

Original Research Article

Factors associated with adherence to anti-hypertensive medication among patients attending a secondary referral hospital, in Kirinyaga county, Kenya

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ABSTRACT

Background: In Kenya, hypertension is rising, but adherence levels are poorly documented. The purpose of this study was to assess the level of adherence to antihypertensive medication and identify the patient- and health system-related factors influencing adherence among hypertensive patients in Kirinyaga County.

Methods: This descriptive cross-sectional study assessed medication adherence among 237 hypertensive patients aged 18–60 years at Kerugoya County Referral Hospital between October and December 2024. Systematic sampling was used. Data was collected using a structured questionnaire incorporating the MMAS-8 and analyzed using SPSS with descriptive and inferential statistics.

Results: Slightly more than a third of patients did not take their hypertension medication as prescribed. 39% (n=93) lacked health insurance and married individuals were more likely to adhere than the unmarried, while higher hospital fees were linked to non-adherence. Two-thirds had comorbidities and patients with diabetes (89%, n=82), those who monitored their blood pressure at home (91%, n=136) and those aware that skipping medication worsens hypertension (89%, n=133) showed better adherence. Resources and education were generally available. Longer doctor waits times discouraged adherence. Adherent patients were 6 times more likely to report no side effects (OR = 6.058) and more likely to spend less time at the pharmacy (OR=0.977).

Conclusions: This study recommends strengthening health education on adherence, especially regarding home blood pressure monitoring and the risks of missed doses. The facilities should reduce waiting times, sensitize on NHIF enrollment. Further research is necessary to explore the role of social support in promoting adherence.

Keywords: Adherence to anti-hypertensive medication, Health system factors, Patient-related factors

INTRODUCTION

Hypertension is a global public health challenge affecting both developed and developing nations (Abu et al, 2018). Globally, about 1.13 billion people are hypertensive, with two-thirds living in Low- and Middle-Income Countries (LMICs) and prevalence increases with age, affecting approximately 50% of people over 60 years (WHO, 2019).¹ Hypertension remains one of the leading causes

of morbidity and mortality due to its association with cardiovascular and renal complications. In Africa, the prevalence ranges from 22–46%, driven by poor health system capacity and limited access to care.² Sub-Saharan Africa reports a prevalence of about 30%. The epidemiologic transition and changing lifestyle factors in LMICs have further contributed to the rising burden.³ In Kenya, the adult hypertension prevalence is 24% and cardiovascular diseases (CVDs) account for 6.1% to 8%

of deaths, with autopsies suggesting an even higher proportion (over 13%) of cause-specific adult deaths due to CVDs.⁴ The 2015 Kenya Stepwise survey reported that one in four Kenyans is hypertensive, yet only 12% are on treatment. Notably, the Central and Eastern regions of Kenya reported higher rates of raised blood pressure than other counties. Kirinyaga county, one of the counties in the Central region, records a higher hypertension prevalence than the national average and is considered among the counties with the highest burden of the disease. Data from the Kenya National Bureau of Statistics indicate a sharp rise in diagnosed hypertension cases: 11,712 in 2018, 17,079 in 2019 and 16,002 by September 2020. Hypertensive diseases consistently ranked among the top five causes of both morbidity and mortality during this period. In response, the Healthy Heart Africa (HHA) programme was launched in the county in 2015 by AMREF Health Africa to improve screening and treatment.⁵

Hypertension management involves both non-pharmacological interventions such as healthy diet, regular exercise and weight control, as well as pharmacological therapy using various classes of antihypertensive medications like diuretics, beta-blockers, ACE inhibitors and ARBs.⁶ While effective treatments exist, their success depends largely on patient adherence to prescribed therapy. Medication adherence is the extent to which a patient's behavior aligns with medical advice regarding medication intake, lifestyle and diet. Globally, poor adherence remains a concern, especially in LMICs. Even in high-income settings, adherence is estimated at only 50%, with much lower levels in low-resource settings. At Kenyatta National Hospital (KNH), adherence was reported at 31.8%, with only 26% of patients achieving adequate blood pressure control.⁷

Adherence is affected by numerous factors. These include medication-related issues (side effects, dosing frequency, cost), patient-related factors (age, knowledge, beliefs, comorbidities) and systemic issues (provider-patient communication, drug availability, access to health services).^{1,8,9} Additionally, health literacy and patient involvement are key determinants in maintaining long-term medication use and lifestyle changes.¹⁰

Problem statement

Despite adherence being recognized as a key strategy in the effective management of hypertension, adherence levels remain low globally particularly in LMICs. In Kenya, hypertension is increasingly prevalent; however, the status of adherence to antihypertensive medication remains poorly documented.

Specifically, in Kirinyaga County, the level of adherence and the localized factors influencing it are largely unknown. This knowledge gap persists despite a steady rise in hypertension cases within this Central Region the county. The Central and Eastern regions of Kenya have

consistently reported higher rates of raised blood pressure compared to other parts of the country. Between 2018 and 2020, the number of diagnosed hypertension cases in Kirinyaga County doubled, with hypertensive diseases consistently ranking among the top five causes of both morbidity and mortality.¹¹ Hospital admissions and deaths linked to hypertension and its complications have also increased during this period.

The absence of empirical data on medication adherence and its associated factors in Kirinyaga County limits the capacity of healthcare providers and policymakers to design targeted, locally contextualized interventions. Understanding the extent of adherence and the patient- and health-system-related factors that influence it is critical for effectively addressing the burden of hypertension in the county.

Objectives of the study

To determine the adherence to anti-hypertensive medication among hypertensive patients attending a secondary Referral Hospital in Kirinyaga County, Kenya. To describe patient-related factors associated with adherence to anti-hypertensive medication among hypertensive patients attending a secondary Referral Hospital in Kirinyaga County, Kenya. To describe health system related factors associated with adherence to anti-hypertensive medication among hypertensive patients attending a secondary Referral Hospital in Kirinyaga County, Kenya.

METHODS

This study employed a descriptive cross-sectional design to assess medication adherence among hypertensive patients at Kerugoya County Referral Hospital (KCRH), a secondary referral hospital in Kirinyaga County, Kenya. The study population consisted of hypertensive patients aged 18–60 years attending the hospital's medical outpatient clinic. Data were collected from a sample of 237 patients between mid-October and December 2024. Systematic sampling was used, selecting every 2nd patient attending the clinic based on daily turnout. Eligibility criteria included patients aged over 18 years with a confirmed diagnosis of hypertension and on medication for at least six months. Excluded were patients without proof of medication use and those too ill for outpatient participation.

Quantitative data were collected through a structured questionnaire, incorporating the 8-item Morisky medication adherence scale (MMAS-8) to assess adherence.¹² Patients scoring 8 were classified as adherent; those with low or moderate scores were considered non-adherent. Data were analyzed using IBM SPSS version 27. Descriptive statistics (frequencies, percentages, means) were used to summarize demographic and clinical variables. Inferential analysis involved chi-square tests, t-tests, Mann–Whitney U tests

and logistic regression to explore associations between adherence (dependent variable) and individual or health system-related factors (independent variables). Statistical significance was set at $p < 0.05$.

Ethical approval was obtained from the relevant ethical review body and informed consent was secured from all participants. Confidentiality and anonymity were strictly maintained throughout the study.

RESULTS

Adherence

The majority of respondents (63%, $n=149$) took their anti-hypertensive medication as prescribed though slightly more than a third (37%, $n=86$) did not.

Demographic and socio-economic characteristics

As indicated in Table 1, the majority of the patients (85%, $n=202$) were women and married (88%, $n=209$). Each patient had an average of 3.4 children ($SD=1.69$) (Table 2). Most of the patients had completed primary school (58%, $n=137$) and worked as farmers (76%, $n=180$) and 60% ($n=144$) of the participants had medical insurance. Respondents' ages ranged from the youngest at 20 years to the oldest at 65 years, with a mean of 51 years.

Figure 1 illustrates the distribution of age by gender. The frequency of adherence differed significantly depending on marital status, $\chi^2 (1, N=235) = 4.726, p=0.030$. The other socio-demographic factors were not significant. However, when comparing the ages between men and women in relation to medication adherence, there was no statistically significant difference in age between non-adherent individuals ($M=50.77, SD=7.68$) and adherent individuals ($M=51.72, SD=7.56$) ($p=0.358$). The socioeconomic attributes of the respondents are tabulated in Table 3.

The median monthly income for patients was Kshs. 2800. Conversely, the median monthly expenditure for transportation and hospital fees was Kes. 110 and Kshs. 100, respectively. Table 4 presents the relationship between medication adherence and socio-economic factors: age, number of children, monthly income and hospital spending. Most variables showed no significant differences, except hospital spending, where non-adherent patients incurred significantly higher fees ($MD=Kshs.500$) compared to adherent ones ($MD=Kshs.100, p<0.001$).

Patient-related factors

This study explored patient-related factors influencing medication adherence, including duration of hypertension, behaviors and comorbidities. The median hypertension duration was 4 years (range: 1–37). As shown in table 5, few patients reported smoking (2%) or alcohol use (10%). Most monitored their blood pressure at home (85%) and kept clinic appointments (89%). Additionally, 86% understood that missing a single dose could impact their blood pressure. Two-thirds (66%) had at least one comorbidity, with diabetes being the most common (83%), followed by arthritis (4%) and other conditions (19%) such as heart disease, depression, HIV and stroke. Table 6 shows the association between patient-related characteristics and medication adherence. Adherence was significantly higher among those who monitored blood pressure at home ($p=0.001$), believed that missing a single dose affects blood pressure ($p=0.001$) and those with diabetes ($p=0.025$). Other factors, including smoking, alcohol use, clinic attendance and other comorbidities, were not significantly associated with adherence ($p>0.05$).

Health-system related factors

Table 7 summarizes health system factors related to service and supply availability. Most patients (98%) reported receiving hypertension care when needed, with 89.5% indicating that healthcare providers were available to assist. Drugs were readily available for 76% of respondents. Additionally, 98% received instructions on medication use and nearly 90% were provided with hypertension-related education materials. The association between medication adherence and availability of services is shown in Tables 8.

Adherence was more frequently associated with the availability of healthcare service providers ($p=0.000$), availability of drugs in the hospital pharmacy ($p=0.000$), receiving hypertension care when needed ($p=0.017$), being given instructions on how to take medicines ($p=0.048$) and receiving health education materials on hypertension ($p=0.000$) than non-adherence. Another key aspect of the healthcare system was waiting time at service points. Patients experienced the longest waits when seeing a doctor or clinician (median=120 minutes), followed by the laboratory (median=30 minutes) and the pharmacy (median=15 minutes). Longer waiting times negatively affected adherence, as non-adherent patients waited much longer to see a doctor (133 vs. 108 minutes, $p=0.001$) and at the pharmacy (139 vs. 98 minutes, $p=0.000$) compared to adherent patients (Table 8).

Table 1: Demographic characteristics of the patients.

Characteristic	N	%
Gender	Female	202
	Male	35
	Total	237
		100.0

Continued.

Characteristic				N	%
Marital status	Married			209	88.2
	Single/Never married			14	5.9
	Separated/Divorced			10	4.2
	Widowed			4	1.7
	Total			237	100.0
Education level	Primary			137	57.8
	Secondary			69	29.1
	No formal education			26	11.0
	College/Tertiary			4	1.7
	University			1	0.4
	Total			237	100.0
Employment	Farming			180	76.3
	Business			30	12.7
	Self			15	6.4
	Formal			6	2.5
	Pensioner			3	1.3
	Unemployed			2	0.8
	Total			236	100.0
Has health insurance	Yes			144	60.8
	No			93	39.2
	Total			237	100.0
Has children	Yes			234	99.2
	No			2	0.8
	Total			236	100.0
Age distribution	Female	M=51.25	Min=20.00	Max=65.00	SD=7.67
	Male	M=51.57	Min=37.00	Max=60.00	SD=7.37
	Total	M=51.30	Min=20.00	Max=65.00	SD=7.61

Table 2: Association between medication adherence and patient's demographic characteristics.

Characteristics		Non-Adherent	Adherent	Significant at p≤0.05
		N	N	
Gender	Female	69	131	$\chi^2=2.542$, df=1, p=0.111
	Male	17	18	
	Total	86	149	
Marital status	Others	15	12	$\chi^2=4.726$, df=1, p=0.030
	Married	71	137	
	Total	86	149	
Has children	No	1	1	Fisher's exact p=1.000
	Yes	85	147	
	Total	86	148	
Education level	No formal education	5	21	$\chi^2=4.447$, df=2, p=0.108
	Primary	55	80	
	≥Secondary level	26	48	
Employment	Others	25	31	$\chi^2=2.202$, df=1, p=0.138
	Farming	60	118	
	Total	85	149	
Has health insurance	No	39	54	$\chi^2=1.891$, df=1, p=0.169
	Yes	47	95	
	Total	86	149	

Table 3: Socio-economic factors.

Factor	N	Mean	Median	SD	Min	Max
Monthly income	21	5077.83	2800	7292.9	200	50000
Monthly Fare	32	200.82	110	268.92	20	3000
Monthly spending in hospital fees	85	420.92	100	608.44	100	4000
Number of children		3.42	3	1.69	1	12.00
Age of patients	37	51.3	52.5	7.61	20	65.00

Table 4: Medication adherence vs. Socio-Economic factors.

Characteristic	Medication adherence level categories								P≤0.05
	Non-adherent				Adherent				
	N	Mean	Median	SD	N	Mean	Median	SD	
Having children	85	3.53	3	1.88	147	3.37	3	1.59	p=0.485 ^a
Monthly income	82	6464.63	2950	9621.98	137	4302.92	2800	5377.18	p=0.717 ^b
Monthly fare	84	174.64	100	196.96	146	216.23	120	303.78	p=0.454 ^b
Monthly spending in hospital fees	74	677.97	500	764.93	110	248.18	100	397.58	p=0.000 ^b

Independent student's t-test, ^b Independent samples Mann Whitney U test.

Table 5: Patient related factors.

Factor	N	%
Patient habits and attitudes		
Monitors BP at home	No	35
	Yes	202
	Total	237
Smokes	No	232
	Yes	5
	Total	237
Drinks alcohol	No	213
	Yes	24
	Total	237
Honors clinic appointments	No	25
	Yes	210
	Total	235
Thinks missing single dose affects BP	Yes	201
	No	17
	Don't Know	17
	Total	235
Missing single dose affects BP	No	36
	Yes	201
	Total	237
Comorbidities		
Has other chronic disease	No	80
	Yes	156
	Total	236
Diabetes	No	25
	Yes	130
	Total	155
Kidney Disease	No	153
	Yes	2
	Total	155
Asthma	No	154
	Yes	1
	Total	155

Continued.

Factor		N	%
Arthritis	No	149	96.1
	Yes	6	3.9
	Total	155	100.0
Cancer	No	155	100.0
	Yes	0	0.0
	Total	155	100.0
Mental problems	No	153	98.7
	Yes	2	1.3
	Total	155	100.0
Other	No	126	81.3
	Yes	29	18.7
	Total	155	100.0

Table 6: Patient related factors associated with medication adherence.

Patient's practices		Non-adherent	Adherent	Significant at
		N	N	p≤0.05
Monitors BP at home	No	21	13	χ2=10.853, df=1, p=0.001
	Yes	65	136	
	Total	86	149	
Thinks missing single dose affects BP	Yes	66	133	χ2=13.091, df=2, p=0.001
	No	13	4	
	Don't Know	5	12	
	Total	84	149	
Smokes	No	85	145	Fisher's exact p=0.656
	Yes	1	4	
	Total	86	149	
Drinks alcohol	No	76	135	χ2=0.296, df=1, p=0.586
	Yes	10	14	
	Total	86	149	
Honors clinic appointments	No	11	14	χ2=0.605, df=1, p=0.437
	Yes	75	133	
	Total	86	147	
Presence of other comorbidities				
Has other chronic disease	No	24	56	χ2=2.102, df=1, p=0.147
	Yes	61	93	
	Total	85	149	
Diabetes	No	15	10	χ2=5.051, df=1, p=0.025
	Yes	46	82	
	Total	61	92	
Kidney Disease	No	61	90	Fisher's exact p=0.517
	Yes	0	2	
	Total	61	92	
Asthma	No	61	91	Fisher's exact p=1.000
	Yes	0	1	
	Total	61	92	
Arthritis	No	60	87	Fisher's exact p=0.403
	Yes	1	5	
	Total	61	92	
Mental problems	No	59	92	Fisher's exact p=0.157
	Yes	2	0	
	Total	61	92	

Table 7: Patient health system factors: availability of services.

Health system factors		N	%
Receives HTN care at hospital when needed	No	4	1.7
	Yes	232	98.3
	Total	236	100.0
Ever missed your appointment due to unavailability of Doc/HCP	No	212	89.5
	Yes	25	10.5
	Total	237	100.0
Drugs readily available in hosp pharmacy	No	58	24.5
	Yes	179	75.5
	Total	237	100.0
Medication taking instructions given	No	3	1.3
	Yes	234	98.7
	Total	237	100.0
Receives health educ materials on HTN at hospital	Yes	210	89.7
	No	21	9.0
	Don't Know	3	1.3
	Total	234	100.0

Table 8: Association between health system related factors and adherence.

Health systems related			Non-adherent	Adherent	P≤0.05	
			N	N		
Receives HTN care at hospital whenneeded	No	4	0	Fisher’s exact		
	Yes	82	148	p=0.017		
Ever missed care due to unavailability of DR/HCP	No	68	143	χ2=16.991, df=1,		
	Yes	18	6	P=0.000		
	Total	86	149			
Drugs readily available in Hosp pharmacy	No	46	12	χ2=60.552, df=1,		
	Yes	40	137	P=0.000		
	Total	86	149			
Medication taking instructions given	No	3	0	Fisher’s exact		
	Yes	83	149	P=0.048		
	Total	86	149			
Receives education materials on HTN at hospital	Yes	65	143	χ2=21.389, df=1,		
	No/Don’t know	19	5	P=0.000		
	Total	84	148			
Characteristic	Medication adherence level categories					
	Non-adherent		Adherent			
Waiting time for lab test (Minutes)	n=63	Mean rank=105.59	n=141	Mean rank=101.12	P=0.604 ^a	
Waiting time at pharmacy (Minutes)	n=80	Mean rank=138.68	n=144	Mean rank=97.96	P=0.000 ^a	
Waiting time to see Dr/Clinician (Minutes)	n=85	Mean rank=132.58	n=148	Mean rank=108.05	P=0.001 ^a	

^aIndependent-samples Mann Whitney U test.

DISCUSSION

In this study, slightly more than a third of hypertensive patients in Kirinyaga County, Kenya, did not adhere to prescribed antihypertensive therapy. This aligns with global estimates that adherence in low and middle-income countries (LMICs) remains considerably lower than the 50% adherence rate observed in high-income

countries.^{5,13} Locally, the adherence levels observed are consistent with findings from Kenyatta National Hospital, where adherence was reported at 31.8%.⁷ Socio-demographic characteristics such as marital status and healthcare costs significantly influenced adherence. Married patients were more likely to adhere compared to unmarried individuals, suggesting that family and social support may positively reinforce treatment behavior.

Similar associations between social support and adherence have been reported elsewhere.¹⁰ Conversely, higher monthly hospital fees were inversely related to adherence, consistent with evidence from Sub-Saharan Africa indicating that financial barriers remain critical determinants of hypertension management.⁸ National survey data further reveal important gender differences. Among women aged 15–49 who had ever been told they had hypertension, only 32% were on medication.¹⁴ For men in the same age group, prevalence of ever being diagnosed was much lower at 3%, yet treatment rates among those diagnosed were comparable at 31.7%. These findings suggest that women are more likely to be screened and diagnosed, while men may remain undiagnosed despite similar challenges with adherence once treatment is initiated.

Patient-related factors also played a significant role. Two-thirds of patients reported comorbidities, with diabetes mellitus being the most common. Interestingly, patients with diabetes were more likely to be adherent, possibly reflecting higher health literacy and more frequent engagement with healthcare systems, as observed in prior studies.³ Moreover, patients who monitored their blood pressure at home and believed that missing doses could worsen hypertension demonstrated higher adherence. This underscores the importance of health literacy and self-management in promoting long-term adherence.⁶

Health system factors further shaped adherence behavior. Although most respondents reported that medicines, providers and educational materials were available, longer wait times, especially at the doctor's consultation, emerged as a barrier. Logistic regression confirmed that patients who reported shorter pharmacy wait times and no history of side effects were significantly more likely to be adherent. These findings resonate with studies showing that systemic inefficiencies, including delays and poor patient-provider interactions, undermine adherence in LMICs.^{2,8}

This study had several limitations. Being a cross-sectional design, it could not establish causal relationships between identified factors and adherence. The reliance on self-reported measures, including the MMAS-8, may have introduced recall and social desirability bias, potentially overestimating adherence. Additionally, the study was conducted in a single secondary referral hospital, which limits the generalizability of the findings to other settings in Kirinyaga County or Kenya at large.

CONCLUSION

In conclusion, medication adherence among hypertensive patients was influenced by socio-demographic, patient-related and health system factors. Married patients and those with lower hospital expenses were more likely to adhere to treatment. Patient awareness, self-monitoring of blood pressure and the presence of comorbid diabetes significantly promoted adherence. Lastly, resource

availability and timely service delivery were positively associated with adherence, while long wait times discouraged it.

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