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Review article

The Effect of Community Based Intervention on People with Type 2 Diabetes Mellitus: Systematic Review

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Abstract

Background: The rising prevalence of Type 2 Diabetes Mellitus (T2D) has become a significant global health burden, with profound implications for healthcare systems and affected individuals. Strengthening primary healthcare services by integrating health and community-based interventions is critical for improving health outcomes. This rapid systematic review aimed to evaluate the effectiveness of community-based interventions in enhancing health outcomes for patients with T2D.

Objectives: To evaluate the effectiveness of community-based interventions in managing T2D, focusing on their impact on health outcomes

Methods: This systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Data collection involved five major databases: Scopus, Cochrane Library, PubMed, Web of Science, and Clinical Key, covering publications from January 2013 to May 2024. Eligible studies included randomized controlled trials, mixed-methods research, clinical trials, prospective studies, experimental repeated-measures designs, and quasi-experimental designs. The risk of bias in the included studies was assessed using the RevMan 5.4.1 software. Article selection, risk of bias evaluation, data extraction, and synthesis were conducted independently by the authors, with discrepancies resolved through discussion and consensus.

Results: Out of 4.463 identified articles, 13 met the eligibility criteria for inclusion in the review. The community-based intervention strategies identified in these studies involved three primary approaches: family-centered interventions, peer support, and community volunteer programs.

Conclusion: This systematic review concludes that community-based interventions are effective in improving health outcomes for individuals with T2D. Integrating and strengthening health and community-based collaborations within the broader healthcare system is crucial for achieving optimal health outcomes. Nurses are encouraged to collaborate with community-based networks to bridge the gap between healthcare providers and communities, thereby enhancing public health outcomes.

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Background

The prevalence of Type 2 Diabetes Mellitus (T2D) is increasing globally, posing significant public health challenges. With over 529 million adults affected worldwide, T2D constitutes approximately 90% of all diabetes cases (International Diabetes Federation, 2022). By 2045, the number of cases is expected to rise significantly, especially in low- and middle-income countries where population growth is anticipated (WHO, 2023). This increasing burden underlines the need for more sustainable solutions beyond conventional curative and rehabilitative approaches (Luo, Fabre, & Rodwin, 2020).

In many cases, traditional healthcare systems primarily focus on managing symptoms and preventing complications through clinical interventions (Luo et al., 2020). However, these approaches are often insufficient for achieving long-term disease management. Promotive and preventive strategies that empower individuals to manage their health more effectively are essential (Khoe, Wangge, Soewondo, Tahapary, & Widyahening, 2020). The World Health Organization (WHO) advocates for primary healthcare as a pathway toward universal health coverage, emphasizing the importance of integrating preventive and community-based approaches into healthcare systems (WHO, 2022).

Primary care plays a critical role in preventing disease and promoting public health by providing accessible and quality services to communities (Assefa et al., 2020). However, for these systems to be more effective, there is a need to bridge the gap between health services and the community through collaboration with community-based interventions (Halcomb et al., 2020). Integrating community resources such as families, peers, and volunteers within primary healthcare frameworks has been shown to improve patient outcomes (Gyawali et al., 2021; Sittipreechachan, Pichayapinyo, Lagampan, & Chongsuwat, 2022).

Despite existing studies that highlight the value of community involvement in managing T2D, gaps remain in understanding the specific challenges these interventions face (Sittipreechachan et al., 2022). For instance, while peer support has been shown to enhance self-care, emotional well-being, and adherence to treatment (Peimani, Monjazebi, Ghodssi-Ghassemabadi, & Nasli-Esfahani, 2018), the sustainability of such programs within diverse healthcare contexts is underexplored. Furthermore, nurse-led interventions that incorporate community participation remain insufficiently documented (Tamiru et al., 2023).

Given these challenges, the current study aims to evaluate the effectiveness of community-based interventions in managing T2D, focusing on their impact on health outcomes. Specifically, the review examines the roles of family, peers, and community volunteers in supporting individuals with T2D. Addressing these areas through a rapid systematic review provides evidence-based insights that can support policymakers and healthcare providers in designing more effective, community-integrated health programs.

The choice of a rapid systematic review methodology aligns with the study's objective to synthesize evidence quickly to inform timely decision-making (Siddaway, Wood, & Hedges, 2019). Rapid reviews help organize and assess existing literature efficiently, providing valuable insights for healthcare practitioners (Johnston, Kelly, Hsieh, Skidmore, & Wells, 2019). This review fills a critical gap by focusing on community-based interventions involving nurses and other community actors, offering practical recommendations for strengthening healthcare delivery through integrated approaches.

Method

Research Design

This study employed a rapid systematic literature review as its methodology to assess the effectiveness of community-based interventions in managing T2D (Tricco, Langlois, Straus, & World Health, 2017). The rapid systematic review was chosen over a conventional systematic review due to time efficiency and the need for timely evidence to support decision-making. Rapid reviews are particularly suitable when healthcare practitioners and policymakers need to respond to urgent or evolving health issues (Lagisz, Vasilakopoulou, Bridge, Santamouris, & Nakagawa, 2022). Compared to traditional systematic reviews, rapid reviews streamline processes such as data extraction and analysis while still adhering to rigorous research standards (Klerings et al., 2023). Before data collection commenced, the review was registered in the PROSPERO database (CRD42024542442). The research followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist for systematic reviews (Page et al., 2021). The PRISMA checklist was selected due to its thoroughness and structured approach, encompassing critical

appraisal, study selection, and data extraction. The aim of the review is to assess the effect of community-based to improve health outcome of people with T2D.

Inclusion and Exclusion Criteria

The criteria for article selection were designed to focus on studies that could provide relevant insights for community-based interventions. The inclusion criteria for this study were as follows: 1) studies involving individuals with T2D, 2) community-based interventions, 3) publications between 2013 to 2024, and 4) articles written in English. The timeframe (2013–2024) was chosen to capture the most recent developments. While limiting to English-language publications might reduce coverage, it was necessary to ensure data accuracy and consistency across sources. Conversely, the exclusion criteria were: 1) Non-full-text articles, reviews, protocols, and conference abstracts, 2) qualitative studies were also excluded from the review. The Exclution of qualitative studies ensures the focus remains on measurable outcomes relevant to evaluating community-based interventions. Protocols and abstracts were excluded as they do not provide complete data for comprehensive analysis.

Search Methods

The literature search was conducted across five databases: Scopus, Cochrane, PubMed, Web of Science, and Clinical Key. These databases were selected based on their comprehensive coverage of healthcare and clinical research, ensuring relevance to the study's scope. Scopus and Web of Science cover a wide range of interdisciplinary studies, including public health. Cochrane specializes in systematic reviews and clinical trials, providing high-quality evidence. PubMed focuses on medical literature and health research, while Clinical Key offers access to clinical guidelines and patient care strategies. These databases were chosen to ensure coverage across different aspects of diabetes management, including clinical practices and community-based care. The 2013-2024 timeframe was chosen because it covers the most recent developments in health research. By limiting the search to this period, researchers can ensure that the information found reflects the most recent and relevant advances in the field. The timeframe chosen reflects the need for up-to-date information that decision makers need to make more effective and relevant policies. Keywords were identified using the Boolean operators technique, specifically AND and OR, to combine terms during the search. Additionally, quotation marks (") were used to enclose exact phrases, and parentheses ( ) were employed to group similar concepts. The researchers applied the PICO framework (Patient, Intervention, Comparison, and Outcomes) to formulate the clinical questions.

Tabel 1 PICO strategy description

Acronym	Definition	Description
P	Patient and Problem	Diabetes OR Type 2 diabetes
I	Intervention	Community-based
C	Control or Comparision	Usual care
O	Outcome	Quality of life OR physical OR mental OR psychological well-being

Data Extraction

Thirteen selected articles were extracted by all reviewers using a grid synthesis format contained some information, i.e., author, year of publication, country, study design, sample, intervention strategy, intervention outcomes, and community resources. Only information about community-based intervention there was extracted and evaluated. Thirteen articles were selected from the initial pool of 4,463 articles. All reviewers participated in the selection process, following these steps, screening titles and abstracts to exclude irrelevant studies, reviewing full-text articles to assess eligibility, and resolving disagreements through structured discussions until consensus was reached. While the final number of included articles is relatively small, they were carefully chosen to represent a range of study designs and interventions relevant to T2D management. Each article included provided data on different aspects of community-based interventions, ensuring the review captures a comprehensive picture of existing evidence.

Quality Appraisal and Risk of Bias

To assess the quality of the studies in this review, The Joanna Briggs Institute (JBI)'s critical appraisal techniques were employed to evaluate the trustworthiness, relevance, and findings of the published research (Barker et al., 2023; Joanna Briggs Institute, 2020). All authors participated in the critical appraisal of the articles. This review was evaluated using the risk of bias criteria according to the Cochrane group's Risk of Bias instrument (Sterne et al., 2019). The assessment covered seven domains: the randomization process, allocation concealment, blinding of participants and researchers, blinding of outcome assessment, incomplete outcome data, selective reporting, and other potential biases. The RevMan 5.4.1 software was used to determine the risk of bias in the studies. Validation and determination of whether the criteria were met were conducted through discussions or consultations with all reviewers. Each reviewer independently assessed the included studies for risk of bias. Discrepancies were discussed and resolved in team meetings through consensus-building exercises. No major challenges were encountered during the risk assessment process, though minor differences in interpretation were resolved through discussion. RevMan 5.4.1 was used to generate risk of bias summaries, which informed the overall analysis by identifying areas where study results could be potentially biased. Figures 1 and 2 display the overall judgment scores for each risk of bias item.

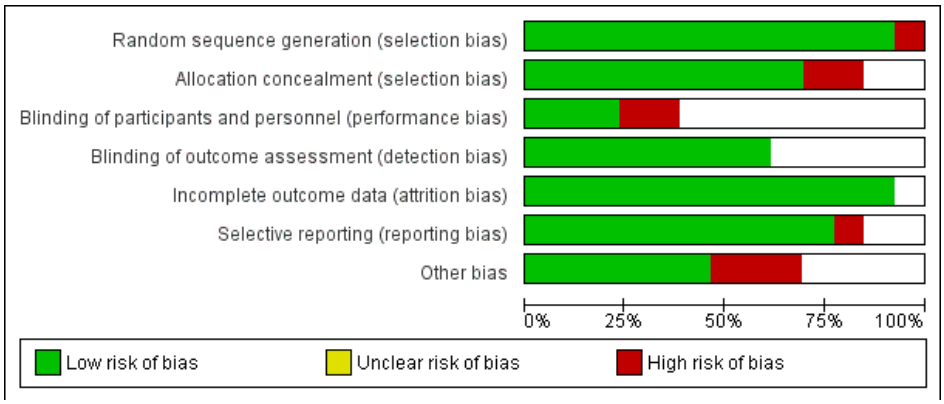

Figure 1 Risk of bias summary, review authors' judgements about each risk of bias using RevMan 5.4.1

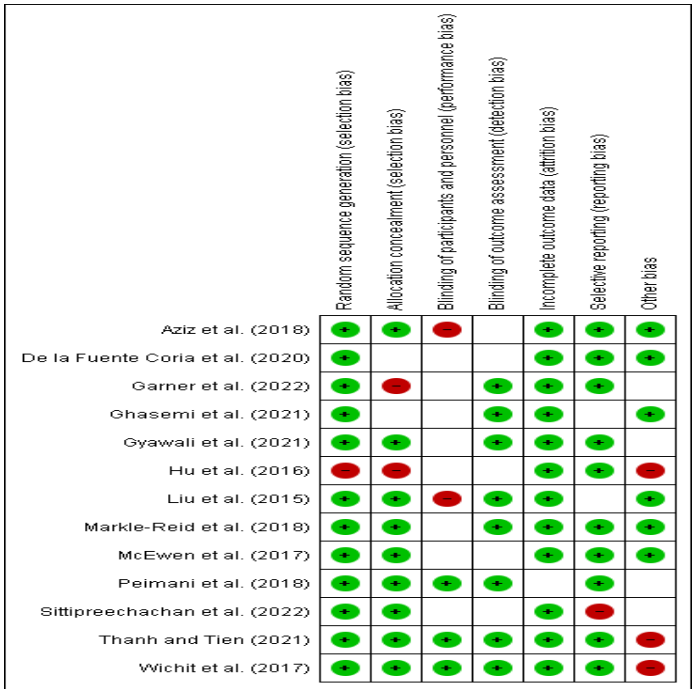

Figure 2 Risk of bias summary using RevMan 5.4.1

Data Synthesis and Analysis

The results were synthesized based on methodological quality, intervention strategies, and outcomes. These findings are summarized in Table 1. Each study was categorized according to the type of community-based intervention (family-based, peer-supported, or volunteer-based). This synthesis aimed to identify patterns in the effectiveness of different interventions across various settings. Although RevMan 5.4.1 was primarily used to assess bias, it also contributed to the overall analysis by enabling comparison across studies. The software allowed for visual summaries of bias distribution, helping the authors to evaluate the consistency of findings across different intervention models. The final synthesis was conducted through iterative discussions among all reviewers. Disagreements during data synthesis were addressed by revisiting the original data and holding structured discussions until consensus was reached. This approach ensured that the conclusions drawn were robust and reflective of the available evidence.

Results

A total of 4463 records were found through database searching, and 203 records were removed due to duplication. Thereafter, the records were screened based on the titles and abstracts, conference presentation, and study protocols 4157 were excluded. A total of 87 records were examined for full-text review. Finally, 13 articles were include in this review after assessing their eligibility, as shown in Figure 1.

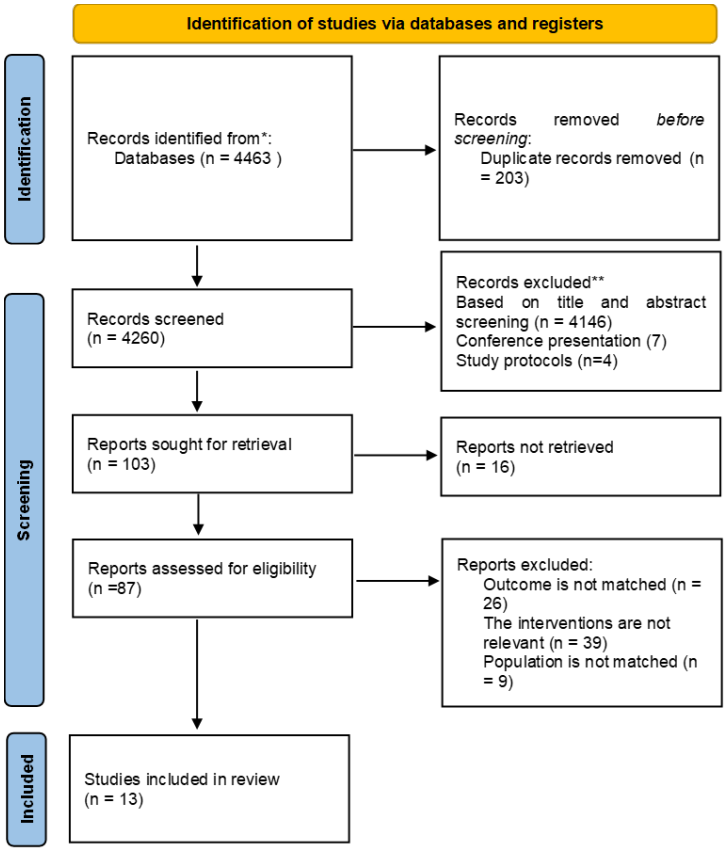

Figure 3. PRISMA Flow Diagram

Thirteen articles included in the study contained different strategy and outcome evaluations that measured the effect of nurse and community-based in the community level. Community-based interventions in diabetes mellitus management involve efforts to improve community health and prevent and manage diabetes mellitus through a comprehensive approach (Ratnayake et al., 2021). This approach involves various parties, including individuals, families, communities, and health systems (Markle-Reid et al., 2018). the results of this review found community-based nurse interventions in managing T2D mellitus including: family, peer, and community volunteers.

Family

Family member has been discussed as a community resource and a key role in the care of people with T2D while at home. This family-oriented diabetes education program is delivered by nurses using education sessions conducted by family members on individuals with T2D (Pamungkas, Chamroonsawasdi, & Vatanasomboon, 2017). Wichit, Mnatzaganian, Courtney, Schulz, and Johnson (2017) mplemented a 9-week family education model for individuals with T2D, where education was provided to groups of 8-12 pairs using Diabetes Information Workbooks through explanation and discussion methods. Similarly, McEwen, Pasvogel, Murdaugh, and Hepworth (2017) developed a 12-week nurse-led education program for families that included social support sessions, home visits, and phone calls, concluding that it enhanced diabetes self-management regarding healthy eating and physical activity, and reduced physician distress, regimen distress, interpersonal distress, and overall diabetes distress.

Aligned with these findings, De la Fuente Coria, Cruz-Cobo, and Santi-Cano (2020) created an educational intervention package comprising six months of educational sessions, with follow-ups at 12 and 18 months, requiring participants to attend with a family member or caregiver. Hu, Amirehsani, Wallace, McCoy, and Silva (2016) introduced a family-based education model consisting of eight weekly interactive modules totaling 12 hours (1.5 hours per week). Family-based care was emphasized as a critical component of the healthcare team, providing support and assisting individuals in effectively managing their diabetes and preventing long-term complications (Zhang et al., 2022). By fostering close collaboration between family members and community nurses, the management of diabetes mellitus can become more holistic and integrated (Luthfa & Ardian, 2019). amily support plays a vital role in enhancing the quality of life for individuals with diabetes, mitigating the risk of complications, and fostering a supportive environment for a healthy lifestyle (Ebrahimi, Ashrafi, Rudsari, Parsayekta, & Haghani, 2018).

Peer

Peer support has been identified as a powerful intervention that offers self-care, emotional, social, and self-management assistance. Various studies, including those by Peimani et al. (2018), Ghasemi, Yousefi, and Torabikhah (2021), and Thanh and Tien (2021), highlight the significant role of peers in providing support and sharing experiences to enhance quality of life. Peimani et al. (2018) explored how trained peers contribute to daily diabetes self-management by sharing their experiences and challenges. Interventions by community nurses that incorporate peer support can offer numerous advantages to those living with diabetes (Assah, Atanga, Enoru, Sobngwi, & Mbanya, 2015). Peers provide not only unique emotional support but also share personal experiences that deepen the understanding of the challenges associated with managing diabetes (Haregu et al., 2023).

Ghasemi et al. (2021) examined the involvement of trained peers in aiding T2D individuals with foot care. Peers can also assist nurses in educating patients about diabetes knowledge, diet, exercise, and overall diabetes care management (Thanh & Tien, 2021). Further studies by Liu et al. (2015) and Aziz et al. (2018) discussed the roles of peer leaders in offering support, guidance, and inspiration to people with T2D. Liu et al. (2015) highlighted how peer leaders provide diabetes self-care skills, emotional support, encouragement for lifestyle changes, and help with understanding and adhering to treatment plans. Additionally, peer involvement is utilized in group settings like the Kerala Diabetes Prevention Program (K-DPP), which aims to lower the risk of T2D in high-risk individuals (Aziz et al., 2018).

Community Volunteers

The role of community health volunteers is considered a community-based intervention that enhances accessibility between nurses and individuals with T2D within the community. Sittipreechachan et al. (2022) conducted a study involving trained community health volunteers over a 20-week period to improve diabetes self-care management. This was achieved through educational efforts, diabetes prevention campaigns, disease warning posters, guidance on food selection, and encouraging families to prepare suitable diets, engage in physical activity, and adhere to medication regimens. Community volunteers can foster active community participation, which enhances public health and provides significant benefits to the healthcare system (Ratnayake et al., 2021).

According to a study conducted by Gyawali et al. (2021) showed that trained female community health volunteers can conduct home visits to provide diabetes education and treatment, check blood sugar

levels using a finger-stick glucometer, and accompany T2D individuals to health facilities. The role of the community health volunteer as a key role in the community serving as a link between the health care system and the community to facilitate access to services that improve health outcomes (Sadikin, Lestari, & Victor, 2024). Community-based nurse interventions involving health volunteer can be created as a more effective effort in managing diabetes at the community level, thus improving the overall health of the community (Sittipreechachan et al., 2022).

Discussion

This rapid systematic review aimed to evaluate the impact of community-based interventions on the health outcomes of individuals with T2D. The review synthesized evidence from thirteen studies. According to our data, the implementation of the community-based intervention to overcome T2D in community including, family, peer, and community volunteers. Furthermore, community-based intervention strategies should be prioritized in diabetes management as a promotive and preventive effort to address the problem of T2D.

Diabetes mellitus management strategies are still a major challenge that needs to be effectively developed, designed, and implemented to promote healthy behaviors (ElSayed et al., 2023). The problems encountered in the accessibility of patients with T2D and the high cost of care that allows increased complications are a major burden for patients and the health care system (Rawal et al., 2023). Some literature explains to overcome this gap by matching the needs of patients with empowering existing community-based to expand the reach of accessible health services (Bahari et al., 2023; Higa, Davidson, & Loos, 2021; O'Flynn, 2022; Zare et al., 2022). Community involvement in the management of T2D is a key element in ensuring that patients with T2D can lead healthy and productive lives (Harris et al., 2019).

Community-level management is important because most diabetes care occurs in the community, where patients live in their homes, and this influences diabetes management behaviors (Mphasha, Mothiba, & Skaal, 2022). Family-based interventions can actively support and care for patients with diabetes (Busebaia, Thompson, Fairbrother, & Ali, 2023). In line with the findings of this rapid systematic review, studies have shown that nurse-led and family-oriented intervention strategies can improve diabetes knowledge, self-management, and outcome expectations (Hu et al., 2016; McEwen et al., 2017; Wichit et al., 2017). The findings on this family-based intervention imply an important role for family support and involvement in the management of care for patients with T2D.

Another valuable community resource in managing T2D is peer support-based interventions for diabetes patients (Seah et al., 2022). Peer support can foster connectivity, enhance motivation, and improve confidence in self-managing diabetes among individuals with T2D (Ameneh, Mohtasham, Sakineh, Yadollah, & Ali, 2023; Liang et al., 2021). Consistent with these findings, peer support or peer leader-based intervention strategies have been shown to be effective in diabetes self-management (Liu et al., 2015; Peimani et al., 2018). Numerous studies have highlighted the importance of peer support for individuals with T2D (Ashrafi et al., 2022; Seuring et al., 2019; Zhao, Yu, & Zhang, 2019). Peer support is seen as a means to boost confidence and motivation among T2D patients.

This review also identified community volunteers as potential diabetes educators for interventions targeting individuals with T2D. The involvement of community volunteers is acknowledged as a crucial resource in aiding community nurses to deliver and support primary health care (Alaofè et al., 2017; Boocha & Ploylearmsang, 2023; Ratnayake et al., 2021). Several studies highlight that health volunteers also play a role in the prevention and control of non-communicable diseases (Tsolekile, Puoane, Schneider, Levitt, & Steyn, 2014), mental health coping support (Barnett, Gonzalez, Miranda, Chavira, & Lau, 2018), to the involvement of handling the Covid-19 pandemic in the community (Akbar, Juniarti, & Yamin, 2022). Therefore, community volunteers are recommended to provide education and ongoing support for people with T2D. This review's strength lies in its systematic, experimental-based approach, summarizing studies to aid nurses in decision-making. Community nurses should optimize T2D outcomes through resource-based interventions, while future meta-analyses should assess community intervention effectiveness.

Tabel 2 Data Extraction of the selected studies

Author, Year	Country	Study Design	Sample	Intervention Strategy	Intervention Outcomes	Community Resources
Wichit et al. (2017)	Thailand	RCT	140 volunteer individuals with T2D	Family-centered program by nurses (educational classes, group discussions, home visits, telephone follow-ups).	Improved self-efficacy, self-management, knowledge, and reduced HbA1c.	family
Peimani et al. (2018)	Iran	RCT	200 patients with T2D	Peer support for daily self-management and discussions	Empowering peer support interventions to self-management, quality of life, reduced HbA1c	Peer
Sittipreechachan et al. (2022)	Thailand	Mix-Method Study	60 patients with T2D	Community health volunteers (education, home visits, campaigns, broadcasts, health food shops)	Improved HbA1c, knowledge, self-efficacy, support, behavior	community health volunteer
Ghasemi et al. (2021)	Iran	clinical trial	50 patients with T2D	Peer-led foot care training sessions (35 days)	Increased self-efficacy, foot-care behaviors	Peer
Liu et al. (2015)	China	prospective study	127 patients with T2D and 20 peer leaders	Peer leaders (self-care skills, emotional support, motivation, medication guidance)	Enhanced self-management, emotional well-being, quality of life	Peer leader
Markle-Reid et al. (2018)	Ontario, Canada	RCT	159 Community-dwelling older adults (≥65) with T2D	Interprofessional team (nurses, dietitians, program coordinator, peer volunteers) provided diabetes education, counseling, individual/family support, life plans.	Improved quality of life, self-management, reduced depressive symptoms	Volunteers
McEwen et al. (2017)	Arizona, USA	Experimental repeated measures design	157 dyads (participant with T2D and family member)	Family-based self-management support (education, social support, home visits, calls	Improved eating, activity, reduced distress.	Family member
Garner, Pond, Auckland, and Sampson (2022)	UK	pre specified pre–post study	104 lay volunteers with T2D	Lay volunteers (prevention mentors, lifestyle intervention co-facilitators)	Enhanced physical and mental health.	Volunteer

De la Fuente Coria et al. (2020)	Andalusia, Spain	RCT	236 patients with T2D	Nurse-led educational intervention (family involvement)	Reduced HbA1c, glucose, cholesterol, blood pressure	Family member
Hu et al. (2016)	North Carolina, USA	Quasi-experimental design	186 patients with T2D	Nurse-family diabetes program (knowledge, self-efficacy, barriers, control, quality of life)	Improved glycemic control, knowledge, self-efficacy, quality of life	Family
Aziz et al. (2018)	Kerala, India	RCT	29 patients with T2D	Kerala Diabetes Prevention Program (peer-support group)	Effective lifestyle behavior changes	Peer leaders
Thanh and Tien (2021)	Vietnam	RCT	364 patients with T2D	Community group education (T2D knowledge, diet, exercise)	Improved disease knowledge and blood glucose control	Peer (T2D community group)
Gyawali et al. (2021)	Nepal	RCT	244 participants with T2D	Female community health volunteers (T2D management, counseling)	Improved diabetes control	Female community health volunteers

A limitation of this rapid systematic review is the generalizability of the research settings and no specific information on interventions in rural or urban areas. The author considers that rural and urban settings have different societal challenges. These differences may include several aspects related to the environment, community characteristics, and the challenges and opportunities faced. This should be a concern as community-based at these levels may have other challenges that need to be addressed.

Conclusion

This rapid systematic review concluded that community-based are effective in improving health outcomes in people with T2D. The results of this study found that the intervention strategy that can be used is to empower community-based which include, family, peers, and community volunteers. Strengthening health and community-based that are integrated and collaborate on the overall health care system is an important key to achieving the expected health outcomes. It is recommended that nurses collaborate with community-based to provide a bridge between the community and health professionals to improve public health. This rapid systematic review showed relevant evidence of the capabilities of community-based that can be utilized and other resources that can be explored in future research. An integrated multilevel approach between, nurses, community volunteers and families should be investigated for continuity between tiered interventions.

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Conflict of Interest
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Author Contributions
Conceptualization, formal analysis, project administration, visualization, and writing-original draft, **MAG**; Conceptualization, data curation, formal analysis, methodology, and writing-original draft, **JH**; data curation, methodology, and project administration, **ER**; methodology, visualization, and writing-review & editing, **RADS**; formal analysis, methodology, and writing-review & editing, **PG**.

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