and Ortiz, 2014).The rate of adherence in this study was above average which was similar to one carried out in Kiambu county that observed a rate of 62.4% (Kimuyu, 2016). Studies in Nigeria (Iyalomhe and Iyalomhe, 2010) and Uzbekistan (Amonov et al, 2014) yielded comparatively low rates of adherence at 33.3% and 22.8% respectively. The

difference could be attributed to the rising awareness about the illness especially in central Kenya where prevalence of hypertension is high. Lack of finances was one of the predictors of non-adherence (Iyalomhe and Iyalomhe,2010). The cost of medicines is relatively high in Kenyan compared to the level of income (Ambaw et al.,2012). Despite that cost is subsidized in public health facilities, erratic supplies of medicines necessitates patients to purchase medicines from private pharmacies. Other direct costs incurred includes transportation and laboratory investigations. Considering that most of these participants were old and had other essential needs despite lack of regular source of income, financial distress was inevitable.

5.0 Conclusion

The most common used antihypertensive drugs were diuretics and angiotensin-converting enzyme inhibitors. The level of adherence to medicines was inadequate due mainly to lack of finances, inadequate knowledge, forgetfulness, adverse drug reactions, long duration of therapy and fear of dependence. Adequate patient education and accessibility to medications should be enhanced in order to improve adherence to antihypertensive medicines and improve therapeutic outcomes. In addition prompt management of the adverse drug effects should be done. Accessibility may be improved by ensuring regular supplies of medicines and also encouraging patients to collect them from the nearest health facility to their homes.

Conflict of Interest declaration

The authors declare no conflict of interest.

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