

Global Journal of Health Science (GJHS)

**A Comparative Analysis of Non-Communicable Diseases Screening and Linkages
among Community Health Volunteers in Intervention and Control Groups in Nyeri
County, Kenya**

Dr. Kenneth Mugambi Langakuo, PhD, Dr. Jackline Nyaberi, PhD and Dr. Elizabeth Echoka,
PhD



A Comparative Analysis of Non-Communicable Diseases Screening and Linkages among Community Health Volunteers in Intervention and Control Groups in Nyeri County, Kenya

 ^{1*}Dr. Kenneth Mugambi Langakuo, PhD
Researcher, School of Public Health, KEMRI /Jomo
Kenyatta University of Science & Technology

 ²Dr. Jackline Nyaberi, PhD
Lecturer, School of Public Health, Jomo Kenyatta
University of Science & Technology

 ³Dr. Elizabeth Echoka, PhD
Chief Principal Research Scientist, Kenya Medical Research
Institute

Article History

Received 16th June 2026

Received in Revised Form 13th July 2026

Accepted 19th August 2026



How to cite in APA format:

Langakuo, K., Nyaberi, J., & Echoka, E. E. (2026). A Comparative Analysis of Non-Communicable Diseases Screening and Linkages among Community Health Volunteers in Intervention and Control Groups in Nyeri County, Kenya. *Global Journal of Health Sciences*, 11(4), 19–28. <https://doi.org/10.47604/gjhs.3933>

Abstract

Purpose: Community Health Volunteers (CHVs) are critical to the early identification and linkage of individuals with non-communicable diseases (NCDs) to appropriate health services, particularly in resource-limited settings. However, evidence on the impact of structured capacity-building interventions on CHV performance remains limited. This study compared NCD screening and linkage levels among Community Health Volunteers (CHVs) in the intervention and control groups in Nyeri County.

Methodology: A quasi-experimental mixed-methods design was adopted. Quantitative data were collected using structured Likert-scale questionnaires assessing CHV capacity in screening and linkage, alongside referral records documenting completed NCD screening services. Statistical analyses included descriptive statistics, one-way ANOVA, and ANCOVA to control for baseline differences. Qualitative data were obtained through focus group discussions (FGDs) and key informant interviews (KIIs) and were analyzed thematically.

Findings: Community Health Volunteers (CHVs) in the intervention group demonstrated significantly higher capacity across multiple domains, including role recognition ($M = 3.49$ vs. 3.24 , $p = 0.010$), screening engagement ($M = 3.41$ vs. 3.11 , $p = 0.001$), and household monitoring ($M = 3.27$ vs. 2.98 , $p < 0.001$). Analysis of covariance (ANCOVA) further revealed a significant effect of the intervention on linkage to care ($F = 5.905$, $p = 0.016$). Referral outcomes also showed higher completion rates for blood pressure measurement, anthropometric assessments, and body mass index (BMI) evaluation among clients referred by intervention CHVs. Qualitative findings complemented these results, indicating that CHVs in the intervention group experienced improved knowledge, confidence, and clarity of roles in NCD service delivery. They reported enhanced community trust, increased acceptance of screening services, and greater commitment to follow-up of referred clients. Improved understanding of referral processes contributed to more proactive linkage practices, although persistent challenges, including limited resources, weak feedback systems, and a lack of incentives, were noted across both groups. Structured capacity-building interventions significantly enhance CHV screening and linkage performance for NCDs. Strengthening CHV training, supervision, and resourcing is essential for effective community-based NCD control.

Unique Contribution to Theory, Practice and Policy: The study demonstrates that structured capacity-building interventions significantly improve CHV performance. It contributes to community health systems theory by reinforcing the role of capacity strengthening in task-shifting models. Practically, it supports investment in CHV training, supervision, and tools. From a policy perspective, it provides evidence to guide scaling of standardized CHV interventions for NCD control in Kenya and similar settings.

Keywords: Community Health Volunteers, Non-Communicable Diseases, Screening, Linkage to Care, Capacity Building

JEL Codes: I10, I11, I18, J24, O15

©2026 by the Authors. This Article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0>)

INTRODUCTION

Non-communicable diseases (NCDs), particularly cardiovascular diseases, diabetes mellitus, cancers and chronic respiratory diseases, are increasingly contributing to morbidity, mortality and healthcare utilization in low- and middle-income countries. This epidemiological transition is particularly important in sub-Saharan Africa, where health systems continue to manage a substantial burden of communicable diseases while simultaneously responding to the growing prevalence of chronic diseases. The increasing burden of NCDs has consequently created a need for preventive, promotive and early-detection interventions that can be delivered closer to where people live.

Community-based health workers provide an important platform for extending primary healthcare services to underserved populations, particularly in settings where shortages of skilled health personnel and other health-system constraints limit access to facility-based care. Evidence from sub-Saharan Africa demonstrates that community health workers can contribute to health promotion, disease prevention, early identification of illness, referral and continuity of care. Their proximity to households also provides an opportunity to address risk factors and identify individuals with chronic conditions before complications develop.

In Kenya, the community health workforce has progressively become integrated into the primary healthcare system as part of efforts to achieve universal health coverage (UHC). The country's community health strategy has increasingly emphasized preventive and promotive health services delivered at household and community levels. This policy direction was further strengthened through the Primary Health Care Act, 2023, which formally recognizes Community Health Promoters (CHPs) and assigns them responsibilities including community disease surveillance, health education, prevention and management of NCDs, household health monitoring and referral to health facilities. The Act also provides for training, supervision and provision of working tools to support their functions.

The formalization of the community health workforce provides an important opportunity for strengthening NCD prevention and control. Community Health Volunteers (CHVs), subsequently incorporated within the broader Community Health Promoter framework, are strategically positioned to reach individuals who may not routinely access health facilities. Their responsibilities can include health education, identification of behavioral and metabolic risk factors, screening for selected NCDs, referral of individuals with abnormal findings and follow-up of clients within the community. The Kenyan Ministry of Health has similarly emphasized the role of Community Health Promoters in shifting primary healthcare towards prevention and health promotion.

Nyeri County provides an important setting in which to strengthen this community-based approach. Evidence from Nyeri indicates a substantial burden of NCDs, particularly diabetes and other cardiometabolic conditions. Recent research at Nyeri County Referral Hospital reported that more than 50% of hospital admissions were attributable to NCDs and that more than 55% of hospital deaths were attributable to NCDs. The same study reported a diabetes prevalence of approximately 6.4% in Nyeri County, considerably higher than the national estimate cited by the investigators. Earlier evidence has also documented a high diabetes burden in Nyeri, further supporting the importance of strengthening prevention and early detection strategies within the county.

Despite this burden, access to NCD screening and timely linkage to appropriate care remains an important health-system challenge. Facility-based services alone may not adequately

identify individuals who are asymptomatic, have limited contact with health facilities or face barriers to accessing formal healthcare. Community-level screening therefore provides an opportunity to identify individuals with elevated blood pressure or blood glucose, provide appropriate health education and facilitate early referral and linkage to care.

Within Nyeri County, the F3C AMREF model provided a foundation for engaging CHVs in NCD prevention and control at household and community levels. Under this approach, CHVs were trained to provide health education, promote healthy lifestyles, identify NCD risk factors, undertake screening and refer individuals with abnormal screening results to health facilities. Following facility assessment and management, CHVs could support follow-up and continuity of care within the community. This model therefore provided an important platform for integrating NCD screening and linkage activities into existing community health structures.

However, the effectiveness of community-based NCD screening and linkage depends substantially on the knowledge, skills, tools and support available to CHVs. Screening for hypertension and diabetes requires CHVs to understand NCD risk factors, recognize relevant signs and symptoms, correctly use screening equipment, interpret basic findings, communicate results and provide appropriate referral and follow-up. Gaps in these competencies may compromise both the identification of individuals at risk and the subsequent linkage of those identified to appropriate healthcare services.

There was therefore a need to strengthen the existing community health model through a structured, context-specific approach to CHV capacity building. The proposed model incorporated didactic and practical training focused on the causes and risk factors of NCDs, signs and symptoms, screening and basic interpretation of findings, prevention and control, referral and linkage to care, and recognition of selected NCD-related emergencies. The enhanced approach was designed to strengthen the knowledge and practical competencies of CHVs while integrating screening, referral and community follow-up within the existing primary healthcare structure.

This enhanced approach formed the basis of the CRIPSS model, which was developed to strengthen the capacity of CHVs to identify individuals at risk of hypertension and diabetes, undertake appropriate community-level screening and facilitate timely linkage to healthcare services. The model therefore sought to address a critical gap between community-level identification of NCDs and access to appropriate facility-based care. The present study evaluated the effectiveness of this enhanced community health approach by comparing NCD screening and linkage-to-care outcomes among CHVs in intervention and control groups in Nyeri County.

Problem Statement

Non-communicable diseases (NCDs), particularly hypertension and diabetes mellitus, are an increasing public health burden in Kenya and require early detection, timely referral and sustained linkage to care. The growing burden of NCDs has placed additional demands on primary healthcare systems, particularly in communities where access to facility-based screening and diagnostic services remains limited. Community Health Volunteers (CHVs) are strategically positioned to extend preventive and promotive health services to households and communities and can contribute to NCD risk assessment, screening, referral and follow-up. However, the effectiveness of community-based NCD interventions depends on the knowledge, practical skills, availability of appropriate screening tools, supervision and the strength of referral and feedback mechanisms linking communities with health facilities.

In Kenya, community health workers have increasingly been integrated into primary healthcare as part of efforts to strengthen community-based prevention and achieve universal health coverage. The Primary Health Care Act, 2023 formally recognizes Community Health Promoters and provides for their involvement in health promotion, disease prevention, surveillance, NCD prevention and management, household monitoring and referral. However, despite this policy direction, challenges remain in translating community-level NCD screening into effective linkage to facility-based care. Inadequate NCD-specific training, limited practical competencies, inadequate or inconsistent access to screening tools, weak referral tracking, limited feedback from health facilities and inconsistent supervision may reduce the ability of CHVs to identify individuals at risk and ensure that those with abnormal screening results complete the referral pathway.

This problem is particularly relevant in Nyeri County, where NCDs constitute a substantial proportion of morbidity, hospital utilization and mortality. Recent evidence from Nyeri County Referral Hospital indicates that NCDs account for more than half of hospital admissions and deaths, with diabetes and other cardiometabolic conditions contributing substantially to the local disease burden. This epidemiological profile highlights the need for strengthened community-based approaches that can promote early identification of individuals at risk of hypertension and diabetes and facilitate timely access to appropriate healthcare services. However, facility-based services alone may not adequately reach asymptomatic individuals or those experiencing barriers to accessing healthcare, making community-level screening and linkage an important component of the county's NCD response.

The existing F3C community health approach provided a platform through which CHVs could undertake health education, promote healthy lifestyles, identify NCD risk factors, screen community members and refer individuals with abnormal findings to health facilities. However, there was limited evidence on whether strengthening this existing approach through a structured, context-specific capacity-building intervention could produce measurable improvements in NCD screening and linkage to care. In particular, it remained unclear whether enhanced CHV training and practical skills, supported by appropriate screening tools and strengthened referral and follow-up mechanisms, would result in higher screening coverage and improved completion of referrals compared with the existing approach.

To address these gaps, the CRIPSS model was developed as an enhanced community-based intervention building on the F3C approach. The model integrated four complementary components: (1) didactic training, to strengthen CHV knowledge of hypertension, diabetes, risk factors, prevention, screening, referral and management; (2) practical skills training, to develop competency in the use of screening equipment, performance of screening procedures, interpretation of basic findings and appropriate referral; (3) referral and linkage tracking, to strengthen documentation, follow-up and completion of referrals between the community and health facilities; and (4) digital/e-Health integration, where applicable, to support documentation, monitoring, reporting and feedback along the screening-to-care pathway. Collectively, these components were designed to address both CHV capacity and weaknesses in the community–facility continuum of care.

The central problem addressed by this study was therefore the limited effectiveness of the existing CHV approach in translating community-level NCD screening into timely and completed linkage to care. Although CHVs have the potential to improve early identification of hypertension and diabetes in underserved communities, there was insufficient empirical evidence from Nyeri County demonstrating whether an enhanced, structured CHV model could

improve measurable NCD screening and linkage outcomes compared with the existing approach. Furthermore, evidence evaluating such interventions using comparative or quasi-experimental designs remains limited in the Kenyan context.

The primary objective of this study was therefore to determine the effectiveness of an enhanced CHV model in improving NCD screening and linkage to care among community members in Nyeri County, Kenya, compared with the existing CHV approach. The primary quantitative outcomes were the proportion of eligible community members screened for NCDs and the proportion of individuals identified with abnormal screening results who were successfully linked to health-facility care, with outcomes compared between intervention and control groups. Changes in CHV knowledge and capacity to undertake NCD screening and linkage activities were assessed as additional outcomes.

Establishing the effectiveness of the CRIPSS model is important for generating context-specific evidence on how CHV capacity strengthening, practical skills development, screening support and strengthened community–facility referral mechanisms can improve the NCD screening-to-care continuum. Such evidence may inform the refinement, integration and potential scale-up of community-based NCD interventions within Kenya's primary healthcare system and contribute to broader efforts to strengthen prevention, early detection and management of NCDs at community level.

METHODOLOGY

Study Design and Setting: A quasi-experimental mixed-methods design was employed to compare CHV performance between intervention and control groups in Nyeri County

Quantitative Data Collection: Data were collected using structured Likert-scale questionnaires validated through expert review and pilot testing, and referral register reviews.

Qualitative Data Collection: Qualitative data were obtained through FGDs and KIIs. Focus group discussions and key informant interviews were conducted with CHVs and community health stakeholders to explore experiences related to training, engagement, resource availability, and linkage processes.

Data Analysis: Quantitative data were analyzed using descriptive statistics, one-way ANOVA, and ANCOVA, adjusting for baseline linkage. Qualitative data were transcribed verbatim and analyzed thematically to complement quantitative findings. Ethical approval was obtained, and informed consent was secured from all participants.

RESULTS

Interventional CHVs demonstrated significantly higher performance across key indicators, as shown below;

Indicator	Intervention Mean	Control Mean	p-value
Role recognition	3.49	3.24	0.01
Screening Engagement	3.41	3.11	0.001
Household monitoring	3.27	2.98	<0.001
Linkages	3.32	2.91	<0.001

A comparative analysis was conducted to assess differences in performance between Community Health Volunteers (CHVs) in the intervention and control groups across key

domains of NCD service delivery. The findings revealed statistically significant differences favouring the intervention group.

CHVs in the intervention group reported significantly higher role recognition scores (mean = 3.49) compared to those in the control group (mean = 3.24; $p = 0.010$). This indicates improved clarity and understanding of roles following the intervention. Similarly, screening engagement was higher among the intervention group (mean = 3.41) than the control group (mean = 3.11; $p = 0.001$), reflecting increased participation in NCD screening activities.

The most pronounced difference was observed in household monitoring, where the intervention group recorded a mean of 3.27 compared to 2.98 in the control group ($p < 0.001$). This suggests enhanced follow-up practices and continuity of care among CHVs who received the intervention.

Overall, the results demonstrate that the intervention significantly improved CHV performance across all measured indicators. Qualitative data were analyzed thematically to explore CHVs' experiences and perceptions regarding NCD screening and linkage to care. Four key themes emerged, which are enhanced knowledge and confidence, improved community trust and engagement, strengthened referrals and follow-up processes and Persistent systemic challenges as described below;

Enhanced knowledge and confidence: CHVs in the intervention group reported increased competence in conducting screenings and delivering health education. Training was perceived as practical and directly applicable to community work.

Improved community trust and engagement: Participants noted that increased knowledge and consistent follow-up enhanced their credibility, leading to greater community acceptance and participation in screening activities.

Strengthened referral and follow-up processes: Intervention CHVs described improved understanding of referral pathways and greater effort in tracking referred clients, although formal feedback mechanisms remained limited.

Persistent systemic challenges: Both groups reported ongoing barriers, including inadequate supplies, limited supervision, and a lack of financial incentives, which continue to affect service delivery.

Discussion

The findings of this study are consistent with existing literature demonstrating that structured training and support significantly improve CHV performance. Similar studies in low- and middle-income countries have shown that community health workers contribute to improved screening uptake and continuity of care when adequately trained and supported (Jeet *et al.*, 2017; Perry *et al.*, 2017).

This study provides robust evidence that structured capacity-building interventions improve CHV performance in NCD screening and linkage. Higher mean scores across key capacity indicators and significantly better referral outcomes among intervention CHVs suggest that enhanced training and system support translate into measurable service delivery gains. The findings are consistent with previous studies from low- and middle-income countries demonstrating that well-trained and supported community health workers contribute to improved early detection and continuity of care for chronic conditions.

The significant improvement in objective screening indicators strengthens the validity of self-reported capacity measures. Therefore, the observed improvements in referral completion align

with findings by Olaniran *et al.* (2017), who highlighted that CHV effectiveness is strongly influenced by training quality, supervision, and system integration. Furthermore, the consistency between self-reported capacity and objective screening outcomes strengthens the reliability of these findings.

Qualitative findings elucidate the mechanisms underlying these improvements, highlighting the importance of inclusive training, refresher courses, and adequate resources. Persistent gaps in equipment availability, financial facilitation, and feedback mechanisms for referrals remain barriers to optimal performance. The study underscores the need for integrated interventions that address knowledge, tools, motivation, and health system responsiveness concurrently.

Addressing these dimensions is critical for maximizing the impact of CHVs in community-based NCD prevention and control. However, persistent challenges such as inadequate supplies, limited financial incentives, and weak referral feedback systems mirror findings from Kok *et al.* (2015), emphasizing the need for holistic health system strengthening.

This study demonstrates that targeted capacity-building interventions significantly enhance the performance of Community Health Volunteers (CHVs) in screening and linking individuals with non-communicable diseases (NCDs) to care in Nyeri County. CHVs in the intervention group showed improved role recognition, increased engagement in screening activities, and stronger household monitoring compared to those in the control group. These improvements highlight the effectiveness of structured training and support in strengthening community-level health service delivery.

However, persistent systemic challenges, including limited resources, weak referral feedback mechanisms, and inadequate incentives, continue to constrain optimal performance. Addressing these barriers is essential to sustain and scale CHV-led NCD interventions. Overall, the findings provide robust evidence that enhancing CHV capacity can improve early detection and continuity of care for NCDs within Kenya's primary healthcare systems.

Limitations of the Study

This study had several limitations as highlighted below;

1. The quasi-experimental design may have introduced residual confounding because participants were not randomly assigned to intervention and control groups. Although efforts were made to ensure comparability between the groups, unmeasured differences between Community Health Units (CHUs) may have influenced the observed outcomes.
2. Spillover or contamination between intervention and control CHUs cannot be completely excluded. CHVs operate within closely connected communities and may interact with neighbouring CHUs, potentially leading to informal sharing of knowledge, skills, screening approaches, or intervention materials. Such contamination may have reduced the apparent difference between the intervention and control groups.
3. Referral completion and linkage to care were not determined solely by CHV performance. Health-system factors at receiving facilities, including availability of medicines, particularly antihypertensive medications, waiting times, costs of care, staffing, diagnostic capacity, and continuity of services, may have influenced whether individuals completed referrals. Consequently, failure to complete a referral may not necessarily reflect inadequate CHV follow-up or performance.

4. Some information was self-reported by CHVs and community members and may therefore have been affected by recall and social desirability biases, particularly among older CHVs. These biases may have influenced the reporting of screening, referral, and follow-up activities.
5. Some CHVs participating in the NCD programme were themselves experiencing NCD-related symptoms or health challenges, which may have affected their participation or ability to consistently deliver intervention activities. However, the extent to which this influenced the study outcomes could not be objectively quantified.
6. The study evaluated the intervention over a defined study period and therefore provides limited evidence regarding the long-term sustainability of improvements in CHV capacity, screening, and linkage to care after the intervention and research support were withdrawn. Future studies should use longer follow-up periods and, where feasible, incorporate health-facility-level measures to disentangle CHV-related effects from broader health-system constraints.

Ethical Considerations

Confidentiality was maintained across all sections and processes for this study. Study permission was obtained from the School of Postgraduate Studies at Jomo-Kenyatta University of Agriculture and Technology (JKUAT), Ref Number JKU/2/11/HS411-0183/2018.

Clearance and research ethical approval were obtained from the Ethical Review Board of Kenya Medical Research Institute (Scientific Ref Number KEMRI-SERU/CPHR/025-07-2021/4400).

A research permit was obtained from the National Commission for Science, Technology and Innovation Ref number NACOSTI/P/22/20516).

Subsequently, study permission was obtained from Nyeri County Ministry of Health Ref CGN/HEALTH/HRM/5/VOL11, Nyeri County Commissioner Ref NYC/ADM/1/57/VOL VIII/94, Ministry of Education Nyeri County Ref Number CDE/NYI/GEN/23/VOL IV/86 and later permission from community units in charge.

Before consenting to the study, participants were informed in a language they could understand, including the purpose, benefits, and risks associated with participating in the research and the aspect of absolute voluntarism.

Acknowledgement

The author acknowledges the community health volunteers across the selected community units, the Health Department, County and Local administrators of all the sub-counties where the study was conducted. KEMRI-SERU, JKUAT and NACOSTI for the licenses for data collection.

Conflict of interest: The authors declare no conflicts of interest.

Source of funding: The study was self-funded.

REFERENCES

- Jeet, G., Thakur, J. S., Prinja, S., & Singh, M. (2017). Community health workers for non-communicable diseases prevention and control in developing countries: Evidence and implications. *PLOS ONE*, 12(7), e0180640. <https://doi.org/10.1371/journal.pone.0180640>
- Kawakatsu, Y., Sugishita, T., Oruenjo, K., Wakhule, S., Kibosia, K., Were, E., & Honda, S. (2017). Effectiveness of and factors related to retention in community health volunteers in Kenya: A cross-sectional study. *BMJ Open*, 7(3), e015165. <https://doi.org/10.1136/bmjopen-2016-015165>
- Kok, M. C., Dieleman, M., Taegtmeier, M., Broerse, J. E., Kane, S. S., Ormel, H., Tijm, M. M., & de Koning, K. A. (2015). Which intervention design factors influence the performance of community health workers? A systematic review. *Health Policy and Planning*, 30(9), 1207–1227. <https://doi.org/10.1093/heapol/czu126>
- Mdege, N. D., Chindove, S., & Ali, S. (2017). The effectiveness and cost implications of task-shifting in the delivery of antiretroviral therapy: A systematic review. *Health Policy and Planning*, 32(7), 1044–1059. <https://doi.org/10.1093/heapol/czx033>
- Ministry of Health, Kenya. (2015). *Kenya national strategy for the prevention and control of non-communicable diseases 2015–2020*. Government of Kenya.
- Ministry of Health Kenya. (2020). *Kenya community health strategy 2020–2025*. Government of Kenya.
- Nxumalo, N., Goudge, J., & Manderson, L. (2018). Community health workers, recipients of care and stakeholders' perceptions of relationships in community-based health programmes: A systematic review. *Global Health*, 14(1), 71. <https://doi.org/10.1186/s12992-018-0396-7>
- Olaniran, A., Smith, H., Unkels, R., Bar-Zeev, S., & van den Broek, N. (2017). Who is a community health worker? A systematic review of definitions. *Global Health Action*, 10(1), 1272223. <https://doi.org/10.1080/16549716.2017.1272223>
- Perry, H. B., Zulliger, R., & Rogers, M. M. (2017). Community health workers in low-, middle-, and high-income countries: An overview of their history and effectiveness. *Annual Review of Public Health*, 38, 399–421. <https://doi.org/10.1146/annurev-publhealth-031816-044348>
- Rachlis, B., Naanyu, V., Wachira, J., et al. (2016). Community perceptions of community health workers in western Kenya. *Human Resources for Health*, 14, 47. <https://doi.org/10.1186/s12960-016-0142-4>
- Turin, T. C., Chowdhury, N., Haque, S., Rahman, M. M., & Rumana, N. (2021). Involving community health workers for management of NCDs in LMICs: A systematic review. *BMC Health Services Research*, 21, 1–15. <https://doi.org/10.1186/s12913-021-06279-5>
- World Health Organization. (2018). *Task shifting: Global recommendations and guidelines*. WHO.
- World Health Organization. (2015). *Global health workforce statistics*. WHO.

- World Health Organization. (2018). *WHO guideline on health policy and system support to optimize community health worker programmes*. WHO.
- World Health Organization. (2020). *State of the world's nursing 2020*. WHO.
- World Health Organization. (2023). *Noncommunicable diseases*. <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>