E-ISSN: 3031-229
International Journal of Community Services
Vol. 4, Issue 1 (2026), August

Early Education on Diabetes Mellitus Prevention

Arniat Christiani Telambanua[1*], Annita[2], Yanti Rahayu[3], Mardifa Dwi Azhari[4], Melanie Sabrina Putri[4]

[4]Medical Laboratory Technology, Syedza Saintika University, Indonesia

***Corresponding Author: Arniat Christiania Telambanua, Syedza Saintika University;**

christianiarniat@gmail.com

Date Received: 2026-08-24; Date Published: 2026-08-31

Abstract

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels and is increasingly recognized as a major public health concern. Early prevention through health education is essential to increase community awareness and encourage healthy lifestyle practices. This community service activity aimed to improve community knowledge regarding the early prevention of diabetes mellitus in Seberang Palinggam. The activity was conducted through health education using lectures, PowerPoint presentations, LCD projectors, and informational leaflets. The activity consisted of three stages: preparation, delivery of educational materials, and consolidation through discussion and evaluation. A total of 74 community members participated in the activity. Participants' knowledge was assessed using a five-item multiple-choice questionnaire administered before and after the educational intervention. The results showed that before the intervention, 51 participants (68.92%) had below-average knowledge, 18 participants (24.32%) had fair knowledge, and only 5 participants (6.76%) had good knowledge. Following the educational intervention, the proportion of participants with good knowledge increased substantially to 63 participants (85.13%), while no participants remained in the below-average category. The activity was also characterized by high participant enthusiasm and active engagement during the discussion session. These findings indicate that health education on early diabetes mellitus prevention can effectively improve community knowledge. Continuous community-based education focusing on healthy dietary practices, physical activity, and other preventive behaviors is recommended to support sustainable diabetes prevention.

Keywords: Diabetes mellitus, Health education, Early prevention, Community, Health promotion

Introduction

Diabetes mellitus is a metabolic disease characterized by blood glucose levels rising above normal—a condition known as hyperglycemia (Fatimah, 2015). It is one of the leading chronic causes of death in Indonesia (Hestiana, 2017). Data from the Institute for Health Metrics and Evaluation indicates that diabetes was the third leading cause of death in Indonesia in 2019, with a rate of approximately 57.42 deaths per 100,000 population (Zhao, 2021). Data from the International Diabetes Federation (IDF) shows a rapid increase in the number of people with diabetes in Indonesia over the last decade. This figure is projected to reach 28.57 million by 2045—a 47% increase from the 19.47 million recorded in 2021 (Rachman, Bhatara, & Hendryanny, 2021). Diabetes—often referred to colloquially as "sugar disease" or *kencing manis* (sweet urine)—manifests in two forms: type 1 and type 2. Type 1 diabetes is an autoimmune disease that renders the body unable to produce insulin, whereas in type 2 diabetes, the body may still produce insulin, but the hormone fails to function effectively (Lestari, Zulkarnain, & Sijid, 2021). Symptoms of type 1 diabetes tend to appear more rapidly than those of type 2. Both types pose significant risks, necessitating appropriate therapeutic interventions. If not properly managed, diabetes mellitus can lead to fatal complications in the long term (Insel et al., 2015). Consequences of type 2 diabetes mellitus include vision impairment, cataracts, heart disease, kidney disease, impotence, slow-healing wounds that may progress to tissue decay (gangrene), lung infections, vascular disorders, stroke, and more. Furthermore, patients with advanced diabetes mellitus frequently require limb amputation due to tissue necrosis (Fatimah, 2015). Given the rising incidence of diabetes mellitus, special attention to its management is required. According to PERKENI (2015), diabetes management rests on four main pillars: education, medical nutrition therapy, physical exercise or activity, and pharmacological intervention (Putra & Berawi, 2015). Fox (cited in Berkat et al., 2018) identifies several factors that cause blood sugar levels to rise, including a lack of exercise, increased food intake, heightened stress and emotional factors, weight gain, aging, and the effects of medications such as steroids (Berkat, Saraswati, & Muniroh, 2018). Blood sugar levels can be maintained through a healthy lifestyle, which includes physical exercise, dietary management, and the cessation of smoking and alcohol consumption (Rini, Manto, & Irawan, 2022). Uncontrolled blood sugar levels can lead

to short-term and long-term complications and may even result in death for the patient (Chen, Ovbiagele, & Feng, 2016). Effective control of blood glucose levels is essential for managing diabetes mellitus, improving patients' quality of life, and preventing complications (Bin Rakhis, AlDuwayhis, Aleid, AlBarrak, & Aloraini, 2022). Considering the factors contributing to type 2 diabetes mellitus, prevention efforts should be initiated as early as possible. One such approach is education, which is crucial for increasing knowledge (Galaviz, Narayan, Lobelo, & Weber, 2018). A community service study by Muliasari, Hamdin, Ananto, and Ihsan (2019) found that education and early detection of diabetes mellitus have a positive impact on reducing the prevalence and risk of degenerative diseases while also enhancing knowledge. Observations at the integrated health post (*Posyandu*) revealed that four elderly individuals had been diagnosed with diabetes mellitus. Interviews with ten individuals revealed that they habitually consume processed foods and sugary beverages. The sugary foods consumed include items such as bread, chips, doughnuts, cakes, and wafers, while the sugary drinks—which clearly contain sugar—include milk, tea, syrup, coffee, juice, ice cream, and other beverages like boba. Given this context, this community service initiative aims to provide early-stage education on diabetes mellitus prevention in Seberang Palinggam.

Method

This community service activity involved health education on the early prevention of diabetes mellitus, aiming to improve the health status of the residents of Wonolelo Village, Pleret, Bantul. The method employed was health education/outreach, targeting the community of Sebrang Palinggam on December 20, 2025. The activity was conducted in three stages. Stage 1 was the preparation phase, during which the Sebrang Palinggam community was notified of the upcoming health education session and medical screening, allowing them to prepare to observe health protocols given that the event was taking place during a pandemic. During the material presentation stage, the media used included LCDs, projectors, and PowerPoint presentations; leaflets were also

distributed as informational materials for participants to take home. The third stage was the consolidation phase, which served as a period for the comprehensive internalization of the knowledge gained during the presentation on diabetes mellitus. In this stage, community members were asked questions or invited to explain back the material regarding diabetes mellitus that had been presented.

Results

The activity was conducted in the third week of December 2025, consisting of a single face-to-face session. The procedure involved administering a pre-test prior to the educational session to assess the participants' baseline knowledge of the material, followed by a post-test after the material was presented. The community service activity took place in the Seberang Palinggam Urban Village, involving the general public, while strictly adhering to health protocols—specifically handwashing before the session, wearing masks during the activity, and maintaining physical distance throughout the presentation. Before the educational session began, pre-test questionnaires were distributed to measure the participants' initial level of knowledge regarding the health education topic. The test consisted of five multiple-choice questions, which participants completed in approximately 10 minutes. This was followed by the presentation of the material.

The material was presented via a lecture format lasting approximately 30 minutes, utilizing an LCD projector, PowerPoint slides, and informational leaflets. A discussion session was also included, allowing participants to ask questions and offer comments.

The activity demonstrated high levels of participant enthusiasm; all attendees paid close attention to the material from start to finish, and several participants actively asked questions. Understanding of the material was assessed through the pre-test and post-test questionnaires. During the session, the presenter reviewed the material and summarized the key points of the health education provided. Subsequently, participants took a post-test—lasting approximately 10 minutes—to measure how much information they had retained following the educational session. Table 1 presents the participants' knowledge levels before and after the education.

Table 1: Pre-test and Post-test Results for Early-Stage Diabetes Mellitus Prevention

Education: Community Service in Seberang Palinggam.

Category of participants' knowledge regarding diabetes mellitus	Pretest Result		Posttest Result	
	n	%	n	%
Below average	51	68,92	0	0,00
Fair	18	24,32	11	14,84
Good	5	6,76	63	85,13
Total	74	100,0	74	100,0

The results in Table 1 indicate that, prior to the educational session, the majority of participants (68.92%) possessed poor knowledge, while only 6.76% fell into the "good" category. In contrast, post-test results showed that the majority of participants (85.13%) possessed good knowledge, with 0% of respondents remaining in the "poor" knowledge category. These findings demonstrate that the educational activity conducted as part of this community service initiative successfully improved participants' knowledge regarding diabetes mellitus. The community service activity concluded following the post-test, followed by a closing prayer. The service team also conducted an evaluation covering structure, process, and outcomes. The structural evaluation revealed that preparation and outreach took place one week prior to the event; tasks included securing a speaker, preparing the instructional plan (SAP) and leaflets, and distributing invitations two days before the session. The process evaluation showed that 74 participants from Seberang Palinggam attended the event. The session ran from 08:00 to 11:00 WIB at the Seberang Palinggam Urban Village Office, with participants showing great enthusiasm throughout the proceedings. Finally, the outcome evaluation—based on attendance records—indicated that 82% of those invited actually attended. During the presentation, participants paid close attention to the material and were eager to ask questions. Post-test results showed an improvement compared to pre-test results.

Discussion

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood glucose levels and is associated with various long-term complications when not properly prevented and managed. The increasing burden of diabetes mellitus highlights

the importance of preventive strategies, particularly those aimed at modifying risk factors through healthy dietary practices, physical activity, and increased health literacy. In this context, community-based health education represents an important preventive approach because adequate knowledge can support individuals in recognizing risk factors and adopting healthier behaviors. The present community service activity was therefore designed to increase community knowledge regarding the early prevention of diabetes mellitus in Seberang Palinggam.

The findings demonstrated a substantial improvement in participants' knowledge following the educational intervention. Before the intervention, 51 participants (68.92%) had below-average knowledge, 18 participants (24.32%) had fair knowledge, and only 5 participants (6.76%) demonstrated good knowledge. Following the intervention, the number of participants with good knowledge increased to 63 (85.13%), while no participants remained in the below-average category. These findings indicate that the educational intervention was effective in improving participants' understanding of diabetes mellitus prevention. The improvement is particularly important because the initial level of knowledge indicated that most participants had limited understanding of diabetes prevention.

The improvement in knowledge may be related to the educational methods and media used during the activity. The intervention combined a lecture with PowerPoint presentations, LCD/projector-based visual materials, informational leaflets, and a discussion session. The use of multiple educational media may have facilitated participants' understanding by presenting information in both visual and verbal forms. In addition, the discussion session provided an opportunity for participants to clarify information and actively engage with the material presented. During the activity, participants demonstrated considerable enthusiasm, paid attention to the presentation, and actively asked questions. This level of engagement may have contributed to better retention and understanding of the educational material.

The results are consistent with the concept that health education plays an important role in increasing knowledge as an initial component of diabetes prevention. The article's previous discussion of diabetes prevention emphasizes the importance of education in increasing community knowledge and encouraging early preventive efforts. Galaviz et al. (2018), as cited in the article, also emphasized lifestyle modification as an important

component of type 2 diabetes prevention. Similarly, the community service study by Muliasari et al. (2019) reported that education and early detection of diabetes mellitus can contribute to reducing the risk of degenerative diseases while increasing community knowledge.

The educational content was also relevant to the behavioral risk factors identified during the preliminary assessment. Interviews with community members indicated frequent consumption of processed foods and sugary foods and beverages, including bread, chips, doughnuts, cakes, wafers, sweetened beverages, and other high-sugar products. Such consumption patterns highlight the need for preventive education emphasizing appropriate dietary choices. In addition to dietary management, participants were introduced to other important preventive behaviors, including regular physical activity and maintaining a healthy lifestyle. The article identifies lack of exercise, increased food intake, stress, weight gain, and aging among factors associated with increased blood glucose levels.

From a community health perspective, the findings suggest that simple, structured, and accessible educational activities can be implemented as an early preventive strategy. The involvement of 74 community members demonstrates that community-based health promotion activities can attract substantial participation when the topic is directly related to common health concerns. The attendance rate was reported as 82% of those invited, while participants showed enthusiasm throughout the activity. These findings indicate that community engagement is an important component in the implementation of preventive health programs.

Nevertheless, the findings should be interpreted within the scope of the activity. The evaluation focused primarily on changes in knowledge measured through pre-test and post-test questionnaires. Therefore, the results demonstrate an improvement in knowledge but do not directly establish changes in participants' dietary behavior, physical activity, blood glucose levels, or the incidence of diabetes mellitus. Further community-based programs could incorporate longer-term follow-up, behavioral assessments, and early screening indicators to determine whether increased knowledge is translated into sustained preventive practices.

Overall, the activity demonstrates that health education can serve as an effective initial intervention for strengthening community knowledge regarding early diabetes mellitus

prevention. The substantial increase in the proportion of participants with good knowledge after the intervention suggests that structured education supported by appropriate learning media and interactive discussion can improve understanding of diabetes prevention. Continuous education and follow-up activities are therefore recommended to strengthen the adoption of healthy lifestyles and support sustainable community-based diabetes prevention.

.

Conclusion

The conclusion drawn from this activity is that the educational program on early prevention of diabetes mellitus for the community in Seberang Palinggam was successfully conducted. Evaluation of the initiative indicates that the preparatory work facilitated a smooth process, pre- and post-tests were administered, and the educational material was effectively delivered. Seventy-four participants took part, showing great enthusiasm from start to finish. Results show that before the education session, the majority of participants (68.92%) possessed poor knowledge, with only 6.76% falling into the "good" category. In contrast, post-test results revealed that the majority (85.13%) possessed good knowledge, and no respondents (0%) remained in the "poor" knowledge category. These findings demonstrate that the educational activity successfully improved participants' knowledge regarding diabetes mellitus.

References

1. Adam, L., & Tomayahu, M. B. (2019). Tingkat Stres Dengan Kadar Gula Darah Pada Pasien Diabetes Melitus. *Jambura Health and Sport Journal*, *1*(1), 1–5.
2. Berkat, Saraswati, L. D., & Muniroh, M. (2018). Faktor-Faktor Yang Berhubungan Dengan Kadar Gula Darah Pada Penderita Diabetes Melitus Tipe 2. *Jurnal Kesehatan Masyarakat (e-Journal)*, *6*(1), 200–206.
3. Bin Rakhis, S. A. S., AlDuwayhis, N. M., Aleid, N., AlBarrak, A. N., & Aloraini, A. A. (2022). Glycemic Control for Type 2 Diabetes Mellitus
4. Patients: A Systematic Review. *Cureus*, *14*(6), e26180.
5. Chen, R., Ovbiagele, B., & Feng, W. (2016). Diabetes and Stroke: Epidemiology, Pathophysiology, Pharmaceuticals and Outcomes. *The American Journal of the Medical Sciences*, *351*(4), 380 386. https://doi.org/10.1016/j.amjms.2016.01.011
6. Fatimah, R. N. (2015). Diabetes Melitus Tipe 2. *J Majority*, *4*(5), 93 –

101. https://doi.org/10.14499/indonesianjpharm27iss2pp74

7. Galaviz, K. I., Narayan, K. M. V., Lobelo, F., & Weber, M. B. (2018). Lifestyle and the Prevention of Type 2 Diabetes: A Status Report. *American Journal of Lifestyle Medicine*, *12*(1), 4–20. https://doi.org/10.1177/1559827615619159
8. Hestiana, D. W. (2017). Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Dalam Pengelolaan Diet Pada Pasien Rawat Jalan Diabetes Mellitus Tipe 2 Di Kota Semarang. *Jurnal of Health Education*, *2*(2), 138–145.
9. Insel, R. A., Dunne, J. L., Atkinson, M. A., Chiang, J. L., Dabelea, D., Gottlieb, P. A., ... Ziegler, A.-G. (2015). Staging presymptomatic type 1 diabetes: a scientific statement of JDRF, the Endocrine Society, and the American Diabetes Association. *Diabetes Care*, *38*(10), 1964 – 1974. https://doi.org/10.2337/dc15-1419
10. Lestari, Zulkarnain, & Sijid, S. A. (2021). Diabetes Melitus : Review Etiologi , Patofisiologi , Gejala , Penyebab , Cara Pemeriksaan , Cara Pengobatan dan Cara Pencegahan. In *Prosiding Biologi Achieving the Sustainable Development Goals with Biodiversity in Confronting Climate Change Gowa, 08 November 2021* (pp. 237 – 241). Jurusan Biologi, Fakultas Sains dan Teknologi, UIN Alauddin Makassar.
11. Melinda, Khasanah, S., & Susanto, A. (2022). Gambaran Kadar Gula Darah Penderita Diabetes Mellitus Peserta Prolanis Di Puskesmas 1 Sumbang Kabupaten Banyumas. *Jurnal Inovasi Penelitian*, *3*(6), 6657–6670.
12. Muliasari, H., Hamdin, C. D., Ananto, A. D., & Ihsan, M. (2019). Edukasi Dan Deteksi Dini Diabetes Mellitus Sebagai Upaya Mengurangi Prevalensi Dan Resiko Penyakit Degeneratif, *2*(1). https://doi.org/10.29303/jppm.v2i1.1018
13. Putra, I. W. A., & Berawi, K. N. (2015). Empat Pilar Penatalaksanaan Pasien Diabetes Mellitus Tipe 2. *J Majority*, *4*(9), 8–12.
14. Rachman, S. K., Bhatara, T., & Hendryanny, E. (2021). Scoping Review: Hubungan Kontrol Glikemik (HbA1C), Durasi Penyakit, dan Profil Lipid pada Pasien Diabetes Melitus Tipe II dengan Kejadian Neuropati Diabetik. *Journal of Health and Science Integration*, *3*(2), 207–2014.
15. Rini, S., Manto, O. A. D., & Irawan, A. (2022). Hubungan Pola Hidup Dengan Kadar Gula Darah Pasien Dengan Diabetes Mellitus Tipe 2. *Journal of Nursing Invention*, *3*(2), 82–88.
16. Zhao, D. (2021). Epidemiological Features of Cardiovascular Disease in Asia. *JACC. Asia*, *1*(1), 1–13. https://doi.org/10.1016/j.jacasi.2021.04.007