Original Paper

Barriers and Facilitators to Community-Based Interventions for the Prevention and Control of Type 2 Diabetes Mellitus in Pakistan: Qualitative Study

Noor Sanauddin[1*], PhD; Amber Tahir[2*], MSc; Rubia Zafar[3], MPhil; Sara Imtiaz[2], MSc; Mariam Abdeali[2], MSc; Nadia Khaleeq[3], MSPH; Khalid Rehman[3], PhD; Zohaib Khan[3], PhD; Abdul Basit[2,4], FRCP; Saima Afaq[3,5], PhD; Hannah Maria Jennings[6], BSc, MA, PhD

[1]Department of Sociology, University of Peshawar, Peshawar, Khyber Pakhtunkhwa, Pakistan
[2]Health Promotion Foundation, Karachi, Sindh, Pakistan
[3]Khyber Medical University, Peshawar, Khyber Pakhtunkhwa, Pakistan
[4]Indus Diabetes and Endocrinology Center (IDEC), Indus Hospital and Health Network (IHHN), Karachi, Sindh, Pakistan
[5]Department of Health Sciences, University of York, Heslington, York, England, United Kingdom
[6]Hull York Medical School, University of York, York, England, United Kingdom
*these authors contributed equally

Corresponding Author:

Hannah Maria Jennings, BSc, MA, PhD
Hull York Medical School, University of York
Siwards Way, Heslington
York, England YO10 5DD
United Kingdom
Phone: 44 01904328786
Email: hannah.jennings@york.ac.uk

Abstract

Background: Community-based interventions (CBIs) are a promising strategy for preventing and controlling noncommunicable diseases, including type 2 diabetes mellitus. However, the success of such interventions depends on cultural and contextual factors that influence community mobilization and participation.

Objective: This qualitative study aimed to investigate the barriers and facilitators to CBIs for the prevention and control of type 2 diabetes in rural and urban Pakistan.

Methods: We conducted a multisite qualitative study involving 37 in-depth interviews and 12 focus group discussions with community members with known and unknown type 2 diabetes status, their caregivers, community elders, and health care providers. Data were collected from approximately 50 participants in rural and urban areas of Pakistan and were analyzed using the framework approach.

Results: Three overarching themes emerged—familiarity with CBIs, barriers to implementation, and facilitators to implementation—mapped across the socioecological model. Participants displayed limited yet varied understanding of CBIs, with rural participants often equating them to research activities, while urban participants linked them to health education and moral responsibility. Barriers included low awareness, misconceptions, gender and cultural constraints, logistical challenges, economic hardship, and security concerns. Facilitators encompassed engagement with community leaders, gender-sensitive approaches, incentives, accessible venues, mass mobilization, religious spaces, and involvement of local health care workers for intervention delivery. Rural-urban contrasts highlighted the influence of social cohesion, prior exposure, and structural factors on CBI uptake.

Conclusions: This study highlights that CBIs for diabetes prevention and control in Pakistan require contextually tailored, culturally sensitive, and gender-responsive approaches. Rural-urban contrasts underscore the role of social cohesion, prior exposure, and structural factors in shaping engagement. Integrating these insights can guide the design and implementation of scalable, sustainable CBIs aimed at tackling diabetes across diverse Pakistani communities.

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Keywords: community participation; community-based interventions; type 2 diabetes; Pakistan; qualitative; South Asia

Introduction

The global burden of type 2 diabetes mellitus (T2DM) poses a major public health challenge and is growing. Currently, an estimated 1 in 9 adults (589 million) lives with the condition [1,2], with 80% of people with T2DM residing in low-income and middle-income countries [2]. T2DM also imposes a substantial economic burden, accounting for an estimated US $1.015 trillion in global health expenditure in 2024—a 338% rise in less than 2 decades [2]. Pakistan is one of the most affected countries, with an estimated 34.5 (31.4%) million adults living with diabetes. This is the highest prevalence rate of any country, and the number is expected to double by 2050 [3].

Behavioral modifications (such as healthy eating and physical activity) can reduce the risk of T2DM by up to 58% [4,5]. However, in many resource-strained settings, including Pakistan, sustained behavior change is challenged by structural, social, and environmental barriers—such as limited access to healthy foods, restrictive gender norms, low health literacy, and inadequate preventive services. It is important that approaches to preventing and controlling T2DM extend beyond biomedical care and address underlying barriers through approaches such as community engagement, empowerment, and supportive social networks [6]. Community-based participatory interventions are effective strategies for promoting healthier behavior and improving outcomes for noncommunicable diseases through colearning, shared decision-making, and collective agency [7,8]. These interventions leverage local structures—such as neighborhood groups, religious institutions, and women's collectives—to enhance social support, build trust, and promote culturally relevant behavior change. Community-based interventions (CBIs) enhance collective efficacy, encourage peer accountability, and ensure that interventions align with local needs [9-11]. They are consistent with primary health care principles, particularly participation, equity, and collaboration, and reflect a global shift toward community ownership in noncommunicable disease prevention and management [12,13]. However, the successful implementation of CBIs is highly context-dependent. In Pakistan, informal community networks are strong, but social norms, gender dynamics, and institutional limitations may facilitate or hinder intervention delivery. For example, religious leaders, community elders, and family structures may support health messaging [14,15], while cultural constraints on women's mobility [16] or mistrust of external organizations may pose barriers. Understanding such contextual influences is essential for designing interventions that are acceptable, feasible, and sustainable.

Although CBIs have shown promise across diverse contexts, the operational realities of their implementation are rarely examined in depth. Furthermore, there remains limited evidence on the specific barriers and facilitators shaping their implementation within Pakistan. In Pakistan, urban and rural contexts substantially differ in terms of community structures, health-seeking behaviors, mobility patterns, social cohesion, and access to resources. Urban areas often exhibit greater population diversity, fragmented community networks, and competing livelihood pressures. In contrast, rural communities may be shaped by stronger informal social systems but have more limited access to health services. While these contextual variations may both enable and constrain community-based T2DM prevention efforts in different ways, there remains limited research comparing these settings. Exploring these variations is important for understanding how CBIs can be effectively designed and delivered throughout Pakistan.

This qualitative study aimed to investigate the barriers and facilitators to CBIs for the prevention and control of T2DM in rural and urban Pakistan. It was conducted as part of formative adaptation work for the EMPOWER-D (Engagement of Community Through Participatory Learning and Action for Control and Prevention of Type II Diabetes and Its Risk Factors) program in Pakistan. The EMPOWER-D intervention is a CBI that aims to prevent and control T2DM through participatory learning and action approaches, emphasizing community engagement, collective problem-solving, and locally driven solutions. The intervention consists of facilitated community groups that identify and prioritize diabetes-related problems, develop and implement locally appropriate strategies, and evaluate their success. The EMPOWER-D program includes an effectiveness trial of the intervention in rural Pakistan [17] and feasibility trials in urban Pakistan [18] and rural Afghanistan. The intervention has been adapted to each setting through formative research and co-design [19].

The novelty of this study lies in its comparative, multicontextual approach to understanding community-based participation in health research with a focus on T2DM. Limited evidence exists on the contextual, social, and operational factors influencing the implementation of CBIs in Pakistan [20]; this study helps to address this gap. Furthermore, global evidence on CBIs has paid limited attention to variations across rural and urban settings. The study also has direct translational relevance as part of the EMPOWER-D program. Its findings will inform the development of contextually appropriate CBIs for the prevention and control of diabetes and other noncommunicable diseases in Pakistan, with relevance to other contexts facing similar challenges. Finally, the study has policy and health-system implications by identifying conditions that can facilitate meaningful community participation. It moves beyond viewing community participation as a research methodology and highlights its potential for strengthening health research, improving intervention acceptability, and promoting more responsive and inclusive health systems.

Methods

Conceptual Framework

This qualitative exploration is guided by the socioecological model [21], which emphasizes that health behaviors and outcomes are driven by a dynamic interplay of individual, interpersonal, community, organizational, and policy-level factors. The model acknowledges that sustainable and effective CBIs require supportive environments across multiple hierarchies.

In this study, the socioecological model provides a framework for exploring the multilevel barriers and facilitators affecting CBIs for the prevention and control of T2DM in rural and urban community settings in Pakistan. It helps position individual barriers and facilitators within the broader social, cultural, and structural contexts, offering a comprehensive understanding of how CBIs can be designed, strengthened, and sustained.

Study Design and Settings

This study used a qualitative exploratory design, as this approach allows for an in-depth exploration of participants' perceptions, previous experiences, and social dynamics. The design is also well-suited to capturing context-specific insights across different settings. Exploratory qualitative research also facilitates the understanding of the underlying drivers through which CBIs influence health behaviors, including the roles of family and peers, religious leaders, and community engagement, which are crucial elements for their success [22].

Data were collected as part of the EMPOWER-D project to inform the adaptation of the intervention. The study was conducted across 2 sites in Pakistan: rural areas of Peshawar and Swabi in Khyber Pakhtunkhwa (KP) province and an urban site in Karachi, Sindh province. Islam is the state religion of Pakistan, and 97% of the population is Muslim. Islam plays an important role culturally and socially across Pakistan in both urban and rural settings, as reflected in all our study sites. Peshawar and Swabi are predominantly rural districts with populations of approximately 4.7 million and 1.9 million, respectively. Both areas are primarily inhabited by Pashtun communities and are characterized by limited infrastructure, underresourced education systems, and widespread poverty. Government health facilities serve as the main source of care, complemented by private providers. The region has experienced prolonged periods of conflict and terrorism, which have hindered economic and social development [17].

Karachi—the capital of Sindh and Pakistan's largest metropolitan city—has an estimated population of 20 million [23]. For this study, District Central, one of the 5 districts of Karachi, was selected. It represents a diverse and densely populated urban setting of about 3.8 million residents [23]. The district comprises multiple ethnic groups and socioeconomic classes, with livelihoods ranging from formal employment to informal labor. Educational access varies widely, from elite private institutions to underfunded public schools. Karachi's health care system is extensive, encompassing public, private, and nonprofit sectors; however, it faces persistent challenges of overcrowding and inequitable access, particularly within public facilities.

Participants and Recruitment

Participants were recruited through purposive sampling from the 2 study sites, comprising the following 5 categories:

1. People with T2DM: adults with a medical diagnosis of T2DM.
2. Carers of people with T2DM: adults who are the primary caregivers of someone living with T2DM
3. People with unknown T2DM status: adults who do not have a known diagnosis of T2DM
4. Influential people: this group included *imams* (Muslim scholars who provide spiritual guidance to communities), who lead daily ritual prayers and deliver Friday sermons at the mosque (a place of worship for Muslims), male and female Muslim Quran (the central sacred scripture of Islam) teachers, elected representatives, school teachers, and community leaders
5. Health care providers (HCPs): this group included general physicians, lady health workers, and a nurse

Table 1 shows the list of participants. Eligible participants were adults (≥18 y) residing within the geographical boundaries of the selected sites who could communicate effectively in either Pashto (in KP) or Urdu (in Karachi) and were willing to share their experiences and opinions openly. Maximum variation sampling was used to capture a diverse range of demographic characteristics.

Table 1. Participant categories and sample sizes for in-depth interviews (IDIs) and focus group discussions (FGDs).

Participants' category and data collection tool	Sample size		
	Rural Pakistan (KP[a] province)	Urban Pakistan (Karachi)	Total sample
People living with T2DM[b]			
IDIs	4 (2 males and 2 females)	4 (2 males and 2 females)	8 (4 males and 4 females)
FGDs	4 (2 males and 2 females)	2 (1 male and 1 female)	6 (3 males and 3 females)
People with unknown T2DM status			
IDIs	4 (2 males and 2 females)	4 (2 males and 2 females)	8 (4 males and 4 females)
FGDs	4 (2 males and 2 females)	2 (1 male and 1 female)	6 (3 males and 3 females)
Carers of people with T2DM			

Participants' category and data collection tool	Sample size		
	Rural Pakistan (KP[a] province)	Urban Pakistan (Karachi)	Total sample
IDIs	4 (2 males and 2 females)	4 (2 males and 2 females)	8 (4 males and 4 females)
Health care providers			
IDIs	4 (2 males and 2 females)	2 (0 male and 2 females)	6 (2 males and 4 females)
Community influentials			
IDIs	4 (2 males and 2 females)	3 (2 males and 1 female)	7 (4 males and 3 females)

[a]KP: Khyber Pakhtunkhwa.
[b]T2DM: type 2 diabetes mellitus.

Recruitment was conducted by the research team in collaboration with community advisory panels, established at each site for the EMPOWER-D project, which comprised religious leaders, community elders, health care professionals, individuals living with T2DM, and their caregivers. Participants were identified and approached through professional networks and snowball sampling.

Identified individuals were approached in person and informed about the study verbally and through a participant information sheet in their local language. Participants were encouraged to ask questions before deciding to participate. They were informed that anonymized findings, including deidentified quotations from interviews or focus group discussions (FGDs), could be published in academic reports and journals. Those who agreed provided written informed consent, and a date was arranged for an in-depth interview (IDI) or FGD. Recruitment aimed to achieve gender balance and continued until data saturation was reached.

Data Collection

Data were collected through IDIs and FGDs. The research team developed topic guides for each participant group based on the study's objectives and conceptual framework. The guides, along with participant information sheets, were reviewed by community advisory panel members at each site to ensure cultural sensitivity, clarity, and the use of appropriate local languages. The guides were translated into Urdu for Karachi and Pashto for KP province.

A total of 37 interviews and 12 FGDs were conducted. None of the approached stakeholders declined participation; no participants withdrew after consent; and no repeat interviews were conducted. Interviews were conducted in private, convenient locations and lasted 45 to 60 minutes. FGDs lasted 60 to 90 minutes and were conducted separately for men and women and for participants with T2DM and those of unknown status.

The research team members responsible for data collection underwent a 3-day refresher training workshop on qualitative methods, covering interview techniques, facilitation skills, effective questioning and probing strategies, and ethical considerations. An experienced project team member supervised the fieldwork at each site. During data collection, the research team held periodic debriefing sessions to discuss emerging themes, challenges, and necessary adjustments to data collection. These iterative discussions informed decisions on when further data collection was unlikely to yield new insights, at which point recruitment was concluded.

At the urban site, the interviews and FGDs were conducted by researchers SI, MA, and AT, all of whom held a master's degree. At the rural sites, data collection was conducted by NS (postdoctoral fellow) and NK (PhD student). At the time of data collection, SI, NK, and MA were employed full time, while NS and AT were employed part time on the EMPOWER-D project. All interviewers had prior experience conducting interviews and FGDs in health research. Interviewers did not have any prior relationship with the participants before recruitment, except when initial contact was facilitated through community advisory panel members. Reflexivity was maintained through regular debriefing and peer discussion during data collection and analysis to minimize potential bias and enhance interpretive credibility.

Data Analysis

All interviews and FGDs were recorded, transcribed verbatim, and translated into English. Each transcript was checked for accuracy by a senior researcher at each site fluent in English and Urdu or Pashto. Transcripts were stored in a secure, password-protected file accessible only to the research team.

Data were analyzed using the framework approach [24], which involved four main steps: (1) iteratively developing a coding framework deductively and inductively, (2) coding and charting transcripts within the framework, (3) comparing and analyzing data to develop overarching themes, which included site-specific thematic reports, and (4) synthesizing and writing up findings (subsequent paragraphs describe details of each step). Regular researcher discussions and peer-debriefing sessions were used throughout the analytical process to challenge interpretations, resolve discrepancies, refine emerging themes, and enhance the credibility, consistency, and trustworthiness of the findings.

The coding framework was informed by (1) codes that emerged inductively from transcripts, (2) domains addressed in the topic guides, and (3) constructs of the socioecological framework. This approach ensured that the analysis remained grounded in participants' accounts while also allowing theoretically relevant concepts to be systematically examined. Initially, 5 transcripts, purposively selected to represent different participant groups and contexts, were reviewed and independently inductively coded by 2 researchers. The researchers compared their coding—discussing

similarities and differences and resolving discrepancies through discussion. The codes were subsequently reviewed and refined to develop the initial coding framework. The framework was further complemented and refined by incorporating the socioecological framework and topic guide domains.

Subsequently, all transcripts were deductively coded against the framework and systematically charted according to relevant codes and categories. The framework was treated as iterative rather than fixed, and new codes were added when further analysis identified concepts that were not adequately captured by the initial framework.

The coded data were compared within and across participant groups. Related codes were clustered into broader categories, which were subsequently synthesized into overarching themes. Particular attention was given to identifying barriers and facilitators to CBIs and to examining similarities and differences across geographical and contextual settings. To account for contextual variation, data were first analyzed separately for each study site, resulting in 3 site-specific thematic reports.

The thematic reports were subsequently compared and synthesized to develop an integrated analysis across sites. Rural-urban differences were systematically examined by comparing the initial reports and returning to the coded data. Each apparent difference was assessed against the coded data to determine whether it represented a recurring pattern. The importance of a difference was determined by examining its recurrence in the data, its consistency across participant groups, and the emphasis placed on it by participants. Divergent and contradictory accounts were also examined. Rural-urban interpretations were retained only when supported by detailed accounts, demonstrating clear contextual relevance. The reports and themes were combined and written up.

Rigor and Reporting Standards

This study is reported in accordance with the COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist [25], which guides the reporting of qualitative studies (Checklist 1). Strategies to ensure trustworthiness included purposive and maximum variation sampling, gender-segregated FGDs, triangulation of data sources and participant groups, iterative team-based analysis, and regular debriefing sessions during data collection.

Ethical Considerations

The study received ethical approval from the following institutional review boards: Khyber Medical University Ethical Review Board (reference number 2023-9340-27449), Aga Khan University Review Board (reference number 2024-9340-28927), and the National Bioethics Committee, Pakistan (reference number NBCR 1070). All ethical considerations were followed, including obtaining informed consent, maintaining participant anonymity, and ensuring confidentiality.

Results

Results Overview

We organized our findings into three overarching themes: (1) familiarity with CBIs, (2) barriers to CBIs, and (3) facilitators of CBIs. Each of these themes has been further divided into subthemes. Table 2 outlines the themes, subthemes, and findings. We highlight the similarities and differences between urban and rural sites. Applying the socioecological model, we mapped the findings across individual, interpersonal, community, organizational, and policy levels to identify the factors shaping CBIs' uptake and effectiveness, as shown in Figure 1.

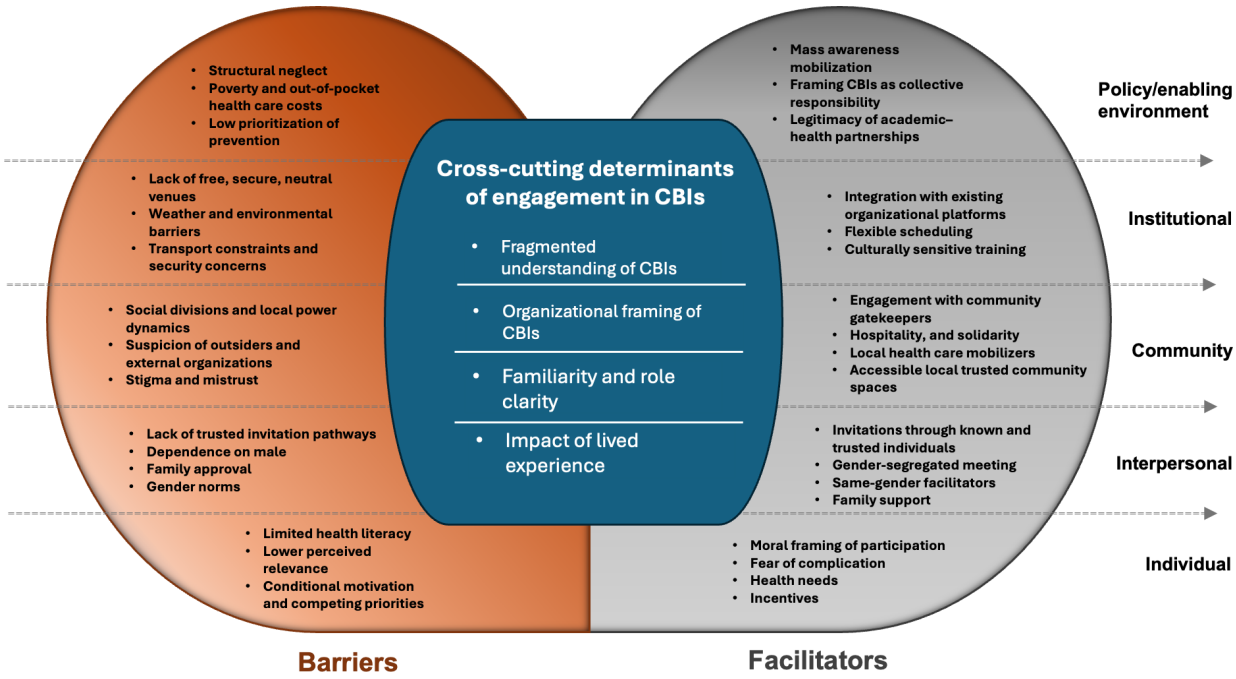
Table 2. Themes, subthemes, and key findings.

Theme and subtheme	Pattern	Rural findings	Urban findings
Theme 1: familiarity with CBIs[a]			
Understanding of CBIs	Shared	Limited; externally driven	Limited; program-led
Prior experience of CBIs	Contrasting	Minimal or none; first engagement common	Prior workshops/seminars; episodic
Willingness to participate	Shared	High	High
Theme 2: barrier to CBIs			
Perceptions of "no barrier"	Shared	Initiatives would be positively received	Initiatives would be positively received
Relevance and motivation to participate	Contrasting	Collective duty; unmet needs	Conditional; convenience and personal benefit
Mistrust, misconceptions, and low awareness	Contrasting	Prominent; outsiders, supernatural beliefs	Present but less pronounced
Gender dynamics	Contrasting	Strong; mobility limits; female facilitators essential	Moderate; family support enabling
Logistical and structural challenges	Contrasting	Distance, weather, neutral venues	Venue availability, scheduling
Security and safety concerns	Contrasting	Not reported	Explicit need for police/security
Poverty and economic barriers	Contrasting	Prominent; poverty affects participation	Less visible
Theme 3: facilitators to CBIs			

Theme and subtheme	Pattern	Rural findings	Urban findings
Engaging with local political leaders and community elders	Shared	Important	Important
Gender-sensitive approaches	Shared	Important; practical suggestions made	Important; practical suggestions made
Accessible venues	Contrasting	Neutral venues and religious spaces	Convenient locations and timing
Mobilization channels	Shared	Mass awareness important; door-to-door campaigns; mosques; social media	Mass awareness important; social media, housing associations
Local health care workers for intervention delivery	Contrasting	Important; local workers more trusted	Limited

[a]CBI: community-based intervention.

Figure 1. Mapping of findings onto the socioecological model domains. CBI: community-based intervention.



Theme 1: Familiarity With CBIs

Familiarity with CBIs emerged as a cross-cutting factor influencing engagement across multiple socioecological model levels, with contextual factors and prior experiences shaping participants' willingness to participate at both urban and rural sites.

Subtheme 1.1: Understanding of CBIs

Across sites, participants showed limited yet diverse understandings of CBIs. Most perceptions were at the organizational level, where they were largely synonymous with hospital-led or program-led awareness sessions rather than sustained community-based engagement.

In rural sites, CBIs were referred to as "research" activities, such as conducting surveys, asking questions, or gathering information. Some rural participants equated them with the work of nongovernmental organizations (NGOs) and with practical activities—data gathering could also be part of this. However, rural participants also frequently stressed the absence of such initiatives in their communities:

> *[community-based interventions are] research on the community level and illness-related information collection*. [IDI-PSH-female-carers of people with T2DM]

> *they involve surveying the community. NGOs play a major role. When NGOs visit communities, they gather people in mosques and community centers to discuss and solve social issues*. [FGD-Peshawar-male-people with T2DM]

> *This is the work of NGOs, and no NGO has come to my neighborhood before to arrange camps, conduct research, or raise awareness among people*. [IDI-Peshawar-male-influential people]

Urban participants varied in their familiarity with CBIs. Some had prior exposure through health lectures or hospital-based awareness programs, which shaped their understanding of prevention and early detection. An urban HCP recognized the potential of CBIs to address the rising diabetes burden. Others linked community engagement with religious or moral values, highlighting a sense of social responsibility at the community level:

Yes, I've had the opportunity to attend several times. The last one I attended…. doctors gave very good lectures…related to health… …emphasized that we should keep getting all necessary tests done regularly. [IDI-Karachi-male-people with T2DM]

diabetes is increasingly prevalent in Pakistan. By identifying trends, dietary patterns, or behaviors that contribute diabetes, we can target those specific human behaviors at the community level to help control and manage the condition effectively. [IDI-Karachi-female-HCP]

Subtheme 1.2: Previous Experience With Participation in CBIs

Urban and rural sites had limited but different experiences with CBIs spanning the individual, community, and organizational levels.

Rural community members who participated (people with and without a T2DM diagnosis and caregivers) mostly reported little to no previous engagement with any CBIs. A few associated participation in CBIs with general social or educational events such as *dengue awareness sessions* (IDI-PSH-female-carers of people with T2DM). However, for many, the research team's presence represented the first structured engagement with an external organization:

No, it's the first time that you people have come. … Before this no one ever provided information about diabetes or other diseases or had discussions with us about our issues. [IDI-Swabi-male-people with unknown T2DM status]

Rural participants in leadership roles (health care workers and community influentials) described a broader range of experiences. They reported involvement in NGO-led initiatives, local health/education programs, and community projects in areas such as childcare, breast cancer awareness, polio campaigns, improving access to clean water, and sports facilities. Often these initiatives were short term or externally led:

I have worked in Mother and Child Care at Islamabad. We had a motivating program... I also worked with an NGO and in a clean water supply project. [FGD-Swabi-male-people with T2DM]

Urban participants were more likely to report participation in awareness sessions, workshops, or seminars conducted at organizational levels, which were often not perceived as true CBIs. Many had attended events organized in hospitals, hotels, or universities, where health education was provided by experts. However, involvement in community-led initiatives (beyond individual education events) was rarely reported in urban areas:

Many NGOs run programs like this, and some institutions invite people to join a program to learn and receive guidance. We attended these programs, and almost all advice was to focus on walking, continue with the prescribed medication, and control the diet. [IDI-Karachi-male-carers of people with T2DM]

Subtheme 1.3: Willingness to Participate in CBIs

Participants across urban and rural sites expressed strong willingness to engage in CBIs, though their motivations and expectations differed according to access, prior exposure, and social organization.

In rural sites, willingness was universal. Participation was framed as a shared responsibility as well as a social and moral duty—with interventions perceived as opportunities to support communal health improvement rather than as activities targeted only at individuals:

Absolutely, because it's for our betterment, most people will extend hospitality to you, knowing that you've come to help improve our health and provide assistance with our disease. [IDI-Swabi-male-people with unknown T2DM status]

It's our duty to serve diabetics… we should inform others and take care of ourselves and patients too. [IDI-Swabi-male-carers of people with T2DM]

Urban participants also expressed readiness but in a more individualistic, conditional manner—shaped by convenience, available time, and perceived personal benefit. Furthermore, urban participants balanced their optimism with practical concerns about the relevance of the topic, engagement, and outreach:

It should be on a weekend, with some sort of get-together or refreshments, so that people would want to come and attend. [IDI-Karachi-male-people with T2DM]

Those who have diabetes will definitely attend, those who don't have diabetes might say why they would indulge in those programs, thinking that the illness doesn't concern them. [IDI-Karachi-female-people with T2DM]

Common across urban and rural sites, CBIs were viewed as opportunities to receive care and information. It was also noted that they may provide opportunities for interpersonal connections. There was also high regard for the cause and the research project:

Why would they not come together? People are thirsty for it… they want to put an end to their worries. *[IDI-Swabi-male-influential people]*

If we raise awareness and make information accessible… both men and women are likely to be easily available and attend. [IDI-Karachi-female-HCP]

Age was mentioned as a factor affecting motivation. It was suggested that CBIs may be more appealing to older age groups if supported, as young people had less time and were thought to be less motivated. Gender-sensitive approaches and scheduling were mentioned (see subthemes 2.4 and 3.2). Rural participants emphasized that any efforts should be anchored in trusted local structures such as *hujras* (a traditional communal gathering space in Pashtun culture, where people meet for social interaction, hospitality, consultation, and discussion of community affairs), mosques (Muslim places of worship), or schools:

There's a 50-50 chance [young people will attend] because people don't have time and they aren't serious. [FGD-Karachi-male-people with T2DM]

If Molvi sahib calls from the masjid that doctors are coming, then everyone will reach on their own. [FGD-PSH-male-people with T2DM]

Theme 2: Barriers to CBIs

Although participants in both urban and rural sites generally welcomed the idea of CBIs for the prevention and control of T2DM, several perceived and potential barriers were identified.

Subtheme 2.1: Perceptions of "No Barrier"

A strong narrative across urban and rural sites was that initiatives would be positively received without any challenges. Urban participants noted that people were usually willing to discuss health issues such as T2DM, and there would be no barriers. Rural participants framed CBIs as acts of social welfare that would be actively supported at the community level:

...people will want to get better, those who are sensible will take out time, maybe once or twice a week. [IDI-Karachi-male-people with T2DM]

There will be no barriers or challenges. The community will pray for all of you, as this is an act of social welfare and humanity. We welcome and appreciate you. [IDI-PSH-male-influential people]

Subtheme 2.2: Relevance and Motivation to Participate

Some urban participants raised concerns that CBIs might only appeal to those already diagnosed with T2DM, who are a minority of people. They believed that people without diabetes may not see any relevance or benefit in participating, given diabetes is not perceived to affect them directly:

Those who have diabetes will definitely attend, those who don't have diabetes might say why they would indulge in those programs, thinking that the illness doesn't concern them. [IDI-Karachi-female-people with T2DM]

In contrast, rural participants rarely questioned the relevance of such activities.

Subtheme 2.3: Misconceptions, Mistrust, and Low Awareness

Across settings, low awareness and misconceptions were considered potential barriers, though these concerns were more strongly voiced in rural sites. Misconceptions in rural areas included T2DM being attributed to supernatural causes and, consequently, people seeking cures from local healers. Urban participants suggested that misconceptions may occur due to low literacy and emphasized the importance of community education. In rural areas, some participants worried that people might be suspicious of researchers' intentions, highlighting community-level mistrust of outsiders. Mistrust was also linked to previous experiences with health projects that had not been sustained, leaving people skeptical of such projects:

There may be difficulties, as people in the area might have misconceptions about the work you are initiating. They might ask why they should participate, who you are, and what you are doing. [IDI-PSH-male-carers of people with T2DM]

Challenges could include people who are not well-educated and may have misconceptions, thinking that such initiatives are harmful. [IDI-Karachi-female-HCP]

Many people are not taking it seriously… because many people bring the proposal, but nobody continues it until the very end. [IDI-Karachi-male-influential people]

Subtheme 2.4: Gender and Cultural Constraints

Gender dynamics emerged as an important challenge, particularly in rural settings. It was reported that female participation is often restricted by household roles and social norms that discourage women from leaving their homes for anything other than essential purposes. While less explicitly discussed in urban settings, family support, particularly from male relatives, was highlighted as crucial in enabling women's participation and particularly older women:

In the village it is very hard to make females come out of their homes. Once they come out, then they will participate and contribute to the meeting. [FGD-PSH-female-people with unknown T2DM status]

I think there are problems for females due to the hostile environment outside... but if they've got family support, then there are no such problems….some women can't even step out to markets alone. But if male [relatives] are supportive then there is no problem. [IDI-Karachi-male-people with unknown T2DM status]

Subtheme 2.5: Logistical and Structural Challenges

Practical challenges were raised across all sites, with more detail in rural sites. Urban participants primarily referred to the potential variability in attendance, which would depend on outreach, location, and local weather conditions. It was also mentioned that it might be difficult to find a place to hold any meetings due to the costs:

...maybe you will face issues…there is no such hall where you can organise your program". [IDI-Karachi-female-carers of people with T2DM]

Rural participants reported that accessing a venue could be a barrier, as people would need to walk to any community program. They also highlighted environmental considerations, with extreme weather conditions (eg, heat and floods) likely to be barriers to participation:

The weather is hot these days, and leaving home in such harsh weather is way more difficult. So a calm and soothing location, according to the environment, is necessary. [FGD-PSH-female-people with unknown T2DM status]

Subtheme 2.6: Security and Safety Concerns

Participants in the urban site reported safety concerns, emphasizing the need for visible security arrangements (such as police presence) to ensure the smooth implementation of CBIs. In contrast, no such concerns were expressed in rural settings:

These [security measures] are necessary things. It won't work without the police. [IDI-Karachi-female-influential people]

Subtheme 2.7: Poverty and Economic Barriers

Economic hardship was a prominent rural theme. Participants repeatedly described living in poverty, highlighting it as a critical and systemic barrier to managing T2DM and engaging with any interventions. Poverty as a barrier to participation in CBIs was less visible in the urban data:

here is poverty for diabetic patients and they cannot afford medicine. They go to work early in the morning and they come in the evening. They may have no time to attend meetings. [IDI-Swabi-female-influential people]

Theme 3: Facilitators to CBIs

Despite the barriers, there was enthusiasm for CBIs, as highlighted in theme 1. Several enablers and suggestions for implementation were identified in the data.

Subtheme 3.1: Engaging With Local Political Leaders and Community Elders

One of the most important facilitators identified by participants across sites was engagement with local political and public figures who command authority and respect in the community. While these influential individuals vary across sites, participants across sites emphasized that such figures serve as community gatekeepers who must be consulted before initiating any CBIs in their area. Rural participants particularly emphasized the need to engage with leaders early in the process and suggested that religious leaders, in particular, would greatly facilitate mobilizing people and the successful implementation of CBIs:

Contacting a local influential person is important since people trust him and listen to him carefully. For example, the imam of the mosque or an elected counsellor… or any person who influences people to and they listen to. [FGD-Peshawar-female-people with unknown T2DM status]

Their [influential person] trust must be gained first, and then they will mobilise people in their neighbourhood… If you talk to people individually, most probably they will not join. [IDI-Karachi-male-people with unknown T2DM status]

Subtheme 3.2: Gender-Sensitive Approach for CBIs

Participants across sites stressed that CBIs must adopt gender-sensitive approaches to be acceptable and culturally appropriate. Owing to the prevailing culture of gender segregation and *purdah*, particularly in rural areas, participants recommended that any meetings should be held separately for men and women and that facilitators should match the gender of the group. Participants in Karachi (urban) also suggested gender-segregated meetings, emphasizing that this would be more culturally appropriate and lead to better participation. Ensuring privacy and appropriate timing according to gender was also mentioned:

A separate session [for men and women] would be more preferable.... Also, if both genders are sitting together, many men and women do not find it appropriate to talk. [IDI-Karachi-male-people with T2DM]

If you want to meet females, morning time is better… if for males, evening is better as they go to work. [IDI-PSH-female-HCP]

Subtheme 3.3: Incentives for Community Members

Many participants believed that providing incentives would be essential to attract people to participate in CBIs. Two main types of incentives were identified: refreshments and health-related incentives. Regarding refreshments, participants emphasized the cultural significance of hospitality in the region, highlighting that it is a deeply ingrained cultural ethos in both rural and urban Pakistan:

> *There must be some kind of incentive for motivation. Some sort of food, refreshment, or lunch box, or any kind of incentive*. [FGD-Peshawar-female-people with unknown T2DM status]

> *..for encouragement, there should be refreshments because they provide a little enjoyment and make the mind fresh during the meeting*. [Karachi-FGD-male-people with unknown T2DM status]

The second type of incentive included the provision of free medicines/vitamins, diagnostic tests, and/or health-related literature. It was believed that having health-related incentives was appropriate and could greatly motivate people to attend any community intervention. A rural participant from Peshawar emphasized the word "free" as a primary facilitator for attracting people to attend meetings:

> *You can motivate people through free [diagnostic] tests. Or you can also motivate them through free medicine. This FREE word would definitely attract them"* [FGD-Peshawar-female-people with unknown T2DM status]

> *Along with [refreshment], we should give gifts, like medicine for good health or vitamin tablets. This will attract people to attend sessions"* [FGD-Karachi-male-people with unknown T2DM status]

Subtheme 3.5: Accessible Venues

Across all sites, participants emphasized accessible locations and convenient timings as key facilitators at structural and organizational levels for communities engaging in interventions. However, the nature of the locations varied across urban and rural sites. In rural areas, participants stressed venue neutrality due to local factions and social divisions. Having them at local leaders' homes was often suggested. Urban participants focused less on neutrality and more on convenience, emphasizing that venues should be accessible and easy to reach:

> *The venue should be accessible and neutral, especially for women's meetings*. [IDI-Peshawar-male-carers of people with T2DM]

> *Accessibility and convenience are crucial for better participation*. [FGD-Karachi-female-people with T2DM]

Having convenient timings for meetings was viewed as an important enabler for attendance. Rural participants provided clear and consistent guidance on gender-segregated timing, while urban participants, who also suggested different timings for men and women, showed greater variability.

> *For females… morning… for males… evening, after Zuhr prayers*. [FGD-Peshawar-female-people with T2DM]

> *We will definitely come… if the timing is suitable*. [FGD-Karachi-female-people with T2DM]

In rural areas, participants explained that if engaged with caution and in an appropriate manner, religious spaces, such as mosques, and figures, such as *imams*, could greatly facilitate CBIs. They explained that religious venues and figures could act as effective community platforms, and that *imams* are respected. For women, the venue would need to be one where they are allowed to attend:

> *Announcing the event from the mosque would be the most effective and appropriate strategy for engaging more people*. [IDI-Peshawar-male-carers of people with T2DM]

> *...for women community meetings, we need a place like a madrassa where they can come in the morning around 10 or 11 o'clock*. [IDI-Peshawar-male-people with unknown T2DM status]

Subtheme 3.6: Mobilization Channels

Participants across sites reported that people's motivation and participation in CBIs are directly related to the level of mobilization and awareness created about the issue being addressed. It was noted that people lack awareness about T2DM generally, as well as community-based actions regarding its prevention and control. Therefore, mobilizing communities and raising awareness about T2DM were reported to be crucial facilitating factors, enabling the success of CBIs addressing T2DM or similar issues. A variety of platforms were suggested including door-to-door visits, announcements in mosques, posters, leaflets, and social media. Working with mosques and door-to-door visits were more likely to be suggested in rural areas. Digital campaigns were suggested in urban areas, though the social media channels were also suggested in rural sites. In Karachi (urban), working with specific communities through housing associations was suggested:

> *A door-to-door campaign and using the platform of the mosque for mobilization could spread awareness about such projects* [IDI-Peshawar-male-carers of people without T2DM]

> *Additionally, we should contact area heads from different housing societies and use WhatsApp as an effective medium to spread awareness among people about the project*. [IDI-Karachi-female-HCP]

Subtheme 3.7: Employing Local Health Care Workers for Intervention Delivery

Recruiting and hiring local health care workers for intervention delivery was identified as a facilitator for the effective implementation of CBIs in rural data. Participants in rural sites highlighted that outsiders are often viewed with suspicion; hence, trust in individuals is an interpersonal facilitator:

> *I think people will come to attend the community meetings, especially if someone from our own area invites them. I mean, local health care workers would be effective in this program*. [IDI-Peshawar-male-influential people]

> *Local health care workers will be better able to motivate people for the meetings*. [IDI-Swabi-male-HCP]

Discussion

Principal Findings

This study reveals that, in urban and rural Pakistan, there was strong support for CBIs, though prior experiences with such initiatives were rare. Several barriers to CBIs at the individual, interpersonal, community, and institutional levels were identified. Facilitators and recommendations for their successful implementation highlight the importance of culturally sensitive, gender-responsive, and context-aligned CBIs for T2DM prevention in Pakistan.

Viewed through a socioecological lens, the findings suggest a bottom-up pathway to successful implementation of CBIs. Individual beliefs and attitudes interact with interpersonal relationships and community norms, shaping community acceptance and the feasibility of institutional support. The importance of trusted interpersonal ties and community gatekeepers enables collective readiness for CBIs, particularly in rural areas. Participants rarely linked CBIs to formal government or primary health care systems, reflecting the weak visibility of state-led health reforms. This structural gap reinforces dependence on short-term initiatives and undermines sustainability. Our findings suggest that community readiness alone will not ensure integration into the health system. Therefore, by leveraging this bottom-up pathway, EMPOWER-D aims to strengthen participation and inform long-term integration of diabetes prevention within local systems.

At the individual level, awareness of CBIs was limited, with misconceptions common in rural areas, where they are often conflated with research or NGO activities. This resonates with other research studies [7,9]. Similarity, low health literacy and mistrust toward external programs remain significant barriers to CBIs [10,26]. This strengthens the evidence that education alone is insufficient to change behavior, highlighting that participatory, co-designed interventions are essential to foster sustained engagement and ownership [11,27], and underscores the need to build trust with communities [28].

Religious and cultural norms impose structural barriers that disproportionately limit female participation. In the study context, practices concerning *purdah* (a religious and social practice of gender segregation) and women's mobility were understood as religious obligations while also being deeply embedded in local community culture [15,16]. Their restrictive effects may be reinforced by culturally specific interpretations and social expectations. Although participants favored gender-sensitive approaches, such as female facilitators and separate sessions, gender-transformative interventions are needed to address these interconnected religious and cultural constraints. Partnerships with faith-based stakeholders can strengthen credibility and support contextually appropriate engagement; however, the power dynamics associated with these partnerships remain underexplored [29]. Urban multiculturalism requires intersectional strategies addressing ethnicity, class, religion, and gender, alongside engagement with men, boys, and religious and community leaders to shift entrenched norms [30]. Furthermore, research across all settings should foster equitable participation and adaptive interventions [31-33].

Systemic barriers and governance challenges highlight the need to address structural determinants of health, promote access to interventions, and enable sustainable health solutions [13,34,35]. While participants in this research valued economic incentives, these could inhibit [36]. Behavioral science advocates balancing extrinsic rewards with empowerment for lasting impact [37]. Several media of mobilization were suggested in the research, such as door-to-door visits, mosques, and social media. Digital strategies remain underused in CBIs, indicating opportunities for mobile health innovations, particularly in urban settings [38].

The research reported in this study has real-world implications, and the findings will directly inform the EMPOWER-D project. For example, employing local health care workers in rural areas will be pivotal to increasing trust in any activities. All activities will be gender-sensitive. Aligned with a recent scoping review conducted by the authors, this study confirms that urban implementation requires investment in training, supervision, remuneration, and system integration; without these, workforce quality and motivation may decline, affecting intervention efficacy [39]. Considering the implementation, the EMPOWER-D project may serve as a model for similar CBIs in Pakistan and other low- and middle-income countries.

Strengths and Limitations

The study has several strengths. First, it is based on a multisite design covering rural and urban settings across Pakistan, which captures community participation in diverse sociocultural, geographical, and institutional contexts, thereby enhancing the contextual robustness and transferability of the findings. Second, by including the perspectives of diverse stakeholders, this study provides a broader and more nuanced understanding of community participation, strengthening the credibility and interpretive depth of the findings. Third, the study used the socioecological model, which provides a theoretically informed framework for examining the multilevel and interconnected factors shaping community participation, thereby enhancing the analytical coherence of the study.

We also acknowledge that there were limitations in the study. First, social desirability bias may have influenced participants to report socially acceptable views or overemphasize positive experiences of community participation. Second, by translating the data into English, while done for pragmatic reasons, likely led to a loss of linguistic nuance. Third, the study did not systematically examine power dynamics within communities, including whose voices are represented, whose knowledge is valued, and who influences decision-making. This may have limited the understanding of how existing social hierarchies affect meaningful and equitable participation. Finally, although health officials were included, the study did not comprehensively examine the health-system context or how community engagement and participatory research could be institutionalized within routine health-system structures. Future research should therefore explore the interaction between community participation, power relations, and health-system structures to better understand the conditions required for sustainable and equitable community-based participatory research and interventions.

Conclusions

Culturally tailored, gender-responsive, community-driven CBIs are essential for T2DM prevention in Pakistan. Key barriers include low health literacy, mistrust, and sociocultural constraints, particularly gender norms. Faith-based partnerships and local leaders enhance reach, but superficial engagement risks inequity. Contextual motivators such as incentives and health care workers are critical, but sustainability requires structural support. EMPOWER-D will leverage these insights to adapt participatory interventions, providing a scalable model for T2DM and noncommunicable disease prevention in similar settings.

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Data Availability

Deidentified data will be shared with researchers upon reasonable request made to the corresponding author.

Authors' Contributions

AB, ZK, KR, SA, and HMJ led the application for funding. NS and AT conceptualized the idea for the manuscript, collected and analyzed the data, and prepared the first draft, while all authors (NS, AT, RZ, SI, MA, NK, KR, ZK, AB, SA, and HMJ) contributed by critically appraising and revising the intellectual content of the manuscript. All authors read and approved the final manuscript.

Conflicts of Interest

None declared.

Checklist 1

COREQ checklist.
[PDF File (Adobe File), 46 KB-Checklist 1]

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Abbreviations

CBI: community-based intervention
COREQ: Consolidated Criteria for Reporting Qualitative Research
EMPOWER-D: Engagement of Community Through Participatory Learning and Action for Control and Prevention of Type II Diabetes and Its Risk Factors
FGD: focus group discussion
HCP: health care provider
IDI: in-depth interview
KP: Khyber Pakhtunkhwa
NGO: nongovernmental organization
T2DM: type 2 diabetes mellitus

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