

Patients' and Health Care Workers' Perspectives on Barriers to Hypertension Care in a Pastoralist Setting: Mandera West Sub-County, Kenya

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Abstract

Hypertension affects about one in four Kenyan adults, yet only 15.5% of those affected are aware of their status. No measured prevalence estimate exists for Mandera County, where pastoral mobility, 77% absolute poverty and sparse health services are likely to compound underdetection, while evidence from transitioning pastoralist populations shows that their historically low cardiovascular risk is rising. This study compared patients' and health care workers' (HCWs) perceptions of socioeconomic, cultural, health-system and geographic barriers to hypertension care in Mandera West Sub-County, Kenya. A comparative cross-sectional survey was conducted from June to August 2026 among 100 patients aged 35–68 years with a clinician-confirmed diagnosis of hypertension, randomly sampled from facility hypertension registers and interviewed at hypertension clinics, and 100 HCWs selected by stratified total enumeration. Structured questionnaire data were analysed in SPSS version 27 using descriptive statistics and Pearson's chi-square tests ($\alpha = .05$). Most patients were aged 45–64 years (68%), female (61%), pastoralists (44%) and had Madrassa-only education (45%). Lack of health insurance (90%), treatment costs (78%), poor roads (74%) and distance (58%) were the leading barriers reported by patients, whereas cultural beliefs (8%), herbal medicine (8%) and stigma (18%) were minor. Patients and HCWs agreed on geographic, cultural, staffing and screening barriers ($p > .05$) but diverged significantly on cost of care (78% vs. 56%; $\chi^2 = 10.95$, $p < .001$) and medication availability (37% vs. 20% reporting that drugs were rarely available; $\chi^2 = 7.12$, $p = .028$). Barriers to hypertension care in Mandera West are predominantly structural rather than cultural, and providers underestimate the financial and supply burden borne by patients. The county should fund Social Health Authority (SHA) premiums for indigent patients, adopt multi-month dispensing backed by buffer stocks of essential antihypertensives, and equip community health promoters to screen and refill medication along migration routes.

Keywords: *Hypertension care, barriers, pastoralists, health care workers, Mandera*

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1.0 Introduction

Hypertension affects an estimated 1.3 billion adults aged 30–79 years worldwide, most of whom live in low- and middle-income countries, and only about one in five of them has the condition under control (World Health Organization [WHO], 2023). In a pooled analysis of 44 low- and middle-income countries, sub-Saharan Africa (SSA) recorded the largest losses along the care cascade from diagnosis to control (1). Surveys in rural and urban communities of four SSA countries documented a high prevalence of hypertension with low treatment coverage (Hendriks et al., 2012), and a systematic review attributed poor control to interacting patient, provider, and health-system barriers such as cost, medication access and distance (Elnaem et al., 2022).

In Kenya, the 2015 national STEPwise survey measured a hypertension prevalence of 24.5% among adults aged 18–69 years; only 15.5% of those affected were aware of their status and 26.9% of those aware were on treatment (Mohamed et al., 2018). A secondary analysis of the same survey estimated prevalence at 28.6%, rising from 17.7% at 18–29 years to 58.3% at 60–69 years (Pengpid & Peltzer, 2020). In a 2025 multi-facility study that included Garissa County Referral Hospital in north-eastern Kenya, 29.4% of clients had hypertension and 48.5% of these were unaware of it (Shah et al., 2025). However, neither the STEPwise survey nor the 2022 Kenya Demographic and Health Survey (KDHS), which recorded only self-reported diagnoses (9% of women and 3% of men aged 15–49 years), provides county-level estimates (Kenya National Bureau of Statistics [KNBS] & ICF, 2023). The burden of hypertension in Mandera County is therefore undocumented rather than known to be low. In Somalia, whose population shares language, culture, and livelihood with Mandera, only 2.1% of adults reported a hypertension diagnosis in the 2020 national survey (Farih et al., 2024), a figure far below measured prevalence elsewhere in the region and more consistent with under-diagnosis than with low risk.

Traditional mobile pastoralism, with high physical activity and a milk-based diet, has historically been associated with low blood pressure, but this protection is eroding. Among the Turkana of northern Kenya, sedentarisation, urban residence and market integration were associated with markedly higher blood pressure and other cardiometabolic risks (Lea et al., 2020), and a survey of pastoralists in Monduli, Tanzania found a hypertension prevalence of 26%, driven by overweight, sedentary time and fatty diets (Khamis et al., 2020). In neighbouring Garissa County, hypertensive adults had significantly higher body mass index and lower health knowledge than normotensive peers (Osman et al., 2024), and in Wajir North Sub-County, community programmes for hypertension and diabetes were constrained by distance, medicine stock-outs and out-of-pocket costs (Hefow et al., 2025).

“Hypertension care in Mandera West Sub-County is constrained mainly by structural barriers: lack of insurance, treatment costs, unreliable medication supply, faulty screening equipment, distance and poor roads”

Mandera County is among the most marginalised counties in Kenya. About 77% of residents live in absolute poverty, and although devolution expanded the number of health facilities from 34 to 112 (Cannon & Ali, 2018; County Government of Mandera, 2023), these facilities serve a vast area with poor roads. By November 2024, only 3.4% of the county’s population had registered with the new Social Health Authority (SHA), one of the lowest rates in the country (Kinyanjui, 2024). In rural Coastal Kenya, comparable conditions

produced costly travel, recurrent stock-outs and interrupted care for hypertensive patients (Oyando et al., 2025). Although such barriers are recognised in general terms, it is not known whether patients and the health care workers (HCWs) who plan and deliver services perceive them in the same way. A mismatch would mean that services are designed around providers' assumptions rather than patients' constraints.

This study therefore compared patients' and HCWs' perceptions of socioeconomic, cultural, health-system and geographic barriers to hypertension care in Mandera West Sub-County.

2.0 Materials and Methods

Study Design and Setting

A comparative cross-sectional design using quantitative methods was employed from June to August 2026 in Mandera West Sub-County, Mandera County, in north-eastern Kenya on the borders with Ethiopia and Somalia. The sub-county is arid and sparsely populated, its residents are predominantly Somali pastoralist and agro-pastoralist households, and its health facilities are separated by long distances over largely unpaved roads.

Study Population and Case Definition

Two groups were studied. The first comprised patients aged 35 years or older with a diagnosis of hypertension recorded in the hypertension register or patient file of a public or private health facility in the sub-county and who were on follow-up at that facility. The study did not diagnose hypertension: because a diagnosis requires elevated readings on repeated occasions rather than a single measurement, only patients whose diagnosis had already been confirmed by a clinician and documented in facility records were eligible. Blood pressure was therefore not measured for study purposes, as the outcome of interest was perceived barriers to care rather than prevalence or control. The second group comprised HCWs (medical officers, clinical officers, nurses, pharmaceutical technologists, allied health

professionals and health care assistants) working in facilities that provide hypertension services.

Sample Size, Sampling and Recruitment

The study enrolled 200 participants. One hundred patients were selected by simple random sampling from the hypertension registers of participating facilities. Selected patients were approached at the facility hypertension (non-communicable disease) clinic on their scheduled clinic day and interviewed in a private area after their consultation. One hundred HCWs were selected through total enumeration of eligible staff after stratification by facility and were interviewed at their workstations.

Data Collection

Structured questionnaires aligned to the study objectives were used. The patient questionnaire covered (i) sociodemographic characteristics (age, gender, education and occupation); (ii) socioeconomic and cultural barriers (treatment cost, insurance coverage, cultural beliefs, stigma, herbal medicine and misinformation); (iii) health-system barriers (staff shortages, medication availability, screening and treatment services, and missed appointments); and (iv) geographic barriers (distance to the facility and road conditions). The HCW questionnaire contained parallel items so that responses could be compared directly, together with the cadre of the respondent and suggestions for improving services. Questionnaires were self-administered; trained research assistants administered them to participants who could not complete them unaided because of limited literacy.

Data Analysis

Responses were entered into Microsoft Excel, cleaned and imported into SPSS version 27. Categorical variables were summarised using frequencies and percentages. Pearson's chi-square (χ^2) test of independence, without continuity correction, was used to compare patients' and HCWs' responses on each barrier;

all expected cell frequencies were five or more. Statistical significance was set at $\alpha = .05$.

Ethical Considerations

Ethical approval was granted by the Kenya Methodist University Institutional Scientific and Ethics Review Committee (KeMU/ISERC/PHT/04/2026), and a research licence was issued by the National Commission for Science, Technology and Innovation (NACOSTI/P/26/4186391). Permission to conduct the study was granted by the County Government of Mandera, Department of Health. Participation was voluntary; written or oral informed consent was obtained from every participant, and responses were anonymised.

3.0 Results and Discussion

Sociodemographic Characteristics of Patients

Table 1 presents the characteristics of the 100 patients. Most were aged 45–64 years (68.0%), female (61.0%), pastoralists (44.0%) and had Madrassa-only education (45.0%).

Table 1

Sociodemographic Characteristics of Patients With Hypertension (n = 100)

Characteristic	n (%)
Age (years)	
35–44	23 (23.0)
45–64	68 (68.0)
≥65	9 (9.0)
Gender	
Male	39 (39.0)
Female	61 (61.0)
Occupation	
Pastoralist	44 (44.0)
Housewife	24 (24.0)
Business	22 (22.0)
Transport	6 (6.0)
Teacher	4 (4.0)
Education level	
Madrassa only	45 (45.0)
Primary	25 (25.0)
Secondary	18 (18.0)
College	12 (12.0)

Because only patients already diagnosed and attending clinics were sampled, these proportions describe the population in care and not the prevalence of hypertension by age, sex or education. The concentration in the 45–64-year group is consistent with the steep age gradient reported nationally (Pengpid & Peltzer, 2020), while the small share aged 65 years and above may reflect the young age structure and lower life expectancy of the region. The predominance of women contrasts with the higher prevalence among men reported in pastoralist Tanzania (Khamis et al., 2020) and more plausibly reflects greater clinic attendance by women, whose work is home-based, than by men who move with livestock; hypertensive men may therefore be underrepresented in care. That 44% of patients were pastoralists shows that hypertension is already established in pastoral households and is not confined to urban residents, in line with

evidence from the Turkana (Lea et al., 2020). The large share with Madrassa-only education implies that written health education materials may not reach many patients, a concern reinforced by the association between low health knowledge and cardiovascular risk in Garissa (Osman et al., 2024).

Barriers Reported by Patients

Table 2 shows that financial and geographic barriers dominated. Lack of health insurance (90.0%) and treatment costs (78.0%) were the most frequently reported, followed by poor road conditionss (74.0%) and distance (58.0%). More than one-third of patients (37.0%) reported that medication was rarely available, 49.0% that screening and treatment services were not available when needed and 38.0% that staff were in short supply. Cultural beliefs (8.0%), herbal medicine (8.0%), misinformation (10.0%) and stigma (18.0%) were reported by small minorities.

Table 2

Barriers to Hypertension Care Reported by Patients (n = 100)

Barrier	Response	n (%)
Socioeconomic and cultural		
Treatment costs	Yes / No	78 (78.0) / 22 (22.0)
Lack of insurance coverage	Yes / No	90 (90.0) / 10 (10.0)
Cultural beliefs	Yes / No	8 (8.0) / 92 (92.0)
Stigma	Yes / No	18 (18.0) / 82 (82.0)
Herbal medicine	Yes / No	8 (8.0) / 92 (92.0)
Misinformation	Yes / No	10 (10.0) / 90 (90.0)
Health system		
Staff shortages	Yes / No	38 (38.0) / 62 (62.0)
Medication available	Always	33 (33.0)
	Sometimes	30 (30.0)
	Rarely	37 (37.0)
Screening and treatment services available	Yes / No	51 (51.0) / 49 (49.0)
Missed appointments	Always	2 (2.0)
	Sometimes	16 (16.0)
	Never	82 (82.0)
Geographic		
Poor road conditions	Yes / No	74 (74.0) / 26 (26.0)
Distance to facility	Yes / No	58 (58.0) / 42 (42.0)

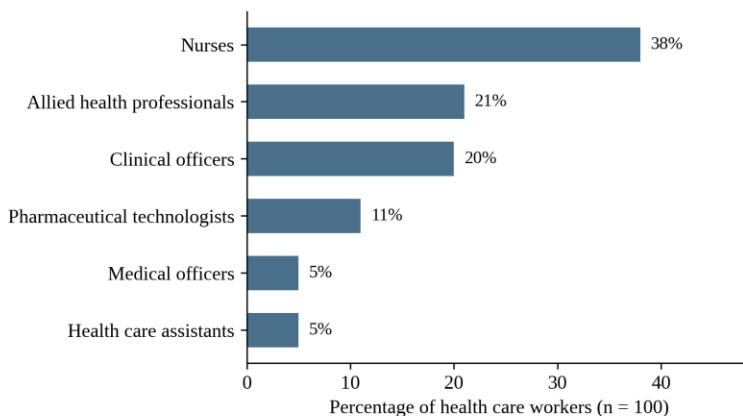
Characteristics of Health Care Workers and Barriers They Reported

(21%) and clinical officers (20%); medical officers accounted for only 5% (Figure 1).

Nurses formed the largest cadre of HCWs (38%), followed by allied health professionals

Figure 1

Cadres of Health Care Workers Interviewed (n = 100)



As shown in Table 3, most HCWs identified poor road conditions (70.0%) and distance (62.0%) as barriers, and 62.0% reported that blood pressure machines and other screening equipment were faulty or unavailable. Just over half (56.0%) considered cost a barrier, 26.0%

reported staff shortages and 17.0% cited cultural beliefs. Only 20.0% said antihypertensive drugs were rarely available, and 80.0% estimated that patients rarely defaulted on treatment

Table 3

Barriers to Hypertension Care Reported by Health Care Workers (n = 100)

Barrier	Response	n (%)
Socioeconomic and cultural		
Cost of care	Yes / No	56 (56.0) / 44 (44.0)
Cultural beliefs	Yes / No	17 (17.0) / 83 (83.0)
Health system		
Staff shortages	Yes / No	26 (26.0) / 74 (74.0)
Medication available	Always	43 (43.0)
	Sometimes	37 (37.0)
	Rarely	20 (20.0)
Patients default on medication	Always	8 (8.0)
	Sometimes	12 (12.0)
	Rarely	80 (80.0)
Screening equipment available and functional	Yes / No	38 (38.0) / 62 (62.0)
Geographic		
Distance to facility	Yes / No	62 (62.0) / 38 (38.0)
Poor road conditions	Yes / No	70 (70.0) / 30 (30.0)

Comparison of Patient and Health Care Worker Perceptions of care and medication availability, and agreed on all others.

Table 4 compares the two groups. They differed significantly on only two barriers, cost

Table 4

Comparison of Patient and Health Care Worker Perceptions of Barriers to Hypertension Care

Barrier	Patients n (%)	HCWs n (%)	Total n (%)	χ^2 (df)	p
Cost of care				10.95 (1)	< .001
Yes	78 (78.0)	56 (56.0)	134 (67.0)		
No	22 (22.0)	44 (44.0)	66 (33.0)		
Cultural beliefs				3.70 (1)	.054
Yes	8 (8.0)	17 (17.0)	25 (12.5)		
No	92 (92.0)	83 (83.0)	175 (87.5)		
Staff shortages				3.31 (1)	.069
Yes	38 (38.0)	26 (26.0)	64 (32.0)		
No	62 (62.0)	74 (74.0)	136 (68.0)		
Screening and treatment available				3.42 (1)	.064
Yes	51 (51.0)	38 (38.0)	89 (44.5)		
No	49 (49.0)	62 (62.0)	111 (55.5)		
Medication available				7.12 (2)	.028
Always	33 (33.0)	43 (43.0)	76 (38.0)		
Sometimes	30 (30.0)	37 (37.0)	67 (33.5)		
Rarely	37 (37.0)	20 (20.0)	57 (28.5)		
Missed treatment or appointments				4.20 (2)	.123
Always	2 (2.0)	8 (8.0)	10 (5.0)		
Sometimes	16 (16.0)	12 (12.0)	28 (14.0)		
Never/rarely	82 (82.0)	80 (80.0)	162 (81.0)		
Distance to facility				0.33 (1)	.564
Yes	58 (58.0)	62 (62.0)	120 (60.0)		
No	42 (42.0)	38 (38.0)	80 (40.0)		

Barrier	Patients n (%)	HCWs n (%)	Total n (%)	χ^2 (df)	p
Poor road conditions				0.40 (1)	.529
Yes	74 (74.0)	70 (70.0)	144 (72.0)		
No	26 (26.0)	30 (30.0)	56 (28.0)		

Note. HCWs = health care workers. Pearson's chi-square test without continuity correction; all expected cell frequencies ≥ 5 .

Cost of Care and Health Insurance

Cost was the clearest point of disagreement: 78.0% of patients but only 56.0% of HCWs regarded it as a barrier ($\chi^2 = 10.95$, $df = 1$, $p < .001$). This suggests that providers may underestimate the financial burden of a lifelong condition in a county where most households live in absolute poverty (County Government of Mandera, 2023). Cost interacts with supply: when public stocks run out, patients must buy drugs privately or go without, as reported for rural Coastal Kenya (Oyando et al., 2025) and Wajir North (Hefow et al., 2025). The 90.0% of patients who cited lack of insurance mirrors the county's SHA registration rate of 3.4% (Kinyanjui, 2024). For a pastoral household with irregular cash income, the minimum SHA contribution of KES 300 (about US\$2.30 at KES 129 per US dollar) per month competes with food and livestock needs, so the scheme has not yet removed financial barriers for this population.

Medication Availability

Patients were almost twice as likely as HCWs to report that antihypertensives were rarely available (37.0% vs. 20.0%; $\chi^2 = 7.12$, $df = 2$, $p = .028$). HCWs may judge availability from the facility store, whereas patients experience it as whether they leave the clinic with a full supply; a partial or delayed supply may be counted as available by the former but not by the latter. Stock-outs are a recognised driver of poor control in low- and middle-income countries (Geldsetzer et al., 2019; WHO, 2023) and may lead patients to ration or discontinue treatment (Mutua et al., 2023). Strengthening primary health care supply systems is therefore central to control (Haque et al., 2020).

Staffing and Screening Services

Patients and HCWs agreed on staffing (38.0% vs. 26.0%; $\chi^2 = 3.31$, $p = .069$) and on the availability of screening and treatment services (51.0% vs. 38.0% available; $\chi^2 = 3.42$, $p = .064$). Staff shortages were reported by a minority in both groups, yet 80% of HCWs recommended more staffing (Figure 2), suggesting that the problem is the mix and distribution of cadres rather than the headcount: medical officers accounted for only 5% of respondents. The finding that 62.0% of HCWs reported faulty or unavailable screening equipment is more concerning, because without functioning blood pressure machines new cases cannot be detected and treated patients cannot be monitored. Task sharing with non-physician workers has been modelled as a feasible way to meet hypertension workforce needs in rural Kenya (Vedanthan et al., 2019).

Geographic Barriers

Both groups identified distance (58.0% vs. 62.0%; $\chi^2 = 0.33$, $p = .564$) and poor roads (74.0% vs. 70.0%; $\chi^2 = 0.40$, $p = .529$) as barriers, making these the barriers on which consensus was strongest. Distance and travel costs have been reported as major constraints on continuity of hypertension care in rural Kenya (Hefow et al., 2025; Oyando et al., 2025). For mobile households, distance also changes with the season as they move in search of pasture, which fixed-site clinic schedules may not accommodate.

Cultural Beliefs, Stigma and Herbal Medicine

Contrary to the common assumption that cultural practices explain poor health service use in Somali pastoralist communities, few patients cited cultural beliefs (8.0%), herbal medicine (8.0%) or misinformation (10.0%), and patients

and HCWs did not differ significantly in their reports of cultural barriers ($\chi^2 = 3.70$, $p = .054$). Stigma (18.0%) was the most frequently reported non-structural barrier and deserves attention in health education. These findings indicate that interventions focused mainly on changing beliefs would miss the main barriers identified by patients.

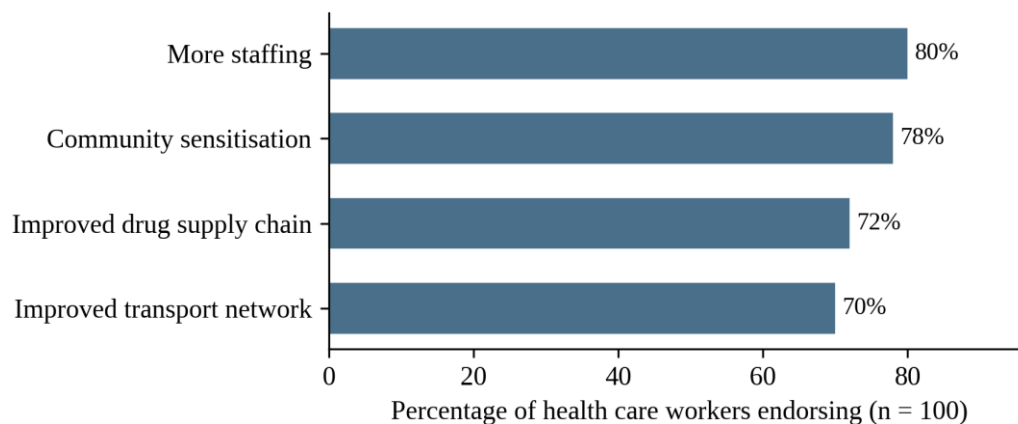
Adherence and Suggestions for Improvement

Most patients (82.0%) reported never missing appointments and 80.0% of HCWs estimated

that patients rarely defaulted, with no difference between the groups ($\chi^2 = 4.20$, $df = 2$, $p = .123$). Because only patients who were attending clinics were interviewed, this finding probably overstates adherence in the wider hypertensive population. HCWs most often recommended more staffing (80%), community sensitisation (78%), a better drug supply chain (72%) and improved transport (70%), as shown in Figure 2.

Figure 2

Health Care Workers' Suggestions for Improving Hypertension Care (n = 100)



Contribution of the Study

To our knowledge, this is the first study in Mandera County to measure barriers to hypertension care from the perspectives of both patients and providers. It adds three findings to existing knowledge. First, it provides empirical evidence that hypertension is present and treated among pastoralists in Mandera, a population often assumed to be at low risk and absent from national estimates. Second, it quantifies a provider–patient perception gap on cost and medication availability, showing that services planned around providers' views will underestimate these barriers. Third, it shows that barriers are overwhelmingly structural rather than cultural, which redirects intervention priorities from behavior change towards financing, supply and access.

Limitations

The cross-sectional design cannot establish causality. Patients were recruited from clinic registers, so people with undiagnosed hypertension or who had dropped out of care, who may face the greatest barriers, were not represented. Barriers were self-reported, and blood pressure was not measured; therefore, the study cannot estimate the prevalence or control of hypertension in Mandera West.

4.0 Conclusion

Hypertension care in Mandera West Sub-County is constrained mainly by structural barriers: lack of insurance, treatment costs, unreliable medication supply, faulty screening equipment, distance and poor roads. Cultural beliefs, herbal medicine and stigma play a minor role. Patients and HCWs agree on most barriers,

but providers significantly underestimate the cost of care and the frequency with which patients report medication shortages.

5.0 Recommendations

Each recommendation below responds to a specific finding of this study.

- (i) Financing (90% uninsured; cost gap). The Mandera County Department of Health should enrol patients in SHA during clinic visits and at livestock markets, and use means testing to identify indigent hypertensive patients whose premiums could be paid by the county or national government.
- (ii) Medication supply (37% of patients report drugs rarely available). The county should keep buffer stocks of essential antihypertensives at peripheral facilities and adopt three-month dispensing for stable patients, timed before seasonal migration.
- (iii) Closing the perception gap. Facility teams should routinely ask patients whether they can afford and obtain prescribed drugs, and track dispensing, not only stock levels as the indicator of availability.

- (iv) Screening and follow-up (62% of HCWs report faulty equipment). The county should replace and calibrate blood pressure machines and train and equip community health promoters with validated digital monitors to screen, follow up, and support medication refills in pastoral settlements.
- (v) Health education (45% Madrassa-only education; 18% stigma). Education should use oral and pictorial formats delivered through mosque and Madrassa networks and community radio.
- (vi) Research. A population-based survey with measured blood pressure is needed to establish the prevalence of hypertension in Mandera, together with a longitudinal study of how seasonal migration affects continuity of care.

Value and implications. These recommendations give the county health department, SHA and partners evidence to prioritise financing and supply-chain reforms over awareness-only campaigns, and a model of patient-provider comparison that other arid and semi-arid counties can use to test their own service assumptions.

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