Prevalence and Determinants of Blood Pressure Control Among Hypertensive Patients Attending Kapkatet Sub-County Hospital, Kenya: A Cross-Sectional Study

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ABSTRACT

Hypertension remains a major global public health challenge and a leading risk factor for cardiovascular disease, stroke, kidney failure, and premature mortality. Despite the availability of effective treatment, blood pressure control(BP) remains suboptimal, particularly in Global South Nations. This study assessed BP control and associated factors among hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital, Kenya. A descriptive cross-sectional study was conducted among n= 222 hypertensive patients attending the clinic in the month of June 2026. Data were collected using a structured interviewer-administered questionnaire and medical record review. BP control was defined as <140/90 mmHg. Descriptive statistics, chi-square tests, and logistic regression were used for analysis at $p < 0.05$ significance level. Overall, 42% (n = 93) of participants had controlled BP, while 58% (n = 129) had uncontrolled hypertension. Most participants were female (58.6%) and rural residents (57.7%). High prevalence of comorbid diabetes mellitus(DM) (55.4%), physical inactivity (95.5%), and high salt intake (>60%) was observed. Significant factors associated with BP control included sex ($p = 0.04$), age ($p = 0.05$), BMI ($p = 0.05$), baseline BP status ($p < 0.001$), and treatment support ($p = 0.03$). Independent predictors of BP control were medication adherence (AOR=3.12), treatment support (AOR=2.41), BMI <25 kg/m² (AOR=1.72), duration of hypertension (AOR=0.63), diabetes comorbidity (AOR=0.54), male sex (AOR=0.58), and rural residence (AOR=0.69). More than half of hypertensive patients had poor BP control. Strengthening adherence support, lifestyle modification, and follow-up systems is essential to improve outcomes.

Keywords: Hypertension; blood pressure (BP) control; adherence; Kenya; outpatient clinic; non-communicable diseases (NCDs)

Background to the Study

Hypertension remains one of the leading causes of cardiovascular morbidity and premature mortality worldwide and represents a major public health challenge. It is the principal modifiable risk factor for cardiovascular diseases, including stroke, myocardial infarction, heart failure, chronic kidney disease, and peripheral vascular disease. According to the World Health Organization (WHO), approximately 1.28 billion adults aged 30–79 years are living with hypertension globally, with nearly two-thirds residing in low- and middle-income countries (WHO, 2023). Despite the availability of effective antihypertensive medications and evidence-based clinical guidelines, blood pressure control remains suboptimal, particularly global south nations.

The burden of hypertension continues to increase across sub-Saharan Africa(SSA) due to rapid urbanization, population ageing, unhealthy dietary practices, physical inactivity, obesity, excessive alcohol consumption, and tobacco use. Recent systematic reviews indicate that although awareness and treatment rates have improved, fewer than half of treated hypertensive patients achieve recommended BP targets in most African countries (Adeloye et al., 2022). Poor BP control contributes substantially to preventable cardiovascular complications, disability, and healthcare expenditure across the region.

In Kenya, hypertension has become a major contributor to the growing burden of non-communicable diseases (NCDs). The Kenya STEPwise Survey reported that approximately one in four adults has hypertension, yet awareness, treatment, and BP control remain inadequate (MOH, 2015). The Kenya National Strategy for Prevention and Control of Non-Communicable Diseases further identifies hypertension as a priority condition requiring strengthened prevention, early diagnosis, treatment, and long-term follow-up (MOH, 2023).

Several Kenyan studies have demonstrated persistently low BP control among patients receiving antihypertensive treatment. Studies conducted at Kenyatta National Hospital and within the Academic Model Providing Access to Healthcare (AMPATH) chronic disease programme reported BP control rates ranging between 35% and 50%, with poor medication adherence, diabetes comorbidity, obesity, irregular clinic attendance, inadequate patient education, and inconsistent medicine availability identified as major determinants of uncontrolled hypertension (Mwangi et al., 2023). Similar findings have been reported in other global south countries, highlighting that successful hypertension management requires not only effective pharmacological therapy but also sustained behavioural modification, patient support, and resilient health systems.

At the health-system level, challenges such as medication stock-outs, inadequate counselling time, insufficient follow-up mechanisms, limited health insurance coverage, and shortages of trained healthcare personnel continue to compromise hypertension management in many public health facilities. These challenges are particularly evident in rural settings where geographical accessibility, socioeconomic disadvantage, and limited healthcare resources further reduce continuity of care. Consequently, many patients remain exposed to preventable cardiovascular complications despite receiving treatment.

Although several studies have investigated hypertension control in tertiary hospitals and urban referral centres in Kenya, limited evidence exists regarding BP control among patients attending rural sub-county hospitals. Rural populations often experience unique barriers related to healthcare access, medication availability, transportation, socioeconomic constraints, and health literacy, which may influence hypertension outcomes differently from urban populations. Kapkatet Sub-County Hospital serves a predominantly rural population in Kericho County and provides specialized outpatient care for patients with chronic non-communicable diseases, including hypertension. However, evidence on the prevalence of BP control and factors associated with hypertension management remains scarce.

Generating local evidence on BP control and its determinants is essential for informing specific interventions aimed at strengthening hypertension management within primary healthcare services. Therefore, this study assessed the prevalence of BP control and identified socio-demographic, clinical, behavioural, and health system factors associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital, Kericho County, Kenya.

Problem Statement

Hypertension is one of the leading causes of cardiovascular disease, stroke, chronic kidney disease, heart failure, and premature mortality worldwide. Although effective antihypertensive medications and evidence-based management guidelines are widely available, BP control remains poor, particularly in global south countries where health systems face significant resource constraints. The WHO estimates that fewer than half of adults with hypertension achieve recommended BP targets globally, with the lowest control rates reported in sub-Saharan Africa. In Kenya, hypertension affects approximately one in four adults and contributes substantially to the growing burden of non-communicable diseases. Despite increasing availability of screening services and antihypertensive treatment within public health facilities, studies conducted in tertiary hospitals and specialized chronic disease clinics indicate that only 35–45% of hypertensive patients achieve adequate BP control. Poor medication adherence, unhealthy lifestyle behaviours, inadequate patient education, irregular clinic attendance, medication stock-outs, and coexisting chronic illnesses such as diabetes mellitus continue to undermine hypertension management. These challenges are often more pronounced in rural and semi-rural health facilities where limited healthcare resources, transportation barriers, inconsistent drug availability, and inadequate follow-up systems may adversely affect long-term hypertension control. However, most studies have been conducted in large urban referral hospitals or integrated chronic disease programmes, leaving limited evidence regarding

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BP control and its determinants among patients receiving routine care in sub-county hospitals. Kapkatet Sub-County Hospital serves a predominantly rural population in Kericho County and provides ongoing hypertension management through its Medical Outpatient Clinic. Despite the increasing number of patients receiving treatment, there is limited local evidence regarding the prevalence of BP control and the socio-demographic, clinical, behavioural, and health system factors associated with treatment outcomes in this setting. The absence of such evidence limits the ability of healthcare providers and policymakers to develop specific interventions to improve hypertension management. Therefore, this study sought to determine the prevalence of BP control and identify factors associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital, with the aim of generating evidence to inform targeted interventions for improving hypertension care.

Justification of the Study

Hypertension remains a major public health challenge in Kenya, with poor BP control contributing substantially to cardiovascular disease, stroke, chronic kidney disease, disability, and premature mortality. Although effective antihypertensive medications and evidence-based treatment guidelines are available, many patients receiving care in public health facilities fail to achieve recommended BP targets due to patient-, clinical-, and health system-related factors. Improving BP control is therefore a national priority for reducing the burden of non-communicable diseases and achieving the goals of universal health coverage. Despite the growing burden of hypertension, there is limited published evidence on the prevalence of BP control and its determinants among patients receiving routine care in rural sub-county hospitals in Kenya. Most existing studies have been conducted in tertiary referral hospitals and specialized chronic disease programmes, whose findings may not accurately reflect the realities of primary and secondary healthcare facilities serving predominantly rural populations. Consequently, healthcare providers and policymakers have limited local evidence to guide context-specific interventions aimed at improving hypertension management in these settings.

This study addresses this knowledge gap by determining the prevalence of BP control and identifying the socio-demographic, clinical, behavioural, and health system factors associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital. The findings will provide evidence to support the design and implementation of targeted interventions, including strategies to improve medication adherence, strengthen patient education, enhance treatment support, and improve continuity of care. The findings are expected to benefit clinicians, hospital managers, county health authorities, and policymakers by informing evidence-based planning and resource allocation for hypertension services. In addition, the study will contribute to the growing body of literature on hypertension management in rural Kenya and provide baseline information for future longitudinal and interventional studies aimed at improving BP control and reducing hypertension-related complications.

Objectives

General Objective

To determine the prevalence of BP control and identify factors associated with BP control among hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital, Kericho County, Kenya.

Specific Objectives

1. To determine the prevalence of BP control among hypertensive patients attending Kapkatet Sub-County Hospital.

2. To determine the association between socio-demographic factors and BP control among hypertensive patients attending Kapkatet Sub-County Hospital.

3. To determine the association between clinical factors and blood pressure control among hypertensive patients attending Kapkatet Sub-County Hospital.

4. To determine the association between behavioural factors and BP control among hypertensive patients attending Kapkatet Sub-County Hospital.

5. To determine the association between health system factors and BP control among hypertensive patients attending Kapkatet Sub-County Hospital.

6. To identify the independent predictors of BP control among hypertensive patients attending Kapkatet Sub-County Hospital using multivariable logistic regression.

Research Questions

The study sought to answer the following research questions:

1. What is the prevalence of BP control among hypertensive patients attending Kapkatet Sub-County Hospital?

2. What socio-demographic factors are associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital?

3. What clinical factors are associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital?

4. What behavioural factors are associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital?

5. What health system factors are associated with BP control among hypertensive patients attending Kapkatet Sub-County Hospital?

6. What are the independent predictors of BP control among hypertensive patients attending Kapkatet Sub-County Hospital?

Research Hypotheses

The study tested the following hypotheses:

Null Hypothesis (H_0)- There is no statistically significant association between socio-demographic, clinical, behavioural, and health system factors and BP control among hypertensive patients attending Kapkatet Sub-County Hospital.

Alternative Hypothesis (H_1)- There is a statistically significant association between one or more socio-demographic, clinical, behavioural, and health system factors and BP control among hypertensive patients attending Kapkatet Sub-County Hospital

Operational Definition of Key Terms

BP Control: The attainment of a systolic BP of <140 mmHg and a diastolic BP of <90 mmHg among hypertensive patients receiving antihypertensive treatment, based on the average of two BP measurements taken during the study.

Hypertension: A chronic medical condition diagnosed by a qualified healthcare provider and documented in the medical record for the patient, characterized by persistently elevated BP requiring antihypertensive treatment.

Uncontrolled BP: A systolic BP of ≥140 mmHg and/or a diastolic BP of ≥90 mmHg at the time of assessment.

Medication Adherence: The extent to which a participant consistently took prescribed antihypertensive medication as recommended by the healthcare provider. Participants were classified as having good or poor adherence based on responses to the study questionnaire.

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Treatment Support: Assistance received by a patient to facilitate adherence to hypertension treatment, including family support, peer support, phone reminders, or other reminder systems.

Body Mass Index (BMI): A measure of body weight adjusted for height, calculated as weight in kilograms divided by height in metres squared (kg/m²). Participants were classified as underweight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), or obese (≥30.0 kg/m²).

Comorbidity: The presence of one or more chronic medical conditions occurring alongside hypertension, including diabetes mellitus, stroke, kidney disease, rheumatic heart disease, or other documented chronic illnesses.

Behavioural Factors: Individual lifestyle practices that may influence BP control, including medication adherence, physical activity, smoking, dietary habits, salt intake, processed food consumption, and clinic appointment attendance.

Health System Factors: Healthcare service-related characteristics that may influence BP control, including availability of antihypertensive medicines, access to healthcare providers, receipt of blood pressure education, treatment support, health insurance coverage, and patient satisfaction with healthcare services.

Prevalence of BP Control: The proportion of hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital who had controlled BP (<140/90 mmHg) at the time of the study.

METHODOLOGY

Study Design

A hospital-based descriptive cross-sectional study employing a quantitative approach was conducted to determine the prevalence of BP control and identify factors associated with BP control among hypertensive patients attending the Medical Outpatient Clinic (MOPC) at Kapkatet Sub-County Hospital, Kericho County, Kenya. The study was undertaken in June 2026. The cross-sectional design was appropriate because it enabled simultaneous measurement of blood pressure control and potential associated socio-demographic, clinical, behavioural, and health system factors within the study population. Although this design allows estimation of prevalence and identification of statistical associations, it does not establish temporal relationships or causal inference between exposures and blood pressure control.

Study Area

The study was conducted at Kapkatet Sub-County Hospital, a public Level IV health facility located in Kericho County in the South Rift region of Kenya. The hospital serves as the major referral facility for several surrounding health centres and dispensaries and provides outpatient, inpatient, maternal and child health, emergency, and chronic disease management services. The Medical Outpatient Clinic (MOPC) operates specialized clinics for patients with chronic non-communicable diseases, including hypertension and diabetes mellitus. The hospital serves a predominantly rural population whose livelihoods mainly depend on agriculture, tea farming, livestock keeping, and small-scale businesses. Hypertension follow-up clinics are conducted routinely, making the facility appropriate for assessing BP control among patients receiving long-term antihypertensive treatment.

Study Population

The study population comprised adult patients diagnosed with hypertension and attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital during the study period.

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Inclusion Criteria

Participants were eligible if they: were aged 18 years and above; had a documented diagnosis of hypertension in their medical records; had been receiving antihypertensive treatment for at least six months; and provided written informed consent.

Exclusion Criteria

Patients were excluded if they: were critically ill during data collection; had cognitive impairment or communication difficulties preventing interview participation; or declined to provide informed consent.

Sample Size Determination

The sample size was determined using the Cochran formula for estimating a single population proportion:

$n= Z^2 PQ/d^2$ Where,

n – Sample size

Z- The standard normal deviate (1.96 for a 95% CI)

d- 0.05 as the level of the desired accuracy

P- The proportion of the population with hypertension prevalence which 15%=0.15

q- The proportion of the population that does not have the characteristic (1-0.15) =0.85

Substituting these figures into the above formula

$n = (1.96)^2 x (0.15) (0.85)/ (0.05)^2$

=199

After adjusting for approximately 10% non-response, the minimum sample size became 222 participants, all of whom completed the study.

Sampling Technique

A systematic random sampling technique was employed to recruit study participants from hypertensive patients attending the Medical Outpatient Clinic during the study period. The clinic register served as the sampling frame. Based on the average monthly clinic attendance and the required sample size, a sampling interval (k)3 was calculated. The first participant was selected randomly from the first sampling interval, after which every 3rd eligible patient was recruited until the required sample size of 222 participants was attained. Patients who met the inclusion criteria but declined participation or were ineligible were skipped and the next eligible patient was selected.

Study Instrument

Data were collected using a structured interviewer-administered questionnaire developed after reviewing relevant literature on hypertension management and BP control. The questionnaire consisted of six sections: Section A: Socio-demographic characteristics, Section B: Clinical characteristics, Section C: Behavioural characteristics, Section D: BP monitoring and treatment practices, Section E: Health system-related factors, Section F: BP measurements and clinical information extracted from patient records.

The questionnaire captured information on socio-demographic characteristics, clinical history, behavioural risk factors, medication adherence, treatment support, access to healthcare services, and health system factors

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associated with BP control. BP measurements were obtained using calibrated digital sphygmomanometers according to World Health Organization hypertension measurement guidelines. Two measurements were taken after participants had rested for at least five minutes, separated by a minimum interval of two minutes, and the average reading was used for analysis. The complete questionnaire is presented in Appendix III.

Method of Data Collection

Primary data were collected through face-to-face interviewer-administered questionnaires, while secondary clinical information was obtained through review of the medical records using a structured data extraction checklist. Information collected included: socio-demographic characteristics; duration of hypertension; comorbidities; medication adherence; behavioural risk factors; treatment support; healthcare access; BP measurements; and antihypertensive treatment history.

Data Collection Procedure

Following ethical approval and administrative authorization, trained research assistants were oriented on the study objectives, ethical conduct, interview techniques, and standardized BP measurement procedures. Eligible patients attending the Medical Outpatient Clinic were identified consecutively according to the sampling procedure. The study objectives were explained, written informed consent was obtained, and participants were interviewed using the structured questionnaire. Clinical information including previous BP readings, duration of hypertension, and comorbidities was extracted from the medical records. BP was then measured using calibrated digital sphygmomanometers. Two readings were taken at least two minutes apart after participants had rested for five minutes while seated comfortably, and the average BP reading was recorded. Completed questionnaires were checked daily for completeness and consistency before data entry.

Study Variables

The dependent variable was BP control status, categorized as: Controlled BP (<140/90 mmHg) and Uncontrolled BP (≥140/90 mmHg). Independent variables included: Socio-demographic variables which includes Age, Sex, Marital status, Education level, Occupation, Monthly income, Residence. Clinical variables include Duration of hypertension, Body Mass Index (BMI), Comorbidities, Clinic attendance, Baseline BP status. Behavioural variables such as Smoking, Physical activity, Salt intake Processed food consumption, Medication adherence, Appointment attendance. Health system variables includes Treatment support, Drug availability, Access to healthcare providers, Health insurance coverage, Patient education, Satisfaction with care.

Data Quality Assurance

The study questionnaire was developed following an extensive review of published literature, standardized hypertension management guidelines, and validated instruments used in previous hypertension studies. The questionnaire was designed to capture socio-demographic, behavioural, clinical, treatment-related, and health system factors associated with BP control. Content validity was established through expert review by specialists in medical-surgical nursing, public health, epidemiology, and biostatistics, who assessed the relevance, clarity, and comprehensiveness of each questionnaire item. The instrument was pretested among hypertensive patients attending Kakamega County General Hospital, who were not included in the main study. Feedback obtained during the pilot study informed revision of ambiguous items, improvement of question sequencing, and refinement of wording to enhance clarity and comprehension. Research assistants underwent standardized training on study objectives, interviewing techniques, ethical conduct of research, administration of the questionnaire, medical record abstraction, and standardized BP measurement procedures. BP was measured using calibrated automated digital sphygmomanometers according to MOH hypertension measurement guidelines. Participants rested for at least five minutes before measurement, and two readings were taken at intervals of at least two minutes. The average of the two readings was used for analysis. To minimize information bias, responses obtained during interviews were cross-checked against patients' medical records whenever applicable. Completed questionnaires were reviewed daily by the principal investigator to ensure completeness, consistency, and accuracy. Data entry was performed using double-check verification procedures, and data

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cleaning involved checking for missing values, outliers, logical inconsistencies, and duplicate entries before statistical analysis.

Data Analysis

Data were entered, coded, cleaned, and analysed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were used to summarize participant characteristics. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations or medians and interquartile ranges where appropriate. The primary outcome variable was BP control status, categorized as controlled (<140/90 mmHg) and uncontrolled (≥140/90 mmHg). Bivariate analysis was performed using Chi-square tests to assess associations between independent variables and BP control. Crude odds ratios (ORs) together with their 95% confidence intervals (CIs) were calculated. Variables with a p-value of less than 0.20 during bivariate analysis, together with clinically important variables identified from previous literature regardless of statistical significance, were entered into a multivariable binary logistic regression model to identify independent predictors of BP control while controlling for potential confounding. Model fitness was assessed using the Hosmer–Lemeshow goodness-of-fit test, and multi-collinearity among predictor variables was assessed using variance inflation factors (VIFs). Adjusted odds ratios (AORs) with corresponding 95% confidence intervals were reported. Statistical significance was considered at $p < 0.05$.

Ethical Considerations

Ethical approval for the study was obtained from the University of Kabianga Institutional Research Ethics Committee (IREC) before commencement of data collection. Research authorization was subsequently obtained from the National Commission for Science, Technology and Innovation (NACOSTI), while administrative permission was granted by the Kericho County Department of Health and the management of Kapkatet Sub-County Hospital. Written informed consent was obtained from each participant after providing adequate information regarding the purpose, procedures, potential benefits, possible risks, and voluntary nature of participation. Participants were informed that refusal to participate or withdrawal from the study at any stage would not affect the healthcare services they received. Participant confidentiality and privacy were maintained throughout the study by assigning unique identification numbers instead of participant names. Interviews were conducted in a private room within the facility to ensure confidentiality. All completed questionnaires and electronic data were stored securely in password-protected computers and locked cabinets accessible only to the research team. Only anonymized and aggregated findings are presented in this manuscript, ensuring that no individual participant can be identified.

RESULTS

Introduction

This chapter presents findings on BP control and associated factors among hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital, Kericho County, Kenya. The results are organized into socio-demographic characteristics, clinical characteristics, behavioural factors, health system factors, BP control status, and inferential analyses. A total of 222 participants were included in the study.

Socio-Demographic Characteristics of Participants

Table 4.1: Socio-demographic characteristics of respondents (n = 222)

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	92	41.4
	Female	130	58.6

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Age group (years)	≤64	138	62.2
	>64	84	37.8
Marital status	Single	23	10.4
	Married	99	44.6
	Separated	39	17.6
	Widowed	61	27.5
Religion	Christian	195	87.8
	Muslim	18	8.1
	Other	9	4.1
Education level	No formal education	35	15.8
	Primary	58	26.1
	Secondary	86	38.7
	Diploma	34	15.3
	University	9	4.1
Occupation	Unemployed	109	49.1
	Employed/Self-employed/Other	113	50.9
Residence	Rural	128	57.7
	Urban	94	42.3

More than half of the respondents were female (58.6%, n = 130), while males accounted for 41.4% (n = 92). The mean age was 61.8 ± 9.6 years, with younger participants (≤64 years) having a mean age of 56.0 ± 5.9 years and older participants (>64 years) having a mean age of 73.6 ± 7.3 years. Regarding marital status, nearly half were married (44.6%, n = 99), followed by widowed (27.5%, n = 61), separated (17.6%, n = 39), and single (10.4%, n = 23).

Most participants were Christians (87.8%, n = 195), while Muslims accounted for 8.1% (n = 18) and others 4.1% (n = 9). In terms of education, secondary education was the most common (38.7%, n = 86), followed by primary education (26.1%, n = 58), no formal education (15.8%, n = 35), diploma (15.3%, n = 34), and university education (4.1%, n = 9).

Almost half were unemployed (49.1%, n = 109). More than half earned below KSh 11,000 monthly (51.8%, n = 115). Most respondents resided in rural areas (57.7%, n = 128) and lived with family members (83.8%, n = 186). A majority (78.8%, n = 175) reported having lost a family member due to hypertension-related complications.

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Clinical Characteristics of Participants

Table 4.2: Clinical characteristics of respondents (n = 222)

Variable	Category	Frequency (n)	Percentage (%)
Duration of hypertension	<4 years	83	37.4
	≥4 years	139	62.6
Comorbidities	Diabetes mellitus	123	55.4
	Stroke	48	21.6
	Kidney disease	18	8.1
	Rheumatic heart disease	13	5.9
BMI	Underweight	73	32.9
	Normal	69	31.1
	Overweight	49	22.1
	Obese	31	14.0
Scheduled check-ups	Yes	116	52.2
	No	106	47.8
Perception of care	Friendly	19	8.6
	Neutral	44	19.8
	Hostile	159	71.6

Most participants had been diagnosed with hypertension for more than 4 years (62.6%, n = 139), while 28.8% (n = 64) had lived with the condition for 3–4 years. More than half had comorbid diabetes mellitus (55.4%, n = 123), followed by stroke (21.6%, n = 48), kidney disease (8.1%, n = 18), and rheumatic heart disease (5.9%, n = 13). Regarding BMI, 32.9% (n = 73) were underweight, 31.1% (n = 69) had normal BMI, 22.1% (n = 49) were overweight, and 14.0% (n = 31) were obese. Slightly over half of respondents (52.2%, n = 116) attended scheduled medical check-ups, mostly on a monthly basis (51.7%, n = 60 among those attending). A majority perceived care as somewhat hostile (71.6%, n = 159), while only 8.6% (n = 19) described providers as friendly.

Behavioural Characteristics of Participants

Table 4.3: Behavioural characteristics (n = 222)

Variable	Category	Frequency (n)	Percentage (%)
Physical activity	Yes	10	4.5
	No	212	95.5

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Smoking (past 12 months)	Yes	44	19.8
	No	178	80.2
Processed food intake	Yes	214	96.4
	No	8	3.6
Salt addition after cooking	Yes	218	98.2
	No	4	1.8
Estimated salt intake	High (≥3 tsp/day)	135	60.8
	Low	87	39.2

Almost all participants reported consuming iodized salt (97.3%, n = 216) and adding salt at the table (98.2%, n = 218). Most consumed 3–4 teaspoons of salt daily (60.8%, n = 135). Processed food consumption was very high, with 96.4% (n = 214) consuming processed foods daily. Half reported carbohydrate-based diets (50.5%, n = 112), while 49.1% (n = 109) ate whatever food was available. Physical inactivity was widespread, with 95.5% (n = 212) not engaging in moderate physical activity. Smoking in the last 12 months was reported by 19.8% (n = 44).

Blood Pressure (BP) Monitoring and Treatment Practices

Most participants (82.4%, n = 183) could not recall when their BP was last checked. Only 2.2% (n = 5) had checked BP within the last three months. Almost all participants (97.8%, n = 217) missed at least one clinic appointment, mainly due to forgetting (89.9%, n = 195). None of the participants reported receiving instructions on medication use (100%), and only 9.5% (n = 21) had treatment support reminders. A large proportion (91.9%, n = 204) reported missing medication doses, mainly due to cost (42.6%) and socio-cultural factors (40.2%).

Health System Factors

Table 4.4: Health system-related factors (n = 222)

Variable	**Category**	**Frequency (n)**	**Percentage (%)**
Membership in support group	Yes	40	18.0
	No	182	82.0
Access to provider	Easy	39	17.6
	Difficult	183	82.4
Satisfaction with care	Satisfied	61	27.5
	Not satisfied	161	72.5
Drug availability	Available	71	32.0
	Not available	151	68.0
Health insurance coverage-SHA	Yes	75	33.8

	No	147	66.2
Received BP education	Yes	114	51.3
	No	108	48.7

Most participants were not members of psychosocial support groups (82.0%, n = 182). Only 17.6% (n = 39) could easily access healthcare providers when needed. Satisfaction with services was low, with 72.5% (n = 161) reporting dissatisfaction. Only 32.0% (n = 71) reported availability of prescribed drugs. Health insurance coverage was low at 33.8% (n = 75). Only 51.3% (n = 114) had received education on BP control.

Blood Pressure (BP) Control

Table 4.5: Blood pressure (BP) control status (n = 222)

BP Status	**Frequency (n)**	**Percentage (%)**
Controlled (<140/90 mmHg)	93	42.0
Uncontrolled (≥140/90 mmHg)	129	58.0

Overall, 42.0% (n = 93) of participants had good BP control (<140/90 mmHg), while 58.0% (n = 129) had uncontrolled blood pressure. A marked improvement was observed from admission, where only 17.6% had controlled BP, increasing to 28.0% at the time of data collection. Severe hypertension (Grade 3) reduced from 29.3% to 7.7%.

Bivariate Analysis of Factors Associated with BP Control

Table 4.6: Bivariate logistic regression analysis

Variable	**Category**	**OR**	**95% CI**	**p-value**
Sex	Male vs Female	0.50	0.26–0.95	0.040
Age	<64 vs ≥64	0.60	0.36–1.00	0.050
BMI	<25 vs ≥25	1.90	1.00–3.60	0.050
Baseline BP	Normal vs High	6.10	3.20–11.50	<0.001
Treatment support	Yes vs No	2.60	1.10–5.80	0.030

Bivariate analysis showed that sex, age, BMI, baseline BP status, and treatment support were significantly associated with BP control. Males were less likely to achieve control (OR = 0.5, p = 0.04), Age <64 years was associated with poorer control (OR = 0.6, p = 0.05), BMI <25 was associated with better control (OR = 1.9, p = 0.05), Normal BP at admission strongly predicted control (OR = 6.1, p < 0.001), Treatment support improved BP control (OR = 2.6, p = 0.03)

Multivariate Logistic Regression Analysis

Table 4.7: Multivariate logistic regression analysis of factors associated with BP control (n = 222)

Variable	**Category**	**AOR**	**95% CI**	**p-value**

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Sex	Male vs Female	0.58	0.31–0.96	0.041
Age	<64 vs ≥64 years	0.66	0.38–1.12	0.118
BMI	<25 vs ≥25 kg/m²	1.72	1.05–3.21	0.032
Duration of hypertension	≥4 years vs <4 years	0.63	0.40–0.98	0.045
Comorbid diabetes mellitus	Yes vs No	0.54	0.33–0.89	0.016
Treatment support	Yes vs No	2.41	1.18–4.92	0.015
Medication adherence	Good vs Poor	3.12	1.71–5.68	<0.001
Rural residence	Rural vs Urban	0.69	0.41–0.98	0.044

After adjusting for confounding variables, several factors remained independently associated with BP control. Medication adherence was the strongest predictor of BP control. Patients with good adherence were 3.1 times more likely to have controlled BP compared to those with poor adherence (AOR = 3.12, $p < 0.001$). Treatment support systems significantly improved BP control, with patients receiving reminders or family/peer support being 2.4 times more likely to achieve control (AOR = 2.41, $p = 0.015$). BMI <25 kg/m² remained significantly associated with better BP control (AOR = 1.72, $p = 0.032$), confirming the role of overweight/obesity in poor antihypertensive response. Comorbid diabetes mellitus significantly reduced the likelihood of BP control (AOR = 0.54, $p = 0.016$), reflecting the complexity of multi-morbidity. Longer duration of hypertension (≥4 years) was associated with poorer control (AOR = 0.63, $p = 0.045$), suggesting treatment fatigue and progressive disease complexity. Sex (male) remained a significant predictor of poor control (AOR = 0.58, $p = 0.041$), consistent with lower health-seeking behaviour among men. Rural residence was independently associated with poorer BP control (AOR = 0.69, $p = 0.044$), highlighting access and continuity-of-care challenges. Age lost statistical significance after adjustment ($p = 0.118$), suggesting its effect is mediated through adherence and comorbidities. The multivariate analysis indicates that BP control among hypertensive patients at Kapkatet Sub-County Hospital is significantly associated with both behavioural and health system factors, particularly medication adherence and treatment support. In contrast, most socio-demographic variables were not independently associated with BP control after adjustment. These findings suggest that modifiable factors within patient behaviour and service delivery may play a more important role in determining BP outcomes than demographic characteristics alone. This highlights the importance of strengthening adherence support mechanisms and improving continuity of care within county-level hypertension management programs.

DISCUSSION

This study assessed BP control and associated factors among hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital, Kenya.

Prevalence of Blood Pressure Control

This study found that 42.0% of hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital had controlled BP (<140/90 mmHg), while the majority (58.0%) had uncontrolled hypertension. These findings indicate that BP control remains suboptimal despite participants being enrolled in routine hypertension care, highlighting persistent challenges in achieving recommended treatment targets in rural public health facilities. The observed prevalence is consistent with findings from other studies conducted in Kenya and sub-Saharan Africa, where BP control among treated hypertensive patients generally ranges between 35% and 50%. For example, studies conducted at Kenyatta National Hospital reported control rates of approximately 35–45%, while patients enrolled in the AMPATH chronic disease programme in western Kenya achieved control rates of about 45–50%. Similar findings have been reported in Ethiopia, Uganda, and Ghana, where fewer than half of treated hypertensive patients achieve optimal BP control despite regular clinic attendance. These

similarities suggest that inadequate BP control remains a widespread challenge across many global south countries, reflecting common barriers within chronic disease management systems.

The suboptimal BP control observed in this study is likely multifactorial. Although antihypertensive treatment was available, the study identified widespread medication non-adherence, limited treatment support, poor access to healthcare providers, inadequate availability of prescribed medicines, and a high burden of unhealthy lifestyle behaviours, including excessive dietary salt intake and physical inactivity. These factors collectively reduce the effectiveness of long-term hypertension management and increase the likelihood of persistent uncontrolled BP. Furthermore, the predominance of rural residents in the study population may have compounded these challenges through longer travel distances to health facilities, financial constraints, and reduced continuity of care.From a public health perspective, the findings are concerning because uncontrolled hypertension substantially increases the risk of stroke, myocardial infarction, heart failure, chronic kidney disease, and premature mortality. Improving BP control therefore requires interventions that extend beyond pharmacological treatment alone. Strengthening patient education, improving medication adherence, ensuring uninterrupted availability of antihypertensive medicines, promoting healthy lifestyle modification, and enhancing follow-up through community- and facility-based support systems are likely to improve treatment outcomes. These findings underscore the need for integrated hypertension management strategies within rural primary healthcare settings to accelerate progress toward national and global targets for non-communicable disease control.

Socio-Demographic Factors and Blood Pressure Control

This study demonstrated that socio-demographic characteristics influenced BP control among hypertensive patients, although their effects varied after adjustment for potential confounding factors. Male sex remained an independent predictor of poor BP control, while age was no longer significantly associated after multivariable analysis. Rural residence also emerged as an independent predictor of uncontrolled BP, highlighting the influence of geographical and healthcare access disparities on hypertension outcomes. The finding that male patients were less likely to achieve BP control is consistent with previous studies conducted in Kenya and other sub-Saharan African countries. Studies from Kenyatta National Hospital and the AMPATH chronic disease programme have similarly reported poorer hypertension control among men, largely attributed to delayed health-seeking behaviour, lower adherence to long-term medication, and competing occupational and socioeconomic responsibilities that reduce regular clinic attendance. Comparable findings have also been reported in Ethiopia, Ghana, and Nigeria, suggesting that sex-related differences in health service utilization remain an important determinant of hypertension management across Global south countries. Although younger participants appeared less likely to achieve BP control during bivariate analysis, this association was no longer statistically significant after adjustment for other variables. This finding suggests that the apparent effect of age may be mediated through factors such as medication adherence, duration of hypertension, comorbidities, and treatment support rather than age itself. Similar observations have been reported in longitudinal studies where behavioural and clinical factors explained much of the variation initially attributed to age.

Rural residence remained independently associated with poorer BP control, indicating that patients living in rural communities face additional barriers to effective hypertension management. These barriers may include longer travel distances to health facilities, higher transport costs, limited availability of healthcare providers, inconsistent access to prescribed medicines, and fewer opportunities for continuous health education and follow-up. Similar disparities between rural and urban populations have been documented in several African countries, where geographical inequities contribute to poorer chronic disease outcomes despite comparable treatment recommendations. The findings highlight that while socio-demographic characteristics themselves cannot be modified, they identify population groups that may require targeted interventions. Male patients and individuals residing in rural areas may benefit from differentiated models of care that incorporate flexible clinic schedules, community-based follow-up, family-centred treatment support, and decentralized hypertension services. Such strategies have the potential to improve access to care, enhance treatment adherence, and ultimately increase BP control among populations at greater risk of poor hypertension outcomes.

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Clinical Factors Associated with Blood Pressure Control

The present study demonstrated that several clinical factors significantly influenced BP control among hypertensive patients. After adjustment for potential confounders, body mass index (BMI), duration of hypertension, and the presence of diabetes mellitus remained independent predictors of BP control, whereas the effect of baseline BP status observed during bivariate analysis was no longer statistically significant. These findings underscore the important role of disease characteristics and comorbid conditions in determining long-term hypertension outcomes. Patients with a BMI of less than 25 kg/m² were significantly more likely to achieve BP control than those who were overweight or obese. This finding is consistent with previous studies conducted in Kenya and global south countries, which have identified excess body weight as a major contributor to uncontrolled hypertension (Ng'ambwa et al.,2021). Overweight and obesity increase peripheral vascular resistance, activate the renin angiotensin aldosterone system, and promote sympathetic nervous system activity, thereby reducing the effectiveness of antihypertensive therapy. Similar associations have been reported in the WHO Global Report on Hypertension and other international studies, which recommend weight management as an essential component of comprehensive hypertension care.

The presence of diabetes mellitus was also independently associated with poor BP control. This finding is consistent with evidence from Kenyan outpatient clinics and studies conducted across SSA, where patients with coexisting hypertension and diabetes often experience poorer treatment outcomes than those with hypertension alone. The coexistence of these chronic conditions increases treatment complexity, medication burden, and the likelihood of complications, while also requiring more intensive clinical monitoring and lifestyle modification. These findings emphasize the importance of integrated management of hypertension and diabetes within chronic disease clinics to improve overall cardiovascular outcomes.

Longer duration of hypertension was associated with a lower likelihood of achieving BP control. Patients who had lived with hypertension for four years or more were less likely to attain recommended BP targets than those with a shorter duration of disease. This observation is consistent with previous studies suggesting that prolonged hypertension is associated with progressive vascular changes, increasing therapeutic complexity, treatment fatigue, and declining medication adherence over time. As the duration of illness increases, patients may also develop additional comorbidities that complicate BP management and necessitate more individualized treatment strategies.

Although baseline BP status showed a strong association with BP control during bivariate analysis, it did not remain significant after adjustment for other clinical and behavioural factors. This suggests that the influence of initial BP may be mediated through modifiable factors such as medication adherence, treatment support, and ongoing clinical management rather than representing an independent determinant of long-term BP control. Overall, these findings highlight the need for individualized clinical management of hypertensive patients, particularly those who are overweight or obese, have lived with hypertension for many years, or have coexisting DM. Comprehensive care should include regular assessment of cardiovascular risk, weight management interventions, integrated management of comorbid conditions, and periodic treatment reviews to optimize therapeutic outcomes. Such patient-centred approaches are essential for improving BP control and reducing the long-term burden of hypertension-related complications in rural healthcare settings**.**

Behavioural Factors Associated with Blood Pressure Control

Behavioural factors are fundamental determinants of hypertension management because they directly influence adherence to treatment and long-term blood pressure control. Although lifestyle-related variables such as physical activity, dietary salt intake, smoking, and processed food consumption did not remain statistically significant predictors in the multivariable model, the study revealed a high prevalence of unhealthy behaviours among participants, indicating substantial opportunities for preventive interventions. Medication adherence, however, remained the strongest independent behavioural predictor of BP control. Patients with good medication adherence were more than three times as likely to achieve controlled BP compared with those who had poor adherence. This finding is consistent with evidence from SSA countries demonstrating that adherence to antihypertensive therapy is one of the most important determinants of successful blood pressure management.

Studies conducted in the AMPATH chronic disease programme have similarly reported that poor adherence contributes to persistent uncontrolled hypertension, increased healthcare utilization, and a higher risk of cardiovascular complications. Medication adherence is influenced by multiple factors, including patients' understanding of their condition, affordability and availability of medicines, treatment complexity, perceived benefits of therapy, and family or community support.

Although physical inactivity and high dietary salt intake were not independently associated with BP control after adjustment, their high prevalence among study participants remains clinically important. Nearly all participants reported inadequate physical activity, while excessive salt consumption and frequent intake of processed foods were common. These behaviours are well-established modifiable risk factors for hypertension and are strongly associated with poor cardiovascular outcomes. The lack of statistical significance in the multivariable model may reflect the relatively homogeneous distribution of these behaviours within the study population, limiting their ability to distinguish between patients with controlled and uncontrolled BP.

Similarly, smoking was reported by a smaller proportion of participants and was not significantly associated with BP control. Nevertheless, tobacco use remains an important cardiovascular risk factor and may accelerate vascular damage among individuals with hypertension. Smoking cessation should therefore continue to form part of comprehensive cardiovascular risk reduction strategies even where it is not identified as an independent predictor of BP control. The behavioural profile observed in this study suggests that hypertension management should extend beyond pharmacological treatment to include sustained lifestyle modification interventions. Routine counselling on medication adherence, healthy dietary practices, salt reduction, regular physical activity, weight management, and smoking cessation should be integrated into outpatient hypertension services. In addition, patient-centred approaches such as motivational counselling, family engagement, peer support groups, and mobile phone reminders may strengthen self-management and improve long-term adherence to treatment. Addressing these modifiable behavioural factors is essential for achieving sustained improvements in BP control and reducing the burden of hypertension-related complications.

Health System Factors Associated with Blood Pressure Control

The present study demonstrated that health system factors play a critical role in determining BP control among hypertensive patients. After adjustment for potential confounding variables, treatment support remained an independent predictor of BP control, while other health system factors including access to healthcare providers, availability of antihypertensive medicines, health insurance coverage, patient satisfaction, and receipt of BP education, did not retain statistical significance in the multivariable model. Nevertheless, the descriptive findings indicate substantial deficiencies in healthcare delivery that may indirectly influence long-term hypertension management.

Patients who received treatment support were more than twice as likely to achieve controlled BP compared with those who lacked such support. This finding is consistent with evidence from chronic disease management programmes demonstrating that family involvement, peer support, reminder systems, and community-based follow-up improve medication adherence and continuity of care. Similar findings have been reported in sub-Saharan African countries, where structured treatment support interventions have been associated with improved adherence, better clinic attendance, and higher rates of BP control. These findings reinforce the importance of patient-centred care models that extend beyond routine clinical consultations to include psychosocial and community support mechanisms.

Although access to healthcare providers, drug availability, patient satisfaction, and health insurance coverage were not independently associated with BP control, the high proportion of participants reporting difficulties in accessing healthcare providers, frequent medication stock-outs, dissatisfaction with services, and lack of health insurance highlights important systemic barriers to effective hypertension management. These challenges may contribute to missed clinic appointments, interruptions in treatment, and reduced adherence, ultimately compromising long-term BP control. Similar health system constraints have been documented in public healthcare facilities across, where shortages of essential medicines, workforce limitations, and financial barriers continue to affect the quality of chronic disease care.

Approximately half of the participants reported receiving education on BP control, suggesting missed opportunities for strengthening patient knowledge and self-management. Effective patient education has been shown to improve medication adherence, encourage healthy lifestyle behaviours, and enhance recognition of hypertension-related complications. The absence of a significant statistical association in this study should therefore not diminish the importance of structured health education as a key component of comprehensive hypertension management. Overall, these findings suggest that improving BP control requires strengthening health system capacity alongside individual patient interventions. Ensuring a reliable supply of essential antihypertensive medicines, improving access to healthcare providers, expanding treatment support programmes, enhancing patient education, and strengthening continuity of care through community-based follow-up and digital reminder systems may substantially improve hypertension outcomes. Investment in these health system interventions is particularly important in rural areas, where healthcare access and resource limitations continue to impede effective long-term management of hypertension.

Strengths and Limitations

This study has several strengths that enhance the credibility and applicability of its findings. First, it examined BP control using both interviewer-administered questionnaires and medical record review, thereby providing comprehensive information on socio-demographic, clinical, behavioural, and health system factors associated with hypertension management. Second, BP measurements were obtained using calibrated digital sphygmomanometers following standardized measurement procedures, with two readings averaged for each participant to improve measurement reliability. Third, the study employed multivariable logistic regression to adjust for potential confounding factors and identify independent predictors of BP control, thereby strengthening the validity of the reported associations. Furthermore, the use of a pretested data collection instrument, standardized training of research assistants, and routine quality assurance procedures enhanced the consistency and reliability of data collection.

Despite these strengths, several limitations should be considered when interpreting the findings. The cross-sectional study design precludes the establishment of temporal or causal relationships between the identified factors and BP control. Consequently, the observed associations should not be interpreted as evidence of causality. The study was conducted in a single public sub-county hospital, which may limit the generalizability of the findings to other healthcare settings, particularly tertiary referral hospitals or private health facilities. In addition, several behavioural variables, including medication adherence, dietary practices, physical activity, and smoking status, were based on self-reports by patients and may therefore be subject to recall and social desirability bias. Although multivariable analysis was performed to control for measured confounders, residual confounding from unmeasured factors such as health literacy, psychological wellbeing, household socioeconomic status, distance to health facilities, pharmacy refill patterns, and medication stock-out frequency cannot be excluded.

Future research should consider prospective cohort and longitudinal study designs involving multiple health facilities to better evaluate changes in BP control over time and establish temporal relationships between patient behaviours, health system factors, and treatment outcomes.

Implications for Practice

The findings of this study have important implications for clinical practice, health service delivery, and public health policy. The low prevalence of BP control observed among hypertensive patients highlights the need to strengthen comprehensive hypertension management within primary and secondary healthcare facilities. Since medication adherence and treatment support emerged as the strongest independent predictors of BP control, interventions aimed at improving adherence should become a routine component of outpatient hypertension care. Healthcare providers should implement structured patient education, individualized adherence counselling, medication reminders, and family-centred support strategies to promote long-term treatment adherence and self-management. The findings also emphasize the need to strengthen lifestyle modification programmes within routine hypertension services. Regular counselling on dietary salt reduction, healthy nutrition, weight management, physical activity, smoking cessation, and alcohol reduction should be integrated into every clinic

visit. Such interventions should be reinforced through culturally appropriate health education materials and community-based health promotion initiatives to improve knowledge, motivation, and self-efficacy of patients in managing hypertension. At the health system level, improving access to essential antihypertensive medicines and ensuring uninterrupted drug availability should remain a priority. Strengthening pharmaceutical supply chain management, improving clinic appointment systems, expanding health insurance coverage, and enhancing continuity of care through community health workers and digital follow-up systems may substantially improve treatment adherence and blood pressure control. In addition, establishing community-based hypertension support groups and integrating hypertension services within existing chronic disease programmes could provide sustained psychosocial support and improve long-term retention in care. From a policy perspective, the findings support continued implementation of the Kenya National Strategy for the Prevention and Control of Non-Communicable Diseases and align with the World Health Organization's HEARTS technical package for cardiovascular disease prevention in primary healthcare. County governments and health facility managers should prioritize investment in hypertension screening, patient education, workforce capacity building, and routine monitoring of blood pressure control indicators as part of quality improvement initiatives. Incorporating standardized hypertension management protocols and electronic patient monitoring systems into routine clinical practice may further strengthen continuity of care and facilitate timely identification of patients requiring intensified management. Finally, the study provides important baseline evidence for future research and intervention development in rural Kenya. Future studies should evaluate the effectiveness of nurse-led interventions, community-based adherence support programmes, digital health technologies, and differentiated models of care in improving long-term blood pressure control.

CONCLUSION

This study found that BP control among hypertensive patients attending the Medical Outpatient Clinic at Kapkatet Sub-County Hospital was suboptimal, with fewer than half of the participants achieving the recommended BP target of <140/90 mmHg. The findings indicate that uncontrolled hypertension remains a significant public health concern in this rural healthcare setting despite the availability of antihypertensive treatment. Medication adherence and treatment support were the strongest independent predictors of BP control, while normal body mass index was associated with improved BP outcomes. Conversely, the presence of DM, longer duration of hypertension, male sex, and rural residence were associated with a reduced likelihood of achieving BP control. These findings demonstrate that BP control is influenced by a complex interplay of behavioural, clinical, socio-demographic, and health system factors. The study underscores the need for comprehensive, patient-centred hypertension management strategies that extend beyond pharmacological treatment. Strengthening medication adherence, enhancing treatment support systems, promoting healthy lifestyle practices, improving continuity of care, and ensuring consistent availability of essential antihypertensive medicines are critical to improving BP control and reducing the burden of hypertension-related complications.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are proposed to improve BP control among hypertensive patients attending Kapkatet Sub-County Hospital and similar primary healthcare facilities in the Lake Region, Kenya.

Recommendations for Clinical Practice

Healthcare providers should strengthen patient-centred hypertension management by implementing structured medication adherence counselling during every clinic visit. Patients should receive individualized education on the importance of lifelong treatment, lifestyle modification, and regular BP monitoring. Special attention should be given to patients with DM, those with longer duration of hypertension, overweight or obesity, and male patients, who were identified as being at greater risk of uncontrolled BP. Treatment support systems should be strengthened by encouraging family involvement, peer-support groups, appointment reminders, and follow-up telephone calls and short message service (SMS) reminders to improve medication adherence and continuity of care.

Recommendations for Health Facility Management

Kapkatet Sub-County Hospital and similar county health facilities should strengthen the availability of essential antihypertensive medicines through improved forecasting, procurement, and stock monitoring to minimize drug stock-outs. Routine blood pressure measurement protocols should continue to be implemented using calibrated equipment and standardized procedures. The hospital should establish a structured hypertension follow-up programme that includes patient registers, appointment tracking systems, and regular monitoring of blood pressure control indicators to facilitate early identification of poorly controlled patients requiring intensified management.

Recommendations for County and National Health Policy

The Kericho County Department of Health and the Ministry of Health should strengthen primary healthcare services for hypertension by expanding community-based screening programmes, promoting healthy lifestyles, and integrating hypertension management into existing non-communicable disease programmes. Policies that improve access to affordable antihypertensive medicines and expand health insurance coverage should be strengthened to reduce financial barriers to treatment adherence, particularly among rural populations.

Recommendations for Community Health Promotion

Community health promoters should intensify health education on hypertension prevention and control through household visits, community forums, churches, and local gatherings. Education should emphasize salt reduction, healthy dietary practices, regular physical activity, smoking cessation, weight management, and adherence to prescribed medications. Community-based support groups should also be promoted to enhance self-management and peer support among patients living with hypertension.

Recommendations for Future Research

Future studies should employ prospective cohort and longitudinal study designs to better establish relationships between medication adherence, health system factors, and BP control. Multi-centre studies involving larger and more representative populations across different counties are recommended to improve generalizability. Researchers should also incorporate objective measures of medication adherence, such as pharmacy refill records or pill counts, together with health system indicators including medicine stock-out frequency, healthcare accessibility, and facility readiness. Mixed-methods studies incorporating qualitative interviews with patients and healthcare providers would provide deeper insights into contextual barriers and facilitators of effective hypertension management in rural Kenya.

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APPENDICES

Appendix I: Participant Information Sheet

Study Title: Prevalence and Determinants of Blood Pressure Control among Hypertensive Patients at Kapkatet Sub-County Hospital, Kenya

Principal Investigator: Thomas Ong'ondo Ng'ambwa

Introduction- You are being invited to participate in a research study being conducted among hypertensive patients attending the Medical Outpatient Clinic (MOPC) at Kapkatet Sub-County Hospital. Before deciding whether to participate, it is important that you understand why the study is being conducted and what your participation will involve.

Purpose of the Study- The purpose of this study is to determine the prevalence of blood pressure control and identify factors associated with blood pressure control among hypertensive patients attending Kapkatet Sub-County Hospital.

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Why Have I Been Selected? You have been selected because you are an adult patient diagnosed with hypertension and attending the Medical Outpatient Clinic for follow-up care.

Study Procedures-If you agree to participate, you will be asked to: Answer questions regarding your demographic characteristics, lifestyle practices, treatment practices, and medical history; Allow the researcher to review relevant information from your medical records; Have your blood pressure measured according to standard procedures.

The interview will take approximately 15–20 minutes.

Benefits of Participation. Although there may be no direct financial benefit to you, the information obtained from this study may contribute to improving hypertension management and healthcare services for patients in the future.

Risks and Discomforts. There are no anticipated physical risks associated with participation. Some questions may make you uncomfortable; however, you may decline to answer any question you do not wish to answer.

Confidentiality. All information collected will be kept strictly confidential. Your name will not appear on any questionnaire or report. Data will be coded and stored securely, and only the research team will have access to the information.

Voluntary Participation. Your participation is entirely voluntary. You are free to refuse participation or withdraw from the study at any time without affecting the healthcare services you receive.

Contacts for Further Information

Principal Investigator:

Thomas Ong'ondo Ng'ambwa Telephone: _____ Email: _____

For questions regarding your rights as a research participant, contact:

Chairperson, Institutional Research Ethics Committee,

University of Kabianga Telephone: _____

Thank you for considering participation in this study.

Appendix Ii: Informed Consent Form

Study Title: Prevalence and Determinants of Blood Pressure Control among Hypertensive Patients at Kapkatet Sub-County Hospital, Kenya

Participant Statement- I have read and understood the information provided regarding this study. The purpose, procedures, potential benefits, and risks of participation have been explained to me.

I understand that: My participation is voluntary, I may withdraw from the study at any time without affecting my treatment or healthcare services, the information I provide will be kept confidential, no identifying information will appear in any report arising from this study, I have been given an opportunity to ask questions and all my questions have been answered satisfactorily.

By signing below, I freely agree to participate in this study.

Participant Name: _____Participant Signature/Thumbprint: _____

Date: _____

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Researcher's Statement

I have explained the purpose, procedures, risks, and benefits of this study to the participant and believe that the participant understands what is involved and has voluntarily agreed to participate.

Researcher's Name: _____Researcher's Signature: _____

Date: _____

Witness (if participant is unable to read or write)

Witness Name: _____Witness Signature: _____

Date: _____

Appendix III: Data Collection Questionnaire

Study Title- Prevalence and Determinants of Blood Pressure Control Among Hypertensive Patients at Kapkatet Sub-County Hospital, Kenya. Questionnaire Number _____ Date _____

Section A: Socio-Demographic Characteristics

1. Age (years) _____

2. Sex 1. Male 2. Female

3. Marital Status 1. Single 2. Married 3. Separated 4. Widowed

4. Religion 1. Christian 2. Muslim 3. Other

5. Residence 1. Rural 2. Urban

6. Level of Education 1. No formal education 2. Primary 3. Secondary 4. Diploma/College 5. University

7. Occupation 1. Employed 2. Self-employed 3. Farmer 4. Unemployed 5. Retired 6. Other

8. Monthly Income 1. Below KSh 11,000 2. KSh 11,000–20,000 3. Above KSh 20,000

9. Who do you live with? 1. Alone2. Family members3. Friends/relatives

10. Have you lost a family member due to hypertension-related complications? 1. Yes 2. No

Section B: Clinical Characteristics

11. Duration since hypertension diagnosis 1. Less than 4 years 2. 4 years or more

12. Duration on antihypertensive treatment 1. Less than 4 years 2. 4 years or more

13. Comorbid conditions (tick all that apply) 1. Diabetes mellitus 2. Stroke 3. Kidney disease 4. Rheumatic heart disease 5. Other: _____6. None

14. Weight (kg)_____

15. Height (m) _____

16. BMI category (calculated by researcher) 1. Underweight (<18.5) 2. Normal (18.5–24.9) 3. Overweight (25.0–29.9) 4. Obese (≥30.0)

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17. Do you attend scheduled medical check-ups? 1. Yes 2. No

18. If yes, how often? 1. Monthly 2. Every 2–3 months 3. Less frequently

19. How would you describe the attitude of HCPs? 1. Friendly 2. Neutral 3. Hostile

Section C: Behavioural Characteristics

20. Do you engage in moderate physical activity for at least 30 ms on most days? 1.Yes 2. No

21. Have you smoked cigarettes in the last 12 months? 1. Yes 2. No

22. Do you consume processed foods (e.g., sausages, crisps, packaged snacks)? 1. Yes 2. No

23. Do you add salt to food after cooking? 1. Yes 2. No

24. How much salt do you consume per day? 1. Less than 3 teaspoons2. 3 teaspoons or more

25. How many servings of fruits & vegetables do you consume daily? 1. Less than 5 servings 2. 5 or more servings

Section D: Bp Monitoring & Treatment Practices

26. When was your blood pressure last checked? 1. Within the last 3 months 2. More than 3 months ago 3. Cannot remember

27. Have you ever missed a clinic appointment for hypertension care? 1. Yes 2. No

28. If yes, what was the main reason? 1. Forgot 2. Transport problems 3. Work commitments 4. Financial constraints 5. Other

29. Have you ever received instructions on how to take your BP medication? 1. Yes 2. No

30. Do you have any treatment support (family reminders, phone reminders, peer support)? 1. Yes 2. No

31. Have you missed taking your hypertension medication in the last month? 1. Yes 2. No

32. If yes, what was the main reason? 1. Cost of medication 2. Forgot 3. Side effects 4. Socio-cultural beliefs 5. Other

33. Overall medication adherence (researcher classification) 1. Good adherence 2. Poor adherence

Section E: Health System Factors

34. Are you a member of a hypertension/diabetes support group? 1. Yes 2. No

35. How easy is it to access a healthcare provider when needed? 1. Easy 2. Difficult

36. Are you satisfied with the BP services provided at this facility? 1. Satisfied 2. Not satisfied

37. Are prescribed BP drugs usually available when you visit the clinic? 1. Yes 2. No

38. Do you have active health insurance coverage (e.g., SHA)? 1. Yes 2. No

39. Have you received education on BP control from a healthcare provider? 1. Yes 2. No

Section F: Bp Measurements (To Be Completed by The Researcher)

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40. Systolic Blood Pressure (mmHg)_____

41. Diastolic Blood Pressure (mmHg) _____

42. Current BP Status 1. Controlled (<140/90 mmHg) 2. Uncontrolled (≥140/90 mmHg)

43. Baseline/Admission BP Status (from medical record) 1. Controlled 2. Uncontrolled

END-THANK YOU