

Research

Community perspectives on foot care interventions delivered by community health workers

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Abstract

Diabetic Foot Ulcers (DFUs) were found to have a relatively high prevalence among type 2 diabetic patients and must never be neglected due to the high associated amputation rate. Community health workers (CHWs) showed promising strategies to combat DFUs in several countries. This study aimed to identify community perspectives on foot care intervention delivered by CHWs. Semi-structured interviews were conducted to gather the opinions of key stakeholders' patients, their family members, CHWs, and health care professionals (HCPs) regarding the acceptability and practicality of FCI by CHWs in the Indonesian context. The recordings of all 29 interviews were transcribed and translated into English. Reflexive thematic analysis (RTA) was used to analyse the qualitative data. The opinions and perceptions of participants in delivering and receiving foot care education in the community were presented in five themes around community experiences in diabetic foot prevention, enhanced healthcare uptakes by extending CHW role, community embeddedness, CHW resources, and community training approach. Overall, the study findings supported the acceptability of CHWs delivering a FCI, albeit some barriers were identified related to the practical aspects of implementing this intervention around the community actors and healthcare policy in the community settings.

Keywords Barriers and supports · Community health workers (CHWs) · Diabetic foot ulcers · Foot CARE

1 Background

A Diabetic Foot Ulcer (DFU) is a full-thickness wound below the ankle in a diabetic patient, regardless of duration, which is a severe and costly complication of diabetes [1]. About one-third of people with diabetes, or 500 million people worldwide, will develop DFU during their lifetime [2]. Diabetic patients are at a 15- to 40-fold increased risk of a lower limb amputation than non-diabetic patients [3].

In line with the global diabetes prevalence, Indonesia has a growing incidence of risk of DFUs, and an increasing prevalence of undiagnosed Diabetes Mellitus (DM). Despite low diagnosis, type 2 diabetes mellitus (T2DM) complications such as DFU are commonly observed in Indonesian diabetic patients [4, 5]. Among Indonesian T2DM patients, DFU complications incur the second-highest medical costs (approximately USD 523), after cardiovascular disease (approximately USD

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774) in terms of direct medical costs per six-month treatment period in Indonesia [6]. This could be because the majority of cases admitted to the hospital are advanced, emphasising the importance of early diagnosis and prompt treatment (to improve patient health and prospects, as well as to minimize health system costs) [4]. The mitigation of complications associated with T2DM not only holds potential benefits for the patient, but also has the capacity to lead to a reduction in aggregate healthcare expenditures [6].

In Indonesia, there are several integrated community health posts (ISP) managed by community health workers (CHWs) as unregistered healthcare providers such as ISP for children and maternal (Posyandu) and for managing non-communicable diseases (Posbindu PTM/ISP-NCD) [7]. Health care professionals (HCPs) are also responsible for delivering interventions to diabetic patients and serve as supervisors to CHWs. Many studies reported that CHWs could make a valuable contribution to communities by facilitating uncomplicated accessibility and availability to their clients [8, 9] including managing foot care intervention (FCI) [10, 11].

This study was part of developing foot care intervention delivered by CHWs (Referred to FIne-CHWs) using the new Medical Research Council (MRC) framework [12]. Understanding community perspectives on foot care interventions is crucial to developing interventions tailored to the Indonesian context particularly their acceptability and practicality of this intervention. Qualitative research is essential to understanding why something happens and is also helpful for identifying the “active ingredients” of the complex intervention [13]. This study aimed to identify the community perspectives on foot care intervention delivered by CHWs (FIne-CHWs) in Indonesia.

2 Methodology

2.1 Study design

We utilized a generic qualitative approach that does not adhere strictly to a single established methodology, such as phenomenology, grounded theory, or ethnography [14, 15]. This approach aims to provide a rich description of the phenomenon being investigated. As a result, the methods employed in generic qualitative research are typically highly inductive, with open coding, categorization, and thematic analysis being the most common techniques used [15]. This study was part of a mixed-methods research design, where the qualitative component played a role in developing a foot care intervention CHWs. A mixed-methods approach was well-suited for generic qualitative research since the study results were intended to be triangulated with findings from other research [14]. Unlike phenomenological studies, which explore the internal, subjective structures of experiences, generic qualitative research focuses on the actual content of participants’ reports—what they think about an issue, their experiences, and opinions. For instance, attitude or opinion studies prioritize understanding the content of experiences rather than their subjective psychological dimensions [15].

In this study, the interview data aimed to gather participants’ opinions regarding FCI in the community to understand the acceptability and practicality of FIne-CHWs. The interview data were analysed employed Reflexive Thematic Analysis (RTA) which emphasising the role of researcher subjectivity as a primary tool for analysis. It recognises the researcher as an instrument within the research process and acknowledges that their perspectives shape the results. Thematic analysis (TA) as a qualitative research method to identify, analyse, and interpret patterns or themes within data. TA is versatile, applicable across different epistemological and ontological frameworks, and suitable for exploring various research questions, including those focused on people’s experiences and perspectives ([16]. This qualitative study follows Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (supplementary material 1), a 32-item checklist organized into three domains: research team and reflexivity, study design, and data analysis and reporting. This comprehensive checklist covers the key aspects of qualitative research [17].

2.1.1 Methodology compliance

All methods were carried out in accordance with the relevant guidelines and regulation have been provided in the manuscript.

2.2 Recruitment of participants

The study site settings comprise two PHCs (Puskesmas) located in Bandung, the capital city of West Java, Indonesia. The study was conducted during the second COVID-19 pandemic, under this policy, there were restrictions on visitors to the PHC. The head of PHCs selected one of their nursing staff to be a gatekeeper for recruiting participants and then conveyed the potential participants' contact details to the first author after getting their permission. The ethics board approved the study before the recruitment of interview participants., number FMHS 238–0421 from the University of Nottingham, School of Health Science Ethics Board and Indonesian ethics committee (No: 652/UNG.KEP/EC/2021).

The participants were contacted to inform them about the study and sent the participant information sheet by email or short message service (SMS). They had three days to decide whether to take a part or decline the interview. The first author sought explicit permission to conduct and record the interviews via a remote verbal consent confirmation form. The recruitment process is described in the figure below (Fig. 1).

2.3 Sample size

A purposive sampling framework was applied to recruit 30 participants (ten patients, five family members, ten CHWs, three nurses and two physicians). In qualitative research no calculation of statistical power is necessary, instead, qualitative approaches seek an in-depth and detailed understanding, and typically use purposeful sampling [18]. The study involved conducting interviews with 29 out of 30 participants as initially planned. Initially, five family members were going to be interviewed, but only three were interviewed as no new themes emerges from this group. On the other hand, the number of nurses was increased to five, adding two more nurses to the original plan to obtain more opinions until no new themes emerged. The total number of participants was considered adequate to achieve data saturation, which refers to the point at which no new themes emerge [19].

2.4 Semi-structured interview

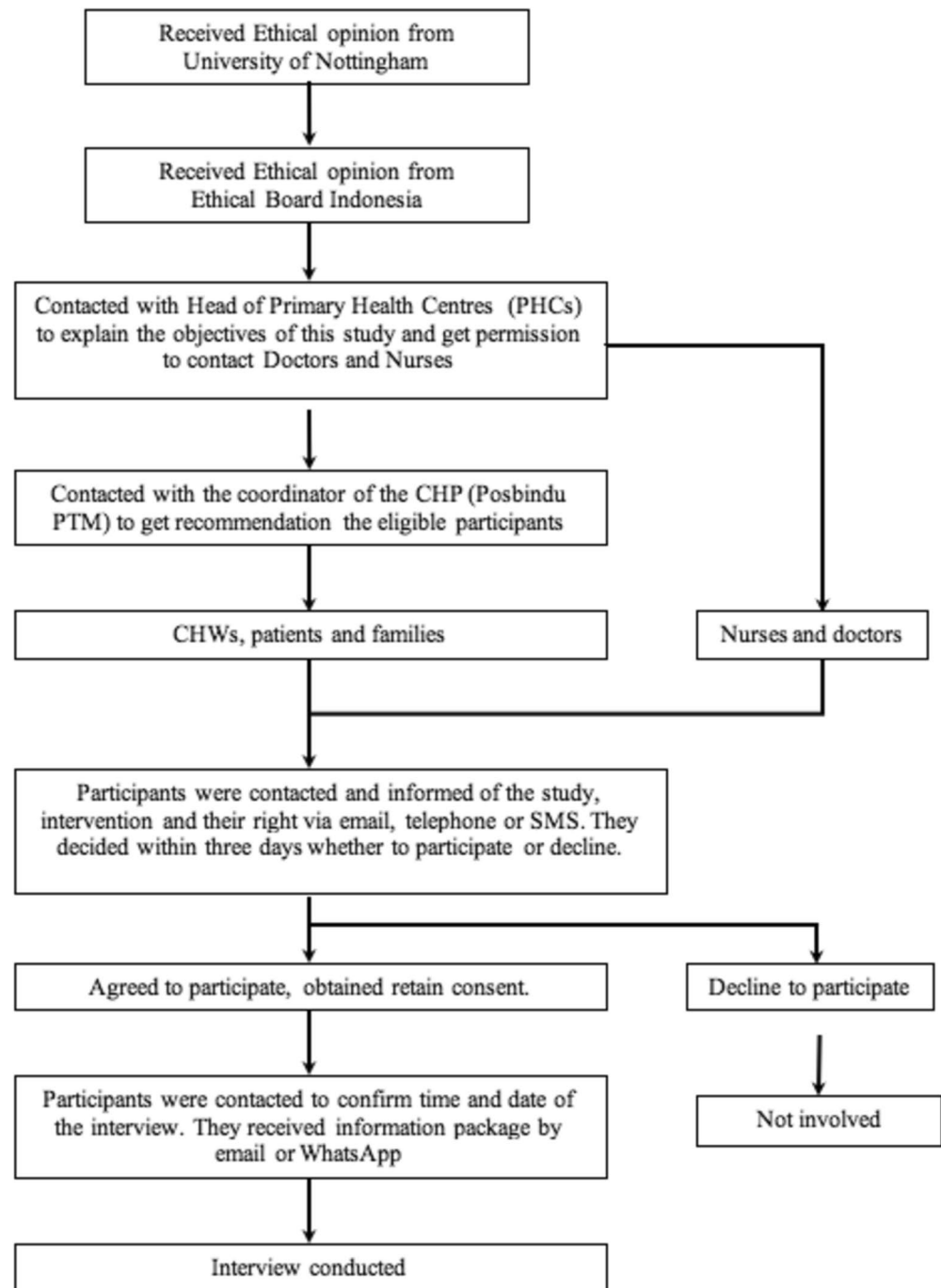
The first author conducted semi-structured interviews, audio-recorded and supplemented by memos and reflective field notes. She underwent training in Research Integrity and Research Interview Skills prior to conducting individual interviews. She also engaged in regular practice sessions, received constructive feedback from other authors, and held discussions with an experienced ethnographer.

The interview guidance was developed prior to the interview based on the emergent findings from the scoping and mapping review. There was limited information regarding the opinions and perceptions of CHWs on foot care interventions, which also reduces bias from previous studies published elsewhere [20]. Participants were interviewed remotely using WhatsApp video calls on smartphones between September and November 2021. Interviews lasted between 45–60 min. Most Indonesians use this medium for communication [21, 22]. Semi-structured interviews were piloted using one patient, one nurse, and one CHW. These participants were included in the final sample (and data analysis), as no significant modifications were required following the review of the pilot interviews' outcomes.

The pilot interview data were analysed to decide whether the data obtained answered the research questions and research objectives. The interview transcript was translated to English then discussed with other authors alongside the preliminary analysed data, other authors then scrutinized the data provided from the pilot interviews and suggested changes to how answers were followed up on to get a greater depth of answers, and also to meet with an ethnographer to learn more how to frame the interview question to gather deep and riches interview data.

2.5 Data analysis

The recordings of all 29 interviews were transcribed and translated into English. The transcription of verbatim interviews was carried out by three Indonesian individuals who shared the same cultural background as the research participants, aiming to enhance the accuracy and meaningfulness of the transcripts [23]. The data were not translated using a back-and-forth translation, since it was difficult to fully develop accurate and meaningful transcripts because the exact equivalence or meaning may not exist [23]. To ensure linguistic coherence, the first author and another bilingual nurse translated all the anonymized documents into English. During the translation process, the translator considers the unique circumstances and cultural context of both societies, aiming to develop a comprehensible translation on multiple levels [23]. In cases where there was less understanding of the intended meaning among

Fig. 1 Recruitment Process

the team, the first author cross-checked the Indonesian transcripts to ensure accurate representation or provided additional contextual explanations to enhance comprehension for all team members. If the researcher possesses bilingual proficiency, they can compare the translation with the original data themselves [24]. To protect participants' rights, we used minimal personally identifiable information when reporting data.

Reflexive thematic analysis (RTA) was used to analyse the qualitative data [16] because the preliminary analyses found that the interview datasets were rich and complex from different group participants. In RTA, research subjectivity is the primary tool as it is treated as a resource for doing analysis [16]. Furthermore, the first author was working with experienced supervisors that could help researchers avoid premature closure of the analysis, assessed whether their conclusions stand up to critical questioning and scrutiny, and considered new possibilities [16].

The analysis process followed six phases [16]. Data set familiarization was started by reading text-based data items repeatedly to get deep engagement with the exciting data and meaning. We then explored the diversity and patterning of datasets, developing codes and applying code labels to particular parts of data using NVivo version 10. Developing initial themes allowed us to draw interpretation from the descriptive to get enriched and in-depth analysis, from semantic to latent meaning. We decided to use initial hand-coding to enable the flexibility of coding interpretation and avoid premature clustering or presenting the descriptive interpretation [16]. We then explored a similar idea of meaning and understanding with different contexts, including community culture and health policy, through the inductive approach in theme development and review. In addition, we ensured that each theme was demarcated, fit into the overall story about the data, and was followed in writing up the themes to develop a rich, nuanced analysis to answer the research question.

3 Result and discussion

The research team analysed the interview data using Reflexive Thematic Analysis (RTA), which resulted in the development of five key themes. The themes are explored in detail in the following sections, highlighting the most significant findings and their implications for the study.

3.1 Theme 1: Community knowledge and experience of DFU prevention

All three groups of participants (patients and their family members, CHWs, and HCPs) were familiar with the basics of managing diabetes, which stresses diet control, medication adherence, and regular exercise as three strategies for preserving normal blood glucose levels.

The procedure for treating diabetic patients is still the same, namely measuring Blood Glucose (BG), giving medication based on the results of BG tests, then checking BG every two months for people who visit Prolanis (PHC programme for insurance patients). (Nurse3/N3)

The community's general knowledge of diabetes management did not directly indicate understanding of the importance of the prevention of Diabetic Foot Problems. Further analysis of the data revealed two subthemes related to participants' experience of footcare in the community are presented below.

3.1.1 Subtheme 1.1: Community beliefs surrounding diabetic foot problems (DFPs)

The participants recounted their experiences with diabetes and its complications; they expressed experiencing unexpected symptoms when first diagnosed with diabetes (including feeling tired, sleepy, thirsty, itchy, and numb). Nearly all of the patient participants identified these symptoms as typical before learning they had diabetes. Most participants admitted that they did not know those symptoms were related to diabetes until they felt sick and sought medical help.

Sometimes the patient also didn't know that they had sugar [diabetes] because when they came to the health centre (PHC), their leg was injured, we saw the wound was leading to gangrene, then we asked, "Do you have a history of sugar [diabetes]?" The answer must have never been checked, then we just checked from there, only to find out that the patient does have sugar [diabetes], but indeed for diabetes now, you could say it seems a bit late due to further complications. (General Practitioner1/GP1)

CHWs and patients had a similar language regarding personal knowledge about diabetes and diabetic foot. They mentioned the terms "dry diabetes" and "wet diabetes" to explain situations that happened for diabetic patients related to the risk of amputation. 'Dry diabetes' is a term for diabetes with black scars on the skin without open wounds, while 'wet diabetes' is a type of diabetes with wet sores and abscesses on the wound that takes a long time to heal, and risks leading to amputation [25]. This term does not exist in the medical field; it is a popular designation.

My neighbour has diabetes. At first, it was itchy, and it was scratched. And then, finally, it was getting wet [wound exudate]. He said it was wet diabetes, not dry diabetes. In fact, his foot was amputated. (Patient9/P9)

In general, a lack of understanding surrounding the causes of DFPs among community members prompts them to rely on locally circulating information, which is presumed to be accurate. Misconstruing the aetiology of diabetic wounds results in misinterpreting appropriate diabetic foot management. Consequently, individuals may possess

limited awareness of the potential risk of DFUs and the consequential possibility of lower limb amputation. Similar understanding around community appointments arises as CHWs deeply understand their culture [26]. However, information can be passed from the CHWs to other community members, including self-correcting any misunderstandings circulating among community members. Thus, employing CHWs as agents to deliver a footcare intervention can be regarded as an effective strategy for promoting positive behaviour within the community.

3.1.2 Subtheme 1.2: Community practice on diabetic foot prevention (no guidance in diabetic foot prevention)

Where patients and CHWs' had knowledge of diabetes management, this tended to come from being involved in research projects rather than from the health service. Similarly, nurses involved in diabetes research projects acknowledge a greater understanding of diabetic foot prevention, but they exclusively applied this knowledge as part of the research protocol, as there was insufficient time to educate patients in their health service role. In addition, a nurse who underwent a brief course in wound care exhibited a more profound comprehension of diabetic foot prevention strategies.

We did it only for research, we did not teach patients on daily basis. Yeah... because we do not have time. (Nurse1/N1)

HCPs emphasize maintaining blood glucose (BG) levels within the standard as the main prevention of diabetes complications, followed by wound care to manage DFU, as narrated by nurses about the diabetes management at the PHC.

We never did foot screening because we have many patients so we would spend a lot of time. So, if a patient has symptoms [sores], we do screening [blood test] for treatment. If there are no symptoms, we never did screening (...). Foot screening is not included in the programme [diabetes]. So, not all nurses know it. In conclusion, diabetes programmes are only for treatment. (N3)

Foot screening to determine risk classification was not implemented in the PHC's protocols due to the absence of manuals and objectives for diabetes management and the unavailability of allocated time to perform the foot screening procedure. Concurrently, it was recognized that HCPs required further education on preventing diabetic foot complications. The preferred foot care intervention identified by participants was foot exercises.

We did not teach skill (other prevention measure in footcare), we just told them by demonstrated using newspapers for foot exercises (...) that's because this topic is easy to do, the tools are easy to get, only used newspapers, it just brings a newspaper. (N3)

Foot exercises have emerged as a popular and recurring method of self-footcare within the community in contrast to other preventive measures. Some patients and CHWs believed in preventing DFU by practicing foot exercise. Foot exercises involve folding, tearing, and using toes to crumple newspaper into a ball. Five of the nine patients interviewed had performed these special foot exercises.

Barriers to diabetic footcare prevention in Indonesia have been identified, including a lack of knowledge among HCPs in PHCs, resulting in poor diabetes treatment at PHC facilities [27, 28]. This study indicates the nurses who would potentially supervise the CHWs have a lack of knowledge in diabetic foot prevention.

3.2 Theme 2: Enhanced healthcare uptake by expanding CHW's role

One of the nurses described the monthly activity in integrated service post for non-communicable disease (ISP-NCD), which focuses on screening for non-communicable diseases (NCD) in the community, and not merely for diabetic patients. Patients who had diabetes were then directed to further intervention in the Prolanis programme managed by HCPs in PHC. The Prolanis programme is a multi-faceted intervention involving both pharmacologic and non-pharmacologic strategies and targeted at diabetic patients and hypertension under the National Health Insurance (NHI) scheme (e.g., patient education, physical activity, monitoring, and reminder system) [29].

Those without insurance may not have access to important information regarding diabetes management and preventing complications. To address this issue, a nurse suggested that CHWs play a vital role in disseminating information through footcare intervention delivered by CHWs (Flne-CHWS) to increase patients' knowledge and awareness of diabetes complications.

There are around 200 people who have diabetes, but only 60 have taken part in Prolanis; not all of them could be taught in PHC, and this [FIne-CHWs] may reduce mortality. So [perhaps] people who do not join Prolanis will get information from CHWs in Posbindu. (N2)

Prolanis as a special programme for diabetic patients held by PHC is indirectly the cause of the lack of focus on diabetes prevention in the community, thus resulting in less optimum CHWs' role, especially for diabetes prevention at ISP-NCD. The possibility of extending CHWs' role to deliver FCI was explored through subthemes below:

3.2.1 Subtheme 2.1: Community empowerment (feasibility of the extended role of diabetes educator)

Regarding implementing FIne-CHWs in the community, the nurse competent in wound care believed that CHWs would be able to deliver FIne-CHWs educational sessions. They noted that the educational content is simple and appropriate for the general population, mainly aimed at preventing DFUs.

(...) because ordinary people do it, I think CHWs can do it because this is basic [footcare]; even with CHWs with lower education, this information [footcare] is familiar in their daily life. (N3)

The above data is supported by several CHWs who believed that the diabetic patients would accept new information from CHWs.

I feel patients will also be happier to be told how to take care of their feet. So, it will be right to do if its procedure is available. (Community Health Worker4/CHW4)

Overall, all three groups of participants who were interviewed acknowledged the significance of the CHW's function as an educator and the potential impact it could enhance service uptakes, particularly in reducing the incidence of DFUs due to many patients already present with extensive foot ulcers upon their initial visit to referral hospital in Indonesia [4]. The practicability of FIne-CHWs within the community to prevent DFUs was acknowledged as a possibility that could be implemented under the present circumstances.

3.2.2 Subtheme 2.2: Capacity of CHWs to gain new knowledge and skills

There is no educational attainment to become a CHW [30]. One of the CHWs' leaders who identified herself as a young CHW indicated that not all the CHWs would have the capacity to extend their role as educators such as for the FIne-CHWs.

Perhaps due to (limited) knowledge, maybe... only a few CHWs understand. The other CHW maybe help us. (CHW5)

Other CHWs who supported this argument also mentioned their role as a supporting CHW, as opposed to the main CHW or CHW leader; the data indicated that receiving training from the PHC was not a priority for supporting CHWs because their role was focused on assisting with specific tasks that were deemed not to require advanced knowledge and skills in Posyandu-Posbindu PTM.

I'm 60 and have been a kader [CHW] for ten years. My education level is elementary school. I am supporting kader. There are leading kader responsible for several sections ... I helped measure the children's heights. Then I gave food supplements, that it is (...). I have not participated in training even though I have been invited because sometimes I have a different schedule. For educating diabetic patients, I could not do because I am busy taking care of my grandchild. (CHW9)

The primary concern regarding the workforce was the shortage of existing CHWs who are suitable qualified to deliver FIne-CHWs. Even for their general/current role, CHW performance often seemed inadequate [31]. The data indicated that the PHC limited invitations to the leader or main CHWs to have training in knowledge and skill.

The community generally viewed community CHWs as a valuable source of information for delivering healthcare knowledge to the community. This finding was supported by Perry and Hodgins (2021) who argued that CHWs can increase the effectiveness of the PHC programme and CHWs can play an important role in screening and managing such diseases, such as hypertension and diabetes [32]. However, concerns were expressed by all the participants, including the CHWs themselves, regarding their ability to provide diabetes foot education effectively. The perception of CHWs' capacity and capability may be affected by the tight-knit community and shared living conditions in nearby areas.

3.3 Theme 3: Community embeddedness

A GP acknowledged specific community members within the PHC catchment area who were considered the most appreciative of CHW services and needed their presence. This group is likely to place more value on and have a greater need for the role of CHWs as community health providers.

Actually, going back to the environmental background, yes, it means that if we are here, there are indeed those from the middle and above [socioeconomic status] who are a bit difficult for us to target; they probably didn't choose the Puskesmas (PHC) as a place for treatment, of course, they didn't choose kader and chose Posbindu <laugh>, but for some regions or sub-districts [low socioeconomic] they likely can work more together with CHW. They can still accept the CHW role; it might be more at the level of the population's needs; now, if that's the case for the lower socioeconomic groups, they are close to CHW. (GP2)

Furthermore, for patients from low socioeconomic background, further incentives were considered necessary to increase community participation in ISPs or educational sessions such as serving snack or food for attending to the community event. All of the group participants agreed that this factor was critical to the success of the intervention.

<laugh> usually, health education is attractive if there are prizes for the lower class; there must be a reward... like being fed. If it was different from that, only a few people came. (N4)

The CHWs are community members who serve as intermediaries between the community and health services [33]. This role is particularly significant for individuals from low socioeconomic backgrounds [32].

The subthemes discussed below present the challenges and facilitators associated with the intermediary position of CHWs between the community and formal healthcare services, and explore the implications and strategies to address this issue and mitigate the trust and distrust concerns.

3.3.1 Subtheme 3.1: Benefits of proximity to community

The proximity of CHWs is a key factor contributing to patients' trust in them. This advantage is particularly evident in neighbourhoods where community members live nearby.

Yeah, I trust them, but they who are close with me. If they are not, I don't believe them It will be comfortable if we are close. We can make jokes or have fun. If I'm wrong, I can ask, so there's no need to stress about what will happen later, right? (P9)

In addition to feeling personally close to CHWs, the proximity of the place of intervention for both CHWs and patients is another benefit of community programme. Most interview participants suggested using a community venue to deliver the FIne-CHWs programme such as the community administrative block office or the community hall or alternatively at the patient's house.

(...) CHW [house] is nearby. Instead of going to PHC, which is far away, it is better to be near here, for the sake of my health too. It can be held in Posbindu or in house... because CHW's house is still surrounding this area. (P3)

The choice of intervention place for delivering FIne-CHWs is consistent with health professionals' preferences for intervention sites, as they also have regularly scheduled visits to the ISPs to supervise those activities.

If counselling is held at Posbindu (ISP), we will definitely have time for that. For example, if the day and time have been scheduled, then we can definitely make it. (GP2)

Given the intrinsic rapport that CHWs have with their own local communities, as described above. A direct link between community respect for CHWs would increase CHW motivation as CHWs feeling proud of their role improves their self-esteem [34] which increases CHWs' confidence to serve those they are familiar with. Some patients also feel more comfort and accessible being taught by CHWs [35].

3.3.2 Subtheme 3.2: Drawbacks of proximity to community

Being close only sometimes guarantees trust; conversely, familiarity with the CHW may lead to them being less trusted. Patients did not trust CHWs for a variety of reasons, including the fact that they were not good role models (not caring for their own health), lacked the necessary training or abilities, or were not trained HCPs.

Mrs. Iis is my niece, all of the kader (CHW) are also my relatives. Mrs. Iis herself (kader suffers from diabetes). She also doesn't get well, she felt itchy... so she has to get well first. (P8)

This issue can act as a barrier to expanding the role of CHWs in delivering FIne-CHWs. Therefore, to address the trust issue within the community, it is necessary to enhance the capabilities of CHWs.

Participants suggested that the distrust of CHWs could be alleviated if they received proper training and supervision from HCPs while conducting FIne-CHW sessions, echoing the findings of Kok, Ormel et al. (2017).

3.3.3 Subtheme 3.3: Pre-service training as an intervention provider

Before delivering information or training to community members, CHWs need to be trained by HCPs in order for patients and family members to trust them. The patient participants needed to be confident that the CHW was qualified to provide FIne-CHWs sessions.

... as long as they have knowledge, I believe. They will be taught first, right? it means they have the knowledge, so they will teach me yeah... I believe in them <laugh>. (P7)

Furthermore, one of GPs believed that requiring the CHWs to pass an examination and providing a certificate to evidence this would increase CHWs confidence that they could demonstrate their competence.

If the kader participate in diabetes foot exercise training and get a certificate, it will increase their confidence. (GP1)

CHW training might address the mistrust of community members concerned about their knowledge and skills in diabetic foot prevention. The significance of training in promoting the trust of communities and demonstrating the competence of CHWs is widely recognized [36]. Provision of training to CHWs has been shown to enhance their technical proficiency, social skills, and understanding of the complexities of clinical care and authoritative guidance, which can potentially improve the quality of care [37, 38]. The lack of training may compromise the quality of care provided by CHWs [39].

Additionally, formal certification based on competence is recommended to increase CHW self-esteem and patient confidence in CHW services [37]. For instance, highlighting the training and certificates of CHWs has been shown to be an effective strategy in increasing patient confidence among Bangladeshi migrants in the US [11]. Training is also required for the HCPs already employed in the health system for new skills to perform their expanded role in part-time support and supervision of the CHWs [40].

3.3.4 Subtheme 3.4: CHWs' supervision

Furthermore, because they knew the CHWs personally, the community assessed their capacity and capabilities in light of personal impressions. They unintentionally made unfair comparisons among both CHWs and HCPs. However, such existential perceptions are nevertheless instrumental in patient trust in and utilization of services. One family member described the situation when CHWs provided services in the community, the presence of HCPs at ISP increased the confidence of CHWs, as well as creating a sense of trust in the community, by conferring veracity on CHW-delivered content and practise.

For the kader, if they wanted to respond [answer the question] they were afraid of being wrong but if the kader were accompanied by a Puskesmas(HCP) officer when CHW shared knowledge [teaches the patients], it looked like kader getting smarter" (...) posyandu officers [CHWs] were not confident, even though the Puskesmas officer (HCP) just sits, just-drinks coffee, but they have brought a different atmosphere psychologically... I did not know how... there was some kind of placebo effect [spellbinding]... for the posyandu officer (CHWs) and the community members. (Family member2/FM2)

Moreover, HCPs expressed reservations regarding CHWs' aptitude to convey information precisely. They are apprehensive that CHWs may not furnish information with the same level of detail as HCPs and therefore opine that the participation of healthcare workers could enhance the community's acceptance of CHWs.

Sometimes there is a possibility of missed [educational content]. The way it is conveyed from one person to another is different, and health education goals still need to be achieved. For example, if you want to clean your feet, there may be missing points or lack of attention to detail... maybe to keep people's trust in kader (CHWs), maybe for some people, if there are health workers, they will believe more "oh, this is true, what the kader teaches". (GP2)

Adequate supervision from HCPs during the delivery of FIne-CHWs sessions is crucial in promoting community trust and ensuring compliance with patient management requirements [37]. The participants in this study requested the presence of HCPs whilst the CHWs were delivering FIne-CHWs in the community. Supportive supervision should include regular monitoring of CHWs at their tasks, obtaining feedback from CHWs to consider potential programme improvements, and ensuring the safety and well-being of CHWs at their work [41].

Supervision plays a vital role in strengthening the relationship between CHWs and health professionals, as well as fostering a positive relationship between CHWs and the community, which can significantly impact the perception and beliefs of the community towards CHWs [33, 42]. However, effective supervision requires sufficient allocation of time and resources. HCP participants recognized that the timing of FIne-CHWs sessions needs to align with their schedules to enable them to supervise ISP (Posbindu-Posyandu) activities successfully.

3.4 Theme 4: Recruitment and selection of CHWs

The recruitment of CHWs with appropriate characteristic is a pivotal determinant of the programme's success, as they must possess the capacity to assimilate the requisite knowledge and skills and embody the proper attitudes for the task at hand. Drawing from his experience as a village administrator, a family member outlined some of the criteria the community deemed essential for CHWs. The family member emphasized the appearance of CHWs as healthcare providers when rendering services in Posyandu.

what I'm saying is that it's about placement, there must be psychological screening, don't put people who are beautiful, but they have high blood pressure, eh, it's troublesome <laugh> not only having knowledge but also their appearance (...) the performance is then supported by a way of interacting... able to make sense because after all, they are kader, their job is to talk to people (...). (FM2)

A family member with prior experience overseeing the community health workers program (CHWP) stressed the significance of selecting CHWs who possess sound knowledge and an empathetic disposition, enabling them to forge robust relationships with community members. The family member also identified communication skills as a vital attribute that CHWs should possess.

To ensure an equitable recruitment process, personal preferences ought to be avoided when selecting CHWs. One family member recounted their experience with a community programme wherein the new village head favoured individuals based on proximity, resulting in CHWs being perceived as politically affiliated and lacking societal respect while on duty.

In my time, I was the village head... If you changed the village head then the passengers changed, the passengers here are the people (involved). Changed to a different one [village head] then the previous kader is no longer active, like that. (...) the Puskesmas (PHC) should not recruit CHW; it's from a politician, whoever it is, whatever colour it is [colour is a symbol of a political party] ... well this is one of the reasons that people's respect decreased... so don't have activists there, it's just a pure community... housewives. (FM2)

A nurse with over 20 years of experience overseeing CHWPs delineated additional criteria to consider when selecting CHWs. The nurse underscored age, educational attainment, and motivation to engage in community service as the three pivotal factors.

I mean, they are elderly... so it's difficult to do reporting, maybe, it will be better if the kader are under 50 years old and also [have a high] education level and also, they have a passion for work. If they really want to be taught ... yeah, actually, we can ask them for help. But in reality, sometimes, yeah, it's a bit difficult to write reports they said that they can't... just can't do that (...). (N5)

To recruit CHWs effectively, specific criteria should be taken into account. CHWs should be regarded as educators and possess good emotional intelligence and practical communication skills while independent of political influence. Selection based solely on proximity to the incumbent village ruler should be avoided. Additionally, CHWs should maintain a professional appearance to command respect from the community. To ensure the successful delivery of FIne-CHWs educational sessions, three critical recruitment characteristics must be considered: age, educational attainment, and high service motivation.

Patients and nurse participants expected young and well-educated CHWs for delivering FIne-CHWs. This expectation may be influenced by the experience of working with senior CHWs who had difficulty with data recording. However,

this bias may not be fully justified, as older CHWs can provide a wealth of experience and knowledge that younger one's may lack [40].

There is some debate regarding the deployment of older CHWs. Concerns have been raised about their ability to cover their assigned geographical areas as effectively as younger CHWs in Nepal [41]. However, older CHWs may have an established position as community leaders and more credibility than their younger counterparts. A study on the CHWP in Nepal found that older CHWs were effective in offering counselling to women and family members on birth preparedness, institutional delivery, new-born care, family planning services and other basic health services. Senior CHWs who were considered to have less mobility can still be effective in providing services and promoting recommended health practices due to their high levels of respect and recognition within the community [41]. Therefore, while there may be biases and concerns surrounding the deployment of older CHWs, their experience and community position can make them valuable assets to CHWPs.

3.4.1 Subtheme 4.1: Motivation underpinning being CHWs and primary requirements

The motivation of CHWs to support their community is considered crucial, with many CHWs citing a desire to help their neighbours as their primary motivation for undertaking the role. This altruistic motivation to contribute to and support the community was deemed necessary by CHWs. One senior CHW even recounted how she dissuaded prospective young CHWs from expecting financial compensation for volunteering in the community.

Let's be a kader. This is a social service, so there is no salary. If you want a salary, you can work in a factory and reach 2 million [rupiahs] a month [but being CHWs]; the reward is for the afterlife—Insha'Allah [if Allah will it] (...) Yes, it's just voluntary to be a kader; I want to be with the community, be close, know the situation of being a kader, and also gain knowledge. It will improve my knowledge; We are the senior kader; asking about the honorarium is embarrassing (...). It is not working as civil servants; why do we ask for an honorarium? God will give it if we are sincere. (CHW7)

The primary motivation for individuals to volunteer as CHWs was their desire to assist others, with some citing religious reasons as well. Another cause identified was gaining new knowledge to support their own families. Nevertheless, when a person volunteers, there is usually an expectation of receiving something in return, which does not necessarily have to be material. Intangible rewards associated with volunteer activities may include a sense of satisfaction, personal development, psychological comfort, or the feeling of contributing to the community [26].

3.4.2 Subtheme 4.2 CHW remuneration

Some CHWs expressed concern that people were no longer interested in volunteering, with the lack of financial benefit from being a CHW being one reason for this change. This shift in motivation could impact the sustainability of the CHWP.

It's decreased, the number of CHWs. Several years ago, it was a lot but now it's few. (CHW5)

Almost all interviewed CHWs stated that altruistic motives were the main reason for volunteering. However, CHW also pointed out that not everyone accepts working without incentives, especially younger people.

Sometimes the kader... the young kader. Sometimes they say, "Is there fee for that, Mrs. lis?" For me, I just want... to encourage the community, sincerely. I don't really care about salary. (CHW7)

In Indonesia, CHWs typically offer their services voluntarily and only receive a nominal reimbursement for transportation expenses provided by the local government. However, the community often supports CHWs through informal means such as offering food and monetary compensation. Introducing formal financial rewards for CHWs may disrupt this informal payment system and potentially compromise the existing relationship between the CHWs and their community.

With a note, remember to increase the capacity, if the problem is related to finance, don't worry... many people will pay attention [helping CHW financially] (...), if members of the community have sustenance [some of the money]. CHW was given an envelope [was given money] (...) so this. also don't keep buying and selling. if buying and selling would not accept, it is a kind of charity, as long the (CHWs) belief is, that the keyword is ... to give the best to the community (FM2)

Consideration needs to be given if reimbursement is provided; this may change the role and motivation of CHW within the community as a volunteer. Although the provision of allowances and transportation could make the programme more acceptable and increase CHW motivation.

The study found there was a perception that younger generations were less likely to assume the role without financial incentives. This change in expectations could jeopardize the programme's long-term viability. An ethnographic study on the position of CHWs in the current situation revealed that the values of "gotong royong" (mutual cooperation) were less appreciated by a society that has shifted to materialism in line with increasingly complex needs and daily life [43]. However, this does not fully explain why young people are not interested in being volunteers. The lack of career advancement opportunities and inadequate incentives may make people less interested in becoming CHWs [41].

Furthermore, CHWs from poor socioeconomic backgrounds often felt that their remuneration did not reflect their efforts. CHWs did not always receive their allowance as per policy in Indonesia, despite often being only USD 5 per month [44]. The compensation provided to CHWs is inadequate to support their financial needs (certainly if considered as an occupational salary), and appropriate incentives should be considered to balance their efforts in helping the community.

3.4.3 CHWs' ability to learn

A patient and a CHW expressed their appreciation and optimism for the younger generation of CHWs. They believed that younger individuals have a greater ability to acquire new knowledge and establish connections with older people. This particular issue was raised by former CHWs and the current CHW leader, who were interviewed as patient participants.

I think they are young (CHWs) <laugh>. They are not like previous kader who were old. Now, if they are taught by the clinic (PHC), they can do it... Yeah, the elderly is easy to be managed by young kader. (P9)

It appears that the recruitment of CHWs should prioritize the ability to learn and acquire new knowledge and skills and demonstrate this capability. The emphasis on recruiting younger CHWs may be related to their higher level of education compared to previous generations. Since the late twentieth century, pedagogical developments and more universal secondary school enrolment has led to significant improvements in education for the younger generation, resulting in higher levels of education compared to their predecessors in Indonesia [45].

One CHW expressed concern that her level of education could create a poor performance as an educator. She felt insecure about it and assumed that someone with a higher level of education was more capable of learning new knowledge.

I could not do anything; I'm afraid that other people will be educated and graduate from school, while I'm not. I'm afraid I can't do it. I'm worried I won't be able to. on how that my way of speaking and knowledge is not like other people who have a high level of education. (CHW6)

The participants in the study also highlighted the importance of higher education among CHWs selected for an extended role in the FIne-CHWs, as it can significantly impact their abilities. It has been observed that younger CHWs tend to have higher education levels [26] and they may also possess more energy to perform their tasks [41]. WHO (2020) reported evidence suggesting that CHWs with higher levels of formal education before joining the workforce are more effective in tasks such as registering patients, diagnosing childhood illnesses, and providing appropriate advice to clients.

WHO (2018) emphasizes the importance of appropriate education levels for CHWs based on their cognitive abilities and the specific tasks they will be performing. In Indonesia, CHWs managing ISP-NCDs (Posbindu PTM) were formerly required to have a minimum educational level of year 12 schooling [30]; however, this educational attainment is not specified by the new CHWs manual [7]. Despite the benefits of an educated CHW, turnover rates for such individuals are relatively high due to a lack of career advancement and educational opportunities within the CHW role [34, 37]. To address this issue, it is recommended that community health programme planners consider recruiting CHWs within education level that meet the requirements of the FIne-CHWs.

However, in selecting CHWs, their engagement, responsiveness, accountability, respect, and trustworthiness are more critical than their level of education; CHWs do not necessarily require high qualifications but must be willing to learn [41]. This value might be identified as enthusiasm for the work which is often linked to CHW performance in Indonesia [46]. The prioritization of education level for undertaking the role of CHWs results in varying levels of capacity and capability among CHWs within the community.

3.5 Theme 5: Community training approach

The majority of visitors to Posbindu (ISP- NCDs) are elderly individuals, including those who have diabetes [47]. Many of the CHWs involved in this activity are also senior community members, which aligns with the age group of most diabetic patients. All three groups of participants have expressed concerns about the patient's ability to comprehend and retain

the information provided during educational sessions at ISP-NCDs and their ability to remember or perform the necessary self-care tasks. The elderly participants expressed that they often forgot the new information provided by the CHWs, leading the CHWs to remind them of the information during subsequent meetings frequently.

If it's only for a while, moreover they are old and tend to forget. Within an hour, if they forgot then they could ask again <laugh> barho [Sundanese, meaning forgetting when you are done], yes it's next month, repeat again, then we have to ask patients/visitors do they still remember or forget, for example if they still remember, thank goodness, we will repeat of the guidance. (CHW4)

The difficulties of the patients leaning new information was mirrored by the difficulties the CHWs experienced learning new information following training.

If we did not forget, we used to forget completely [information from training] <laughs>. (CHW2)

In order to tackle the challenge of learning difficulties, the three groups of participants suggested devising learning strategies that would facilitate the understanding and retention of educational materials by both the CHWs and the patients. One GP proposed a method that involved presenting educational materials accompanied by illustrative pictures and using simple language. This approach aimed to enhance participants' comprehension while enabling them to retain the information more effectively.

Using multiple images is preferable. Because it's usually more accessible for people to understand and remember what we explain, it's different from explaining with just words. For example, "this is what a DFU looks like", and [the picture shows] it has no complications. So, people can easily remember. (GP1)

Family members helped patients recall new information from training and to remind them to adhere to health regimens, making them a potential resource to be involved in FIne-CHW education sessions.

My mother forgets a lot, so she can remember later with the help of her children and husband, who can provide assistance. (FM1)

Moreover, it was suggested that emphasizing hands-on practice would aid in the retention of information by the patients. By engaging in hands-on activities, patients are more likely to retain the knowledge and skills imparted during the educational sessions.

(...) must be demonstrated often practiced, like that... so I don't forget. (P7)
they better get a demonstration skill [footcare]. So, they see [every step]. It is more effective to teach footcare practice. Mainly because they are at an advanced age, [they] do not like reading books, so it is easier to see, hear, and be more effective than asking them to read. (CHW3)

The duration of the intervention also affected the participants' concentration ability with one hour considered the maximum length of an educational session with shorter sessions preferable for concentration and engaging the patient.

(...) CHWs, too... and a community that is given health education too... would make them bored; they don't concentrate either. Usually, it just takes 15 minutes, their concentration has already been dispersed <laugh>. (N4)

To address this issue, participants identified practical ways to teach both CHWs and patients, such as using illustrative pictures, interactive learning, and providing practice skills within a specified time frame while having support from family members.

Research has shown that using pictorial images and teach-back educational strategies can increase knowledge and improve health literacy for patients with low literacy levels, particularly in older adults [48–50]. For instance, Female Community Health Volunteers in Nepal were found to be more effective when pictorial diagrams and appropriate forms are used to adapt to the situation [41]. In a study by Tumbelaka et al. (2018) in East Java (Indonesia), counselling cards containing information and pictures were adapted to the local context and proved to be effective aids in promoting health and improving understanding among pregnant women. In summary, the use of pictorial aids and appropriate training materials is effective in supporting illiterate or low-literacy CHWs in promoting health and improving patient outcomes. This finding is consistent with teaching footcare in Indonesia, where low-educated participants benefit from visual and auditory demonstration methods rather than written instructions [51]. To address this issue, involving family members in patients' education in FIne-CHWs can help them deal with written material and serve as a reminder for patients' adherence to their footcare regimen. Family involvement has been tailored to educate patients about foot care

in Vietnam [52], and family involvement in educational programs is recommended. Furthermore, effective materials should focus on offering practical strategies for behaviour change, the “need to do”, rather than on teaching facts, the “need to know” [53]. Additionally, monitoring and observation conducted after training have been shown to help CHWs remember topics and achieve better health counselling [50, 54].

4 Summary and further discussion

The semi-structured interviews undertaken with three groups of participants—namely CHWs, HCPs (GPs and nurses), and patients and their family members—aimed to gauge the acceptability and feasibility of the FIne-CHWs. Interview data revealed several barriers and facilitators to implementing FIne-CHWs in the Indonesian context. The opinions and perceptions of participants in delivering and receiving footcare education in the community were presented in five themes around: community experiences in diabetic foot prevention, enhanced healthcare uptakes by extending CHW role, community embeddedness; CHW resources (recruitment and selecting CHWs), and community training approach.

The acceptability of the FIne-CHWs programme was acknowledged by all participants, as CHWs providing services within the community were highly appreciated by patients and their families. However, some concerns were raised regarding the capabilities of the CHWs, which need to be addressed through pre-service training and ongoing supervision from HCPs. Moreover, issues pertaining to the selection and recruitment of CHWs, including their motivation, age, and education, were identified as critical factors that influenced their capacity to deliver the FIne-CHWs programme.

This study also found that many CHWs are intrinsically motivated to serve their communities. They believed that community service will earn them intangible gifts from God, in line with Islamic religious values [35]. Similarly, religious motivation is a common factor among those who volunteer to help others, as it is an ideological norm that ensures a place in heaven [55, 56]. Indonesia is renowned as the world’s largest Muslim-majority country [57], where religion is positively linked to altruistic values and prosocial behaviour. Islam encourages giving and helping those in need, and this notion is deeply embedded in the culture. Although there are concerns regarding the adequacy of incentives for CHWs, altruistic motivations and religious values continue to drive their participation, even though young people may expect adequate monetary rewards. The issue of remuneration and incentives for CHWs, which is a hidden barrier that potentially hinders the expansion of their role in delivering FIne-CHWs.

5 Limitation of study

The recruitment strategy used different community groups, but incomplete data may have resulted from the absence of a village committee member responsible for CHW selection and funding. However, a former village head with CHWP experience participated, and some CHW leaders provided valuable information as community leaders.

This study did not employ forward and backward translation, which may result in inaccuracies. To effectively tackle this issue, all anonymized documents were translated into English while considering both societies’ cultural contexts. This approach ensured the clarity of the quotations from the respondents’ responses.

6 Conclusions

This study demonstrated that it is feasible to implement a CHW diabetic foot care intervention in the Indonesian context, though there are some barriers that need to be addressed such as CHW resources, remuneration, supervision and health service policies before introducing a new CHW intervention.

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Data availability All information collected during the study is kept confidential. Study datasets are stored within the lead researcher's One-Drive. The specific folder is accessible only to other members of the research team. The data are, however, available from the authors upon reasonable request and with the permission of the University of Nottingham Data Protection Policy. All methods were carried out following relevant guidelines and regulations.

Declaration

Ethics approval and consent to participate All participants provided virtual informed consent. This study received ethics approval (No: FMHS 238-0421) from the University of Nottingham, School of Health Science Ethics Board on 24 May 2021. The study was reviewed by an Indonesian ethics committee (No: 652/UNG.KEP/ EC/ 2021) on 13 August 2021.

Competing interests The authors declare no competing interests.

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