Piloting a roving nurse mentor into community-based health programmes to capacitate community health workers: Findings from a realist evaluation in South Africa

Hlologelo Malatji (hlolo.malatji@gmail.com)
Centre for Health Policy, School of Public Health, University of the Witwatersrand
https://orcid.org/0000-0002-0093-0879

Jane Goudge
University of the Witwatersrand Centre for Health Policy

Frances Griffiths
University of Warwick Warwick Medical School

Research article

Keywords: community health workers, realist evaluation, intervention, South Africa, health system integration

DOI: https://doi.org/10.21203/rs.3.rs-279480/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License
Abstract

Background

Many low- and middle- income countries (LMICs) are repositioning community health workers (CHW) programmes to provide promotive and preventive services and referrals to the formal health service. However, the CHW low literacy levels, insufficient supervision and fragmented programmes result in the under-performance of the programmes in many settings. In this paper, we report on the realist evaluation of an intervention to explain mechanisms that led to a change in CHW care and household coverage in a semi-rural area of South Africa.

Methods

Using a case study approach, we conducted in-depth interviews, focus group discussions and observations to document the experiences of CHWs, their supervisors, clients, facility staff and community representatives prior to the intervention, during, and after a 6 month post-intervention gap to assess how the benefits were generated and sustained.

Results

The nurse mentor (senior nurse) intervention operated in a complex and dynamic environment with resource shortages, conflicts between CHWs and facility staff, and a disruptive CHW labour union. Over 15 months, the mentor was able to overcome these issues and (1) create learning platforms for the CHWs and their supervisors to learn and practice new skills relating to priority activities, (2) address their fears of failing and (3) establish operational systems to address inefficiencies in the CHWs’ activities, resulting in improved service provision and household coverage. An increase in the CHWs’ stipend to the minimum wage improved their motivation, and their direct employment by the Department of Health led to their formal integration into the health care team working at their ‘home’ facility. However, given the volatile communities in which the teams operated, and the communities focus on demanding government housing, the nurse mentor was not able to establish a collaboration with the community structures.

Conclusions

A roving nurse mentor overseeing several CHW teams within a district healthcare system is a feasible option, particularly in a context where there is a shortage of qualified supervisors. However, the long term sustainability of the effects of intervention is dependent on CHWs’ formal employment by the Department of Health.

Background
Low and middle income countries (LMICs) often have a patchwork of community health worker (CHW) programmes, sometimes led by non-government organisations (NGOs), reaching some communities but not others, focused on specific disease (e.g. HIV/AIDS) or population groups (e.g. child health) (1, 2). The international calls for universal health care (UHC) have led some countries to attempt to achieve a wider reach with their CHW programmes providing a more comprehensive service (3, 4). Many LMIC countries are also exploring ways to utilise CHW programmes to respond to wider range of conditions, including non-communicable and infectious diseases (3), increasing CHW's roles in promotive and preventative care (5). The importance of the CHW role has been given greater prominence and urgency during the Covid-19 pandemic, where CHWs are expected to educate the public and to identify possible COVID cases (6-8). This shift to more comprehensive programmes, both geographically and in terms of health conditions, requires greater supervision to manage, train, mentor and monitor CHWs and to facilitate links with the healthcare system and community structures (9).

South Africa has a long history of CHW programmes starting in the 1940s (10). Since democracy, CHW programmes have played an important role in extending healthcare services to needy populations, however, there was considerable fragmentation (11). With recent reforms of primary health care (PHC) services, South Africa is establishing a nationwide CHW programme, covering a more comprehensive range of health conditions than in the past (9, 12, 13). In 2011, in line with its plans to provide UHC, the South African government introduced several policies to strengthen PHC including a national CHW programme (ward-based outreach teams; WBOTs) (14, 15). Under WBOT, each CHW team is intended to comprise at least 6 CHWs, a professional nurse (outreach team leader), environmental officer and health promoter. Each CHW team, operating within a facility's catchment area, is meant to provide promotive and preventive services to households. CHWs, who were previously working for NGOs contracted by the South African Department of Health (DoH) became the ward-based outreach teams. While the DoH required that the CHW had passed their final school examination in order to be transferred to the new programme, this requirement wasn’t always implemented.

The training for the new teams comprises three courses each with an examination, covers identification of the need for antenatal and post-natal care, monitoring immunisation and adherence to long-term medication, screening for malnutrition, TB, gender-based violence, making referrals to health and social services, and following up on patients who need to visit the clinic (e.g. medication defaulters). The CHWs are expected to care for 250 households (14). In Sedibeng District, where the intervention took place, the CHWs also delivered chronic medications to the elderly or disabled patients. Similarly to other contexts, South Africa has a limited number of health professionals available to oversee the CHW activities, and many CHW teams are functioning without adequate supervision and remain poorly integrated into the healthcare systems (9, 16, 17).

We conducted an intervention study using a before and after study design with realist evaluation, to assess whether a temporary, roving nurse mentor could build the capacity of CHWs and their supervisors, build the CHW teams’ relationships with both the local health system and community structures, and if the effect could be sustained once the nurse mentor left. In this paper, we report on the realist evaluation.
The outcome of the before and after study will be reported elsewhere; for further papers on the situation analysis see (9, 18), and tool development see (13)).

**Methods**

**Study design**

We conducted a situation analysis in September 2016 – February 2017 in which we studied 6 CHW teams with different supervision and location configurations (9, 13). The configurations included facility-based teams supervised by professional nurse and junior nurse, health-post teams supervised by professional nurse and junior nurse, and facility-based teams supervised by a junior nurse only.

Based on the findings of the situation analysis and engagement with local stakeholders, we designed our intervention (see below) and selected two intervention sites. The intervention was implemented from August 2017 to November 2018 (intervention phase). We conducted three household surveys to assess household coverage of the CHW service and observations of household visits to assess quality of care. The first survey took place prior to the intervention (baseline), the second at end of the intervention (endline), and the third 6 months after intervention had ended to assess whether any benefits from the intervention were sustained (post-intervention). We conducted a realist evaluation using data collected during situation analysis prior the intervention, during the intervention phase, and for 2 months from May to September 2019 (post-intervention), following the 6-month gap after the end of the intervention, to explain any changes in coverage and quality of care.

**The realist evaluation**

Given the importance of understanding how and why change comes about in complex health service interventions, we used the realist evaluation methodology (19, 20), aiming to identify context-mechanism-outcome (CMOs) configurations. We focused on the three most common CHW activities (household registration, medication delivery and patient follow-up) within the programme, as well as the community engagement, as this was one of the key aims of the intervention. In the results below we describe the situation prior to the intervention, the nurse mentor's intervention associated with each activity, and, how the CHW, the supervisors and the clinic staff engaged with the intervention (the mechanism). Often there was an iterative interaction between the intervention and mechanism, as the nurse mentor and the team changed their way of working in response to each other. We also report on the outcome for each activity - the change in performance as reported by the CHWs, their supervisors, facility staff and community members at the end of the intervention, and 6 months post intervention.

**Study setting**

In Sedibeng Health District, although relatively affluent by South African standards, over 20% of the residents fall below the food poverty line. Outside the urban areas, disadvantaged communities with inadequate shelter, food insecurity and high disease burdens have limited access to services such as clinics, transport, water and electricity. In the two study sites, located approximately 30km from the
district town, residents’ dwellings consisted mainly of government provided housing (small brick houses) and informal settlements (shacks made of plastic and re-used corrugated iron). Similar to other semi-rural areas in South Africa, the majority of the residents in the two sites were unemployed and dependent on government social grants.

**Our initial programme theory**

Our situation analysis showed the programme was under-resources, and when a CHW team was led by a junior nurse, there was insufficient supervision, and the programme was often under-resourced and poorly integrated into healthcare system and community structures (9). This resulted in poor quality of care and low household coverage (18). In contrast, teams led by an experienced nurse were well integrated in the healthcare system, had access to equipment and CHWs received supportive supervision (9). Given the national shortage of experienced professional nurses, in discussion with district and provincial stakeholders, we agreed our intervention would be an experienced professional nurse (‘a nurse mentor’), who would move between the two facility-based teams which had junior nurses supervising the CHWs. It was anticipated that a nurse mentor, who was knowledgeable and skilled in outreach work and adult training, could help build the capacity of the CHWs and their supervisors, and facilitate their integration into healthcare systems and community structures in a way that was sustained.

**The intervention**

The intervention had three specific aims: 1) to strengthen the supervision capacity of junior nurse supervisors; 2) to help strengthen relationships between the CHW, their supervisor and clinic staff; 3) to strengthen relationships with community political structures and organisations. The appointed ‘nurse mentor’ had a 4-year nursing degree and 15 years’ experience in nursing of which 6 years was in supervisory roles in other CHW programmes. She provided training to the CHWs and their supervisors on priority activities (e.g. household registration, monitoring medication adherence and tracing medication defaulters). She coached the CHW and the supervisors on the DoH CHW curriculum, and organized for the CHW to sit two of the three examinations. The nurse mentor rotated between the two facilities, allowing the supervisors to take charge of the CHWs in her absence and demonstrate the capability to manage the teams on their own. She initiated activities to facilitate collaboration between the CHW teams, facility staff and with community structures (e.g. local political leaders and NGOs).

**Outcomes from the before and after study**

The proportion of households in Site 1, who had received a visit in the last year, rose considerably from 20% before the intervention to 40% after the intervention and fell to 30% post-intervention, and in Site 2 from 20–31% and then fell to 30%; while Site 1 had a greater increase during the intervention, CHW weren't able to sustain that increase. While the proportion of appropriate messages recalled by the householders didn’t improve, the observations of the household visits showed the CHW doing a much broader range of more complex tasks; rather than predominately delivering medication, they were, for example, registering new households more frequently, checking on the immunisation of young children,
access to ante-natal care by pregnant mothers and the wellbeing of the elderly. The detailed findings from the surveys (coverage and quality of care) are reported elsewhere.

Data collection

CHWs and their supervisors, health facility staff members, patients and community representatives were purposively selected to participate in the study (21). We employed various data collection methods including observations, interviews, and focus group discussions throughout the project (Table 1). The first author (HM), a doctoral research fellow and fieldworkers experienced in working in primary healthcare settings and qualitative research were responsible for the collection of the project data. At the time of the study, the research team had no prior personal and professional relationship with the study sites and participants.

Focus group discussions (FGD)

During the situation analysis, we conducted FGDs with CHWs in each site, gathering information on CHW experiences of the CHW programme and their working conditions, as well as their perceptions of its successes and challenges (See additional file 4). Post the intervention, FGDs with the CHWs gathered information on their experiences since the nurse mentor left, and whether their routines had changed. The FGDs ranged in duration from 1hr to 2hrs, were audio-recorded and transcribed verbatim and checked for accuracy by members of the research team.

Observations

We designed observation templates and refined them through role-plays involving the fieldworkers (See additional file 3) (22). We gathered observation data from CHW meetings, household visits, CHW engagement with patients, and supervision of the CHWs, both in the community and in the facility. In the facilities, we captured data on interactions between patients, facility staff members and members of the CHW team. During household observations, no one was present except for household members who all consented being observed as part of a CHW activity. There was no reported refusal to participate in the study.

Interviews

Using a semi-structured interview schedule, we conducted interviews with the CHWs, supervisors, health facility staff and CHW clients during the situation analysis (pre-intervention) (see additional file 2), the intervention and post intervention periods. The interviews lasting approximately 30–60 min each with the CHW gathered additional information following field observations, while interviews with facility staff were conducted to understand their interaction with the CHW team, benefit and challenges of the CHW programme and the intervention. Interviews with CHW clients and community representatives gathered information about the nature of care provided by the CHW, experiences of care at the facility and relationship between community structures (e.g. NGOs) and CHW programme.
In order to ensure alignment between the intervention aim and interview questions, the research team continuously refined the interview guides and observation templates through consultative meetings with study participants (23). Furthermore, feedback meetings were held over the periods of data collection, and these meetings allowed the participants to comment on the study initial findings. The feedback given by the participants enabled the research team to align and strengthen the research instruments for the next round of interviews and observations (24).

### Table 1

Number of respondents in each research phase

| Data collection method | Type of participant | Situation analysis (6 sites) | During intervention (2 sites) | Six months post-intervention (2 sites) |
|------------------------|---------------------|-----------------------------|-------------------------------|----------------------------------------|
|                        |                     |                             | Period 1 | Period 2 | Period 3 |                              |
| FGD                    | CHW (no. of participants) | 2 (21)                     | -       | -       | -       | 2 (23)                     |
| Obs (days)             | CHW (with & without supervisor) | 126                        | 7       | 9       | 7       | 24                          |
|                        | CHW (with Nurse Mentor & Supervisor) | n/a                       | 16      | 11      | 6       | n/a                         |
| In-depth interviews    | CHW                  | -                           | 10      | 11      | 4       | 18                          |
|                        | Supervisor           | 13                          | 5       | 4       | 2       | 2                            |
|                        | Nurse Mentor         | n/a                         | -       | 2       | 2       | n/a                         |
|                        | Facility staff members | 7                          | 15      | 5       | 6       | 10                          |
|                        | Patients             | 74                          | 11      | 7       | 2       | -                           |
|                        | Community representatives | 24                      | -       | -       | 13      | -                           |

### Data analysis

We drew together the data from the observations, interviews and FGDs for each team and associated facility. We extracted data from the original transcripts in a word document in chronological order, summarizing data with important quotations extracted verbatim. This increased our familiarity with the data, reduced the considerable volume of the data, and allowed assessment of change over time. The first author (HM) did the extraction and made weekly presentations to the team, who checked the extracted data against the raw dataset, until the research team was confident that no significant data was being omitted. Once the data extraction was complete we developed a coding system that included CHW priority activities and emerging themes (such as social hierarchy, CHW unionisation and healthcare system integration). The extraction datasheets were then imported into NVIVO 12 software for coding. The coding was completed by the first author, with weekly discussion with the wider research team. The
coded data was synthesized using the realist evaluation CMOs configurations; the aim of the synthesis was to describe how the study participants responded to interventions of the nurse mentor (M-mechanism), the influence of the context(C-context), and what the outcomes (O-outcomes) were.

Findings

Context prior to the intervention

Training and resources

Both supervisors had completed 2-year nursing qualification and had a couple of years post-training work experience, but had not worked with CHWs before. One of the supervisors (Team 2) originated from outside the province and sometimes appeared uneasy to oversee the CHWs, as the majority of the CHWs were local women and older than her. The supervisor in Team 1 was from the district, assertive and managed a relatively younger group of CHWs.

The CHW length of service ranged between 2–4 years. Eleven of the CHWs (of 14) in Team 1 and 14 CHWs (of 34) in Team 2 had not completed their final school leaving qualification. Two CHWs in Team 1, and one CHW in Team 2 had completed Level 1 CHW training. None of the CHWs had completed the Levels 2 or 3 CHW training.

During the situation analysis (pre-intervention), the CHW teams were provided with equipment bags (one bag per pair of CHW), containing blood pressure and glucose machines, weight scales, bandages and umbrellas. In one team, the CHW had not received training on how to use the manual blood pressure machines provided. By the time of the intervention, much of the equipment was faulty. The CHWs shared the remaining working equipment; despite informing the district office, the faulty equipment was not replaced or repaired. CHWs in Team 2 held their work planning meetings in the facility meeting room, however the room was often used by nurses, and then the CHW had to move outside. CHW commented: “When they [nurses] like they don’t even tell you that they have a meeting; they just enter the room… you just know that you have to go outside” (Interview, CHW, Team 2). Team 1, based in a relatively smaller facility, had no room to use, and met their supervisors outside.

The CHW teams needed to make copies their various forms, however, the photocopy machines were often broken or out of ink. Staff had to contribute their own funds to purchase ink, which many of the CHWs could not afford, and so didn’t make copies. The supervisors had to travel to sub-district office (30kms away) to make copies. (Although not sustainable, during the intervention, the nurse mentor occasionally provided copies of stationary so the CHWs were able to undertake their work). CHW had to use their own funds to purchase a notebook and pen to record daily activities; many used loose pieces of papers to record the details of visits.

Conditions of employment and unionisation
At the beginning of the study, the CHWs were a contracted labour force managed by a private administrative payroll company. They received a meagre stipend of R2 500 (143 USD) per month. The staff members expressed dismissive attitudes towards the CHWs. “The facility manager tells us that we are not part of the clinic [because they were contracted to the payroll company] so there’s nothing she can do for us’’ (Field notes, Team 1). The CHW felt belittled: “The peer educators, HIV/AIDS counsellor we all go together to sign the same contract but they are treated as if they are more educated than us, they call us street maids” (CHW-FGD, Team 2).

A task team was established by the CHWs to demand improved conditions of employment. Only a few CHWs from the study sites participated in the task team meetings, as they were held in the district town and transport was expensive. A greater number of the CHWs participated in the protests, which were often one day ‘stay-aways’; one militant CHW threatened to report the CHW to the task team if they went to work. Since the supervisors and the CHWs were often used by clinic staff to do facility-based work when they should be in the community, the CHWs were instructed by the task team to stop activities in the facilities, even then those activities were part of the CHW programme (e.g. assisting nurses to retrieve CHW patient files, practicing taking blood pressure measurements in the vital signs room). They were also instructed not to work when the supervisors were not present, or if it was raining. Overall, the teams lost approximately 10–15 days’ work in the 15 months data collection period.

Towards the end of the intervention, the CHWs were formally employed by the Provincial Department of Health (PDoH) in June 2018. Their monthly stipend was increased to the minimum wage of R3 500 (200 USD). The increment was encouraged the CHWs: “It has motivated me to work harder than before” (Interview, CHW, Team 2). Some CHWs used the increment to invest in the education of their children: “I am now able to save for my child secondary school education. I have been saving R1 000 every month, so when she passes matric I am able to pay for her college fees” (Interview, CHW, Team 2).

Household registration

Prior to intervention

Each CHW was expected to register new households to identify individuals or families in need of care. Prior to the intervention, the registration of households was low with only 20% households in both sites ever having been visited by a CHW (18). Moreover, CHW asked less than half of the nine household registration questions, partly due difficulties in understanding the questions as they are written in English, or the purpose of the questions.

Intervention, mechanisms and their iterative interaction

The mentor gave talks and organised role plays, and the supervisors and CHWs practiced responding to complex patient scenarios. In early training sessions and household visits, one supervisor was reluctant to participate in activities. The nurse mentor commented “At first they [the supervisors] were struggling because they did not know the content themselves especially the supervisor from Team 2. She was struggling and frustrated.” (Interview, Nurse mentor)
Several of the CHW were resistance to receiving instruction from the nurse mentor, and were obstrusive or often absent. Not having finished their school education, their educational experience was unlikely to have been positive. However, the CHWs came to appreciate the assistance they received from the mentor: “At first I was scared of the nurse mentor but now I enjoy learning new things from her” (Interview, CHW, Team 2). The mentor took time to unpack complex topics: “She was giving a lesson about a particular health condition. I could not understand her, so I approached her. She sat me down and went over the lesson until I understood” (Interview, CHW, Team 1). This patience relieved some of the CHWs anxieties. However, when the mentor felt the CHW had not paid attention or applied themselves sufficiently, she would get irritated. “The nurse mentor sometimes shouts at me in front of patients when I make mistakes. She doesn’t keep quiet and let me finish what I am doing and correct me later, she shouts at you right there” (Interview, CHW, Team 1). In protest, some withdrew from the training, and reported to the task team that the nurse mentor is forcing them to participate in-service training against their will. This resulted in a tension, with the mentor and supervisors being threatened by task team members when attending district meetings. The mentor did adopt gentler strategy, which helped soften the stance of the CHWs; overtime the CHWs came to realise the mentor didn’t want to intimidate them, rather to ensure they worked to improve their performance “the nurse mentor is the type of person who just want to see progress in your work.” (Interview, CHW, Team 1).

Outcome

The majority of the CHW passed both the Level 1 and 2 training as a result of the nurse mentor’s coaching; only 1 in Team 1 and 3 in Team 2 failed due to their low level of literacy. (These individuals moved to a home-based care programme.) The training, and passing their examinations, boosted the CHWs’ morale: “When I get to a household, I don’t feel ashamed anymore, I enter with confidence because I know my work” (Interview, CHW, Team 1). Patients expressed their appreciation: “The patient told the mentor and supervisor that she is happy with the CHWs. Before the intervention, the CHW’s visit was brief. The visits now take longer and the [CHWs] monitor her BP and sugar level” (Field notes, Team 1). The supervisor, who appeared passive and defensive early on, grew in confidence and began to take initiative: “She is very active and engaging when supervising the CHWs. She informs them if they have not given a patient appropriate health information during their visits” (Nurse mentor; interview).

In the post-intervention period, the supervisors continued to provide training to the CHWs every Friday: “Last week Friday, she trained us on pregnancy screening, STIs, HIV and heart attack” (FGD, CHW, Team 1). When asked, the CHWs could also prepare informative lessons on a given topic and share with their colleagues.

The supervisors accompanied the CHWs to help with patients not complying with CHWs instructions: “She assists us; recently there was a problem with one lady who had not brought her children to the clinic for vaccination. The supervisor went to the household with the CHWs to speak to her.” (Interview, CHW, Team 2). The woman, subsequently, took the children to the facility. The supervisor for Team 2 adopted a sensitive approach when supervising the CHW: “She prefers to keep quiet while in the households even if
you make mistakes. It is only when we meet at the clinic that she will identify your errors and advise you how to fix them” (Interview, CHW, Team 2). The CHW appreciated this approach.

**Chronic medication delivery**

**Prior to intervention**

In order to deliver medication to a patient, the CHW would collect a patient’s appointment card from the patient’s home, and brings it to the admin staff at the facility to retrieve the patient file. The professional nurses would confirm the patient’s repeat prescription, and the pharmacy assistants would prepare the medication for delivery. On delivery of the medication the CHW would measure and record the patient’s BP or blood glucose on the card. In the pre-intervention period, some patients were not receiving their medications on the scheduled dates and would come into the clinic to complain, or the CHWs, realizing they had missed a patient’s date would hurriedly request for the medication from the facility staff. Both outcomes led to tension between the CHW and facility staff.

**Intervention, mechanisms and their iterative interaction**

The mentor engaged with all staff involved to understand their experience and challenges with the medication delivery system. She trained the CHW to record the details of patient (e.g. names, address, type of medication, expected delivery date and CHW return date) in a book. She enlisted the support of the clinic staff for the new system and agreed their roles.

Despite the new system, some CHWs still collected the appointment cards late. This frustrated the facility staff: “Sometimes they will expect you to pack the medication same day they are expected to deliver. you have to stop what you are doing and attend to them” (Interview, Pharmacy Assistant, Team 1). One admin clerk insisted that the CHW queue like an ordinary patient to get the file. The mentor negotiated with the manager in Facility 2 for two CHWs to assist in retrieving files to minimise the delay, and for the professional nurses to issue the medication. This helped ease the frustrations of the admin clerks and pharmacy assistant. In Facility 1, there was insufficient space for CHW to assist in the filing room. However, the facility manager stepped into resolve conflicts where possible.

The nurse mentor spent time negotiating with the facility manager for the inclusion of the CHWs in facility meetings, as this was a potential forum to discuss and resolve issues surrounding medication delivery. However, the managers refused, as the CHWs were contracted to an external pay roll administrator, and didn’t see the CHW as their responsibility. In Facility 2, the nurse mentor did negotiate for the CHWs to help take the patients BP measurements in the clinic, so they could practice their skills and gain confidence. However, the facility manager appeared distrustful of the CHWs and her attitude allowed the junior staff to dismiss the CHWs efforts, rather than train the CHW: “Yuuu that was a disaster, only few of them were are trying. I finally decided to stop them from coming as they overcrowded the room and they don’t know what they are doing” (Interview, Enrolled Nurse Assistant, Facility 2). In Facility 1, the facility manager was keen to have the CHWs in triage room to help take patient BP measurement; however, infrastructural constraints made it impossible to accommodate more personnel in the room.
Outcome

Recording the patients’ delivery dates in their books helped the CHW ensure they delivered the medication on time, and the facility staff noted their improvement: “They have improved because now they take the dates of all the patients. Every week they take out the files for the whole week and give them to their team leader who then takes them to the pharmacy room. The pharmacy assistant uses the patient files to pack the medications for the CHWs for the whole week” (Interview, Enrolled Nurse Assistant, Team 2). The lack of equipment continued to hinder CHWs’ ability to do their job: “The blood pressure and glucose machine broke. Now I just deliver [medication] without doing anything to the patient” (Interview, CHW, Team 2).

Some patients demanded they monitor their vital signs; the CHWs reported being embarrassed that they could not.

Towards the end of the intervention, when the CHW were formally employed by the DoH, the facility managers became responsible for the CHW teams, the CHWs started to participate in clinic meetings. A nurse commented: “It makes a huge difference because we get to learn what it is that they are doing out there, the challenges they face. Once everybody is involved in the meetings, it means we can all take ownership of our work” (Interview, Professional nurse, Team 2). The professional nurses acknowledged the change in CHW’s performance and the CHWs felt supported by them: “We work well with facility staff. Whenever we want patients’ files they assist us on time. If I am not feeling well, I am able to speak to the nurses and get medication without having to join the queue like a patient would do” (Interview, CHW, Team 2).

In the post-intervention period, the CHWs continued to collect patient appointment cards generally on time, and the supervisor, professional nurses and pharmacy assistants cooperated with the CHW. However, some of the CHWs occasionally forgot to collect the patient appointment cards. Like admin clerks, the two supervisors learnt to penalize CHWs who present patient cards late: “You have to join the queue to get the patient medication…she does not take stories” (Interview, CHW, Team 2).

Patient follow-up

Prior to intervention

CHW are responsible for tracing patients who fail to attend clinic appointments. Some nurses are not sufficiently careful about ensuring the confidentiality of a patient’s condition (particularly for HIV treatment), and as a result patients seek care in clinics outside their own community. Knowing nurses would insist that they return to their local clinic, patients often gives an incorrect address, hampering the CHWs efforts to locate them. Others, however, once located, refused to return to clinic: “I do not see the reason to go to the clinic, nurse A does not treat people well, she walk around publicly displaying our medication to staff members and patients” (Field notes, Team 1). The CHWs’ difficulties in locating and persuading patients to return to the clinic affected their relationship with staff who believed the CHWs did not put sufficient effort into tracing patients.
Intervention, mechanisms and their iterative interaction

The nurse mentor arranged for the admin clerk to provide a list of patients and their addresses who needed to be followed up each week. It was agreed that CHWs should visit each address at least three times on separate days before marking the patient as untraceable, and would give feedback on their progress a week later. As a result, it became clear what was expected of the CHW, and they could mark a patient as untraceable, rather than continued to be blamed for the non-appearance of the patient. The nurse mentor accompanied CHWs to visit patients who were refusing to return to the clinic: “Even if she [nurse mentor] is with another CHW, if I encounter a problem, I am able to contact her for assistance” (Interview, CHW, Team 1). The household visit by the mentor often reassured the patient and helped resolve any impasse between the patient and clinic.

Outcome

The CHW’s efforts at tracing patients improved, and the data clerks, in particular, provided the CHWs with regular support. As the CHW were acknowledged as contributing members of staff, the relationship with staff improved. One facility manager commented: “They are very helpful. In our facility we have many patients who have defaulted on their medications. The CHWs help us locate these patients” (Interview, Facility Manager, Team 1).

However, there was a sense of discomfort among the staff members when the CHWs failed to locate a patient, and this continued to strain the CHW and staff members’ relationship. Post intervention, the facilities reported slight drop in the number of patients returning to care. One facility had fewer antennal care and postnatal care patients and the manager attributed this to CHW inability to successfully locate cases and provide feedback.

The supervisors were able to provide support with challenging cases, as the mentor had done: “There was a teenage boy who was on ART medication and refusing to take the medication. The supervisor accompanied me to the boy’s home. She persuaded the patient to go the facility” (Interview, CHW, Team 1). The mentor intervention had improved the supervisor’s skills at engaging with patients.

Engagement with community structures

Prior to intervention

Prior to the intervention, the CHW programme did not have a functional relationship with community leaders and representatives (e.g. local political leaders). Most community leaders knew little about the programme, and there was no collaboration with local NGOs (for example those providing food) who might have identified households in need of health care.

Intervention, mechanisms and their iterative interaction

The nurse mentor repeatedly engaged the community leaders (i.e. ward councilors) to set up meetings with the community but only managed to have one meeting. The local political leaders appeared
disinterested in supporting the mentor in creating a link between the CHW programme and community; meetings were agreed upon but then were cancelled or postponed. Community meetings called by the political leaders were often used to discuss the lack of housing and sanitation, rather than health care. Some of these meetings turned violent as the residents tried to push the leaders to speed up the process of providing housing and other services of immediate concern. The service provided by the CHW was not a priority.

Following nurses’ complaints that traditional healers give pregnant women traditional herbs to manage their pregnancy, the mentor organised a meeting with traditional healers. A traditional healer participating in the meeting narrated “They were complaining that we [traditional healers] give pregnant women ‘isihlambezo’ (traditional herb) and that the babies are born disabled. It is not the herb that causes the disability but other things such as drinking and smoking during pregnancy (Interview, Traditional healer, Site1). The traditional healers were not ready to work with the health facility: “They [nurses] undermine us” (Interview, Traditional healer, Site 1); a long-standing impasse between the health facility and the traditional healers frustrated the mentor’s efforts to establish a collaboration.

The nurse mentor also encountered challenges with uncooperative NGO representatives: “We went to a meeting of NGOs, there were only few NGO staff present, the meeting had to be postponed because there was no point in continuing with only the few of us present. Till to date we have not received a new date for the meeting (Field notes, Site 1).

The CHWs had a positive relationship with individual community members, who often informed CHW about individuals in need of their services. A CHW shared: “When you are walking in the community, community members will tell to go and attend a sick person in a particular household” (Interview, CHW, Team 2). Individuals often approached CHWs informally to seek health-related information: “Last month I came across two gentlemen of which one told us that his body was itching and could not sleep at night…. We wrote him a referral letter to go to the clinic” (Interview, CHW, Team 2).

**Outcome**

The volatile environment and long neglected partnerships between the facilities and community structures limited the nurse mentor’s ability, within the 15 month time period, to establish a collaboration with the community structures.

**Discussion**

In our study, we examined the role of a roving nurse mentor in building the capacity of two CHW teams led by junior nurses in two primary health facilities in a semi-rural area of South Africa. Initially, with many of the CHW not having finished their schooling, the mentor’s involvement evoked fear in some CHWs, resulting in them being obstructive, or not fully participating in the capacity-building activities. The mentor had to strike a balance between pushing the CHW to try to learn, despite not having positive educational experiences, and adopting a gentler approach that didn’t alienate them; over time the nurse
mentor was able to get this balance right, and so improving the CHWs’, and their supervisors’, skills and so building their confidence. In LMIC settings, CHW often may not have finished their school education, and so it is important to provide a supportive environment to overcome their fears of failing again, and so enabling them to achieve their potential (25, 26).

The nurse mentor negotiated with the facility staff to establish three new operational systems to assist the CHW: the book for recording the patients’ delivery dates; working in the vital signs room to practice taking BP measurements; and the list and three visits only to patients who needed to be traced. These systems led to an improvement in the CHW performance, although they were still hampered by the lack of equipment, limited space and the dismissive attitude of junior staff. The CHW needed a dedicated senior person to work out what systems were required and to establish them, and to navigate problems when they arose. Once the nurse mentor left, it was difficult to maintain these systems as negotiation with staff was hampered by existing social hierarchies. However, once the CHW were more integrated into the clinic due to their change in employment status, the facility managers took greater responsibility for the CHW team.

Doherty and Coetzee investigated CHWs and professional nurses’ relationships in South Africa (27). The CHWs reported to be uncomfortable to work with the professional nurses, as they [nurses] often failed to recognise them as members of the health team. Similarly, Payne et al argued the stalemate between clinicians and CHWs is largely due to differences in training (curative and non-curative) (28). Other studies have found some clinicians tend to undermine and marginalize the CHW role (27, 29). Systematic review evidence suggests that health workers negative attitudes towards CHWs affect their performance (30). A study in Malawi found clinicians who were reluctant to give drugs to Health Surveillance Assistants (HSA) to have hindered their role and performance in the community (31). In our study, we found that a senior nurse, who serves as point of authority within the CHW teams, and champions the role of the CHW, is a critical resource in establishing operational systems, and addressing emerging conflicts between CHWs and clinic staff. Once the CHW were employed by the DoH, and so fully integrated into the health system, the facility managers built on what the nurse mentor had achieved; it is unlikely with their workload as a facility managers, that they would have been able to bring the CHWs’ skills and confidence up to the necessary level without the nurse mentor.

International evidence suggests that community members tend to utilise services if the health programme is embedded in the community structures (32–35). For example, Tuyisenge, Crooks and Berry studied the CHW provision of maternal health care services in Rwanda. In this context, village leaders and community security officers assumed the crucial role of ensuring mothers and pregnant women were aware of the maternal and child services available to them at health facility and community level (36). Similarly, Kok et al, explored the relationships between Health Surveillance Assistants (HAS), health system and community and implication for HAS performance in Malawi (34). Volunteers, who belonged to a wide range of community-based committees, also supported the HSAs in completion of their daily tasks and made effort to inform the HSAs of problems that required their attention in the community. Our study found community forums with the potential to collaborate with the CHW programme but these
forums were focused on the lack of housing rather than healthcare services. Due to the volatile political situation in the communities, it appeared that the intervention period of only 15-month was too short to establish collaborations with community structures, as well as build relationships in the clinic.

Globally, CHW labour groupings have focused on securing permanent employment, decent wages and recognition of CHWs as contributing members of healthcare system (37–39). Similarly in South Africa, the CHWs are demanding better wages from the government; in Gauteng Province, their persistence resulted in their monthly stipends being increased from R2 500 (143 USD) to R3 500 (200 USD) and being formally employed by the DoH. It appears the CHWs’ protests drew attention to their contribution. Our findings show that paying the CHWs a minimum wage and effectively integrating them into the healthcare system, is critical to CHW motivation and performance. During the COVID-19 pandemic the CHWs in Gauteng Province have been permanently employed by the PDoH, with an increase in salary to R7 500 (491 USD).

The WHO Global Strategy on Human Resources for Health emphasizes the need to align CHW initiatives and programmes to broader national health workforce policies (40); this includes strengthening CHW selection, training and supervision, if CHW effectiveness is to be realised (32). Although the WHO guidelines highlight areas of CHW programmes that need to be looked into, the guidelines however do not adequately acknowledge the chronic shortage of health workers in LMICs, to oversee the CHW programmes (9, 30, 33). Our study provides evidence of a unique CHW supervision configuration, which can be considered for other contexts that continue to experience health worker shortage. Through our 15 months intervention, we demonstrated that a roving, experienced nurse mentor can be responsible for several CHW programmes in a district healthcare system, contribute to the knowledge and skills development of the CHWs, and enhance the capacity of junior supervisors. However, the long term success of this approach is dependent on fair remuneration and the integration that results from employment of CHW by the DoH.

The limitations of the study were, firstly, that the CHWs, their supervisors and facility staff may have changed their normal routines and behaviors during observations (the hawthorne effect). To mitigate this, we observed the same pair of CHWs for at least 3 days; over this time, and the course of the four-year study, we found reverted to their normal behaviours. Secondly, the intervention study was undertaken with two CHW teams, and so this limited our ability to judge how many teams a roving mentor could support. Additionally, intervening in only two CHW teams limits the generalizability of the findings, however, the two facilities and CHW teams were typical of many teams situated in semi-rural parts of South Africa. The study demonstrates some strengths. As far as we know, this is one of the few studies that piloted an intervention to address challenges inherent in many CHW programmes (i.e. insufficient supervision, poor health systems integration and poor relations with local communities). The outcomes imply that with careful consideration of differing contexts, a similar intervention may be useful elsewhere. Furthermore, the use of realist evaluation methodology to understand how local context influenced the actors’ interaction with the intervention (mechanisms) proved to be critical in understanding the dynamics process involved in building CHW capacity in a resource constrained environment.
Conclusion

In a resource constrained setting like South Africa, where there is a shortage of health workers to oversee the implementation of CHW programmes, the use of a roving nurse mentor supporting several CHW teams is a feasible option. However, the success of the nurse is dependent on the successful management of clinic staff and community complex relationship, and formal employment of the CHWs into the healthcare systems.

Abbreviations

CHW
Community Health Worker

CMO
Context, mechanisms and outcome

LMIC
Low and middle-income country

DoH
Department of Health

PDoH
Provincial Department of Health

WHO
World Health Organisation

Declarations

Ethics approval and participation consent

The study was given ethical clearance by the University of the Witwatersrand Human Research Ethics Committee (Medical) (M160354). Participants gave written informed consent. Consent for the fieldworker to observe the CHW in the household was given by all included households. To ensure participants anonymity, unique codes were allocated to participants.

Consent for publication

Not applicable.

Availability of data and materials

Dataset is available on a reasonable request.

Competing interests

The authors declare that they have no competing interests.
Funding

The study was funded by Medical Research Council UK, DFID, ESRC and Wellcome Trust under the Joint Health Systems Research Initiative.

Authors’ contributions

JG and FG conceptualised the research project and secured funding. HM collected, analysed and interpreted the data, wrote and revised the manuscript with JG and FG. All the authors critically revised the manuscript and approved the final manuscript as submitted.

Acknowledgements

The authors would like to thank the following individuals for their invaluable contribution: the field workers, CHWs and their supervisors, health facility staff members and community representatives. The support of the Sedibeng Health District management, in particular the former district director Mrs. Salamina Hlahane and community-based services coordinator Mrs. Bridget Lefhoedi is highly appreciated. The authors would also like to thank these organisations for their generous support: Department of Health Sedibeng District, Gauteng Department of Health and the UK Medical Research Council (MRC).

References

1. Ameha A, Karim AM, Erbo A, Ashenafi A, Hailu M, Hailu B, et al. Effectiveness of supportive supervision on the consistency of integrated community cases management skills of the health extension workers in 113 districts of Ethiopia. Ethiopian medical journal. 2014;52 Suppl 3:65-71.
2. Schneider H, Schaay N, Dudley L, Goliath C, Qukula T. The challenges of reshaping disease specific and care oriented community based services towards comprehensive goals: a situation appraisal in the Western Cape Province, South Africa. BMC health services research. 2015;15:436.
3. Tulenko K, Møgedal S, Afzal MM, Frymus D, Oshin A, Pate M, et al. Community health workers for universal health-care coverage: from fragmentation to synergy. Bulletin of the World Health Organization. 2013;91(11):847-52.
4. Verhagen I, Steunenberg B, de Wit NJ, Ros WJ. Community health worker interventions to improve access to health care services for older adults from ethnic minorities: a systematic review. BMC health services research. 2014;14:497.
5. Neupane D, Kallestrup P, McLachlan CS, Perry H. Community health workers for non-communicable diseases. The Lancet Global health. 2014;2(10):e567.
6. Goldfield NI, Crittenden R, Fox D, McDonough J, Nichols L, Rosenthal EL. COVID-19 Crisis Creates Opportunities for Community-Centered Population Health: Community Health Workers: at the Center. The Journal of ambulatory care management. 2020;43(3):184-90.
7. Palafox B, Renedo A, Lasco G, Palileo-Villanueva L, Balabanova D, McKee M. Maintaining population health in low- and middle-income countries during the Covid-19 pandemic: Why we should be investing in Community Health Workers. Tropical Medicine & International Health. 2020.

8. Ballard M, Bancroft E, Nesbit J, Johnson A, Holeman I, Foth J, et al. Prioritising the role of community health workers in the COVID-19 response. BMJ global health. 2020;5(6):e002550.

9. Tseng YH, Griffiths F, de Kadt J, Nxumalo N, Rwafa T, Malatji H, et al. Integrating community health workers into the formal health system to improve performance: a qualitative study on the role of on-site supervision in the South African programme. BMJ open. 2019;9(2):e022186.

10. van Ginneken N, Lewin S, Berridge V. The emergence of community health worker programmes in the late apartheid era in South Africa: An historical analysis. Social science & medicine. 2010;71(6):1110-8.

11. Besada D, Eagar D, Rensburg R, Shabangu G, Hlahane S, Daviaud E. Resource requirements for community-based care in rural, deep-rural and peri-urban communities in South Africa: A comparative analysis in 2 South African provinces. PloS one. 2020;15(1):e0218682.

12. Munshi S, Christofides NJ. Sub-national perspectives on the implementation of a national community health worker programme in Gauteng Province, South Africa. 2019;4(Suppl 10):e001564.

13. Griffiths F, Babalola O, Brown C. Development of a tool for assessing quality of comprehensive care provided by community health workers in a community-based care programme in South Africa. 2019;9(9):e030677.

14. South African Department of Health. Provincial guidelines for the implementation of the three streams of PHC Re-engineering In: Helath SADo, editor. Pretoria: Department of Health; 2011.

15. Ramukumba MM. Exploration of Community Health Workers' views about in their role and support in Primary Health Care in Northern Cape, South Africa. Journal of community health. 2020;45(1):55-62.

16. Ludwick T, Turyakira E, Kyomuhangi T, Manalili K, Robinson S, Brenner JL. Supportive supervision and constructive relationships with healthcare workers support CHW performance: use of a qualitative framework to evaluate CHW programming in Uganda. Human resources for health. 2018;16(1):1-8.

17. Musoke D, Ssemugabo C, Ndejjo R, Atusingwize E, Mukama T, Gibson L. Strengthening the community health worker programme for health improvement through enhancing training, supervision and motivation in Wakiso district, Uganda. BMC research notes. 2019;12(1):1-5.

18. Goudge. JDK, J; Babalola., O; Muteba., M; Tseng., Y; Malatji., H; Rwafa., T; Nxumalo., N; Levin., J; Thorogood., M; Daviaud., E; Watkins., J & Griffiths., F. Household coverage, comprehensiveness, quality and cost care provided by community health worker teams in South Africa: Findings from a mixed methods study. BMJ open. 2020.

19. Greenhalgh T, Humphrey C, Hughes J, Macfarlane F, Butler C, Pawson R. How do you modernize a health service? A realist evaluation of whole-scale transformation in london. The Milbank quarterly. 2009;87(2):391-416.
20. Kreindler SA. Advancing the evaluation of integrated knowledge translation. Health research policy and systems. 2018;16(1):104.
21. Patton MQ. Sampling, qualitative (purposive). The Blackwell encyclopedia of sociology. 2007.
22. Patton MQ. Qualitative research. Encyclopedia of statistics in behavioral science. 2005.
23. Hurst S, Arulogun OS, Owolabi MO, Akinyemi R, Uvere E, Warth S, et al. Pretesting qualitative data collection procedures to facilitate methodological adherence and team building in Nigeria. International journal of qualitative methods. 2015;14(1):53-64.
24. Bowden A, Fox-Rushby JA, Nyandieka L, Wanjau J. Methods for pre-testing and piloting survey questions: illustrations from the KENQOL survey of health-related quality of life. Health policy and planning. 2002;17(3):322-30.
25. Van Boetzelaer E, Zhou A, Tesfai C, Kozuki N. Performance of low-literate community health workers treating severe acute malnutrition in South Sudan. Maternal & child nutrition. 2019;15:e12716.
26. Kozuki N, Van Boetzelaer E, Tesfai C, Zhou A. Severe acute malnutrition treatment delivered by low-literate community health workers in South Sudan: A prospective cohort study. Journal of global health. 2020;10(1).
27. Doherty TM, Coetzee M. Community health workers and professional nurses: defining the roles and understanding the relationships. Public health nursing. 2005;22(4):360-5.
28. Payne J, Razi S, Emery K, Quattrone W, Tardif-Douglin M. Integrating Community Health Workers (CHWs) into Health Care Organizations. Journal of community health. 2017;42(5):983-90.
29. Brown O, Kangovi S, Wiggins N, Alvarado CS. Supervision Strategies and Community Health Worker Effectiveness in Health Care Settings. NAM Perspectives. 2020.
30. Kok MC, Dieleman M, Taegtmeyer M, Broerse JE, Kane SS, Ormel H, et al. Which intervention design factors influence performance of community health workers in low- and middle-income countries? A systematic review. Health policy and planning. 2015;30(9):1207-27.
31. Callaghan-Koru JA, Hyder AA, George A, Gilroy KE, Nsona H, Mtimuni A, et al. Health workers’ and managers’ perceptions of the integrated community case management program for childhood illness in Malawi: the importance of expanding access to child health services. The American journal of tropical medicine and hygiene. 2012;87(5 Suppl):61-8.
32. Cometto G, Ford N, Pfaffman-Zambruni J, Akl EA, Lehmann U, McPake B, et al. Health policy and system support to optimise community health worker programmes: an abridged WHO guideline. The Lancet Global health. 2018;6(12):e1397-e404.
33. Kok MC, Kea AZ, Datiko DG, Broerse JE, Dieleman M, Taegtmeyer M, et al. A qualitative assessment of health extension workers' relationships with the community and health sector in Ethiopia: opportunities for enhancing maternal health performance. Human resources for health. 2015;13:80.
34. Kok MC, Namakhoma I, Nyirenda L, Chikaphupha K, Broerse JE, Dieleman M, et al. Health surveillance assistants as intermediates between the community and health sector in Malawi: exploring how relationships influence performance. BMC health services research. 2016;16(1):164.
35. Kok MC, Ormel H, Broerse JEW. Optimising the benefits of community health workers' unique position between communities and the health sector: A comparative analysis of factors shaping relationships in four countries. 2017;12(11):1404-32.

36. Tuyisenge G, Crooks VA, Berry NS. Facilitating equitable community-level access to maternal health services: exploring the experiences of Rwanda's community health workers. International journal for equity in health. 2019;18(1):1-10.

37. Roundup W. Gauteng community healthcare workers strike over permanent jobs. Medical Brief. 2019 24 April 2019.

38. Shoba S. Community Healthcare Workers demand wage increase and recognition as public servants. Daily Maverick. 2019 28/03/2019.

39. Trafford Z, Swartz A, Colvin CJ. "Contract to Volunteer": South African Community Health Worker Mobilization for Better Labor Protection. New solutions : a journal of environmental and occupational health policy : NS. 2018;27(4):648-66.

40. Cometto G, Ford N, Pfaffman-Zambruni J, Akl EA, Lehmann U, McPake B, et al. Health policy and system support to optimise community health worker programmes: an abridged WHO guideline. The Lancet Global Health. 2018;6(12):e1397-e404.