International Journal of Community Medicine and Public Health
Hefow SH et al. Int J Community Med Public Health. 2025 Nov;12(11):4854-4862
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040
DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20253308

Original Research Article

Community health initiatives improve diabetes and hypertension management in Wajir North Sub County

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Received: 13 September 2025
Revised: 29 September 2025
Accepted: 04 October 2025

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ABSTRACT

Background: Diabetes and hypertension drive a heavy Non-Communicable Disease burden in Kenya's arid and semi-arid lands. Community health initiatives, led by community health promoters, may close gaps in access, adherence, and self-management, yet their performance in pastoralist settings remains under-described.
Methods: We conducted a cross-sectional survey of adults (n=378) living with both diabetes and hypertension in Wajir County, Kenya. Proportionate sampling covered seven wards. Structured questionnaires captured socio-demographics, Community Health Initiatives exposure, medication access and adherence, monitoring behaviors, and lifestyle practices, including diet, salt/sugar reduction, alcohol/tobacco, and physical activity. Analyses included descriptive statistics, χ^2 tests, and logistic regression for self-management outcomes.
Results: Respondents were predominantly middle-aged, married, and low-schooled, with pastoralist and unemployed groups prominent, profiles that complicate clinic-based follow-up. Community Health Initiatives' reach and awareness were high, with common services including education, screening/referral, and medication navigation. Participation was associated with better-reported medicine access, more consistent blood pressure/glucose monitoring, and higher uptake of lifestyle changes. Persistent barriers included distance to facilities, medicine stock-outs, and out-of-pocket costs.
Conclusion: In this underserved arid and semi-arid lands context, community health initiatives appear essential for translating knowledge into day-to-day diabetes and hypertension management. Strengthening low-literacy counseling, peer-supported activity, practical salt-reduction aids, alongside supply-chain reliability and mobile refills, could accelerate control. Findings support investment in integrated, culturally responsive community strategies to sustain primary health care for non-communicable diseases.

Keywords: Community health initiatives, Community health promoters, Diabetes, Hypertension, Wajir North, Primary health care, Kenya, Adherence

INTRODUCTION

Diabetes and hypertension are leading drivers of non-communicable disease (NCD) morbidity, mortality, and costs worldwide.[1] Together they account for a substantial share of NCD deaths, estimated at over two-thirds in some reports.[2] Global adult hypertension prevalence remains high (32% in women; 34% in men), and the burden in sub-Saharan Africa is significant, with estimates of 32% in Nigeria and 28.6% in Kenya; diabetes prevalence is similarly concerning at ~8% and ~5%, respectively.[2] Effective management requires more than prescriptions.[3] Sustained self-care, diet quality, physical activity, and regular monitoring must align with consistent access to medicines and care.[3] These demands are difficult to meet in resource-constrained settings and impose heavy financial and logistical burdens on households and health systems.[4] Hypertension and diabetes are major risk factors for cardiovascular disease.[5] Non-pharmacological strategies, including dietary changes, increased physical

activity, stress management, and reduced alcohol and tobacco use, can reduce medication needs and slow disease progression, but only when delivery is reliable and culturally acceptable.[5]

Wajir North Sub-County in Wajir County in Kenya faces distinctive barriers, including sparse and distant facilities, pastoralist livelihoods, low household incomes, and socio-cultural customs that complicate clinic-based follow-up. Local data suggest a growing burden of diabetes and hypertension (12.5% and 14%, respectively, and 1% for individuals having both conditions) DHIS, 2024, yet the performance of community-based management has not been systematically evaluated.[5] Community health initiatives (CHI), implemented by community health promoters (CHP), are well-positioned to bridge these gaps by providing health education, screening, referral, medication navigation, adherence support, and feedback loops with facilities.[6,7]

This study assessed key indicators of CHI performance in the management of adults living with both diabetes and hypertension in Wajir North Sub-County. Specifically, we examined uptake of lifestyle counseling and practices, access to and use of medicines, monitoring behaviors, and perceived effectiveness of services. By clarifying what is working and where gaps persist, our findings aim to guide evidence-based changes to community programs, inform resource allocation, and support policies that strengthen integrated, culturally responsive chronic disease care in arid and semi-arid settings.[8,9]

METHODS

Study design and setting

We conducted a cross-sectional, facility-based survey in Wajir North Sub-County, Kenya, to assess key indicators of community-based interventions for diabetes and hypertension between February and April 2025.

Participants

Eligible respondents were adults ≥20 years residing in the sub-county with both diabetes and hypertension. We excluded individuals <20 years, those without both conditions, and anyone not providing informed consent.

Sample size and sampling

The minimum required sample (n=184) was calculated using Fisher's formula. The formula was chosen because it is suitable and more accurate for selecting a minimum sample for a population with a specific condition whose frequency of occurrence in the community is low (Charan and Biswas).[10] Recruitment used stratified proportional allocation across the seven wards; all county facilities managing diabetes and hypertension were included. Within each ward stratum, participants were purposively recruited at health facilities. In total, 378 respondents completed the survey.

Data collection and measures

Data were collected using a structured questionnaire aligned to the study objectives. Sections covered- socio-demographics (age, sex, education, and occupation), lifestyle risks and self-management actions (alcohol, salt/sugar intake, smoking, physical activity, and attempts to modify these behaviors) access to medications (oral hypoglycemics, insulin, diuretics, and antihypertensives), and awareness and engagement with community health initiatives. Questionnaires were self-administered; trained research assistants supported participants with limited literacy through translation to the local dialect.

Statistical analysis

All analyses were performed in IBM statistical package for the social sciences (SPSS) statistics v26. Continuous variables were summarized as mean (SD) and categorical variables as n (%). Self-management behaviors (reduced salt/sugar/alcohol, reduced smoking, increased physical activity) were coded as binary indicators. Associations between categorical variables were tested using Pearson's χ^2 (or Fisher's exact where appropriate). Binary logistic regression estimated adjusted odds ratios (ORs, 95% CI) for two primary outcomes, adequate self-management and awareness of dietary management, with behavioral indicators as predictors and age and education as core covariates. Listwise deletion handled missing data. A two-sided $p<0.05$ indicated statistical significance.

Ethical consideration

Ethical approval was obtained from the Kenya Methodist University, Institutional Scientific Ethical Review Committee (KeMU/ISERC/PHT/05/2024) and National Commission for Science, Technology and Innovation (NACOSTI/P/25/415307). Written/oral informed consent was obtained, and responses were anonymized. Permission to conduct the study was granted by the Wajir County Government.

RESULTS

Socio-demographic characteristics

The results in Table 1 show that respondents were predominantly middle-aged (45–64 years) with a nearly equal gender distribution and overwhelmingly married, suggesting stable households but mid-life NCD burden. Education clustered at the primary level, with few reaching colleges, indicating low health-literacy risk. Occupationally, the sample is unusual for NCD studies: pastoralists (27%) and unemployed (26.5%) are the largest groups, pointing to mobility, rurality, and income constraints that complicate clinic-based care. This profile aligns strongly with the study aim: it highlights where CHI

can add value, reaching mobile/rural households, using low-literacy materials, and integrating livelihood-sensitive follow-up—thereby translating awareness into sustained diabetes and hypertension management.

Table 1: Socio-demographic characteristics of respondents.

Characteristics	N (%)
Age (years)	
20-44	87 (23.0)
45-64	163 (43.1)
65-74	105 (27.8)
75-82	23 (6.1)
Gender	
Female	194 (51.3)
Male	184 (48.7)
Marital status	
Married	344 (91.0)
Single	22 (5.8)
Widower	12 (3.2)
Education attained	
No formal schooling	43 (11.4)
Primary	208 (55.0)
Secondary	82 (21.7)
College	45 (11.9)
Occupation	
Beekeeping	7 (1.9)
Business	47 (12.4)
Clinical	12 (3.2)
Farmer	23 (6.1)
Unemployed	100 (26.5)
Pastoralist	102 (27.0)
Teaching	28 (7.4)
Transport and logistics	40 (10.6)
Weaving	19 (5.0)

Awareness of risk factors associated with diabetes and hypertension

The level of awareness of risk factors is high, with consistently greater recognition for diabetes (91.3%) than hypertension (82.8%), yet important gaps remain (Figure 1). Classic metabolic risks, including obesity, inactivity, and unhealthy diets, are well recognized, while chronic stress and reproductive risks (gestational diabetes, polycystic ovarian syndrome (PCOS) for women) are least understood, indicating areas for targeted education.

Notably, alcohol use and smoking are strongly recognized as hypertension risks, but age above 45 is more readily linked to diabetes than hypertension, suggesting residual confusion about age-related risk. This pattern is new for Wajir County: despite low formal schooling (Table 1), awareness is high but uneven across domains. This implies that CHI can close these specific knowledge gaps, especially stress and reproductive risks, and reinforce age-related and lifestyle messaging for hypertension, thereby improving prevention and self-management counseling.

Awareness of symptoms and management of diabetes and hypertension

Figure 2 shows that awareness is generally good (≈60%) for the common symptom clusters of diabetes (polyuria, thirst, fatigue) in panel A and hypertension (severe headache, dizziness, dyspnea) in panel B, but understated red flags are under-recognized, notably diabetes weight loss (≈40%)/ blurred vision (≈50%) and hypertension nosebleeds/irregular heartbeat (≈40%). Management knowledge favors “lifestyle change” and “medicines”, while routine glucose monitoring and exercise for blood pressure control (<60%) are the weakest areas, key gaps in day-to-day self-management (panel C). This asymmetry (high basic awareness, lower recognition of elusive symptoms and proactive behaviors) is notable given the population cohort’s low formal schooling. Again, here CHI can improve case-finding and control by targeting these specific shortfalls, normalizing symptom recognition, and reinforcing monitoring and physical activity in follow-up counseling.

Lifestyle, medication, and dietary practices

Respondents show strong medication uptake and diet literacy, but uneven lifestyle implementation (Figure 3). Most are on oral antihypertensives (≈90%), with diuretics used by about half and insulin by a small minority; herbal medicine use persists for a notable subgroup of respondents. Diet-related knowledge and self-reported practices are consistently high (following recommendations, portion-size awareness, label checking, low-salt/low-sugar, fiber intake), while day-to-day behaviors in panel A reveal gaps: many still add extra salt, relatively few reports reducing salt, and regular exercise remains low despite sizeable smoking/alcohol reduction and a high perceived effectiveness of changes. Taken together, the pattern suggests community health efforts are succeeding in treatment linkage and nutrition education, but further gains will likely come from behavior-change support that targets sodium reduction and physical activity adherence. Figure 4 summarizes the use of oral hypoglycemics, and it shows that Metformin (22.5%) and Diabenese (21.4%) were the predominant oral hypoglycemics used, indicating reliance on a few first-line agents. Use of newer or alternative drugs was limited, and 15.3% of respondents reported not using any oral hypoglycemic.

Access to medication and community health interventions

Access to medication shows a structural gap (Table 2), only 1 in 4 respondents find medicines affordable (24.3%), yet three-quarters report they are easily available (73.3%). Over half obtain drugs from health facilities (55.6%), and non-adherence due to skipped doses is reported by 19%.

Among named barriers, distance to facilities dominates (37.6%), followed by poor awareness of sources, stock-outs, and lack of insurance; notably, high cost is selected by just 11.9% in the barrier list despite low affordability overall, suggesting that while medicines may be perceived as generally unaffordable, day-to-day access is most constrained by geography and information, not price alone. Against this backdrop, CHI is near-universal and valued. Awareness is 96.6%, participation is mostly regular (55.8%), and CHI is perceived to improve adherence (96.8%) and health status, while raising awareness for most. Management support is the most common CHI component (40%), ahead of screening and lifestyle programs. These results align with the proposition that CHI supports primary care for NCDs, notably by enhancing adherence and self-reported health, even where affordability and access logistics remain challenging. It is important to note that the affordability–barrier mismatch and the predominance of distance/information barriers are distinctive signals in the study population, pointing to operational obstacles rather than purely financial ones. To translate high CHI engagement into sustained control of diabetes and hypertension, programs should couple CHI with access enablers, community drug delivery, or mobile clinics to reduce travel distance, navigation/enrollment for insurance, stock-out surveillance, and targeted medication-source education, while continuing the CHI elements that demonstrably improve adherence.

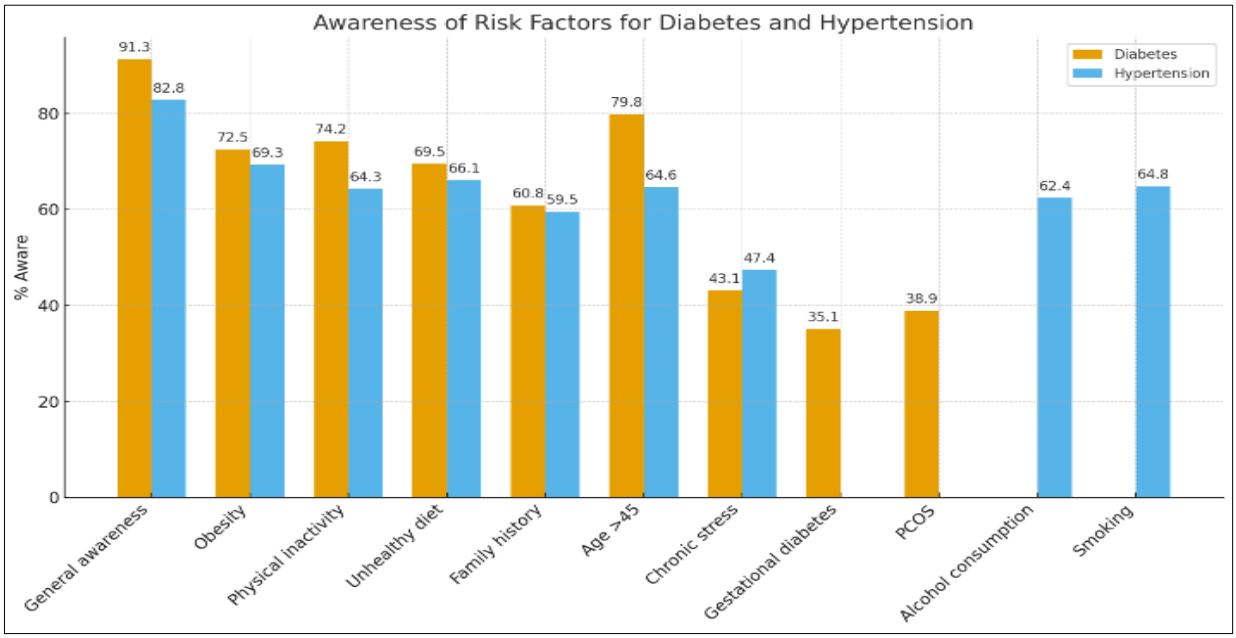

Figure 1: Awareness of risk factors associated with diabetes and hypertension.

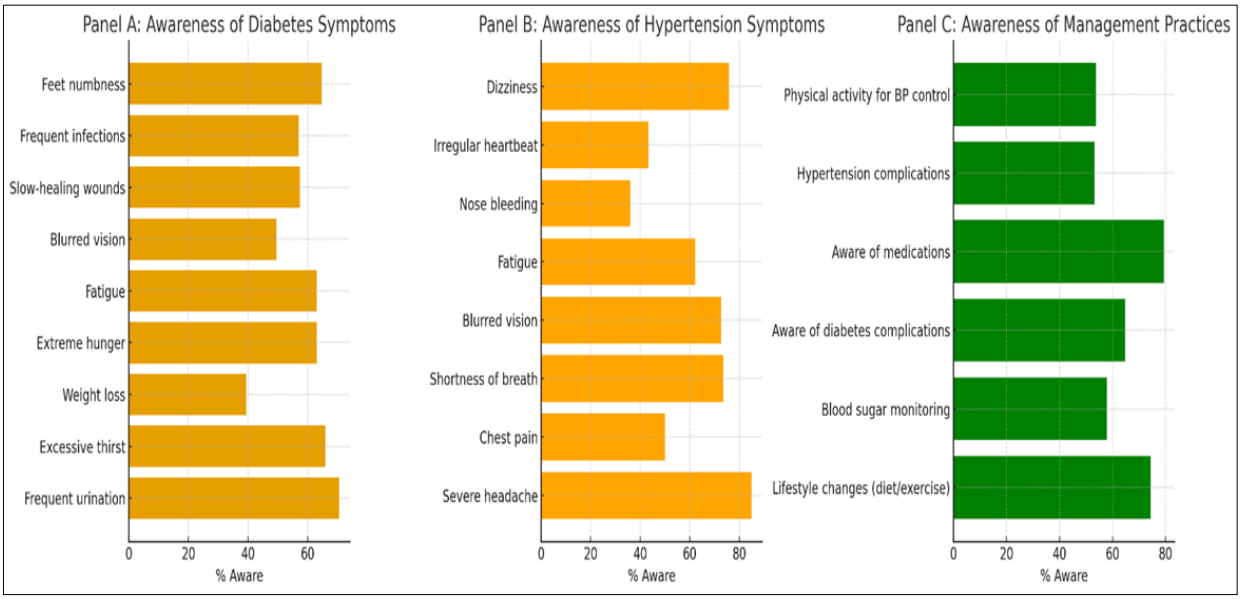

Figure 2: Awareness of symptoms and management of diabetes and hypertension among respondents.

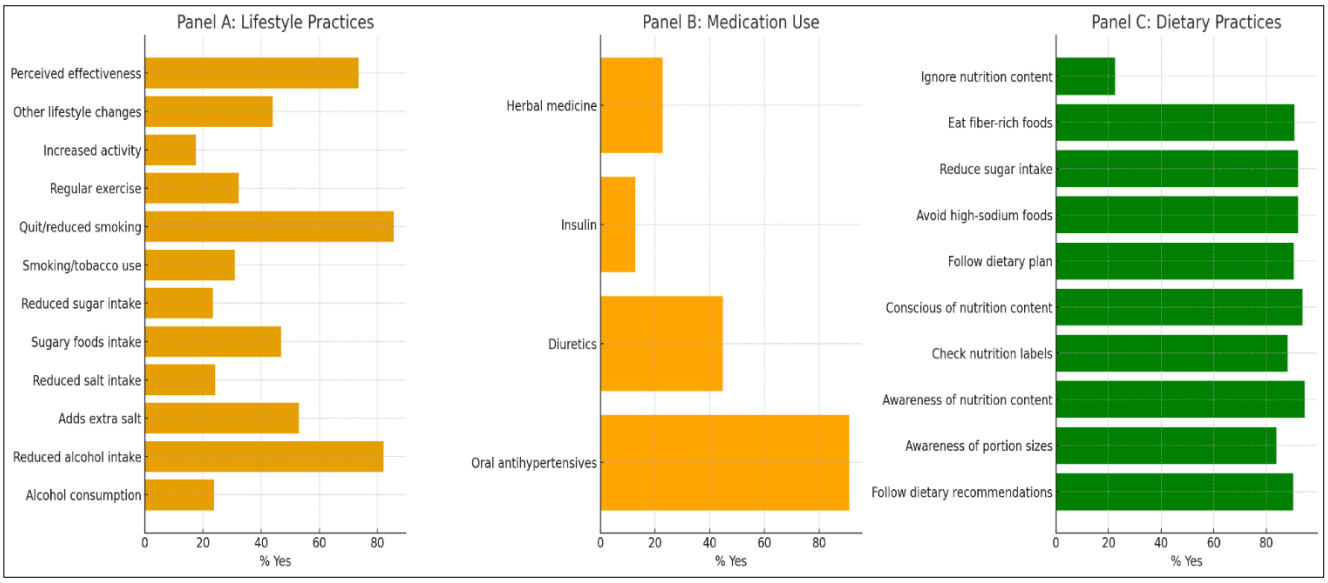

Figure 3: Lifestyle, medication, and dietary practices among respondents.

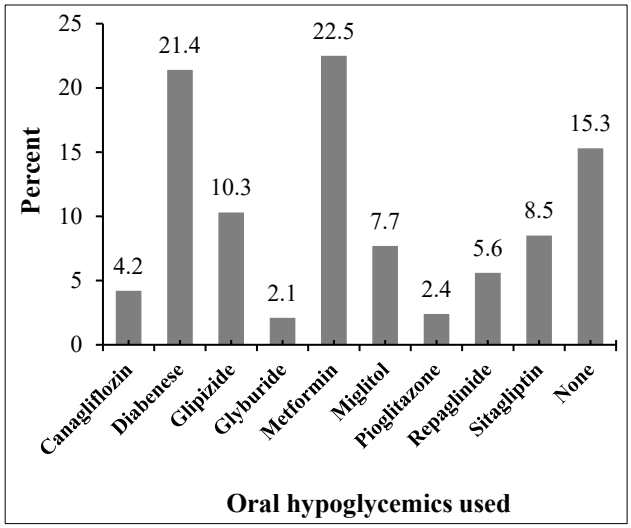

Figure 4: Distribution of oral hypoglycemic agents used by respondents.

Predictors of dietary knowledge and practice

To determine the predictors of dietary knowledge and practice outcomes, binary logistic regression was performed for five endpoints (awareness of nutritional content, regular label checking, following a dietary plan, avoiding high-sodium foods, and eating fiber-rich foods), entering behavior-change indicators (reduced sugar, reduced salt, reduced alcohol, increased exercise), and adjusting for age and education. Two robust signals emerged. Older age was associated with lower odds of nutrition awareness (aOR=0.89, 95% CI 0.79–1.00, p=0.043), highlighting a potential knowledge gap among older adults. Self-reported alcohol reduction was strongly associated with regular label checking (aOR=15.15, 95% CI 2.60–90.91, p=0.002), suggesting a cluster of health-conscious behaviors that could be leveraged in counseling. For the remaining outcomes, no predictor showed a clear independent association after adjustment; estimates were imprecise (wide Confidence Intervals) and, in some cases, pointed in opposing directions, for example, a trend toward lower odds of following a plan with increased exercise (aOR=0.20, p=0.065) (Table 3). The results show that the gains in one area of diet behavior, like label checking, do not automatically come with gains in others, like reducing salt or eating more fiber. They are weakly related, so each behavior likely needs its own targeted intervention rather than expecting improvements in one to carry over to the rest. This indicates that community health initiatives should deploy targeted, but segmented education. For example, age-tailored nutrition awareness for older adults and combined alcohol-reduction plus label-reading micro-interventions. Because estimates for sodium and fiber practices were imprecise, future work should measure these behaviors with richer, validated items and include a larger or more targeted sample so the effects can be estimated more precisely.

Table 2: Access to medication and effectiveness of community health interventions.

Domain and response	N (%)
Access to medication	
Medication cost affordable	
Yes	92 (24.3)
No	286 (75.7)

Continued.

Domain and response	N (%)
Medication easily available	
Yes	277 (73.3)
No	101 (26.7)
Medication obtained from a medical facility	
Yes	210 (55.6)
No	168 (44.4)
Skips medication doses	
Yes	72 (19.0)
No	306 (81.0)
Barriers to access	
High cost	45 (11.9)
Long distance to facilities	142 (37.6)
Stock-outs/ unavailability	57 (15.1)
Lack of health insurance	51 (13.5)
Poor awareness of sources	83 (22.0)
Community health interventions	
Awareness of interventions	
Yes	365 (96.6)
No	13 (3.4)
Types of interventions	
Management support	144 (40.0)
Screening services	113 (31.4)
Lifestyle modification	103 (28.6)
Interventions helped adherence	
Yes	366 (96.8)
No	12 (3.2)
Health improved after the intervention	
Yes	308 (81.5)
No	70 (18.5)
Interventions are effective in awareness raising	
Yes	277 (73.3)
No	101 (26.7)
Participation in programs	
Regularly	211 (55.8)
Occasionally	167 (44.2)

Table 3: Predictors of dietary knowledge/practice outcomes (multivariable logistic regression, n=378).

Outcome	Predictor	aOR*	95% CI	P value
Awareness of nutritional content	Age (per year)	0.89	0.79–1.00	0.043
	Reduced sugary foods	10.00	0.60–166.67	0.108
	Increased exercise	2.82	0.22–35.71	0.422
Checks nutrition labels regularly	Age (per year)	0.97	0.92–1.03	0.285
	Reduced sugary foods	2.46	0.49–12.20	0.272
	Reduced salt intake	0.84	0.11–6.25	0.864
	Increased exercise	0.23	0.03–1.65	0.143
	Reduced alcohol intake	15.15	2.60–90.91	0.002
Follows a specific dietary plan	Age (per year)	1.01	0.97–1.06	0.607
	Reduced sugary foods	0.74	0.18–3.04	0.681
	Reduced salt intake	0.58	0.11–2.99	0.516
	Increased exercise	0.20	0.04–1.10	0.065
Avoids high-sodium foods	Age (per year)	0.99	0.92–1.06	0.737
	Reduced sugary foods	1.64	0.29–9.35	0.579
	Reduced salt intake	3.04	0.27–34.48	0.370
	Reduced alcohol intake	2.97	0.47–18.52	0.245

Continued.

Outcome	Predictor	aOR*	95% CI	P value
Eats fiber-rich foods	Age (per year)	1.01	0.95–1.08	0.722
	Reduced sugary foods	2.92	0.27–32.26	0.378
	Reduced salt intake	0.51	0.03–8.40	0.641
	Increased exercise	0.18	0.02–1.92	0.155

*Adjusted odds ratio, Model set: each outcome regressed on behavior changes, age, and education. Binary behaviors reported as yes versus no.

DISCUSSION

Our study shows a community grappling with chronic disease in the context of low formal schooling, economic difficulties, and access to healthcare, an unusual profile for NCD cohorts that nonetheless is increasingly common across rural and pastoral communities.[10-12] Context influences disease knowledge, service access, and early behavior change. Our results point to a positive role for CHI. Respondents understood diabetes and hypertension and took part in treatment and dietary management.[13,14] The data also show persistent gaps in physical activity, salt reduction, spotting silent symptoms, and day-to-day self-monitoring. CHI and primary care systems need to act together to turn knowledge into lasting control. Awareness is necessary but not sufficient to guarantee diabetes or hypertension control. Most participants understood the big three risk factors and common symptoms, which shows strong communication of the basics. Gaps remained in reproductive and stress-related risks, subtle signs, and routine self-management.[14,15] These gaps matter because they lead to late presentation and missed chances for prevention. They persist even with broad health messaging. CHI should now focus less on defining NCDs and more on early warning signs and routine self-care, such as glucometer use, home blood pressure checks, and simple exercise plans. Older adults knew less about nutrition, so age-specific, low-literacy teaching is vital.

We also see uneven behavior changes. Treatment initiation and diet literacy have moved farther than physical activity and sodium reduction. This happens when education outruns cultural and environmental support. Physical exercise is limited by norms, time, safety, and a few structured options.[16,17] Salt reduction clashes with taste preferences, family cooking practices, and limited product choice.[17] This implies that, firstly, CHI should complement nutrition education with behavior change techniques, including goal setting, peer support, short label reading drills, simple salt swaps at home, and supports like walking groups, women-led activity clubs, and community spice kits. Secondly, when programs are designed, the modules should not be bundled together, but should be separated from each other since gains in one (label checking) do not guarantee gains in the other (salt intake).[18] The strong link between alcohol reduction and label use suggests a health-conscious subgroup whose drive can be harnessed. CHP can identify such early adopters and use their success as an anchor for additional changes, both for the individual (sequencing the next behavior) and socially (peer mentoring). At the same time, the absence of strong predictors for salt intake and fiber consumption behaviors cautions against assuming broad spillover; those behaviors likely require distinct, hands-on strategies and more granular measurement to detect change.

We can safely assume that the therapy patterns reflect system realities, and reliance on older, affordable antihypertensives and first-line oral hypoglycemics is clinically reasonable and economically pragmatic in low-resource settings. The limited use of newer agents and low insulin uptake point to access, cost, and operational challenges like storage, training, and fears of injections.[19-21] Persistent use of herbal remedies is not trivial but indicative of the management of the diabetes environment, and ignoring it is a risk for fragmented care. As an alternative, CHP should normalize open dialogue about traditional therapies, promote safety, and encourage timely biomedical care by engaging community leaders to reduce stigma and build trust in hospital-based treatment. There is a striking mismatch between medicine availability and what actually keeps people from staying on treatment: distance, stock predictability, and navigation. People skip doses not simply because of price but because refilling is logistically hard.[22,23] In these cases, CHPs can do more than education. They can link patients to facilities, announce stock status in the community, coordinate group pickups, and advocate for mobile clinics or community dispensing. These last-mile roles close the gap between knowing and doing; they convert intent into action by smoothing the frictions between households and community dispensaries or clinics.[24] However, CHPs cannot fix supply chains or financing alone; real progress depends on coupling CHPs with system supports, including consistent commodity management, outreach services, and pathways into healthcare financing mechanisms like insurance or subsidy schemes.[24,25]

A pastoral, low-income population will not benefit fully from clinic-centric models, nor from education that assumes high literacy or stable residence. The high CHI awareness and participation self-reported in this study show that communities will engage when services are culturally legible, proximate, and continuous.[25] The task for the Wajir County health management team now is to refine CHI from broad information campaigns into community-based care practices that prioritize older adults, address gender-based barriers to activity, operationalize sodium salt reduction at the household level, and integrate traditional medicine dialogues. Packaging these elements into routine CHPs visits, group sessions, and simple take-home tools can anchor behavior change between clinic appointments.[26]

These findings point to clear program and policy actions. The educational content should shift toward under-recognized risks and hands-on self-management, delivered in age-tailored, low-literacy formats.[26] Lifestyle support should be split into distinct tracks for diet knowledge and intent, nutrient quality actions, and physical activity, with behavior-specific goals and peer role models to harness positive clustering. Additionally, delivery of the CHI should include practical supports such as walking groups, women-only activity spaces, household salt-swap kits, community label-reading demonstrations, and help with medication navigation.[27] The provision of health services needs stronger links to the wider health system through mobile refills, timely stock updates, two-way feedback between CHPs and facilities, and support to enroll in financial protection. The CHIs should also acknowledge traditional therapies with safety counseling and clear referral rules so the systems work together rather than in conflict.[28]

Finally, there is a need to measure in more detail using behavior-specific questions and, when possible, use objective checks to capture real change and target diabetes and hypertension management efforts better.

Limitations and future directions

This study relies on a cross-sectional, self-reported design, which limits causal claims and may introduce recall and social desirability bias. Estimates for sodium salt and fiber practices were imprecise, signalling a need for better measures and larger or more targeted samples.

Future studies should follow participants over time and include objective outcomes such as blood pressure and HbA1c to test whether engagement and adherence lead to clinical control. Trials should assess integrated CHI components in real-world settings. While mixed-methods studies can clarify how gender and culture shape activity and diet, economic evaluations should be built in to guide scalable, cost-effective implementation.

CONCLUSION

In conclusion, our study demonstrates that in a marginalized and pastoral population, CHPs are doing what they are designed to do: promoting awareness and medication use, and supporting adherence. To achieve the next gains, there is a need for a timelier symptom recognition, consistent physical activity, and meaningful sodium salt reduction. Community health intervention programs must pivot from telling people what to do to making it possible and likely that they will do it, week after week. That means targeted, behavior-specific modules, age-sensitive teaching, and logistical bridges between households and health facilities. Coupled with dependable medicines and financial protection, this integrated approach offers a reliable path from high engagement to sustainable control of diabetes and hypertension.

ACKNOWLEDGEMENTS

The authors would like to thank the research assistants and community health promoters who facilitated data collection.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Hefow SH, Mapesa J, Juma R. Community health initiatives improve diabetes and hypertension management in Wajir North Sub County. Int J Community Med Public Health 2025;12:4854-62.