

Diabetes Mellitus Education and Diabetic Foot Exercise Training as an Effort to Prevent Complications among Communities



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Abstract: Diabetes self-management includes daily foot care and appropriate physical activity, yet community members may have limited opportunities to learn and practice these skills. This community service program described the implementation and immediate observational outcomes of diabetes education and diabetic foot exercise training in the working area of Mamajang Public Health Center, Makassar City. Nineteen community members participated, comprising 13 women and 6 men. The one-day program combined interactive education, question-and-answer activities, step-by-step demonstration, and guided foot exercise practice. Evaluation was descriptive and based on facilitator observation and direct questioning because no standardized pre-test or post-test was administered. Participants engaged in the educational discussion and completed the guided exercise movements during the supervised session. They were also able to recall selected messages concerning diabetes symptoms, foot health, and the purpose of foot exercises. These observations indicate that the planned activities were delivered and that participants could follow the exercises with facilitator guidance. They do not establish improvements in knowledge or skills, continued exercise practice, or prevention of diabetic foot complications. Repeated sessions, structured assessment, and follow-up are needed to evaluate retention and application in daily self-care

Keywords: Community; Complication prevention; Foot care; Health education; Physical activity.

1. Introduction

Diabetes mellitus is a chronic metabolic condition that requires sustained self-management and clinical follow-up. The World Health Organization estimated that approximately 830 million people were living with diabetes in 2022, with prevalence increasing most rapidly in low- and middle-income countries (World Health Organization, 2024). The International Diabetes Federation also identifies Indonesia as one of the countries carrying a large diabetes burden (International Diabetes Federation, 2025). National clinical guidance consequently emphasizes glycemic management, education, physical activity, complication surveillance, and patient participation in daily care (Ministry of Health of the Republic of Indonesia, 2020; Indonesian Society of Endocrinology, 2021).

Diabetes-related foot disease develops through interacting neuropathic, vascular, mechanical, and behavioral factors. Loss of protective sensation may allow minor trauma to go unnoticed, while impaired circulation and infection can delay healing and increase the risk of ulceration or amputation (Boulton et al., 2005; Armstrong et al., 2017). International guidance recommends regular foot assessment, daily inspection, appropriate footwear, education, and timely professional review for people at risk (Bus et al., 2024; American Diabetes Association Professional Practice Committee for Diabetes, 2026). Education should be linked to the individual's risk status and reinforced because information delivered once may not be retained or translated into daily behavior (Schaper et al., 2020).

Structured diabetes self-management education can improve knowledge, self-care practices, and glycemic outcomes, although results depend on intervention intensity, follow-up, and participant characteristics (Norris et



al., 2002; Chrvala et al., 2016; Powers et al., 2020). For foot-related outcomes, educational interventions generally improve knowledge and reported self-care behavior, but evidence for preventing ulcers through education alone remains limited (Drovandi et al., 2024). Foot and ankle exercise may improve joint mobility and selected neuropathy-related outcomes; current evidence does not support presenting exercise as an independent method for preventing diabetic foot ulceration (van Netten et al., 2024).

A preliminary community assessment in the working area of Mamajang Public Health Center identified an implementation gap between general diabetes information and practical foot self-care training. Community members required clearer information about diabetes complications and foot health, and they had limited experience performing diabetic foot exercises correctly under supervision. Routine education in the local setting had not combined discussion of complication prevention with step-by-step demonstration and return practice. The program was developed to address this gap through an accessible, one-day learning activity linked to primary health care.

This community service program aimed to deliver diabetes education and supervised diabetic foot exercise training and to describe participant engagement, immediate recall of selected educational messages, and performance of the demonstrated movements during the session. The program was not designed to estimate intervention effectiveness or clinical prevention of diabetic foot complications.

2. Materials and Methods

2.1 Program Design and Setting

A descriptive community service program was conducted in the working area of Mamajang Public Health Center, Makassar City, Indonesia. The one-day activity used a participatory education format comprising interactive explanation, discussion, demonstration, guided practice, and immediate observational evaluation. The educational design was consistent with recommendations that diabetes self-management support combine understandable information with skill development and reinforcement (Powers et al., 2020).

2.2 Participants

Participants were 19 community members from the health center working area. Thirteen were women and six were men. Educational attainment ranged from junior high school to bachelor's degree. The program documentation did not report participants' diabetes diagnosis, diabetes duration, medication use, neuropathy status, vascular status, history of foot ulceration, or other clinical risk characteristics. The group should therefore be interpreted as community participants receiving general education rather than a clinically characterized diabetes cohort.

2.3 Educational Content and Activities

The educational session covered the definition and types of diabetes, common risk factors and symptoms, basic management, possible complications, daily foot observation, situations requiring professional assessment, and the role of physical activity. Foot-care messages were aligned with preventive principles in international and national guidance (Bus et al., 2024; American Diabetes Association Professional Practice Committee for Diabetes, 2026). Facilitators then demonstrated diabetic foot exercise movements step by step. Participants repeated the movements as a group under supervision, allowing immediate correction when required.

2.4 Implementation Procedure

The implementation team consisted of two lecturers and four Bachelor of Nursing students. Preparation included coordination with Mamajang Public Health Center, review of community needs, preparation of educational media, and organization of the exercise area. On the activity day, facilitators introduced the objectives, delivered the educational material, conducted a question-and-answer session, demonstrated the exercises, and supervised participant practice.

2.5 Evaluation and Data Analysis

Evaluation was descriptive and conducted during and immediately after the activity. Facilitators observed attendance, participation in discussion, ability to follow the demonstrated movements, and verbal recall of selected messages about diabetes and foot health. No standardized questionnaire, scored skills checklist, pre-test, post-test, or delayed follow-up was used. Results were summarized as frequencies for participant characteristics and narrative observations for program delivery. No inferential statistical analysis was performed.

2.6 Ethical and Administrative Considerations

The activity was implemented in collaboration with Mamajang Public Health Center as a non-invasive community education and exercise program. Personal information used for documentation was treated confidentially. The source documentation did not provide a research ethics approval number; the activity is therefore reported as community service rather than human-subject effectiveness research.

3. Results

3.1. Participant Characteristics

The community service program involved 19 community members from the working area of Mamajang Public Health Center, Makassar City. The participants consisted of 13 women and 6 men. In terms of educational background, 3 participants had completed junior high school, 10 had completed senior high school, and 6 had a bachelor's degree. The participant characteristics are presented in **Table 1**.

Table 1 Participant characteristics

Characteristic	n
Sex	
Female	13
Male	6
Educational Level	
Junior high school	3
Senior high school	10
Bachelor's degree	6
Total	19

3.2. Implementation of Diabetes Mellitus Education

The diabetes mellitus education session covered the definition and types of diabetes mellitus, causes and risk factors, signs and symptoms, diabetes management, and prevention of complications. The materials were delivered using prepared educational media and presented in simple language to facilitate participants' understanding. Participants were also given an opportunity to ask questions and share experiences related to diabetes mellitus.

The activity was conducted interactively, with participants following the educational session and actively engaging in the question-and-answer process. The evaluation indicated that participants were able to explain several key points, including the definition and signs and symptoms of diabetes mellitus, as well as the importance of maintaining foot health.

The overall implementation of the community service activity is documented in **Figure 1**.



Figure 1 Participants involved in the community service activity at Mamajang Public Health Center.

3.3. Diabetic Foot Exercise Training and Evaluation

Following the educational session, participants received a step-by-step demonstration of diabetic foot exercises. The facilitators demonstrated each movement, followed by guided practice in which participants performed the exercises together. The participants actively followed the demonstration and practice session, as shown in **Figure 2**.



Figure 2 Guided practice of diabetic foot exercises by community participants.

The participants were guided to perform the movements gradually and together under the supervision of the implementation team. The activity documentation is presented in **Figure 3**.



Figure 3 Demonstration and guided practice of diabetic foot exercises.

4. Discussion

The program combined diabetes education with immediate demonstration and supervised practice. The documented outcome was participation in the scheduled activities and the ability to follow the movements while

guidance was available. This finding supports the practical deliverability of the format in a primary health-care setting. It does not establish that participants acquired durable knowledge or independent exercise competency because the evaluation did not use validated instruments, explicit performance criteria, or follow-up assessment.

Linking education with practice addresses the local gap identified before implementation. General information about diabetes may improve awareness, but daily self-management also requires concrete skills and repeated reinforcement. Systematic reviews show that structured diabetes self-management education can improve glycemic outcomes and self-care, particularly when programs include sufficient contact and continuing support (Norris et al., 2002; Chrvala et al., 2016). Current consensus guidance likewise frames diabetes education as an ongoing process adapted to individual needs, rather than a single transfer of information (Powers et al., 2020). The present program introduced this approach at a basic community level by allowing participants to ask questions, observe movements, and practice under supervision.

The focus on foot health was clinically relevant, but the program's scope must be distinguished from clinical diabetic foot prevention. Foot ulceration is associated with neuropathy, deformity, vascular disease, prior ulceration, footwear, and other risk factors that require formal assessment (Boulton et al., 2005; Armstrong et al., 2017; van Netten et al., 2020). Guidelines recommend risk stratification, regular examination, daily self-inspection, suitable footwear, and rapid referral when pre-ulcerative signs or wounds appear (Schaper et al., 2020; Bus et al., 2024; American Diabetes Association Professional Practice Committee for Diabetes, 2026). Exercise may complement mobility and self-management, but it cannot replace these measures.

The exercise component provided behavioral rehearsal rather than evidence of complication prevention. A systematic review found that foot-ankle exercise programs may improve joint range of motion and selected neuropathy outcomes, while evidence remained insufficient for concluding that these programs prevent ulcers (van Netten et al., 2024). The wording of the abstract and conclusion has therefore been limited to implementation and immediate observation. Clinical outcomes such as protective sensation, vascular status, ulcer incidence, glycemic control, or functional change were not assessed.

Interpretation is limited by the small group from one health-center area, the absence of clinical participant characteristics, and reliance on unstructured facilitator observation. The activity lasted one day and did not measure retention, independent technique, adherence, or changes in foot-care behavior. Subsequent programs should use a documented recruitment process, baseline clinical and demographic characteristics, validated knowledge questions, a scored exercise checklist, and delayed follow-up. Participants with diabetes should also receive risk-appropriate clinical foot assessment and referral consistent with national and international guidance (Ministry of Health of the Republic of Indonesia, 2020; Indonesian Society of Endocrinology, 2021; Bus et al., 2024).

5. Conclusions

Diabetes education and supervised foot exercise training were delivered to 19 community members in the working area of Mamajang Public Health Center. Participants engaged in discussion, recalled selected educational messages, and followed the demonstrated movements during guided practice. These observations describe immediate participation and supervised performance; they do not demonstrate lasting improvement or prevention of diabetic foot complications. Repeated education, standardized assessment, clinical risk screening, and follow-up are required before sustained knowledge, independent skills, or clinical outcomes can be evaluated.

Conflict of Interest

No conflicts of interest

Acknowledgments

The authors thank Mamajang Public Health Center, the participating community members, and the lecturers and Bachelor of Nursing students who supported program preparation and implementation.

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