Facilitators and Barriers in the Implementation of Community Health Workers-Led Multicomponent Intervention to Control Hypertension at Selected Health Centers in Rwanda: Qualitative Research

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Abstract

Introduction

Hypertension (HTN) is a leading cause of cardiovascular disease and mortality, with the majority of deaths occurring in LMICs. New models for hypertension care are imperative. Community health worker (CHW)-led multicomponent intervention (MCI) is a model for controlling HTN at the community level. We explored the facilitators and barriers related to the implementation of CHW-led MCI to control hypertension in two districts and selected health centers within the catchment area.

Materials and methods

Two focus group discussions and in-depth interviews were conducted with 48 participants, comprising health center NCD nurses, health center managers, community health workers, and hypertensive patients, as well as two key informant interviews in Gasabo and Bugesera districts, Rwanda, between January and March 2025. The qualitative data were digitally recorded, transcribed verbatim and analyzed via multistepthematic analysis.

Results

The facilitators include financial motivation, training, and increasing CHWs' level of education, and barriers include insufficient financial support, a lack of training, being overwhelmed with responsibilities, a low level of education, and a lack of training specific to hypertension. The scale-up of HTN management from district hospitals to health centers was reported to be generally successful in Rwanda.

Conclusions

This study's findings revealed some facilitators and barriers in the implementation of CHW-led MCI for the management of hypertension in the community. The scale-up of hypertension management from hospitals to health centers was reported to be a successful step in the management of NCDs in selected study settings, which can be a basis for scaling up management to the community level, as this step will be validatedby a quantitative study under investigation, which will highlight the effectiveness of CHW-led MCI in the management of uncontrolled hypertension in the community.

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INTRODUCTION

Hypertension is defined as having a systolic blood pressure (SBP) of 140 mm Hg or higher and/or a diastolic blood pressure (DBP) of 90 mm Hg or higher [1]. Hypertension (HTN) is often not taken seriously by patients because of its chronic and quiet nature. The most important part of long-term care for hypertension patients is lifestyle adjustment, which includes nutrition, exercise, and social behaviors [2]. Hypertension (HTN) is the world's largest risk factor for cardiovascular disease and is caused by a

mix of genetic, environmental, and social variables [3]. To enhance cardiovascular health, scientific information, expert suggestions, and blood pressure control, especially among disproportionately afflicted communities, are critically needed [4]. The factors that contribute to hypertension inequities exist at the community, healthcare system, and individual levels [5]. Despite the availability of clinical practice guidelines for hypertension care, blood pressure (BP) regulation remains suboptimal (< 30%), even in high-income nations [6].

In industrialized countries, such as the United States, key approaches for controlling hypertension include, but are not limited to, accurate blood pressure measurements, increased use of self-measured blood pressure monitoring, and the use of Community Health Workers' multicomponent intervention (CHW-led MCI) [3]. This CHW-led MCI is composed of health education on lifestyle modifications, medication adherence, and monitoring of blood pressure measurements at home at least once a month, but it also ensures home visit check-ups [7]. Regardless of scale, community hypertension awareness programs, paired with intervention measures conducted by healthcare systems, might be implemented concurrently to achieve a synergetic impact [8]. Despite the availability of evidence-based hypertension treatment guidelines in Guatemala, various hurdles prevent hypertension from being managed appropriately in primary care. In Guatemala, there are several limitations in hypertension management, including a limited health budget for the treatment of non-communicable diseases, fragmented governance and service delivery, inadequate training of the healthcare workforce, and a shortage of essential hypertensive medications and basic equipment, particularly in frontline facilities [9].

In low- and middle-income countries (LMICs), such as Sri Lanka, a study provided evidence of the effectiveness and cost-effectiveness of MCI strategies for BP control compared with usual care in the rural public health infrastructure in South Asian countries [10]. In Tajikistan, the results for the case detection step of the cascade of care showed the greatest disparities. Misinformation about hypertension, confusing methods, and insufficient delivery capacity all serve as barriers to case discovery. The identified solutions to these difficulties included mobilizing faith-based organizations, scaling up screening through health caravans, task shifting to increase provider supply, and providing employment aid for providers[11]; patients in Bangladesh were unable to seek and receive treatment from government facilities because of hurdles to access hypertension prevention and management. Expanding the role of community health professionals in disseminating chronic illness information may increase patients' access to hypertension care in remote regions [12].

In African countries such as Ethiopia, patients' beliefs about hypertension, the prevalent use of food during festivals, and insufficient physical activity are connected with poor blood pressure management. The utility of CHWs in addressing the abovementioned challenges is as follows [13]. In Egypt, various media outlets, such as television, are used to improve public awareness of hypertension, prevention, and intervention to control hypertension not merely by CHWs [14]. In Rwanda, the low level of awareness of HTN is a concern; however, some experts believe this could be a result of the combined effects of conflicting priorities in health care [15]. Recognizing the multifaceted nature of the hurdles to HTN control, particularly in LMICs, is critical in planning and implementing tailored interventions [16].

Therefore, we explored the facilitators of and barriers to the implementation of CHW-led MCI, which could benefit more patients in controlling hypertension [17].

MATERIAL AND METHODS

Research design

This qualitative study was conducted in selected health centers located in the Gasabo and Nyamata districts to explore the facilitators of and barriers to implementing Community Health Workers-Led Multicomponent Intervention (CHWs-Led MCI).

Study setting

This study was conducted in two selected districts, namely, the Gasabo and Bugesera (rural) districts. The two districts selected for representing urban (Gasabo) and rural (Bugesera) areas are located in the city of Kigali and Eastern Province in Rwanda, respectively. The Bugesera district has one district hospital called Nyamata hospital and 15 health centers. Nyamata Hospital provides health care services to 434,668 inhabitants from Bugesera district (80%) and other neighboring districts (20%) and supervises 15 health centers and one prison dispensary located in its catchment area. The Gasabo district is one of the three districts that make up the city of Kigali Province. It is made of 15 Sectors. The Gasabo district has one district hospital called Kibagabaga Hospital. Kibagabaga Hospital, which is now 20 years old, serves over 879,504 people in the Gasabo district and beyond, with an average of 5,700 patients per month. The facility supervises 17 health centers, 43 health posts, and five ambulances; however, it has staff gaps of 260 workers, some specialties lacking equipment and skills, and limited space for beds and outpatient services. This study was conducted in randomly selected health centers from two districts. This included four health centers from the Gasabo district (Gihogwe, Kagugu, Bumbogo, and Remera health centers) and four health centers from the Bugesera district (Nyamata, Mayange, Gashora, and Ntarama health centers) to represent the Rwandan primary healthcare settings. The abovementioned study area was added to the Department of Noncommunicable Disease from RBC Rwanda to ensure the point of view of policymakers and the community health department at the Ministry of Health.

The CHW-led MCI

This CHW-led MCI was composed of health education on lifestyle modifications, medication adherence, and monitoring blood pressure measurements at home at least once a month (mid-month; depending on the appointment date at the health center) but also ensures that home visit check-ups are given to patients with uncontrolled hypertension at least once a month.

Study population

The target population consisted of purposefully selected uncontrolled hypertensive patients attending Rwanda health centers, NCD clinic nurses, health center managers, and health policymakers in direct contact with hypertension management but also working closely with community health workers and were selected as information-rich participants until we approached theoretical saturation, which occurred when successive interviews failed to create new additional information.

Inclusion and exclusion criteria

Inclusion criteria

In-depth interviews

The study included twenty-one-year-old and older participants from the target population without a physical or mental health disorder.

Focus Group Discussions

The study included 20 male and female patients aged one year or older with uncontrolled hypertension without a physical or mental health disorder.

Exclusion criteria

Uncontrolled hypertensive patients who were not between 21 and 75 years of age were excluded.

Participants and data collection

A total of forty-eight study participants were purposively selected. Gender, age, district, and socioeconomic status were considered to ensure that they were fairly represented in each category of the study participants (Table 1). Thematic saturation was established when all the researchers discussed and agreed that diverse responses had been obtained and that no new themes emerged from the data. Healthcare providers, which included community health workers, NCD clinic nurses, and health center managers, as well as health policy makers, were purposively selected to ensure representativeness of the health sector in the research. Additionally, patients with uncontrolled hypertension were also considered.

The study participants who received in-depth interviews (IDIs) were health center nurses, health center managers, hypertensive patients, community health workers (CHWs), and healthcare policymakers selected according to their relevant position within the NCD department and community health worker management in the Ministry of Health. Focus group discussions (FGDs) were conducted on the ten hypertensive patients in two different groups of five patients each. FGD participants vary on the basis of the objective of the study and can range from 4–7 or 8–12 [18, 19]. The principal investigator carried out

face-to-face semistructured interviews and focus group discussions (FGDs). The research team was trained to respond to any sensitive situations or signs of distress with appropriate wording, supportive statements, and avoidance of excessive probing.

A pretest was performed on different study participants to standardize the interview guides. On the basis of the participants' preferences, interviews were conducted in English and/or Kinyarwanda, whereas the FGDs were conducted in Kinyarwanda. The researcher interviewed 8 patients enrolled in NCD clinics at health centers. The interviews were conducted privately at the health centers and ranged from 5–20 minutes.

The interview topics for hypertensive patients included a) knowledge of hypertension and its diagnosis, b) how treatment and prevention of hypertension are provided, c) experiences when seeking care and recommendations for improvement, d) factors influencing adherence, e) the role of community health workers in improving the control of hypertension among patients with uncontrolled hypertension and f) facilitators and barriers that may be present in the implementation of community health worker-led multicomponent interventions to control hypertension. The two interviews with policy-makers were tailored to their expertise and position. The interviews focused on understanding NCD programs, the key barriers in the implementation of hypertension programs, key health system-level facilitators, the key actors, aspects that need improvement, and the commitment to scaling up the CHW-led intervention program. The researcher performed two focus group discussions with a total of 10 hypertensive patients to explore their experiences with care in health centers and their opinions about community health workers' multicomponent intervention at their household at the community level. In addition, two FGDs of CHWs were conducted, with eight participants.

Sample size

The sample followed the qualitative principle of data saturation and maximum variation in respondents [20, 21]. Specifically, the study sample size was 48 study participants.

Table 1
Categories of the study participants interviewed

Informants	In-Depth Interviews(IDI)	Two Focus group discussions (FGD)	Total
Patients	8	10	18
Community health workers	6	8	14
Health center nurses	16	-	16
Health center managers	6	-	6
Policymakers	2	-	2
Total	**38**	**18**	**56**

Data collection procedure

Purposive sampling techniques were employed to identify, approach, and recruit participants at each level of the health system until the qualitative principle of data saturation and maximum variation in respondents was achieved.

The investigator enrolled qualitative participants as described above in the study population section and fulfilled the inclusion criteria. However, some participants who came for their routine care at the selected health centers in Rwanda were provided with a participant information sheet (PIS) by a healthcare provider and the principal investigator at the end of the consultation to take home, read, and return upon the next visit for possible enrollment in the study. All the interviews were conducted in Kinyarwanda or English, tape-recorded, and translated into English before being coded. The research team ensured that all respondents had an opportunity to express their views freely, and the FGD/IDI venues were scheduled in locations where they felt comfortable at their respective health facilities or offices. For FGDs, the investigator encouraged all participants to contribute, and each session took approximately 30–60 minutes. Informed consent forms stated that respondents were reminded that everything discussed during the interviews should be kept private and that all data would be anonymized. The participants were informed of their right to withdraw from the study at any time without having to give a reason to the investigator and without having any adverse consequences for them. The participants were given the PI's contact details as part of the PIS, whom they could contact if they wished to withdraw their data after their participation in the study. However, participants were also told that they would not be able to withdraw their data from the particular component of the study once the data had been aggregated.

Data collection

The interview guides (IDIs and FGDs) were developed in accordance with previous literature reviews and research on CHW-led MCIs and were used to guide qualitative interviews [22–24]. The PI collected the data with the assistance of a trained research assistant. All interviews were held in a nearby, quiet, and convenient room for the study participants. The principal investigator conducted onsite observations of study participant interactions and settings. Following each interview, developed observation guides, written notes, and field notes were kept by the Principal Investigator. Data were collected from the end of January 2025 to June 2025.

Data Quality Control

The research investigators gave intensive training to the research assistants (RAs) on the contents of the study protocol, survey tools, survey procedures, data storage procedures, participant recruitment, interview techniques, and obtaining consent before their deployment. During orientation, emphasis was placed on the principles of informed consent, such as volunteerism, confidentiality, and the rights of the participants. The investigators ensured that continuous check-ups were performed, especially during the consent process, while the RA was in the field. Finally, the RA was trained on how to identify signs of distress among participants and procedures to follow if identified.

Study outcomes

This study aimed to explore the facilitators of and barriers to the implementation of community health worker-led multicomponent intervention (CHW-led MCI) to control hypertension at selected health centers in the Gasabo and Bugesera districts from patients, health center nurses, managers, and policymakers' perspectives. In addition, this study explored healthcare providers' and patients' opinions on the scale-up of hypertension management from district hospitals to health centers.

Data analysis

All the interviews were audio-recorded and transcribed verbatim from Kinyarwanda (the local language) to English. However, the work was re-evaluated by the PI and double-checked by the research supervisors. Memos and field notes were written immediately after the observations. The transcripts were loaded into NVivo 11 software for coding and data analysis. Following the framework analysis, all the transcriptions were thematically coded, and the links between the codes were created. During the interviews, the study participants were asked probing questions to elicit more information from their responses. Data were collected from research participants until data saturation was achieved, and no further inferences were drawn from the interviews. The interviews were taped and transcribed verbatim. The transcriptions were translated from their respective languages to English by Kinyarwanda native speakers with excellent English skills. The data were then evaluated via thematic content analysis techniques in two stages. After identifying a priori themes derived from the intervention questions, we manually categorized the transcripts on the basis of these and additional themes that developed during the fieldwork and analysis process. We used this coding to find connections between themes and identify overarching principles.

RESULTS

The study results are reported on the facilitators of and barriers to the implementation of CHW-led MCI to control hypertension among patients with uncontrolled hypertension at Rwandan health centers from the perspectives of community health workers, hypertensive patients, health center nurses, facility managers, and policy makers; two main themes were identified through the analysis of participants' responses. The first theme explored the participants' facilitators, who intervened in favor of the management of hypertension by CHWs at the community level. The second theme explored the barriers or challenges that may make this intervention difficult for both patients and CHWs.

Facilitators for the implementation of CHW-led MCI in the management of HTN at the community level

Overall, the study participants reported the facilitators, which included providing motivational financial incentives to CHWs for transporting the time a CHW visits a patient, the payment on the day they go in outreach to visit patients, and training to increase the awareness of hypertension and its management.

The health policymakers who participated in the study reported the following:

“……., from where we have started, CHWs can do good screening. They can do follow-ups of patients,…; therefore, the facilitator would be financial means and training to CHWs". [IDI-HPM02]

Another health policymaker from the Ministry of Health reported that:

"….., they have to be trained. We are planning... I do not know when it is starting, but we have delayed it. We are beginning training them. In addition, there is a need for some incentives for what they do, which is now somehow a problem, as there are many". [IDI-HPM01]

Health center managers mentioned some of the facilitators, and most of them were similar to the general facilitators mentioned by health policymakers; they reported that:

"……., sure, the community health workers can play a major role in this, because what you have seen here is that although we are treating hypertension, we still have a gap in patient adherence. On my side, the facilitators, as we already do, through the person in charge of hypertension and the community health worker supervisor, can do a course of training and monetary incentives for a worked day. Most importantly the training and follow-up will be enough". [IDI-INT01]

According to health center NCD clinic nurses, those with 5 years of experience in managing hypertension and other non-communicable diseases reported that:

"……., CHWs help us, such as the fact that elderly people cannot get here easily, even though it has become easier to get to the HC. However, when a patient wakes up in the morning may be unable to reach here in that case, I will call the CHW and tell him/her to visit and check for the patient. Therefore, as facilitators, they need financial motivation and training but also a good follow-up of what they do.… Yes, they need motivation, such as training, a small salary, or PBF; it helps a lot. We saw an example in the TB program where they were given PBF, where they were closely monitored because they believed that if patients took their medications well, they would be rewarded". [IDI-CONT04]

Community health workers, in turn, reported that some facilitators may help them achieve this new task if requested by the Rwandan health system, and one of them reported that:

“……, Yes, we can do it, and what we need is just a refresher of training in managing hypertension; we received training, but because implementation is delayed, it is to forget what I don’t do. In addition, another facilitator I can say some financial motivation as we are not monthly paid employees, and you know we need airtime, ticket, and something to eat while we are working or caring for those patients”. [IDI-CHW02]

In the process of exploring the facilitators, the investigator took time to assess the hypertensive patients' perspectives, and one of them reported that:

"… they started already because the one caring for me started a few months ago, and he gives me advice on regular medication taking and being involved in physical exercise but also on how to take a healthier

regime, so as facilitators, I think it may include financial motivations and training and so on…". [IDI-INT09]

Another patient reported that:

"……., this program of CHWs is very helpful to us as patients who suffer from uncontrolled hypertension, as they are assisting us in advice regarding medication and regime and sometimes they help us reach the health center so that if this continues, it will be much appreciated. In addition, facilitators may include financial incentives and training". [IDI-INTFGD08]

Barriers to the implementation of CHW-led MCI in the management of uncontrolled HTN at the community level

Overall, the study participants reported the constraints of financial shortages, the lack of training and continuous supervision, and the limited level of understanding of hypertension and its management among CHWs. Below, the researcher will present what has been reported by different categories of study participants.

Health policymakers' questioned, reported that:

"… as I said, the barrier is just lack of finance. Do you think community health workers' knowledge and skills are sufficient to manage this hypertension program? When they are well trained, they will become a pillar in managing hypertension". [IDI-HPM02]

According to health center managers' opinions, one of them reported the following:

"……, as we said, CHWs can do it, but there are obstacles in that most of the CHWs are old and their level of understanding is low, and the CHWs who are young do not bother to do it because they have to find a life because these young people are too young to progress and find a life; therefore, apart from low education level, there is lack of financial motivation, as they do not get paid". [IDI-CONT03]

Another health center manager mentioned,

"…The barriers that I mentioned above include a lack of training, a lack of effective channels for providing information to patients, and finally, a lack of CHW motivation, including financial support". [IDI-CONT02]

On behalf of the health center NCD clinic nurses, one of them reported that:

"……, the barriers CHWs have may include a lack of sustained training on the different diseases they are responsible for, particularly hypertension, and a lack of motivation". [IDI-INT04]

Another NCD clinic nurse reported that:

"……, the challenge I think is that CHWs are not only responsible for these diseases; CHWs have other responsibilities. If they are not given the ability to commit to their appointments, they will go away, and

when the client comes to see them, they may not be around for them. So there will be a conflicting interest due to lack of motivation like financial motivation". [IDI-CONT04]

With respect to barriers to the implementation of CHW-led MCI, one of the CHWs reported that:

"……, the barriers may not be major but they are present, including that as you know, being a CHW is volunteering, so CHW may miss rendez-vous or the opportunity to visit the patient because he/she went to look for a paid job for surviving, and when I go to look for a patient who is not available, it consumes my time, which I may be using to make money, there may be CHWs who may not be able to avail themselves because of the reasons mentioned above". [IDI-CHW02]

On the side of the patients, one reported that:

"…, The challenge the CHW may face, I can say conflicting responsibilities such as the balance of social life and work due to lack of motivation". [IDI-INT09]

In addition, in FGDs conducted with patients, they mentioned the following:

"……., Maybe if they do not get paid, they will not perform their duties effectively, but we think apart from that, they would perform this task effectively, as they are doing currently in helping us". [FGD-INTFGD08, age 38–72 years]

Outcomes of the scale-up of hypertension management from the district hospital to the health center

The positive outcome of the scale-up of the intervention according to nurses, health center managers, policymakers, and patient perspectives

According to the health policymaker perspective, one reported the following:

"……., the management of HTN at the health center level is one the success in many other which were achieved by our ministry of health as the nurses there are helping patients like the time they were being treated at the hospital level. In addition, patients are receiving these services near to their community compared to the distance they were traveling to the hospital". [IDI-HPM01]

The health center managers reported the following:

"…For me, it is a success, the way we do it, we saw that lots of people, a lot of patients are getting the medicine here and they are being treated here. We can do all the labs and the investigation and administer the medication immediately. What I saw, the advantage of this is that people are not taking a long time and distance for them to get the treatment because the health centers are nearby their household". [IDI-INT01]

The NCD clinic nurses reported that:

I think it is very easy because the management of HTN at the health center has made it easier, in terms of accessibility and prevention of missing rendez-vous for patients, so many patients are being treated here and getting all the package they would get at the hospital just in case they go there". [IDI-INT04]

Another NCD clinic nurse added on this and said that:

"……., some patients did not visit due to a lack of travel tickets, but when they came here, you could see that things were going well, patients were attending the tests, and their condition improved. By visiting here, they are attending, which reduces complications and increases the number of people who can take medication. Therefore, it is a success to me". [IDI-CONT04]

Patients reported that:

"…Oh yeah, believe me, this program to be managed at the health center was very helpful to patients like me who suffer from hypertension, especially for us who are very old and with limited financial means". [FGD-INTFGD08, Age: 50–68 years]

A conducted focus group discussion reported that:

"……., we think that bringing this service from the hospital to the health center was very helpful to the patients as you know we used to visit the hospital once a month where sometimes we were unable to get tickets to go and some other times the time itself spend there was not in our favor because of many people from different geographical locations". [FGD-CONTFGD08, Age: 48–71 years]

Challenges in the scale-up of hypertension management at the health center level by nurses

The health policymaker perspective from RBC reported the following:

"…., the barriers are there. Work overload for health workers at health centers. These are the people who are doing vaccination, doing antenatal consultation and caring for all patients in general". [IDI-HPM02]

According to health center managers, one of them reported that

"……., on my side, the first one is knowledge; they may require more training on that because hypertension sometimes requires more extensive clinical knowledge than what we learn from school. In short, the challenge we have here is sometimes outdated knowledge apart from that the management of hypertension at health is a success". [IDI-INT02]

Another health center manager mentioned that:

"……, there are challenges, because as these services were provided in hospitals, when they come here, there was an increase in the responsibilities for the nurses working there, causing them to be overloaded because it is a job that is additional to what they were already doing". [IDI-CONT03]

NCD clinic nurses reported that:

"……, the challenges are there, first of all, the number of people suffering from this heart disease is very high, which means that they are not receiving the service they deserve owing to the limited number of medical staff. Currently, we have 2 nurses responsible for caring for these patients". [IDI-CONT07]

Patients' perspective, on them reported that:

"……, although we get this chance of being managed here, some of us are very old and need some assistance at the household level, I am saying that even here sometimes is still far from where we live; another challenge is medication stock out, which causes problems in medication adherence". [FGD-CONTFGD08, Age: 45–68 years]

A conducted FGD reported that:

"… the only challenge we face here at the health centers, it does not happen every day but sometimes they prescribe medications which they don't have, and in that circumstance, we are obliged to buy them outside while we don't have enough money and therefore some of us do not buy them and of course, the disease does not get better". [FGD-INTFGD08, Age: 48–65 years]

DISCUSSION

In this study, the researcher focused on exploring the perceptions of patients, CHWs, NCD clinic nurses, health center managers and health policy makers toward CHW-led MCIs and facilitators, and barriers to this MCI were reported. The overall provided answers revealed that the MCI can be implemented in the whole country after the financial means and training of CHWs, as reported by the study participants, are considered. This qualitative study explored the facilitators of and barriers to implementing CHW-led MCI to control hypertension at selected Rwandan health centers from the perspectives of patients, CHWs, NCD clinic nurses, health center managers, and health policymakers, as well as from the viewpoints of healthcare providers, health policymakers, and patients on the outcome of scaling up HTN management from district hospitals to health centers in Rwanda. While this CHW-led MCI was implemented in Sri Lanka, most CHWs were enthusiastic and empowered. Physicians appreciate the training, and patients are grateful to receive the intervention and value it [22].

The overall facilitators of the implementation of CHW-led MCI to control hypertension among patients with uncontrolled HTN managed at the community level by community health workers include financial motivation, training, and increasing CHW levels of education, as mentioned by the study participants; a similar study conducted in Zimbabwe on the adaptability of CHW-led interventions among hypertensive patients; and the study participants, which included community nurses and CHWs, believed that the intervention was effective in improving adherence to recommended lifestyle modifications and overall health outcomes among hypertensive patients, although the study did not list facilitators for this intervention [24]. In Ghana, while the results of the effectiveness of the intervention are pending, overall,

patients and nurses reported positive experiences with MCI and reported that it helped them manage their hypertension, and training healthcare providers was listed as one of the facilitators [23]. Another study conducted in Nepal, where CHWs facilitated home support and routine follow-up care, was effective in controlling blood pressure, but the study results did not identify facilitators of this intervention [25]. In the United States of America, a CHW-led MCI showed significant changes in appointment keeping, and the MCI helped improve BP and related factors.[26] A scoping review conducted in low-income countries (LICs), in the identified 122 articles, reported that CHW-led MCI was effective in controlling HTN but did not report the facilitator of this intervention [27]. Finally, in Kenya, a strategy combining tailored behavioral communication and mobile health for community health workers led to improved linkage to care but not a statistically significant improvement in SBP reduction [26].

The overall barriers include insufficient financial support from the Ministry of Health stakeholders, a lack of training, being overwhelmed by the responsibilities of CHWs, a low level of education, and a lack of training specific to hypertension management. Similar to the results from a study conducted in Ghana, participants reported some barriers, which included training and the sustainability of the program, but many informants expressed concerns over the inability of community nurses and workers to dispense antihypertensive medications due to legal restrictions [23]. A case study conducted in 19 countries acknowledged that although constraints exist in terms of resource availability, physical accessibility and fiscal unavailability, the prioritization of CHW-led MCI for NCD management can be harnessed as a long-term cost-effective strategy to provide equitable healthcare [28]. In Sri Lanka, a study reported barriers such as workload and irregularity in suppliers to CHWs [22].

For the qualitative evaluation of the outcome related to the scale-up of HTN management from the district hospital to the health center, which is now managed by nurses and midwives, the study participants reported that the scale-up is generally successful for the health system in Rwanda and has many positive points not only for patients but also for the health system as a whole. Among the positive points on the patient's side include time savings (distance from home to the healthcare facility was easy), queueing, as a district hospital receives many patients from various health centers from its catchment area, which makes the appointment date saturated with many patients so that the queue to meet a doctor is long and sometimes patients return home untreated, and third, saving money (many hypertensive patients are old with limited financial resources, allowing them to save the little they have instead of spending them in tickets). In a similar study conducted in Argentina, the results revealed that the task of shifting from the hospital to the health center and adding to CHW-led MCI made a positive difference in patients who were involved [29]. In other studies conducted in LMICs, shifting was successful and has been shown to have some positive outcomes, and the strategy will temporarily address the effect of the growing health personnel deficit in most LMICs pending a holistic resolution of the issue of physician shortages [30, 31]; however, in the USA, findings suggest that if all nurses receive even brief training in the management and control of hypertension, major public health benefits are likely to be achieved. First, it reduces the need for physicians to mediate the routine tasks of managing antihypertensive therapy. Second, the management system encourages physicians to focus their energy on problem cases, such as those individuals who fail to achieve satisfactory control. Third, the

management system reinforces the value of collaboration among teams of health professionals [32]. In China, nurse-led hypertension management has been reported to be feasible and effective for patients with uncontrolled blood pressure, particularly in the community [33]. In addition to the abovementioned results from various studies, worldwide, hypertension management at health centers by nurses has evolved and contributed to increasing the number of patients receiving high-quality hypertension care and control [34], and the same emphasis has been reported in studies conducted in the Democratic Republic of Congo (DRC), where the scale-up has reduced the overwhelming and overload of patient-to-doctor ratios at hospitals, which has provided enough time for doctors to care/treat patients effectively. The second point is that patients no longer miss appointments due to a lack of transportation means (money), hence improving the general health of the population and reducing stress to patients and the health system in general [35].

Barriers/challenges to the scale-up of hypertension management at the health center level include recurring shortages of hypertension medications in the health center pharmacy, which leads to inaccurate management of hypertension; work overload among NCD nurses, which does not give them enough time to treat patients effectively, due mainly to the shortage of nursing and midwifery staff at the health centers investigated; consistent training for knowledge updates for NCD nurses; similar results are reported in studies conducted in Indonesia, where some challenges, including the limited number of nurses relative to the target area's population; inadequate infrastructure; and minimal community participation, which hinders efforts to control hypertension effectively in community health centers [36].

CONCLUSION

In conclusion, the facilitators of the implementation of CHW-led MCI to control hypertension among patients with uncontrolled HTN managed at the community level by community health workers included financial motivation, training, and increasing CHW levels of education, as mentioned by the study participants, and the barriers reported were insufficient financial support, a lack of training, being overwhelmed by the responsibilities of CHWs, a low level of education, and a lack of training specific to hypertension management. In the qualitative evaluation of the outcome related to the scale-up of HTN management from the district hospital to the health center, the study participants reported that the scale-up is generally a success for the health system in Rwanda and has many positive points not only for the patients but also for the health system as a whole. Among the positive points on the patient's side, the second point is time savings; the second point is queueing time, as a district hospital receives many patients from various health centers from its catchment area, which saturates the appointment date with many patients so that the queue to meet a doctor is long and sometimes patients return home untreated. The third point saves money and barriers/challenges to scale-up, including recurring shortages of hypertension medications in the health center pharmacy, which leads to inaccurate management of hypertension, work overload of NCD clinic nurses, and inconsistent training for knowledge updates for NCD clinic nurses.

Recommendations

The government of Rwanda, through the Ministry of Health, would invest more effort in involving community health workers in assisting other existing healthcare providers responsible for the management of hypertension to ensure that all hypertensive patients are followed up closely and obtain all necessary support for ensuring effective control of hypertension among Rwandans.

Study limitations

This study was conducted in only eight health centers located in two districts in Rwanda, which may imply the limited geographic representation, as by now Rwanda has thirty districts and the city of Kigali. In addition to this, there may be potential social biases, but also a due to the purposeful sampling method used in the selection of the study participants.

Abbreviations

CHWs
Community health workers
MCI
Multicomponent intervention
HTN
Hypertension
NCD
Non-communicable disease
IRB
Institutional Review Board
PI
Principal Investigator
LMICs
Low- and middle-income countries, UR:University of Rwanda, CMHS:College of Medicine and Health Sciences.

Declarations

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Author contributions

IM, KN, CMCS, and **RK** contributed to the study conception, design, data collection, data analysis, and manuscript refinement.

Conflict of interest

The authors declare no conflicts of interest.

Ethical Approval and consent to participate

This research involved human subjects and prior to its conduction, it was approved by the University of Rwanda Institution Review Board (Approval Notice: 695/CMHS IRB/2024). The permission to work with community health workers was guaranteed by the Ministry of Health in Rwanda (approval number 20/5179/DPMEHF/2024, delivered on 19 November 2024). The formal authorizing letters were presented to the selected health centers to obtain approval to start data collection. At the service level, the investigator explained to the participants the aim of the study and possible benefits. Participation was entirely voluntary.

This research adhered to the Declaration of Helsinki regarding research involving human subjects. All research participants were explained clearly the purpose of the research and its benefits and thereafter they consented verbally after asking questions and getting answers. Finally, in the process of consent to participate the study participants signed a consent form before taking part in the research. The participants participated voluntarily, and they had the right to withdraw from the study at any time and were not penalized for doing so. Participants' privacy and confidentiality were ensured by the use of patient codes instead of names. The recorded audio from the study participants was passed through a password-locked computer, and the password was kept by the principal investigator (PI). There were no risks to the participants in this study. Additionally, the participants were informed that there would be no compensation or direct benefit from participating in this study.

Consent to publish

Not Applicable

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Availability of data and materials

All data relevant to this study are included in the article

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Figures

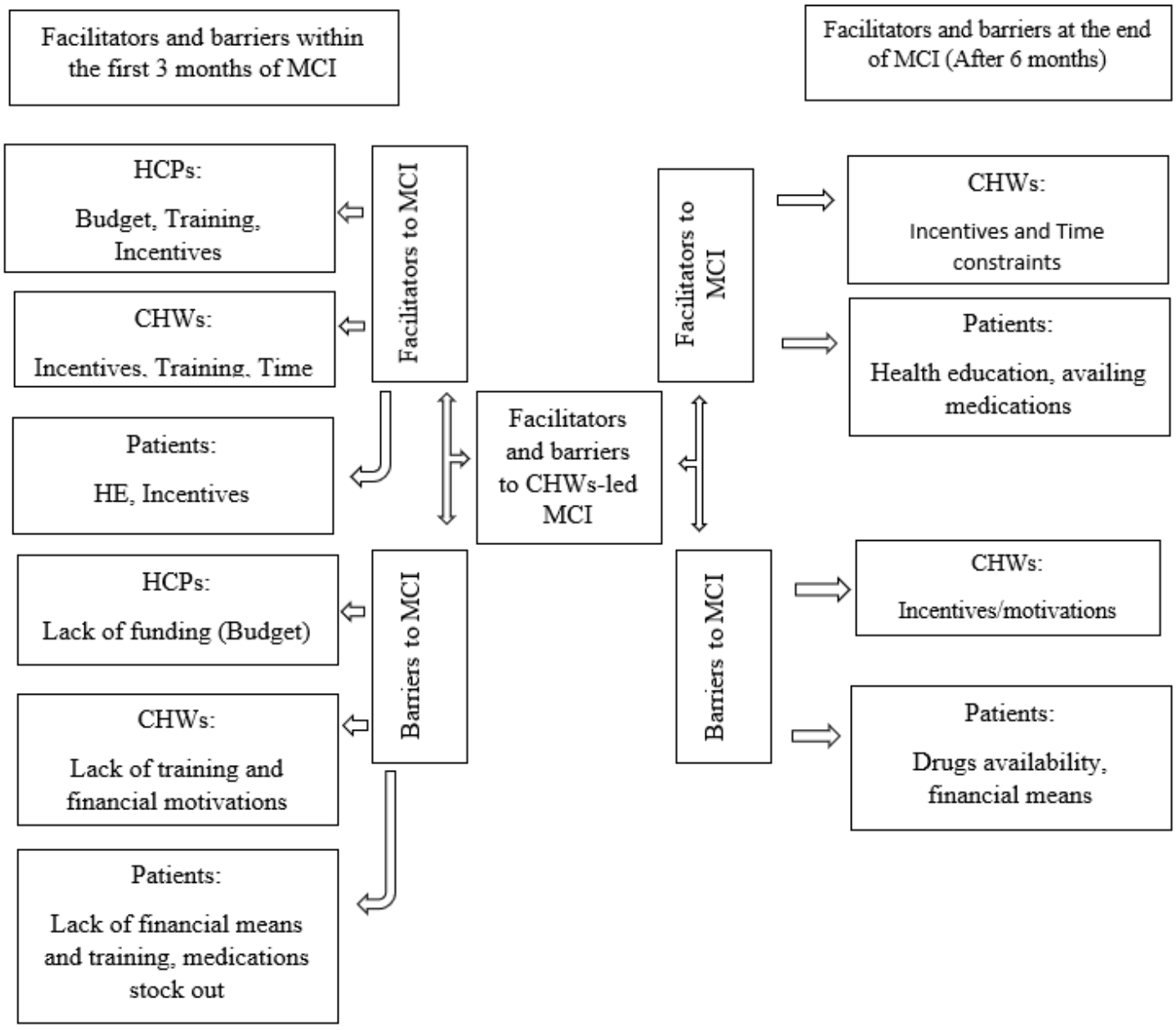

Figure 1

Overall summary of the results from the study participants concerning facilitators of and barriers to CHW-led MCI

Supplementary Files

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- InterviewGuideQualitativeToBMC25.08.2025.docx