

Assessment of Barriers and Challenges to the Screening and Linkages of Non-Communicable Diseases by Community Health Volunteers in Nyeri County, Kenya

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Abstract

Non-communicable diseases (NCDs) are a significant global health challenge, contributing to 50% of worldwide morbidity and 63% of mortality. The burden is particularly substantial in low—and middle-income countries (LMICs), where 80% of NCD-related deaths occur. A quasi-experimental study addressed this challenge from May 2022 to March 2023. This study utilized a non-equivalent pre-and post-test design, with 300 participants in the quantitative and 70 in the qualitative. The study employed multistage cluster and random sampling to select ten community units, resulting in 150 community health volunteers (CHVs) in the control unit and 150 in the intervention group. Data collection was facilitated through the KOBO app. Qualitative data analysis involved six homogeneous focus group discussions (FGDs) and ten key informant interviews (KIIs), audio-recorded, transcribed, and analyzed using N-Vivo 12. Despite efforts to implement screening programs and improve linkages to care, significant barriers persist. This article reviews these barriers, drawing on current literature and empirical evidence. Key obstacles identified include limited awareness, inadequate healthcare infrastructure, cultural beliefs, financial constraints, fragmented healthcare systems, and challenges linking individuals to appropriate care services. The article explores strategies to overcome these barriers, emphasizing the importance of collaborative approaches involving stakeholders at various levels. Addressing these challenges aims to strengthen NCD screening and linkages to care, ultimately improving health outcomes for populations globally. Several recommendations emerge from the study's findings and literature review. Raising awareness about NCDs and preventive measures is crucial and can be achieved through targeted health education campaigns and community out-

reach programs. Addressing healthcare infrastructure deficiencies, such as inadequate facilities and workforce shortages, is essential to ensure access to quality care. Cultural beliefs and practices also play a significant role in shaping health-seeking behavior. Engaging with local communities and incorporating cultural sensitivity into healthcare delivery can help bridge the gap between traditional beliefs and modern healthcare practices. Financial constraints pose a significant barrier to healthcare services, particularly in LMICs. Innovative financing mechanisms, such as health insurance schemes or subsidies, can help alleviate this burden and improve access to care. Furthermore, the fragmented nature of healthcare systems can hinder effective NCD management. Enhancing coordination and integration between primary care providers, specialists, and community health workers is essential to ensure seamless care delivery and patient follow-up. Finally, strengthening linkages between screening programs and care services is critical for the timely diagnosis and management of NCDs. This requires establishing robust referral systems and ensuring continuity of care for patients throughout their healthcare journey. In conclusion, addressing the multifaceted barriers to NCD screening and care linkage is essential for improving health outcomes globally. By implementing targeted interventions and fostering collaboration among stakeholders, progress can be made towards reducing the burden of NCDs and promoting population health.

Keywords

Non-Communicable Diseases, Barriers, Challenges, Healthcare Infrastructure, Awareness, Cultural Beliefs, Financial Constraints

1. Introduction

Non-communicable diseases (NCDs) represent a significant and growing burden on global health systems, contributing to approximately 80% of all deaths worldwide [1]. These diseases include cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes, and are characterized by their chronic nature and long duration of illness. Despite advancements in medical science and healthcare delivery, the prevalence of NCDs continues to rise, particularly in low- and middle-income countries (LMICs). Screening for NCDs and ensuring effective linkages to care are critical components of efforts to mitigate their impact. However, various barriers and challenges hinder the effectiveness of these interventions. This article reviews the obstacles and difficulties in NCD screening and linkages to care, focusing on current literature and empirical evidence.

Community health volunteers (CHV) are crucial in extending care and support to the communities, particularly underserved populations in settings attributed to health workforce shortages and resource challenges [2]. In Sub-Saharan Africa and most low-income nations, the contribution of Community Health Volunteers has resulted in several health indicator gains in children's health, maternal, reproductive health, malaria and HIV/AIDS [3]. The efforts towards

achieving universal health coverage, as well as the Sustainable Development Goals agenda, put much emphasis on the countries investing in their community health workforce to support the delivery of primary healthcare interventions.

This call to action has witnessed African governments commit to addressing human resources for health challenges supported by global initiatives such as the One Million Community workforce campaign [4]. In the past, Community Health Volunteers have been part of primary healthcare systems, embedded within communities yet outside of, but aligned to professional health service structures. Therefore, the current global agenda is to integrate Community Health Volunteers programs into formal structures of national health services [5]. There is a worldwide consensus on the significance of community-based health workers and on consolidating the contribution of community-led health initiatives [5]. However, there is general acknowledgement that the roles and categories of these health care providers are often blurred in terms of engagement, e.g. are they paid? Contracted? Permanent or casual workers? Have they undergone accredited training? In addition, what recruitment mechanisms are used, including whether or not they seek to be residents of the communities they serve [6].

According to Oleribe *et al.* [7], high healthcare costs, lack of adequate infrastructure and health worker shortages all decrease the capability of low and middle-income nations to deliver primary healthcare services to their populations. Sub-Saharan Africa has about 3% of the global health workforce, and an estimated 1.5 million more health workers are needed to provide essential health services in the region [8]. Mainly in response to these health worker shortages, the WHO launched the “treat, train, retain” initiative to strengthen and enhance the global health workforce. This involved the development of more formal cadres of Community Health Workers defined as members who are selected by and answerable to the communities where they work, supported by the health system, and receive less training than formally trained health workers.

Generally, CHVs deliver low-cost primary healthcare services to the communities they serve. They are well situated to bridge the gap between communities and the healthcare system and facilitate engagement and overall continuity of care. Community Health Volunteers range from large-scale national programs to smaller community-led initiatives and have improved access and coverage of Health services in rural and remote areas in lower-middle-income countries [9].

While infectious diseases such as HIV/AIDS and Tuberculosis continue to exert a heavy toll in lower-middle-income Countries, NCDs are also on the rise, with an estimated 639-million hypertensive individuals living in developing countries [10]. In Kenya, NCDs increasingly account for a higher proportion of national morbidity and mortality, and numerous individuals are now living with more than one chronic condition. For instance, while individuals living with HIV represent about 7.1% of the Kenyan population, HIV/TB co-infection is also estimated to affect 48% of all new TB patients and hypertension among

people living with HIV is estimated at 11.2% and 7.4% for men and women respectively [9].

Community health volunteers (CHVs) in Kenya have the potential to improve access to primary healthcare and enhance outcomes, mostly where services are not readily available. This is evidenced by the use of CHVs in HIV programming, which has provided a full continuum of care at three levels: household, community, and facility levels. Thus, by adopting the F3C AMREF model, CHVs were adopted to deliver non-communicable disease services in Nyeri County, which focused on household or community and linkage processes.

At the household and community level, community health volunteers (CHVs) were trained to carry out education, awareness on risk factors, lifestyle modification, and screening for chronic diseases and those who tested positive like raised blood pressure and blood glucose, were referred to the nearest health care facility for further care and treatment and later back to the community treated and well equipped with Knowledge on NCDs hospital and self-care and for further follow-up by CHVs. To ensure that CHVs are effective in screening and linkages of NCDs in the county, there is a need to enhance the existing model by improving and introducing simple, tailor-made NCDs (Hypertension and Diabetes Mellitus) training modules for CHVs. The proposed model focused on skills training and capacity enhancement in terms of a didactic and practical approach that covered NCD causes, Risk factors, signs and symptoms, Investigations or diagnosis, prevention and control, and emergency care for NCD complications leading to the acronym “CRISPS model”, an NCD wheel and an NCD Mobile App [11].

2. Study Design

The research methods in the quasi-experimental study on screening non-communicable diseases (NCDs) in Nyeri County were comprehensive. They involved various stages: sample selection, data collection, analysis, and presentation. The study utilized a non-equivalent pretest and post-test design. A multistage cluster sampling was employed, which involved dividing sample units into clusters based on geography until suitable clusters were obtained [12]. One hundred fifty community health volunteers (CHVs) were randomly assigned to the intervention group and another 150 to the control group. Ideally, Research involving human participants must adhere to established ethical standards and be substantiated by evidence [13]. Recruitment and informed consent were obtained from CHVs aged 18 years and older who were approached for participation. Face-to-face meetings with researchers were conducted to create awareness about the study.

Six FGDs were conducted, each comprising ten homogenous CHV members. Participants were selected randomly from each community unit, and the FGDs covered various topics, including general knowledge of NCDs, risk factors, prevention, CHV skills perception, and linkage and referral processes. Discussions

were conducted in the group's preferred language and recorded for transcription and translation. Ten KIIs were conducted with community health workers chosen for their expertise or position, and these KIIs provided in-depth information to supplement quantitative data [14]. The topics covered were not limited to CHVs' capacity, perception, barriers, and facilitators in NCD screening and linkages with interviews recorded, transcribed, and translated for data analysis.

Transcripts from FGDs and KIIs were analyzed using qualitative methods. This analysis focused on themes such as CHV capacity, perception, knowledge, barriers, and facilitators to NCD screening and linkages, and this study adhered to recognized ethical guidelines for human subjects research where informed consent was obtained from all participants, confidentiality and privacy were maintained during data collection and analysis. Research findings were presented as a thematic analysis, highlighting key barriers and challenges in NCD screening and linkages in Nyeri County. In summary, the research methods involved in the study ensured rigorous data collection and analysis, adhering to ethical guidelines and employing a combination of quantitative and qualitative approaches to investigate barriers and challenges in NCD screening and linkages in Nyeri County.

2.1. Study Setting

The study was conducted in Nyeri County, Kenya, community units with varying NCD prevalence and associated comorbidities and mortalities. Ten (10) community units were selected randomly and allocated to intervention and control sites. These included Gatitu, Kamoko, Kinunga, Nyeri town, and Unjiru health centres formed Interventional groups and Gichira, Kiganjo, Mweiga, Ihururu, and Wamagana for control groups. Homogenous CHVs in these community units were alphabetically selected to produce a sample representing the whole population.

2.2. Study Participants

Community Health Volunteers who consented to the study. The study participants were selected from a pool of CHVs aged 18 years and above who were volunteers under the Community Health Strategy Program in Nyeri County and could consent to the study.

2.3. Current CHV Model

This CHV model was adopted from the AMREF facility-community chronic care (F3C), which is an HIV programming model but has been adapted for use in delivering non-communicable diseases (NCDs) screening and linkage services [15]. The model's continuum of care comprises three levels: household and Community, facility level, and linkages. At the household and community level, CHVs are trained to carry out education, awareness on risk factors, lifestyle modification, and screening for chronic diseases, and those who test positive for

raised blood pressure and blood glucose are referred to the nearest health care facility for further care and treatment.

At the linkage level, clients for chronic disease care identified at the community level were promptly paired with health centres that manage NCDs and act as referral units for CHVs. Once the clients receive care, they are empowered with knowledge of the disease and self-management and later linked back to the community through support groups and treatment. This model was introduced in Nyeri County and was purely adopted to prevent and promote healthy living, especially in children under five years and TB patients. Subsequently, during the outbreak of COVID-19, CHVs were deployed to carry out public health education and follow-up to ensure adherence to WHO protocols in the community units.

2.4. The Interventional Model

In Nyeri County, the use and reliability of CHV were remarkably noted in the control of COVID-19. The success of COVID-19 control and prevention was attributable to the use of CHVs, especially in how they carried out health education and promotion of healthy living. Later, due to the rising number of NCDs in the county, CHVs' scope of work was drastically shifted to screening and linkages of NCDs in their respective community units.

Despite the use of CHVs, the number of NCDs and their related complications continued to rise in the county. This led to questions regarding barriers and challenges to screening and linkages of NCDs in Nyeri County. Thus, these discussions and questions led to the coining of a simple, clear, and easy-to-understand model anchored on a locally available community item/food called Potato. Potatoes are locally available foods that are familiar and acceptable in every household [16]. Noticeably, this foodstuff can be used to create potato crisps that, if salted, are very crunchy and sweet and are a fast food snack for every reveller and locals. Therefore, this name was adopted and used to describe a model that focuses on NCDs, causes risk Investigations, signs, symptoms, predisposing and control factors and therefore an acronym Crisps, resulting in the CRISPS Model.

This Crisps model was adopted as it resonates well with the local staple food, i.e., potatoes commonly found in any family. Therefore, this analogue made it easier for CHVs to recall and attach education, screening, and linkages. This model introduced an intervention that focused on CHV skills and capacity building through didactic and practical training components that cover NCD causes, risk factors, signs and symptoms, investigations or diagnosis, prevention and control, and emergency care for NCD complications as described by the acronym "CRISPS". Later, this model was encrypted into a mobile app and an NCD Wheel, as shown in **Figure 1**.

2.5. Model Roll-Out

Community Health Volunteers were informed of the study and recruited as per

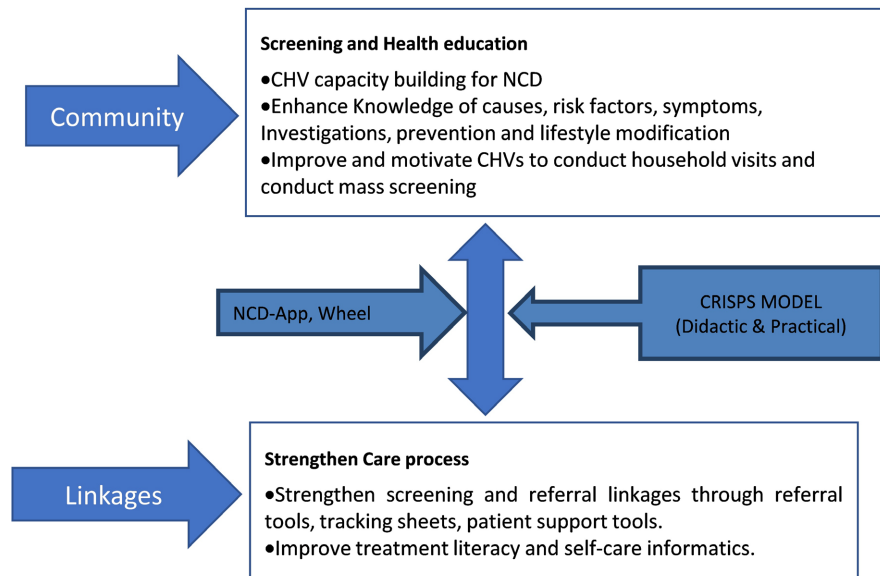


Figure 1. Linkage and referral process, (CHV handbook, MoH 2015).

study protocol. CHVs were either in two groups: an interventional unit group that was exposed to a pre and post-test exam and afterwards an intervention model (CRISPS model) and a control unit group that was enrolled on a pretest and no capacity building in terms of skills training but continued with routine NCDs screening and linkages in the respective community units. The intervention group underwent one week of training, including practical and didactic components. Training teams comprised health professionals fluent in official English and Kiswahili languages and predominantly spoken local languages at the community unit.

Didactic training covered NCDs definitions, causes, signs and symptoms, risk and predisposing factors, investigation and screening methods to use. Didactic programming is intended to facilitate the acquisition of essential competencies while addressing the ever-evolving needs of psychological practice, professional development, and current issues in the field [17]. Didactic elements were assessed using a pre-training knowledge test before the introduction of the Intervention, and later, the aspect was evaluated with a post-training knowledge test before deploying CHVs to the field for screening and linkages. Practical training covered knowledge on various components of blood pressure machines, establishing correct cuff size, and how to take and interpret blood pressure at different sites, which includes the arm and leg, and taken 5 minutes apart with an automated Omron blood pressure machine.

Further practical topics covered measuring height with a tape measure mounted on a stand and taking weight using a digital scale, calculating BMI with a target population, completing risk factor and linkages forms, and maintaining confidentiality during the screening and linkage process. Practical assessments were completed by the trainers obtaining anthropometric measurements on an individual basis as part of the post-training assessment. Only CHVs who passed

both the knowledge test with a minimum score of 60% on content knowledge for NCD pretests and the usage of tools, interpretation, and recording of screening results were deployed to their respective community units, and those not meeting the scores joined the next group of CHVs for remedial training.

The CHVs deployed to the field carried out return demonstrations under the observation of research assistants during a 1 - 2-week run-in period. The research coordinator randomly selected a Community unit, and the corresponding CHVs accompanied the researcher for the day's screening and linkages activity, directly observed the process, and ensured adherence to the study guidelines and protocols. All CHVs were observed in this manner before the end of the run-in period to help identify any performance issues before they participated in the study, and those CHVs who did not do so well in this run-in period were paired with other CHVs who performed so well in the run-in period for support and mentorship. After the run-in period, the CHVs were officially deployed to their respective community units. The research team started the follow-up process with study tools like questionnaires, group discussions, and interview guides.

2.6. Data Management and Analysis

This study relied on a mobile data collection app, whereby a smartphone running Android version 9 software and a Kobo Toolbox were used to collect and store data from the study participants. This method was ideal, considering that the country was recovering from the COVID-19 menace. The technique enabled real-time data transmission, and analysis was very prompt and efficient. In this study, data management comprises two stages: data entry by clerks and data analysis by the researcher with the help of a statistician.

Focused group discussions and Key Informant interview data were audio-recorded, transcribed, translated into English, and coded for content analysis through N-Vivo software version 12 according to themes. The findings augment quantitative results and later conclude whether the Intervention employed in the CHVs model effectively screened and linkages of NCDs

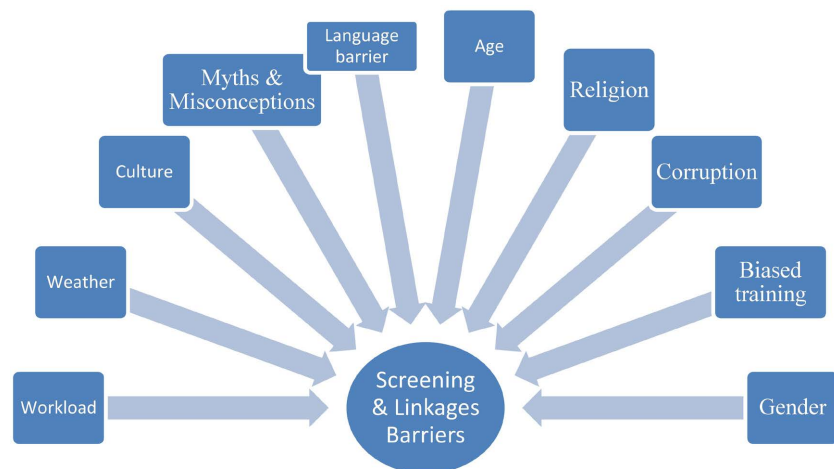
3. Results

Three hundred (300) CHVs (150 per arm), ten key informants, and six focused group discussions comprised of 10 discussants per group, consisting of community health workers and community health volunteers, respectively, were included in the study. The response rate was 100%. The majority, 61.3% (n = 184) of the community health volunteers were female, and 72.7% (n = 218) were aged 40 years and above. In investigating the level of education, 71.7 % (n = 215) had secondary level as their highest level of education, as shown in **Table 1**.

The objective identified several barriers to screening and linkage of NCDs among CHVs within the community context and, therefore, six key sub-themes were identified, as shown in the mind map below (**Figure 2**), as interlinks between the different barriers described by the study participants during their plenary

Table 1. The demographic characteristics of CHVs in Nyeri County.

Demographic factors	Frequency	Per cent
Gender		
Female	184	61.3
Male	116	38.7
Age (Mean, SD)		
18 - 25 years	5	1.6
26 - 33 years	17	5.6
34 - 40 years	60	20.1
Above 40 years	218	72.7
Highest level of education		
Secondary level	215	71.7
Certificate/diploma	73	24.3
Master's level	12	4
Occupation		
Casual	115	38.3
Self-employed	145	48.3
Salaried employee	40	13.4

**Figure 2.** A mind map showing NCD screening and linkage barriers.

discussion. Some of these include traditional beliefs, culture, religion, myths, and misconceptions, which were the major contributors to the barriers the CHVs were facing in screening and linking NCDs in the community.

Most community health volunteers claimed the work was heavy as they were sometimes given challenging targets. The target of ensuring they would refer thirty-three households a month was an issue, and this also affected their work because some were ill-equipped with knowledge about non-communicable diseases. In addition, gender played a key role because CHVs had difficulty han-

dling men. Women quickly opened up and were seen to be found chiefly at home, while men seemed to be more reserved and not interested in health discussions.

Evidence-based health communication and best practices can assist individuals in developing healthy and good habits [18]. It was apparent that communication was among the barriers in screening and linking NCDs when it came to household members who were deaf, blind, and dumb. It was a challenge for CHVs as they could not deliver information in sign language. Hence, it was hard to communicate and screen their health problems so that they could be solved or linked to health facilities. This caused misunderstanding as the community members felt ignored by the CHVs. To some extent, some could fear and not open up about their problems due to fear of confidentiality breaching as the CHVs came from the same community, and this is summarized in **Figure 2**, which shows a mind map of barriers and challenges on NCDs screening and linkage.

The data on challenges and barriers in screening and linkage were collected using a five-point Likert scale. Notably, a five-point Likert scale allows for a range of responses, providing more nuanced data than a binary scale [19]. Still, they were regrouped into three main groups during analysis to enhance emphasis. The findings showed that lack of relevant knowledge hinders CHV's capacity for effective screening and linkage of NCDs ($M = 4.1$, $SD = 0.8$), lack of necessary resources and supplies can also impede the capacity of CHVs' service delivery in the community ($M = 4.0$, $SD = 0.6$) and CHVs still consider the lack of the necessary medical supplies as a significant barrier to their line of work ($M = 4.0$, $SD = 0.7$) were the common barriers in screening and linkages of NCDs in Nyeri county as shown in **Table 2**.

Several themes were identified as barriers to screening and linking NCDs among CHVs within the community. These include;

Table 2. Challenges and barriers to screening and linkage of NCDs.

	Disagree n (%)	Neutral n (%)	Agree n (%)	Mean \pm SD
Lack of relevant knowledge Hinders CHV's capacity for effective screening and linkage	6 (2.0)	52 (17.3)	242 (80.7)	4.17 \pm 0.8
CHVs, in most instances, work in health systems that are mostly under-supported and have a huge personnel shortage.	19 (6.3)	86 (28.7)	195 (65.0)	3.68 \pm 0.7
The high workload at the healthcare facility can challenge the effective screening and linkage process of NCDs.	13 (4.3)	68 (22.7)	219 (73.0)	3.76 \pm 0.7
Lack of necessary resources and supplies can also hinder CHVs' service delivery capacity.	4 (1.3)	51 (17.0)	190 (63.3)	4.0 \pm 0.6
CHVs' lack of the necessary medical supplies is a significant barrier to their line of work.	3 (1.0)	65 (21.7)	232 (77.3)	4.0 \pm 0.7
The name suggests that CHVs work completely voluntarily with no monetary incentive whatsoever.	12 (4.0)	104 (34.7)	184 (61.3)	3.63 \pm 0.7

3.1. Traditional Beliefs

Traditional beliefs, culture, religion, myths and misconceptions were significant contributors to the barriers the community health workers were facing in screening and linkage of NCDs in the community. Community members who suffered from chronic heritable non-communicable diseases believed it was witchcraft or a curse. Some religions were against vaccination, whereby it would be a challenge to administer the polio vaccine to children. Nonetheless, some community members were against taking out babies to get the sun, whereby lack of Vitamin D led to diseases such as jaundice. Herbal or traditional medicines were embraced, and religion and culture led to community members being against modern medicines, as they believed the traditional ones would be able to cure them.

“Another barrier is traditional myths and misconceptions whereby people don’t recognize the role of hospitals. Some people think that some diseases are due to witchcraft and think that they can only be treated with traditional medicine and prayers. As a CHV, you will go and explain to them, but to them, they do not believe that it is a disease and should instead be handled with prayers and using traditional medicine.” [FGD]

“There are some traditions where they believe that if you expose the child, then the child will be bewitched. As a result, the child is prevented from getting sunlight, which is very important. Some of the children even develop jaundice as a result.” [FGD] *“There are some communities which don’t embrace modern medicine. Regardless of the disease you have, you are supposed to be prayed for and probably given some herbs, but not going to the hospital. It is quickly dismissed if you devise the idea about the hospital.” [FGD]*

“A big percentage of people that are suffering from non-communicable diseases are those who believe in being bewitched. They assume that when you have a chronic illness, it is as a result of being bewitched probably because by the time some diseases are discovered, you have probably been to more than one hospital.” [FGD] *“People have cultures and traditions whereby they believe that mental illness is a result of being bewitched. Many people believe that the chronic illnesses are as a result of being bewitched. There is very little that you can tell such a household. It will be as if you are singing to goats because they have not embraced modern medicine.” [FGD]*

3.2. Workload

The majority of the community health volunteers interviewed claimed the work was heavy as they were sometimes challenged to meet targets. For example, the target of ensuring they would refer thirty-three households a month was an issue, and this also affected their payments, as sometimes they were paid according to the number of referrals they made. The community members would sometimes be referred but not seek treatment in the health facilities.

“I think the workload is way up because they want 80% performance, which is

more than 80% for you to qualify for the stipend. That means you will not qualify for the stipend if you do not hit that target. You might go to a household and find people who are not present. That means that you will have to revisit the household later. You will probably need to revisit the household when you really should be going to your house, and all this is supposed to be done within the work's limited time. This makes this job challenging because some clients don't want to talk to you.” [FGD]

“Sometimes the workload is just too much. For example, I am a mother and don't have a house to help. It means I must cook and wash the baby's clothes and my husband's child. Meanwhile, I am also needed in the community; a mother probably doesn't want to take their child to the hospital. I must suspend my work, attend to the more agent situation, and resume later.” [FGD] *“Workload affects us a lot because, as she said, we have to attend to other side hustles to make ends meet. Remember that right now, they have increased the number of households that we are supposed to visit. You can imagine if I work and I am not motivated in any way.” [FGD]*

“The workload is high, but the salary is small. Were these people able to pay us properly for my bills so I could work full time without needing to go for other side hustles? However, with the current stipend of 3500, it is not fair to give me much work with that little pay. We are being treated as donkeys right now. That is what I can say. We are being given unrealistic targets.” [FGD] *“These days, we have performance on pay whereby you are paid according to your performance, yet the workload is also high. We have a target of 33 households and a quarterly target of 100 households. We have a challenge because that workload is high, and we also have duties that we are supposed to attend to because we are family men and women.” [FGD]*

3.3. Inadequate Training

The results illustrated various challenges community health workers and volunteers faced, and the most common one was being less equipped with knowledge about non-communicable diseases (NCDs). The training on NCDs was insufficient, and not every community health worker could attend all the training, which led to a gap in the screening and linkage of NCDs. The community health volunteers claimed insufficient facilitation, such as self-test kits and limited stipends for running their household activities.

They felt the training was done based on biased selection, and not every CHV could attend all the training. A few of the health workers are not well trained because they encounter scenarios that require them to have specific knowledge [20]. However, due to the lack of understanding from biased training, they cannot solve issues such as answering questions being asked in the community.

“Financial challenges, equipment, and the right working tools like kits. We need to be equipped with tools so that we might work.” [KII] *“The challenges are there, for example, you might visit a household and meet challenges like*

gender and education; there are some who are ignorant; we have age, time, and religion. Members of some religions might decline modern healthcare. Some may refuse completely, but you do not necessarily give up; you can invite the doctor to the house to give them more information.” [KII]

“Challenge number one, I can say that we are not equipped with the knowledge about these non-communicable diseases. Challenge number two: we do not have uniforms or badges to identify ourselves. As a community health volunteer, I am supposed to be known not only in the households that I serve but also in the households that I serve. I am supposed to be known beyond. Therefore, having a badge or uniform will make this possible. Another thing is the finances; we are supposed to be paid a salary to become community health workers and not volunteers.” [KII] “While we say that we should take care of the village, the situation continues deteriorating because of a lack of action. No action is taken even after we report cases.” [FGD]

3.4. Gender and Perception

The findings showed that women were easier to deal with than men. This was due to women quickly opening up and airing their views and problems, while men seemed more reserved and uninterested in health discussions. Women were seen to be found chiefly at home compared to men, and hence, as community health volunteers went around, they would do health talks to women more than men, which affected their work in terms of delivery.

“Even gender. Assuming someone like him comes to educate me, I will dismiss him based on age. What can he possibly teach me about nutrition for the children or about hygiene? Some clients take some information for granted because they are older and have been doing something for a long time.” [FGD]

“Yes, sometimes we go to households with a man, a woman. The women are very open compared to the men. Sometimes, the men send us out and ask us to discuss things outside. He pretends that he does not want to listen because he does not embrace family planning; all they want to be doing is to impregnate their wives. Such men do not understand the need for condoms, and they do not embrace it. They rationalize it by saying that even their father never used to use condoms. They are very young but very ignorant.” [FGD]

“Assuming I have visited a man and I want to teach them about condoms as a contraceptive and also as a way of preventing diseases, the client can tell you that they do not know how to use it and they need you to show them how it is used. He then tells you that you can even put it on for them. Gender is, therefore, a challenge for a woman like me, especially when I am dealing with a man.” [FGD]

3.5. Communication

Communication was among the barriers in screening and linking NCDs to household members who were deaf, blind, and dumb. It was a challenge for

CHVs as they could not deliver information in sign language. The community health workers and volunteers could not communicate using sign language as they lacked sign language skills. Hence, it was hard to communicate and screen their health problems so that they could be solved or linked to health facilities. Also, language problems can severely limit participation in research, which might provide biased and incomplete results [21]. The language barrier was a challenge; community health workers/volunteers would meet members who did not understand the national language and would communicate with their locals. This caused misunderstanding as the members felt ignored by the CHVs or CHWs. Some could fear and not open up about their problems due to fear of confidentiality breaching, as the CHVs came from the same community.

“The other challenge that we have is the people living with disabilities, especially those who are deaf. It is a challenge dealing with such people. You might visit a person and find that he is blind. Though he can hear you, he is blind, and often, you are at a loss about how that should turn out. Some clients are deaf, which makes communication a challenge. Therefore, we should be trained at least in sign language because these are challenges we find on the ground. So we should be trained in sign language.” [FGD]

“In some cases, the language barrier issue might arise, thus hindering communication. Some of them even get offended if you tell them that you do not understand the language that they are speaking. That is why we walk in pairs so that at least someone who understands a different language can assist where necessary. I do the same when I go to a place where a different community is predominant so that at least the language barrier is removed.” [FGD]

“The other challenge is fear. Some clients fear opening up because they imagine we might breach confidentiality. They will continue suffering because of non-disclosure. They might also fail to disclose because we do not usually have any supplies when visiting them. While I want to know how they are doing, I do not have anything that I am giving them. Lacking equipment is, therefore, a big challenge” [FGD].

The participants stated that the CHVs face barriers in their community engagement regarding the screening and linkage of NCDs. Some approaches and skills can be adopted to improve efficiency in enhancing the capacity of CHVs in the screening and linkage NCDs. This has produced an effective screening and linkage model.

According to the findings, communication, mobilization, and sensitization were identified as effective models used to screen and link non-communicable diseases. The communication methods used by health workers include sharing information about healthy lifestyle practices, early signs and symptoms of NCDs, the reasons for the screening, and timely medical attendance [22]. Communities Health Workers arrange community meetings, mobile vans, and door visits for all-around participation and involvement. The community health volunteers would visit a household, pass information or educate the household members on health matters and refer cases to health facilities for further treatment (Figure 3).

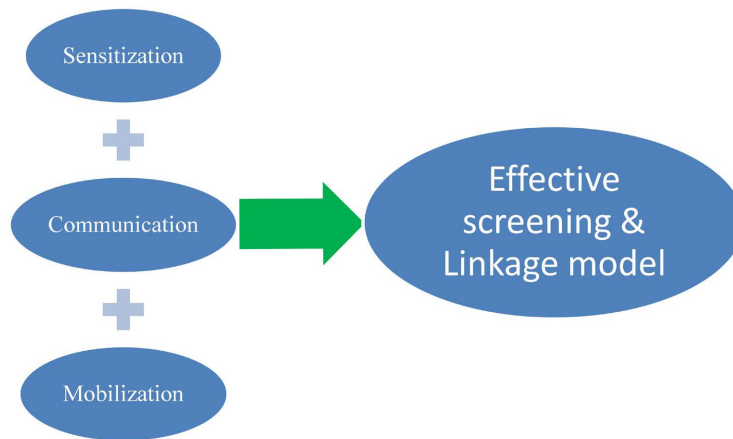


Figure 3. A mind map showing effective NCD screening and linkage model.

“Sensitization. While we are sensitizing persons infected with non-communicable diseases, at that point, someone can get information about where they can be treated.” [FGD] “Most of us are CHVs, as we visit the households, we will encounter those things. You find those cases in households. You can initiate a health talk and refer the client to the facility. [FGD]

“As CHVs, mostly we don’t do the screening. While in the village, we are accompanied by doctors. If no one accompanies us, we are given the self-kit, for example, the HIV kit. You can give it to the client so that they can report the results. If they fail to share the results, you can report them so they can go to the doctor and be tested again.” [FGD] “We are only considered when something happens in the community, so I can mobilize. If everything is calm and quiet, nobody cares about us. However, whenever we have an outbreak of something, the CHV is usually considered so that they can do mobilization.” [FGD]

4. Discussion

In summary, the findings highlight the barriers and challenges experienced by CHVs and the disparities between CHVs in different groups, emphasizing the critical need for comprehensive training, resources, and a better understanding of their roles to optimize their contributions in NCD screening and linkage. It emphasizes the importance of addressing these factors to enhance the effectiveness and impact of CHVs in dealing with Non-Communicable Diseases. Community members and health workers include traditional beliefs; some community members attributed hereditary chronic diseases to witchcraft or curses, and some religious practices that are against vaccinations and modern medicine hindered progress. Despite the above, gross workload challenges were experienced by CHVs who could traverse across heavy workloads and struggled to meet targets, affecting payments. Sometimes, referrals made did not result in community members seeking treatment.

Further, it was noted that CHVs lacked comprehensive training in NCDs. Biased training sessions left gaps in their knowledge, inadequate facilitation and

limited stipends further hampered their activities. In such activities, women were more open to health discussions compared to men, but in case of a communication breakdown due to health-related complications like hearing loss, blindness, or speech-impaired individuals affects the screening process. These findings show the multifaceted barriers CHVs face in their efforts to screen and link NCDs. Traditional beliefs and culture significantly influence community members' perceptions, hindering acceptance of modern healthcare practices and workload challenges, and inadequate training curtails CHVs' effectiveness in delivering health services. Moreover, gender-related communication issues and ineffective communication methods further complicate the efforts of CHVs. These challenges highlight the need for comprehensive and culturally sensitive training, addressing workload concerns, and providing essential resources to enhance CHVs' efficiency.

The study also notes the potential for improvement, emphasizing effective models involving communication, mobilization, and sensitization. A more structured and community-centric approach can enhance the capacity of CHVs in NCD screening and linkage. These findings underline the importance of addressing barriers and introducing effective strategies for improved engagement and effectiveness of CHVs in combating NCDs, and this gives a mind map of an effective screening and linkage model, as shown in the below diagram that shows communication, mobilization, and sensitization was the key ingredient in nourishing an effective screening and linkages of NCDs in Nyeri.

Addressing the barriers and challenges in NCD screening and linkages to care in Nyeri County requires a multifaceted approach involving stakeholders at various levels. Some potential strategies and interventions include conducting Health Education and Awareness Campaigns that should target educational campaigns that raise awareness about NCDs, their risk factors, and the importance of early screening, as well as utilizing community health workers and local leaders to disseminate information and address cultural beliefs and misconceptions [23]. There is also a need to strengthen healthcare infrastructure by investing in its expansion and upgrading facilities in underserved areas, ensuring they are adequately equipped and staffed to provide NCD screening and treatment services. Mobile clinics and telemedicine initiatives can also help reach remote populations.

To achieve universal NCD screening and linkages in the county, financial barriers must be reduced by exploring options for subsidizing or waiving the cost of NCD screening tests and essential medications for low-income individuals and advocating for comprehensive NCD services inclusivity in public health insurance schemes to improve financial access to care. Integrating Care Models and implementing their processes helps streamline the referral process and facilitates seamless transitions between primary, secondary, and tertiary care services [24]. This fosters collaboration between different healthcare providers and sectors to improve care coordination, and coupled with community engagement and em-

powerment, communities learn to take ownership of their health through community-based interventions, peer support groups, and self-management programs for individuals with NCDs. Engage local organizations and community leaders in advocacy efforts and program planning.

Finally, it is essential to invest in robust health information systems for data collection, analysis, and surveillance of NCDs and to ensure consistency in client management now and in the future. Electronic medical records and health information exchanges will facilitate continuity of care and monitor patient outcomes.

5. Conclusions

Addressing the barriers and challenges in screening and linkages of non-communicable diseases in Nyeri County is essential for reducing the burden of NCDs and improving population health outcomes. By implementing targeted strategies and interventions that address healthcare infrastructure, financial barriers, cultural beliefs, and systemic issues, stakeholders can work together to strengthen NCD prevention, screening, and care services. Through collaborative efforts involving government agencies, healthcare providers, community organizations, and individuals, it is possible to overcome these challenges and create a more resilient and inclusive healthcare system that prioritizes the well-being of all residents in Nyeri County.

Effective screening and linkage to care are essential components of comprehensive strategies to address the growing burden of non-communicable diseases globally. However, numerous barriers and challenges hinder the effectiveness of these efforts, particularly in low- and middle-income countries. By addressing these barriers through targeted interventions and collaborative approaches, stakeholders can work together to strengthen NCD prevention, screening, and care services and improve health outcomes for populations worldwide. Continued investment in healthcare infrastructure, health education, and health system strengthening is essential to overcoming these challenges and achieving meaningful progress in the fight against NCDs.

The barriers and challenges in screening and linkages to care for non-communicable diseases are multifaceted and complex. Addressing these challenges requires concerted efforts from policymakers, healthcare providers, communities, and other stakeholders. By implementing targeted strategies to improve awareness, strengthen healthcare infrastructure, reduce financial barriers, enhance care coordination, and engage communities, overcoming these challenges and improving health outcomes for individuals affected by NCDs is possible. Continued research, innovation, and collaboration investment will be crucial in the ongoing fight against NCDs and promoting global health equity.

Recommendations

1) Continued and Improved Training: To bridge the knowledge gap regarding NCDs, CHVs must receive ongoing, comprehensive, and culturally sen-

sitive training. Such training should encompass modern practices, handling workload challenges, and better communication strategies tailored to diverse community needs.

2) Community Engagement and Sensitization: Implementing more structured, community-centric approaches involving effective communication, mobilization, and sensitization can enhance the capacity and acceptance of CHVs' roles in combating NCDs. Addressing traditional beliefs and engaging with local structures and committees is vital to aligning the community with modern healthcare practices.

3) Research Continuation and Policy Implementation: Continuous research and evaluation should drive policy implementations, ensuring that insights gathered are translated into practical changes. This might include reforms in CHV training modules, healthcare resource distribution, and community engagement programs to improve NCD screening and linkage.

Strength of the Study

This study overly focused on the CHVs, who are community-owned resource persons, privy to the community units they serve, and part of the NCD cycle. The Intervention's involvement and subsequent follow-up and return demonstration in the community enabled a process of engagement among the CHVs, which brought about a sense of ownership and belonging.

However, the study had a few limitations, including recall biases among the elderly CHVs, and some of the CHVs in the NCD program experienced some forms of discomfort due to the NCD disease process they are undergoing.

Ethical Considerations

Confidentiality was maintained across all sections and processes for this study. Study permission was obtained from the School of Postgraduate at Jomo-Kenyatta University of Agriculture and Technology (JKUAT) Ref Number JKU/2/11/HSH411-0183/2018, clearance and research ethical approval was 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 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-charges. Before consenting to the study, participants were explained in a language they could understand, including the purpose, benefits, and risks associated with participating in the research and the aspect of absolute voluntarism.

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Conflicts of Interest

The authors declare no conflicts of interest.

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