

Promoting diabetes self management through diabetes peer support groups in rural Tamil Nadu – qualitative exploration of implementation challenges and outcomes

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Abstract

Background: Treatment of diabetes requires adoption of diabetes self-management behaviours. Diabetes self management education and peer support are likely to promote adoption of these behaviours.

Objectives: To study the feasibility, adoption, acceptability of a diabetes peer support intervention in a rural community in Tamil Nadu.

Methods: We implemented a diabetes peer support intervention with 29 peer support groups in 29 villages served by a voluntary health organization as part of a cluster randomized controlled trial. At the end of the 2 year intervention we conducted in depth interviews with all 10 community health workers who facilitated the trial in the field, 6 purposively sampled members from the control group and 10 focus group discussions among 43 members in 10 different peer support groups sampled based on gender, caste and percentage attendance in the group meetings over 2 years. We analyzed the transcripts using the Consolidated Framework for Implementation Research domains.

Results: The facilitators of adoption, acceptability and sustainability of the intervention included empowerment of the community health workers with knowledge about diabetes, confidence, joy, wellbeing and gain of knowledge by the members of the peer support groups, empowerment of the members by the monthly monitoring of blood sugars and blood pressure, readily available medical consultation over mobile phone to clarify doubts and forging strong bonds between the community health workers and the community. The barriers included challenges faced by elderly and persons with disabilities in attending the meetings, complexity of some of the self management interventions like Yoga, workload of working persons, gendered social roles preventing attendance in meetings, inefficient public health system making basic care inaccessible, digital divide preventing use of mHealth content, low literacy levels, male alcoholism impairing engagement and harassment and violence experienced by the female community health workers in the villages.

Conclusions: It is feasible to form peer support groups and provide diabetes self-management education through this platform however sustainability will require addressing some limitations in design of the intervention and navigating inner and outer setting complexities.

Introduction

The burden of diabetes in Tamil Nadu is about 18%, among the highest in the country.^[1] With this high prevalence of diabetes, and a rapidly increasing burden in rural areas it has emerged as one of the most important public health problems in the state. Treatment of diabetes involves sustained behaviour modifications by the patients including diet modifications, regular physical activity, periodic monitoring of blood sugar levels, regular intake of medications, and other behaviours like care of the feet.^[2] Diabetes care in India remains largely biomedical with very little emphasis on these social dimensions.

Tamil Nadu launched the Makkalai Thedi Maruthuvam scheme in 2021, in response to the serious interruptions in supply of drugs for non communicable diseases due to COVID 19.^[3] The scheme delivers medicines for non communicable diseases at the patient's door-step, especially for the elderly and those with restricted mobility. The Women Health Volunteers and the Mid Level Health Providers are the key frontline functionaries of the scheme taking NCD care to the community. However the MTM scheme does not lay emphasis on promotion of diabetes self management behaviors among the patient.

Teams of researchers working in Cameroon, South Africa, Thailand and Uganda demonstrated that peer support interventions offering assistance in everyday management of diabetes, social, emotional support, linkage to clinical care and ongoing availability of support, leads to improvement in clinical and psycho-social outcomes.^[4] There are many studies that have explored the impact of diabetes peer support on self management behaviours among patient. However most of these studies are of low quality and so a systematic review of the findings were inconclusive.^[5] The experience of diabetes peer support groups in India have also been inconclusive. A low cost community based peer support intervention for the prevention of diabetes in Kerala showed a non-significant reduction in incidence of diabetes over a 2 year period. However there was a demonstrable reduction in cardiovascular risk factors.^[6] Therefore there is a need to study the effectiveness of peer support interventions in promoting diabetes self management behaviours in the Indian setting as well as factors that influence the implementation of such a peer support intervention.

We conducted a cluster randomized controlled trial in which we formed patients with diabetes into peer support groups and had a control group without peer support. We provided diabetes self management education using mobile phone-based videos and printed pamphlets to both arms. In addition, we also trained community health workers to facilitate the peer support groups and also closely monitor them monthly to track their blood sugar and blood pressure values. We studied the diabetes self management behaviours using periodic surveys to observe changes in adoption of behaviours, and also clinical outcomes such as monthly capillary blood glucose values, HbA1c levels, and weight. After two years of implementing this intervention we performed a qualitative exploration to identify the factors that facilitate and inhibit its feasibility, adoption, acceptability, scalability and sustainability. We report the findings of this exploration in this paper.

Methods

Study Design and Reflexivity

We conducted a qualitative exploration using a grounded theory approach situated within a social constructivist paradigm. The research team comprised four core investigators: three community health specialists with medical backgrounds (SS, PC, VG) and one demographer specializing in women's, sexual, and reproductive health and rights (BP). The team includes two women (SS, PC) and two men (BP, VG).

At the study's inception, SS worked directly in the community; VG and BP remain actively engaged in community-based operations, while PC provides ongoing programmatic support. VG and BP maintain close, long-term relationships with both the local community and the community health workers (CHWs). While this deep involvement provides a valuable emic (insider) perspective, we recognize it may also color data interpretation. Furthermore, because VG serves as the primary diabetes clinical care provider for multiple study participants, this clinical relationship may have influenced participant responses during discussions.

Study Context

The study was conducted across 29 villages in the Chengalpattu district of Tamil Nadu, India, serving a total population of approximately 18,000. The local partner organization, the Rural Women's Social Education Centre (RUWSEC), was founded over 40 years ago by local women as an adult education initiative. Over time, it evolved into a specialized sexual and reproductive health and rights organization, eventually expanding into diabetes and non-communicable disease care to meet community needs.

RUWSEC has operated clinic- and community-based diabetes peer support groups since 2010. The current implementation research was initiated in 2024 to document the effectiveness and implementation outcomes of a systematic, community-based peer support intervention designed to promote diabetes self-management. The study setting is characterized by significant socioeconomic vulnerability: approximately 40% of the target population belong to Dalit communities, 80% of households are landless, and 40% lack domestic toilet facilities.

Sampling Strategy

To capture diverse perspectives on the barriers and facilitators of the implementation, we purposively sampled 10 out of the 29 active peer support groups for focus group discussions (FGDs). Selection was stratified to ensure equitable representation across key parameters over the preceding two years:

- **Gender:** 6 female groups, 4 male groups.
- **Caste:** Equal representation of Dalit and dominant caste groups.
- **Attendance:** Equal representation of high-attendance (greater than 85%) and low-attendance groups.

Additionally, we conducted individual in-depth interviews (IDIs) with 6 control group members (3 men, 3 women) and comprehensive IDIs with all 10 active CHWs to capture implementation experiences from the frontline workforce.

Data Collection and Processing

Data collection took place in May 2026. IDIs with CHWs were conducted virtually via Google Meet between May 4 and May 8, 2026, by VG, AH (a research intern), SS, and PC. Community-level data

collection—including the 10 FGDs and 6 control group IDIs—was conducted in person by VG and AH between May 10 and May 24, 2026.

All field interactions were conducted in Tamil using semi-structured interview guides tailored to each participant group (peer support members, control members, and CHWs). These guides served as flexible frameworks rather than rigid protocols. Field interactions were audio-recorded on mobile devices with participant permission, supplemented by extensive field notes captured by VG and AH.

To preserve contextual nuances, VG expanded all field notes and audio recordings into comprehensive "reflective transcripts" within 24 hours of each session. These transcripts integrated literal data translation with the researchers' immediate observations and field reflections. Later, VG, SD, BP, and PC met to collectively deliberate on the core findings, intentionally leveraging their insider perspectives as Principal Investigators to enrich the contextual analysis.

Data Analysis

Qualitative data analysis was guided deductively by the Consolidated Framework for Implementation Research (CFIR) to systematically evaluate barriers and facilitators across five core domains: innovation characteristics, outer setting, inner setting, individuals involved, and the implementation process. ^[7]

VG organized the unified dataset within Microsoft Excel. Analysis followed a hybrid approach: open coding was performed inductively to capture emerging insights, which were then mapped deductively to relevant CFIR constructs. These codes were iteratively grouped into broader themes to synthesize overall implementation outcomes. While VG led the primary coding and thematic synthesis, the final analytical framework was reviewed, verified, and refined by SS, BP, PC, and AH to ensure consensus.

Measures to Enhance Trustworthiness

We implemented four specific strategies to ensure rigor and trustworthiness:

1. **Member Checking:** At the conclusion of every FGD and IDI, VG read the summarized field notes back to the participants to secure immediate validation of the recorded points.
2. **Reflexive Journaling:** VG and AH maintained detailed, ongoing reflexivity logs alongside immediate post-interview field debriefs to monitor potential researcher bias.
3. **Data Triangulation:** Emerging themes were actively cross-verified by comparing data generated from peer-support participants, control participants, and CHWs.
4. **Investigator Triangulation:** Because the field researchers were deeply embedded in the project's execution, all participant and worker insights were rigorously balanced and cross-checked against the broader research team's structural perceptions of the intervention.

Ethical Considerations

The study protocol was reviewed and approved by the full board of the RUWSEC Ethics Committee on January 31, 2024. Written informed consent was obtained from all participants at the trial's baseline randomization stage. For this qualitative implementation component, distinct written informed consent was explicitly re-obtained from all participating individuals. All interviews and focus groups were conducted in dedicated spaces ensuring strict visual and auditory privacy, and all data were anonymized to maintain confidentiality.

Results

A total of 43 participants in peer support groups engaged in the 10 focus group discussions. The characteristics of these groups are described in Table 1.

Table 1 Characteristics of the peer support groups sampled for focus group discussions			
Male / Female Groups	Caste Group	Group attendance rate %	Number of participants in the FGD
Women	MBC	87.5%	3
Women	SC	83.3%	6
Women	Muslim	80.9%	6
Women	SC	93.3%	6
Women	SC	88.4%	7
Women	MBC	87.5%	5
Men	SC	100%	2
Men	SC	66.1%	2
Men	MBC	68.4%	6
Men	MBC	95.8%	3

The intervention that was studied was a diabetes peer support intervention in combination with diabetes self management education provided via video messaging through mobile phone and printed pamphlets. This was in addition to active and close community based monitoring of the participants by CHWs.

Facilitators of the implementation

Individuals:

There are two types of individual stakeholders in the implementation of this diabetes peer support and mHealth program namely the community health workers and the participants. The individual level

factors which facilitated their engagement are described for the CHWs and the community members.

Community Health Workers:

Community health workers felt a sense of competence in working with patients with diabetes over the 2 years of work experience. This empowered them.

"Today I am doing work in depth related to diabetes which I did not know earlier. The communities now trust me, they share their problems and I give them guidance confidently to solve them." – IDI with CHW

Some also said they gained digital empowerment. They all perceived an incremental confidence in working with patients with diabetes over time. The senior and more experienced community health workers demonstrated higher levels of competence in their work.

All the community health workers felt that they gained knowledge and this gain in knowledge was transformative. They felt that persistent and intensive community health work has helped them earn the trust and acceptance of the community.

"I have handled this project with many patients and earned their trust. I work with a lot of people, that if I go anywhere people start to recognize me. My own daughter noticed this and shared with me. People do give attention, welcome me, check on me - I started becoming one among them" – IDI with CHW

They felt a sense of empowerment through embodiment of the knowledge that gained for working with patients with diabetes.

"I changed myself a lot. I used to stay fasting for Gods a lot. I learned the importance of taking regular foods. I stopped doing the fasting. In yoga, they taught practices to prevent kidney problem. I started doing it." – IDI with a CHW who has diabetes

They felt that successful work in which they were able to create changes in self management behaviour motivated them. Their community acceptance acted as an emotional refuge for them. They also felt a sense of vicarious professional satisfaction from observing the group dynamics of their peer support groups. They felt a sense of social validation, upward social mobility due to their community health work.

"I was very hesitant initially when I joined. But after I came in and started working things got better. I did not know anything in the beginning. Initially the people used to trouble me and insult me. But then I consistently worked and I gained a lot of experience and respect." – IDI with a CHW

The community health workers saw themselves as agents of behaviour change.

"I know one patient who used to take insulin. They used to take the insulin in the same place daily. I taught them the rotation method of taking insulin. They were surprised because they never knew about it. They started using rotational method of site of insulin. I was very happy that they learned it from me." – IDI with CHW

They also perceived their role as a social support for their patients to be crucial.

"Based on my experience of this project, I came to know that there is more service need for older people because usually there is no support for them from family members or from the society" – IDI with a CHW

Many also felt an altruistic role expansion, by supporting them in matters other than diabetes, and matters other than health.

"I do spend time with them, I ask them how they are? There is a lady patient who was much disturbed because she couldn't go to the hospital for a routine visit. She wanted someone to accompany her. I helped and took her to hospital and she was very happy." – IDI with a CHW

Community members with diabetes:

Greater self-awareness and self-efficacy increased the participants' engagement with the intervention.

"I go out in the hot sun to graze cattle. They sell ice-cream there. I am tempted to buy the cold ice-cream. I have the money to buy it. But I avoid it." – elderly man with high engagement with the support group

"When my blood sugars are high, I get full body pain and burning sensation. So, I will automatically increase my tablet to two tablets per day. When these symptoms go down, I reduce my dose to one tablet per day." – control group participant with high engagement with the CHW

Fear of diabetes and diabetes complications, high levels of inner motivation to make a positive change in their own lives, external motivators such as healthy snacks and gifts and gain of new knowledge were all factors which motivated participants to engage with the intervention.

"The fear is the most important factor. Fear of unknown and fear of complications." – elderly man with high engagement with the support group

"If we think it is easy, everything is easy to do. We must think it is easy" – elderly woman with high engagement with the support group

"We understood how to control our sugar levels in the blood. We learned a lot of new things." – elderly woman with high engagement with the support group

"They said that they enjoyed the various gifts that were given during the meetings. They recalled that the first gift that was given was 50 rupees. They were very happy with that gift. They remembered it very fondly. They listed all the other gift items plate, spoon, ladle, brush, paste, soap, towel, hand mirror, hot water bag, millets, seeds, and so on. They listed all the gifts with a broad smile and a lot of enthusiasm" – reflective note of facilitator of the FGD with a high performing peer support group

Roles of the Community Health Workers perceived by the community: The people with diabetes perceived several crucial roles of the community health workers.

- CHW as a teacher and provider of information

"She comes and teaches us about diabetes like a schoolteacher. We become her students and learn many things." – middle aged women who is highly engaged with her peer support group.

- CHW as agent of behaviour change, motivator of behaviour change

"I walk for 2 KM daily. I have increased physical activity after she told me." – control group participants who was highly engaged with the CHW

- CHW as a source of social support

"Our own sons and daughters don't care for us. They don't ask us how we are. They don't even attend our phone calls. But he is always there for us. This program must continue" – elderly gentleman who was disengaged with the peer support group.

- CHW as a source of mental health support

"I will finish all household work and keep my door open and lie down to sleep in the afternoon. He will come to check on me and will call out my name, "Amma, get up" I will immediately get up cheerfully and sit and talk with him for some time. That will take away all my worries. We are all looking for only his loving words and his visits. If he talks to us our mind feels light." – elderly women who was disengaged with the peer support group.

- CHW as a 'good person'

"She is a woman of great character. She is very kind. She never utters even one harsh word. She speaks very kindly and compassionately. These are great characteristics. Even looking at her smiling face makes us forget all our worries and sadness." – elderly woman who was deeply engaged with the peer support group.

Innovation Characteristics:

The group process led to higher levels of confidence among certain participants.

"More than anything joining this program has given me confidence. I feel confident that I can manage my sugars very well. I doesn't worry about my disease much nowadays." – elderly man with deep engagement with his peer support group

The group cohesion also served as a source of happiness and mental health for some.

"When we come and sit together in this meeting, all our mental stress and tensions go away" – middle aged woman with good engagement with her peer support group.

Membership in the group made some feel a sense of protection and wellbeing.

“After joining this program, my health has become 60% better” – middle aged man with multiple morbidities deeply engaged with his peer support group.

The participants felt empowered by the close monitoring which increased their confidence levels.

“After she came and started testing us, we know our blood sugar values every month. Some months the blood sugar increases, so we correct our diet, start walking and take care of ourselves so that we can reduce it for the next month. We are able to keep our diet, exercise etc. under check because she comes and tests us every month. Without that, we were only taking tablets blindly.” – elderly woman who is not very much engaged with her peer support group.

Simple home remedies and easily adaptable food based recommendations empowered the participants.

“We feel that we are in control. This is mainly because the measures that the community health worker is advising us are common household measures which do not need extra cost or knowledge” – middle aged man not much engaged in his peer support group

Various aspect of the design of the peer support intervention promoted engagement.

- Group activities promoted engagement and were remembered more.

“If you ask me about the most memorable meeting, It was the meeting on physical exercises in which we all danced together.” – middle aged woman who was deeply engaged with her peer support group.

- Some videos were engaging and they promoted behaviour change

“I remember the video on alcohol and its effect on diabetes. Before that I used to drink a lot. After seeing that video, I have reduced drinking. I won’t say I have completely stopped drinking, but I have reduced it a lot.” – elderly man who was not deeply engaged with his peer support group

Inner Settings:

Various factors within the community, in the context in which the implementation operates influenced the implementation.

Supportive family members who encouraged the group membership and who supported the intervention greatly enhanced engagement.

“If we have supportive family, we can manage our diabetes well. My daughter in law makes the herbal tea daily for me. I also show her the pamphlets which she reads regularly. Imagine if someone says I cannot cook or make what is good for diabetes. You have to eat whatever I make. Then we cannot control our sugars at all.” – elderly woman in a well performing peer support group

The CHWs also said that support from their families helped them perform their work well and work better with the community. The CHWs said that personal and trusting bonds that they formed with communities promoted engagement with the intervention.

“They do share their personal problems and do open up to me. For example, a female patient shared that her husband behaves aggressively towards her. He broke the mobile phone when he got angry” – IDI with CHW

Access to information was a great motivator to engagement with the program. The participants also had a sense of pride in sharing this information with others who were not in the intervention. This sense of pride further enhanced engagement.

“We attend the meetings because we learn a lot. We are able to keep our body healthy with what we learn.” – young women who is well engaged with her peer support group

“Even though I don’t know to read and write, I teaches all the things I learn in the group meetings to all my co-workers in the 100-days rural employment guarantee work” – elderly woman who is not much engaged with the peer support group

The CHWs said that the weekly review meetings with teaching-learning sessions covering various aspects of diabetes greatly enhanced their capabilities. The weekly meetings also served as places for discussion about patients.

“I have taken elaborate notes of every Tuesday class. I keep studying and reading it repeatedly. I also used to refer in YouTube and learn. Pamphlets were also useful. I used to study them and learned from them. I also learned from the videos.” – IDI with CHW

Readily available resources for clarification of doubts and questions posed by the community was also helpful.

“Mostly I do call Sir for advice when participants ask me doubt and sometimes, I take notes and get clarified during weekly meetings. When the patient need the important information, Immediately I do call Sir without delaying so that the patients will follow right instructions. Otherwise, they may end up with some health issue.” – IDI with CHW

The conduct of periodic assessment and examinations in the organization helped the CHWs become more prepared for their work.

“I also found the OSCE exam to be a good experience. I learned that I can study and learn and perform well in exams. It gave me confidence.” – IDI with CHW

Outer Settings:

CHWs build strong loving bonds and partnerships with the community which enhanced their work.

"I have many patients who live alone. I used to tell them I am there for you. People who have hated me in the beginning and scolded me have started loving me now. I gave them love. Even after the project is over, I will continue to follow them up." – IDI with CHW

They got local logistical support that facilitated their work. They also built trusting social connections with the community.

"I take my scooter to the field since there is no bus transportation. One time my scooter had a break down. One participant helped and supported me by taking the scooter to a mechanic shop to fix the problem. Sometimes I forgot to fill petrol in my scooter. They helped to get petrol and ensured that I reached home safely." - IDI with CHW

Inhibitors of the implementation

Individual:

Community members with diabetes

Those who lacked an inner motivation to make a change in their own lives and those who had physical disabilities lacked the motivation to engage with the intervention.

"We used the millets when the health worker gave it. Otherwise we did not use them. We don't have the need for them." – elderly man who was disengaged with the peer support group

Some people had low perceived susceptibility to complications of diabetes, some had low perceived effectiveness of group memberships. They did not engage well with the intervention.

"I have no fear. If you give me 1 Kg sweets also, I will eat it all immediately. Similarly, if you give me 1 litre of a bitter gourd juice also I will drink it fully. I don't avoid anything. I eat anything and everything. I don't fear anything" – a middle-aged man who was not engaged with his peer support group

"She had kept the pamphlets thrown all over her home in bits and pieces." – observation by the interviewer in the home of a control group participant

Some members experienced adverse effects of interventions like Yoga and disengaged.

Innovation Characteristics:

Yoga was perceived as a very complex intervention that required high capability and mental strength. So many did not practice Yoga.

“Yoga requires a lot of mental strength and alignment. We don’t have that. We are older people” – elderly man who was deeply engaged with the peer support group

Design quality:

- Low levels of literacy discouraged engagement with the pamphlets

“I cannot read or write and so I don’t find the pamphlets useful. But I have kept them safe.” – control group participant engaged well with his CHW

- Most participants did not have smart phones and hence could not see videos repeatedly, so they forgot the video content

“When we sit in the meeting, she plays the video. We listen to the video. It feels like we understand everything. But the very next day when we sit down to think about what happened the previous day, we don’t remember anything. We are flying around all the time like sparrows, so we don’t remember anything that happens in the meeting” – elderly man well engaged with the peer support group.

- The mobile phone screen on which the videos were shown were too small and sound was soft and unclear despite having speakers

“Many of us do not have good vision. Moreover, the mobile phone screen is too small. So, we mostly only listened to the audio of the videos that were shown.” – elderly man who was well engaged with the peer support group.

“When I go to show the video content to many of my control group participants, they barely are able to pay attention or see the screen.” – IDI with CHW

- Though the snacks and gifts served as motivators, they also created a sense of dependency in some thus deviating from the purpose of self-management

“Give us snacks not just for us but for our entire family. Instead, you can give us the raw materials, and we can cook the snacks ourselves at our home.” – elderly man who was not very much engaged with his peer support group

“Pick us up from here, take us to the hospital and get our blood tests done once in three months. Then give us medicines here.” – elderly man who was not very much engaged with his peer support group

Inner Settings:

The workload associated with long working hours made some give low priority to the intervention.

“We are not jobless. We have our own busy lives. We won’t waste time by coming here. We will do what we must do in our own life and work. Why should we come and sit here?” – a middle aged man who was disengaged with the peer support group

The CHWs also felt that it was more challenging to organize the group meetings for those who were busy with work.

"It is easy to conduct women's support group meetings. But organizing men's meeting was tough. Some go to the atomic energy plant for work and they used to work on a shift basis. So getting them together is tough. Their leave dates are also not coinciding. I can arrange only on days when their leaves coincide." – IDI with CHW

There was poor mobile network connectivity in some places which hindered effective data capture.

"In some places we won't get mobile tower. Sometimes phone will hang." – IDI with CHW

Some patients did not have mobile phones and so contacting them was a challenge for the CHWs.

Outer Settings:

Negative experiences with the NGO implementing this intervention led to poorer engagement.

"I used to come to clinic to get tested and treated. But the doctors there gave me the wrong medicine. My daughter had asthma and the doctor gave some wrong medicine and her whole body became black. I got so angry and came and shouted at the doctor and fought with them. Then we stopped going to RUWSEC." – elderly woman who was disengaged with the peer support group

The local health system on which the participants depended for their medicines and health care did not consider the blood sugar monitoring done by the CHWs as reliable. This led to repeat testing.

"If we show the blood test results taken by the program, they don't even see it. They say, they cannot believe it and ask us to repeat blood sugar test again in the PHC. Even if I take the result of the full body check-up done as part of the program, they don't accept it. They say that instead of taking the test outside in the private clinic we should take the test in the PHC" – middle aged woman who was disengaged with the peer support group

The participants also found that they did not have safe spaces to talk about diabetes without being stigmatized or judged.

"We meet during the 100 days rural employment guarantee work. But there also we cannot talk about diabetes. If we have to get together and talk about diabetes, we require the health worker to organize these meetings." – middle aged woman who was engaged with the peer support group

Some of these villages lacked proper access to health facilities. So they had a demand for providing medicines, blood testing services through the program. As this was not part of the intervention, they were disengaged.

"It would be good if you can supply medicines to us. We are unable to go all the way to the PHC to get the medicines. Our village is a very far away and so we are unable to travel all the way to the PHC to get the

medicines. So you must supply the medicines. The interventions and meetings are not useful without getting the medicines. So we demand that she should be giving us medicines.” – elderly man who is disengaged with the peer support group

Typical rural lifestyles with irregular food timings and physical active lifestyle made them less engaged with the interventions.

“In rural areas the strict three meals a day formula does not work. We eat as per our work and as per our time availability. So following everything strictly is not possible.” – middle aged man who was not engaged with his peer support group

The gendered social roles left very little time for women to practice physical activities and dietary practices.

“Participant 2 and Participant 4 said they do not have time for walking. Both are working women in their younger age group. So they said they don’t have time for walking. They are burdened with a lot of household chores.” – reflection by facilitator of FGD with a well performing peer support group

The CHWs faced a major problem of alcoholism which hindered their work in the community. Men would be drunk when they went to work and this would hamper their work.

“My biggest challenge is the men’s support group. Some men will be drunk. Even if I keep calling them on phone, they won’t pick my call. I would go to their home and call; they would be in home but lie that they are not there. They created a lot of trouble for me. I have cried because of that. One time I went with my son, and in front of my son they scolded me. my son was so upset and asked me why I am doing this work listening to all this scolding.” – IDI with CHW

Cross gender care was another challenge.

“Sometimes I fear to go alone to do blood test for male participant inside their house especially when his wife is not present. I have to protect myself. I only go inside the house when his daughter is around.” – IDI with female CHW

Some women CHWs faced the occupational hazard of harassment and lack of safety during community health work.

“Drunk men used to come and sit in the meeting. I used to be too scared. I used to counsel them to stop drinking. Nowadays they themselves call and ask me for meetings.” – IDI with female CHW

They faced challenges in traveling to distant villages where proper transport facilities were not available.

“In the beginning, I never got bus or auto. Transportation used to be tough. But then I navigated the travel.” – IDI with female CHW

Caste based discrimination was a major challenge faced by the CHWs.

"I belong to scheduled caste. One man belonging to most backward caste kept on asking me for my caste. But I never told him. He somehow found out my caste. The group members started discussing my caste and it was very hurtful." – IDI with CHW

The results are represented in the conceptual framework in Fig. 1.

Discussion

This implementation research of the community based intervention including diabetes peer support groups, diabetes self management education using mobile phone based video messages, printed pamphlets and home based monitoring of blood sugars for persons with diabetes showed that all the interventions were feasible, adoptable, and acceptable to the community. However scalability and sustainability of this intervention will depend on addressing some limitations in design of the intervention and navigating inner and outer setting complexities. In the following paragraphs we will discuss the crucial role of the community health worker in steering this program, diabetes self-management education modalities, and complex socio-cultural factors involved in operationalizing such a program. We will also reflect on the strengths and limitations of this exploration and provide policy recommendations based on these findings.

Community Health Worker – the agent of change

Community health workers often live in the same community, are highly relatable to the community members and foster a sense of trust. They act as the bridge between the community and the health system. Community Health Workers (CHWs) play a crucial role in diabetes prevention and management especially in low and middle-income countries. They have the potential to increase knowledge about diabetes, health and treatment seeking behaviours, promote healthy practices and also improve health outcomes such as glycemic and blood pressure control.^[8] A systematic review of evidence to support the role of community health workers in non communicable disease prevention and control revealed that there is a significant increase in tobacco cessation, blood pressure and blood sugar control.^[9, 10]

In this cluster randomized controlled trial, the ten CHWs who were recruited and trained, were all residents of the local villages. We provided induction training, refresher training at the end of one year, weekly sessions and discussions on diabetes self management, weekly debriefing about community health work, periodic evaluation of their performance and access to a physician during office hours over mobile for clarifications of doubts and question of CHWs and study participants.

These strong capacity building inputs empowered the CHWs and it was reflected in interviews with them as well as the feedback from the participants in the community, all of whom perceived the role of the CHW as essential and irreplaceable. One of the greatest strengths of this intervention is the creation of a

strong workforce of 10 CHWs in the local community with capacity to work as diabetes peer support facilitators and diabetes self management trainers and educators.

The empowerment of these CHWs through knowledge and skills, and their adoption of the knowledge in their own households greatly motivated them to perform optimally as change agents in the community. An interesting 6 country case study of empowerment of CHWs showed that access to medical knowledge, and the social status associated with acting as the bridge between the community and the health system empowered the CHWs. However, the feeling of being unsupported, unappreciated and undervalued frustrated them.^[11] In this intervention we filled this gap, by providing close supportive supervision, periodic review meetings and training and free access to telephonic consultations to clarify doubts and questions. This greatly enhanced the feeling of empowerment experienced by the CHWs. The repeated emphasis on ethics, professionalism, integrity and communication skills during the weekly review meetings fostered a sense of duty and altruism among the CHWs and this was evident during the interviews with them. Therefore, we believe that to scale up and sustain CHW led programs effectively such ongoing support is essential.

Diabetes self management education modalities

In this study we adopted three modalities of diabetes self management education namely, mobile phone based videos, printed pamphlets and inter-personal communication by the CHW. Each participant in the peer support groups as well as the control group received all three modalities. The hypothesis was that the peer support groups will adopt the diabetes self management behaviours better than the control groups due to the ongoing support by the peer support process. However the intended purpose of the digital and print modalities of education was not served. Part of the reason was limitations in the design quality and the other part is local socioeconomic outer settings in this context.

Majority of the participants in the study were persons above 60 years of age. There was an evident digital divide between them and the younger members of the study. Even those elders who had their own mobile phones, only had access to the button phone and not the smart phones. Even those members who had smart phones, were not digitally enabled to maneuver it effectively. The small screen size of the mobile phones made it challenging for the elders to clearly see the videos and engage with them. Often many older members were also hard of hearing and so could not even listen to the sound properly. It is known that inequities in access to digital health education exist based on age, gender and educational status.^[12] This was encountered in the current study too. To keep the expenditure in making the videos to the minimum, the investigators used simple images, voice recording equipment and software packages to generate the videos. This resulted in fairly good quality videos, but the sound quality was not optimal, and some of the video images were pixelated when shown on the mobile screen. Use of better images, sound recording devices, and better quality video editing services would have given rise to better quality videos.

The low literacy levels among persons above 60 years in the rural community, especially among the marginalized groups, prevented them from effectively utilizing the pamphlets. Only those members who could read, or had family members who could read used the pamphlets. However, we also noticed that the pamphlets had symbolic value to some of the participants. They collected all the pamphlets printed and distributed each month and kept them organized in a folder or bag and brought it with them each month for the peer support group meeting. It symbolized gain in knowledge and advancement in health literacy.

Interpersonal communication by the CHW with the participants and explanation about various self management behaviours seems to be the single most efficient modality of diabetes self management education. Community members recalled and reported adopting the behaviours informed by the CHW. Therefore, these challenges in different modalities of diabetes self management education must be borne in mind while planning scale up and sustainability of the intervention.

Inner and Outer setting sociocultural complexities

Gender played a significant role in how the peer support groups functioned. Previous studies have shown that gender of the peer supporter plays a key part in their active engagement in the peer support role. Women are more likely to take up care-giving, and peer supporting role than men.^[13] In this study the influence of gender was complex. Older women and women who were not employed, engaged better with the groups, whereas younger women who had to balance work and household chores could not engage actively with the groups. It was also noticed that the spouses of male peer support group members showed active involvement in the care-giving role and the attendance at the peer support groups, whereas there was no such support and encouragement for the women members. The caste of the CHW played an important role in their effective functioning in the community. Most of the CHWs belonged to Dalit community and when they worked with members of the dominant castes, there were instances of caste-based discrimination. The dominant caste members would refuse to take the healthy snack supplied by the dalit CHW. They would not permit them to enter their house even if it was hot and sunny outside. They would give them water in a separate glass. Similar caste based discrimination experiences have been reported in previous studies among Anganwadi workers.^[14] These discriminatory practices gradually changed with time. Male alcoholism is extremely common and greatly hampered support group attendance, engagement as well as home based monitoring. The female CHWs felt unsafe working with drunk men in the community. The female CHWs also encountered instances of gender based harassment and violence during community health work as part of the research.

We offered a refreshing snack during the peer support group meetings, a gift to the participants and also close community based monitoring. At the time of end of the study, they started demanding that the gifts and testing be continued. The *sundal* and the gift items have also reinforced the broader political culture of offering freebies in favour of voting in a party to the government.^[15] The members started viewing these external motivators as entitlement and started demanding them.

We also noticed a friction with the local health system. The close monthly monitoring of the blood sugars using finger stick capillary blood glucose was disapproved by the local primary health centre. They repeated the blood tests at their centre. This discouraged some of the participants in engaging with the intervention. Inefficient functioning of the public health facility and the facility being inaccessible from some of the villages led to a degree of frustration among the community members. This research was intended to supplement the services that were provided by the public health system. So when the basic medicines and care were inaccessible, the community was frustrated with receiving the supplemental services alone. This inhibited their engagement. Therefore a robust and well functioning primary care health infrastructure is crucial to motivate patients to engage peer support intervention and diabetes self management education.

Strengths and limitations of the study

The greatest strength of this exploration is the complex multidimensional political, social, cultural, biomedical perspective of facilitators and inhibitors of the implementation of the program. Therefore it provides a comprehensive perspective of what factors influence the successful implementation of peer support groups, diabetes self management education and home based close monitoring of blood sugar and blood pressure values of patients with diabetes.

This study also has several limitations. The investigators ourselves performed the full assessment of the implementation outcomes. This is a limitation because there is an inherent bias in the evaluation. We have tried to remain as objective as we can in understanding the performance of the groups. Creating a top-down model of community based peer support groups that had considerable heterogeneity ended up creating non-cohesive groups and suboptimal peer support in these groups.

Implications and policy recommendations

Diabetes self management education along with close home monitoring of blood sugar and blood pressure can be delivered as health system activities. Makkalai Thedi Maruthuvam offers an effective platform for these activities. The important strengths of this project were the extensive training and capacity building of the community health workers and the ongoing supportive supervision and easy access to consultation over mobile phone. This must be provided to the Makkalai Thedi Maruthuvam functionary, the Woman Health Volunteer to improve her sense of empowerment, professional satisfaction and acknowledgment.

Conclusion

This study demonstrated that it is feasible to form peer support groups and provide diabetes self management education through this platform. However their function as peer support groups is sub-optimal due to top-down, biomedical focus of the peer groups and the community health worker facilitating them. Diabetes self management education is most effective through inter-personal communication than mobile phone or pamphlets due to digital divide and low literacy. For peer support

models to work effectively they must be decoupled from the health system and operate at the Panchayat level.

Abbreviations

CFIR

Consolidated Framework for Implementation Research

CHW / CHWs

Community Health Worker(s)

COVID

19–Coronavirus Disease 2019

CTRI

Clinical Trials Registry–India

DOI

Digital Object Identifier

FGD / FGDs

Focus Group Discussion(s)

HbA1c

Glycated haemoglobin

IDI / IDIs

In–depth Interview(s)

MBC

Most Backward Class

mHealth

Mobile health

MTM

Makkalai Thedi Maruthuvam

NCD / NCDs

Non–communicable Disease(s)

NGO

Non–governmental Organization

OSCE

Objective Structured Clinical Examination

PHC

Primary Health Centre

RUWSEC

Rural Women’s Social Education Centre

SC

Scheduled Caste

Declarations

Ethics approval and consent to participate

The study was approved by the full board of the RUWSEC Ethics Committee on 31 January 2024. Written informed consent was obtained from all participants prior to enrolment. All procedures performed in the study were conducted in accordance with the ethical principles of the Declaration of Helsinki and its subsequent amendments. The trial was registered with the Clinical Trials Registry–India (CTRI) (Registration No. CTRI/2024/03/064153; registered on 14 March 2024).

Consent for publication

Not applicable.

Availability of data and materials

The anonymized data, reproducible code, and analytical workflows used in this study are publicly available through the GitHub repository and have been permanently archived on Zenodo (DOI: 10.5281/zenodo.20956571).

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SS, VG, BP and PC conceptualized and designed the study. VG, SS, and AH developed the interview guides and focus group discussion checklists. VG, AH, SS, and PC conducted the in-depth interviews with the community health workers, while VG and AH facilitated the focus group discussions with the peer support group members. VG and AH documented detailed field notes during the interviews and discussions. VG curated and organized the qualitative data. VG, SS, BP, and PC jointly reflected on and interpreted the key findings of the study. VG performed the coding and thematic analysis and prepared Figure 1. The coding and analysis were reviewed and validated by SS, BP, PC, and AH. VG drafted the original manuscript. All authors critically reviewed, revised, and approved the final manuscript and agree to be accountable for all aspects of the work.

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Figures

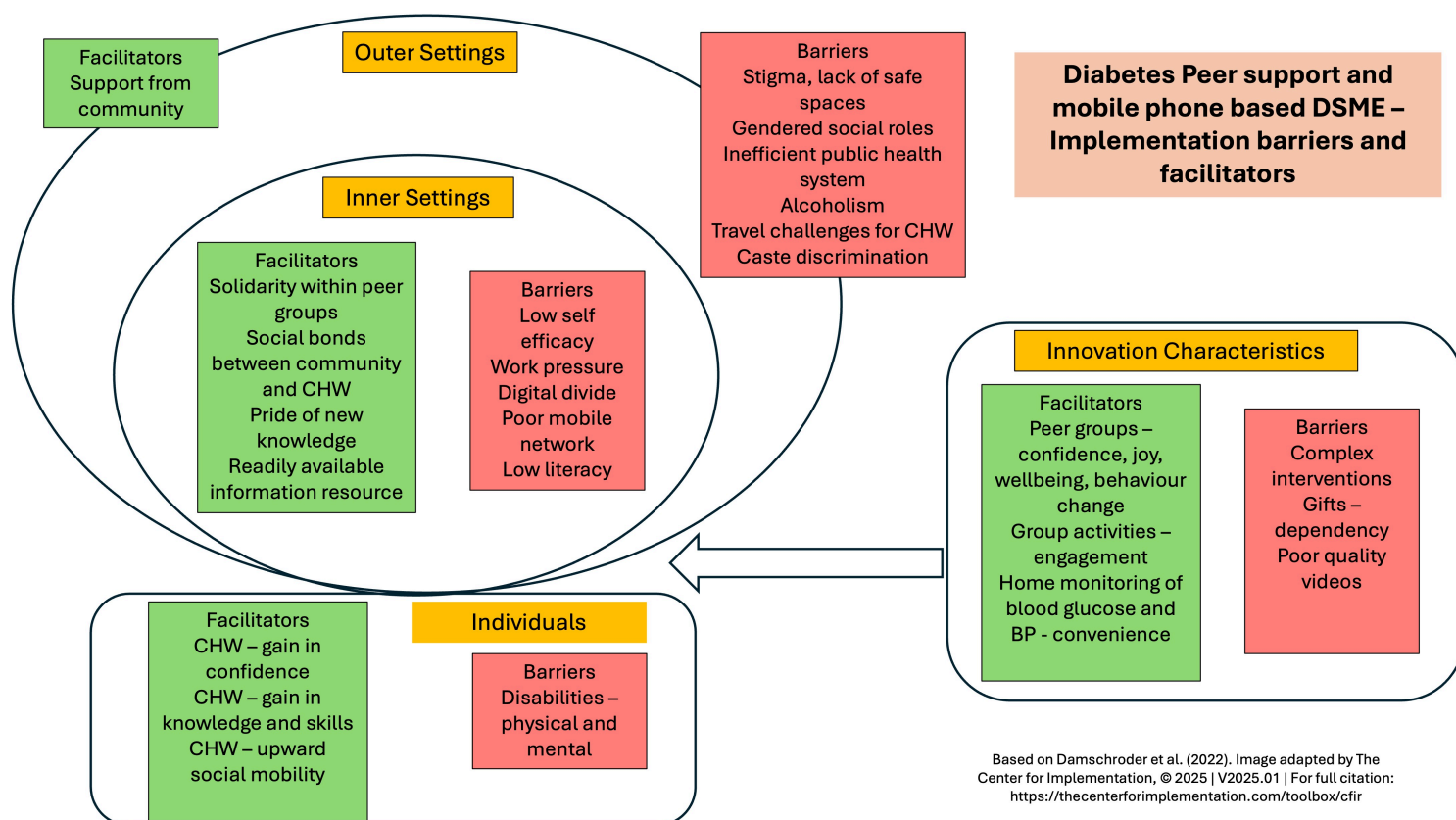


Figure 1

The conceptual framework

Supplementary Files

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