

Community Education on Diabetes Mellitus in Taratara Satu Village, Tomohon Barat District, Indonesia

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ABSTRACT

Diabetes Mellitus (DM) is a major global health issue, with rising prevalence linked to lifestyle factors. In Indonesia, DM was the third leading cause of mortality in 2019, and cases are projected to increase by 47% by 2045. Given these concerns, community education plays a crucial role in enhancing public awareness regarding DM prevention and management. This program aimed to enhance community knowledge about DM risks in Taratara Satu Village, Tomohon Barat District. A pre-experimental one-group pretest-posttest design was used, involving 12 DM-diagnosed respondents. The intervention included a pre-test, door-to-door education using lectures and visual media, and a post-test. Data were analyzed descriptively to assess knowledge improvement. Before the intervention, 58.33% of participants had good knowledge, while 41.67% had moderate knowledge. After the program, 91.67% demonstrated good knowledge, showing a significant improvement. The educational program successfully enhanced public knowledge about Diabetes Mellitus in Taratara Satu Village. The intervention proved effective in increasing awareness of DM risk factors, symptoms, and prevention strategies. This study underscores the importance of continuous community education to promote healthier lifestyles and reduce DM prevalence.

ABSTRAK

Diabetes Melitus (DM) adalah masalah kesehatan global yang utama, dengan peningkatan prevalensi yang terkait dengan faktor gaya hidup. Di Indonesia, DM merupakan penyebab utama kematian ketiga di tahun 2019, dan kasusnya diproyeksikan akan meningkat 47% pada tahun 2045. Mengingat hal tersebut, edukasi masyarakat memainkan peran penting dalam meningkatkan kesadaran masyarakat mengenai pencegahan dan pengelolaan DM. Program ini bertujuan untuk meningkatkan pengetahuan masyarakat tentang risiko DM di Kelurahan Taratara Satu, Kecamatan Tomohon Barat. Penelitian ini menggunakan desain pra-eksperimental satu kelompok pretest-posttest, yang melibatkan 12 responden yang terdiagnosis DM. Intervensi yang dilakukan meliputi pre-test, edukasi dari rumah ke rumah dengan menggunakan ceramah dan media visual, dan post-test. Data dianalisis secara deskriptif untuk menilai peningkatan pengetahuan. Sebelum intervensi, 58,33% peserta memiliki pengetahuan yang baik, sementara 41,67% memiliki pengetahuan yang cukup. Setelah program, 91,67% menunjukkan pengetahuan yang baik, menunjukkan peningkatan yang signifikan. Program edukasi ini berhasil meningkatkan pengetahuan masyarakat tentang Diabetes Melitus di Desa Taratara Satu. Intervensi ini terbukti efektif dalam meningkatkan kesadaran akan faktor risiko DM, gejala, dan strategi pencegahannya. Penelitian ini menggarisbawahi pentingnya edukasi masyarakat yang berkelanjutan untuk mempromosikan gaya hidup sehat dan mengurangi prevalensi DM.

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INTRODUCTION

Diabetes Mellitus (DM) represents a significant global health challenge, with a prevalence of approximately 9.3% as of recent estimates, projected to rise to 10.2% (578 million individuals) by 2030 (Kreutzenberg, 2023). This condition is recognized as one of the leading non-communicable diseases worldwide, contributing to high mortality rates, particularly in high-income and newly industrialized countries (Kakraniya et al., 2024). In the United States, for instance, diabetes affects around 10.5% of the population, highlighting its national significance (Patil et al., 2023). Gestational Diabetes Mellitus (GDM) is also on the rise, affecting 4-12% of pregnancies globally, which poses additional public health concerns (Skóra et al., 2024). Diabetes Mellitus (DM) is one of the leading causes of death in Indonesia. In 2019, it was the third highest cause of mortality in the country, with approximately 57.42 deaths per 100,000 population, according to data from the Institute for Health Metrics and Evaluation. The International Diabetes Federation (IDF) reported a significant increase in the number of diabetes cases in Indonesia in 2021 compared to previous years. This number is projected to reach 28.57 million by 2045, reflecting a 47% increase from 19.47 million cases in 2021. The increasing prevalence of diabetes is linked to lifestyle factors, including obesity and sedentary behavior, which are prevalent in many populations (Kakraniya et al., 2024). Furthermore, diabetes is associated with various comorbidities, exacerbating its impact on health systems (Chami & Khaled, 2022).

Public knowledge plays a crucial role in the prevention and management of Diabetes Mellitus (DM). Health education significantly enhances awareness about diabetes, leading to improved self-care practices among individuals. For instance, studies have shown that health education can effectively increase knowledge regarding diabetes prevention, which is essential for managing this chronic disease (Wijayanti, 2022). Furthermore, individuals with higher levels of knowledge about diabetes are more likely to engage in preventive measures, such as regular health screenings and adopting healthier lifestyles (Nugraheni & Isfandiari, 2022). The correlation between knowledge and positive health behaviors is evident; increased awareness about diabetes risk factors and management strategies can lead to better health outcomes (Shori & Alshareef, 2023; Luambano et al., 2023). In rural areas, where access to healthcare may be limited, disseminating accurate information about diabetes is particularly vital (MacDonald et al., 2021).

Community-based education programs are essential for the effective prevention and management of Diabetes Mellitus (DM). These programs enhance public awareness about diabetes, its risk factors, and self-management strategies, leading to improved health outcomes. Evidence suggests that structured diabetes self-management education (DSME) significantly enhances patients' knowledge and self-care behaviors, which are critical for managing this chronic condition (Carrera (2024) Albarqi, 2023; Utama et al., 2021). Moreover, community involvement in educational initiatives fosters a supportive environment that encourages healthy lifestyle changes. For instance, family-based diabetes education has been shown to improve social support and self-management behaviors among patients (Diriba et al., 2023). Additionally, integrating community health workers into diabetes education efforts can bridge gaps in healthcare access, particularly in underserved populations (Zhang et al., 2023; Yilmaz & BULUT, 2023).

The role of healthcare professionals, including nurses and pharmacists, is pivotal in these educational efforts, as they can provide tailored information and support to patients (Bustami et al., 2023; McSharry et al., 2022). Ultimately, community-based education programs not only empower individuals with diabetes but also contribute to reducing the overall burden of the disease within the community. The prevalence of Diabetes Mellitus (DM) in rural communities is influenced by several risk factors that are often exacerbated by socio-economic and educational challenges. One significant risk factor is the lack of access to healthcare services, which is prevalent in rural areas. Studies indicate that individuals in these regions often face barriers such as long travel distances to healthcare facilities, leading to delayed diagnosis and treatment (Gebremedhin et al., 2021) (Osarenmwindia et al., 2020). This limited access contributes to higher mortality rates among rural patients compared to their urban counterparts (Gebremedhin et al., 2021).

Additionally, educational disparities play a crucial role in diabetes management. Research

shows that lower levels of education correlate with inadequate knowledge about diabetes and its complications, which is particularly pronounced in rural populations (MacDonald et al., 2021; Afaya et al., 2020). Moreover, cultural beliefs and practices can also impact health behaviors in rural communities. Fatalism and limited social support may discourage individuals from seeking timely medical care or adhering to treatment regimens (Abbott et al., 2021; Hill-Briggs et al., 2020). Therefore, addressing these multifaceted risk factors through targeted community-based education and healthcare initiatives is essential for improving diabetes outcomes in rural populations (Zhu & Xu, 2019; Wang et al., 2024; Theivasigamani & Palaniappan, 2023; Silva-Tinoco et al., 2024). This community service program aims to enhance the understanding of residents in Taratara Satu Subdistrict, West Tomohon District, regarding the risks of Diabetes Mellitus (DM). The educational intervention was conducted as a preventive measure to address the rising number of DM cases in the area.



Figure 1. Data collection and counseling to residents

METHODS

This study employs a quantitative method with a pre-experimental design in the form of a one-group pretest-posttest design. The activity was conducted on Friday, August 23, 2024, from 13:00 to 17:00 WITA in Taratara Satu Subdistrict. The population in this study comprises all heads of households in Taratara Satu, with a sample of 12 respondents diagnosed with Diabetes Mellitus. The sample was selected using purposive sampling based on initial data obtained from a local community health survey.

The educational intervention was carried out in three stages. The first stage involved measuring the participants' baseline knowledge by distributing a pre-test questionnaire containing questions related to their understanding of Diabetes Mellitus, including risk factors, clinical symptoms, and diagnosis. The second stage consisted of an educational session conducted door-to-door, where the material was delivered through lectures and supporting media such as posters and banners. This intervention aimed to enhance public awareness regarding the dangers of Diabetes Mellitus, the adverse effects of improper disease management, and the necessary preventive and management measures. The primary target of this educational program was community groups to ensure broader outreach compared to an individual-based approach.

The final stage involved evaluating the effectiveness of the intervention by administering a post-test questionnaire with the same questions as the pre-test. The pre-test and post-test results were compared to assess changes in public knowledge following the intervention. The collected data were analyzed using descriptive analysis with percentage calculations to illustrate the improvement in participants' understanding before and after the educational session. Through this method, it is expected that there will be an increase in knowledge, attitudes, and behaviors related to adopting a healthy lifestyle for the prevention and management of Diabetes Mellitus within the community.

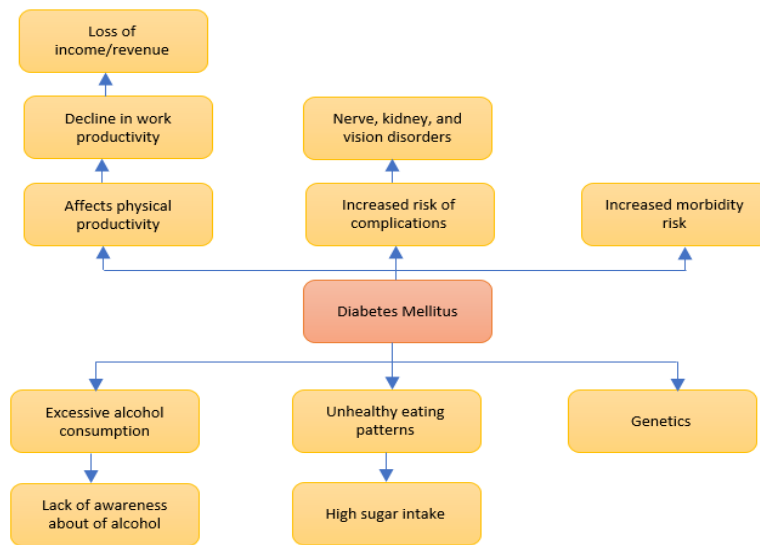


Figure 2. Problem tree

RESULTS AND DISCUSSION

The activity began with data collection from the residents of Taratara Satu Subdistrict (see Figure 1). The data revealed that out of 60 households surveyed, 12 individuals (21.2%) were diagnosed with Diabetes Mellitus. Following the data collection process, the next step was to identify and prioritize the most prevalent health issues in Taratara Satu. Diabetes Mellitus was determined to be a priority health concern due to the significant number of cases, representing 21.2% of the surveyed population. This issue was primarily attributed to unhealthy dietary habits and excessive alcohol consumption.

Subsequently, a problem tree analysis was conducted to identify the underlying factors contributing to the high consumption of heavy meals and excessive alcohol intake among the residents. This analysis also illustrated the potential consequences of Diabetes Mellitus, as depicted in Figure 2. The next phase of the activity involved conducting a door-to-door educational campaign on Diabetes Mellitus, as shown in Figure 1. In addition to the health education sessions, a pre-test questionnaire was administered before the intervention, followed by a post-test questionnaire afterward. This assessment aimed to compare the level of public knowledge before and after the educational session.

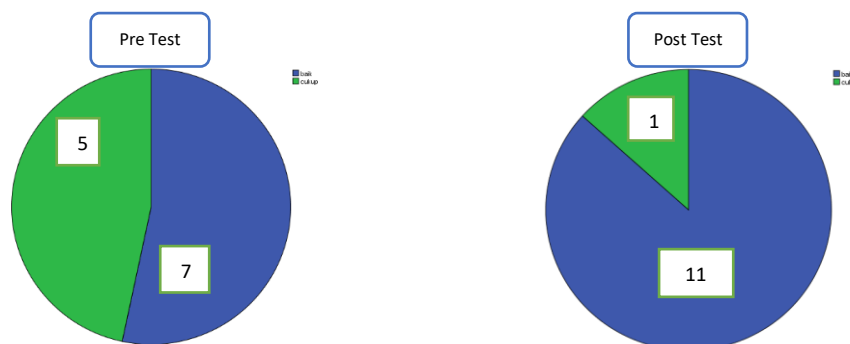


Figure 3. Pre and post-test result

As illustrated in Figure 3, prior to the intervention, 7 respondents (58.33%) demonstrated a good level of knowledge, while 5 respondents (41.67%) were categorized as having a moderate level of understanding. After the educational session, the results showed a significant improvement, with 11 respondents (91.67%) falling into the good knowledge category, and only 1 respondent (8.33%) falling into the moderate level of understanding.

remaining in the moderate category. Based on the comparative analysis shown in Figure 4, it can be concluded that there was a notable increase in community awareness and knowledge regarding Diabetes Mellitus following the intervention. Educational approaches for managing Diabetes Mellitus (DM) encompass a variety of methods, including lectures, discussions, pamphlets, and interactive sessions.

Diabetes Self-Management Education (DSME) is a structured approach that facilitates the knowledge and skills necessary for effective self-care among patients. This method often includes lectures that provide foundational knowledge about diabetes, its complications, and management strategies (Bakara & Kurniyati, 2022; Utama et al., 2021). Discussions and group interactions are also critical, as they allow patients to share experiences and learn from one another, fostering a supportive environment (Khalil et al., 2021; Zhao et al., 2019). The use of pamphlets and written materials can supplement these educational efforts by providing easily accessible information that patients can refer to at their convenience (Das et al., 2020; Çelik et al., 2022).



Figure 4. Comparison chart of pre-test and post-test results

Moreover, innovative methods such as tele-education and peer support have emerged, demonstrating effectiveness in enhancing patient engagement and knowledge retention (TUNA, 2023; Méndez et al., 2022; Hosseini et al., 2019). The combination of these educational strategies, tailored to the specific needs of the community, can significantly improve self-management behaviors and health outcomes for individuals with diabetes (Slamah et al., 2020; Ernawati et al., 2021). Ultimately, a multifaceted educational approach is essential for empowering patients to take control of their diabetes management effectively.

Interactive methods are vital for engaging communities in health education, particularly in the context of Diabetes Mellitus (DM) prevention and management. These methods foster active participation and enhance knowledge retention among community members. One effective approach is the use of peer education, where trained community members share their experiences and knowledge about diabetes management, creating a relatable and supportive environment (Oliver et al., 2020). This method has been shown to improve self-efficacy and encourage healthier lifestyle choices among participants. Workshops and hands-on activities are also beneficial, as they allow participants to practice skills such as meal planning and cooking healthy recipes (Hasan et al., 2019). For instance, cooking classes that incorporate nutritional education can lead to significant behavioral changes and improved dietary intake (Hasan et al., 2019). Additionally, community forums and discussions provide platforms for open dialogue, allowing individuals to ask questions and share concerns, which helps to dispel myths and reduce stigma associated with diabetes (Vanderslott et al., 2021).

Furthermore, home visits by healthcare providers can enhance engagement by offering personalized education and support in familiar settings, thereby increasing participant retention and satisfaction (Vanderslott et al., 2021). Overall, these interactive methods not only empower individuals with knowledge but also foster a sense of community ownership over health outcomes, which is crucial for effective diabetes management (DeFosset et al., 2021).

Logistical, cultural, and behavioral barriers significantly hinder the effective management of Diabetes Mellitus (DM) in rural communities. Logistical barriers often include limited access to healthcare facilities, transportation issues, and inadequate availability of diabetes education resources. Rural residents frequently face long travel distances to obtain medical care, which can discourage regular check-ups and timely interventions (Dugani et al., 2020; Robinson et al., 2021). Furthermore, the lack of reliable internet and cell phone coverage can impede access to telehealth services, which are increasingly vital for managing chronic conditions like diabetes (Robinson et al., 2021). Cultural barriers also play a crucial role in diabetes management. In many rural communities, there may be a lack of culturally competent healthcare practices, leading to misunderstandings about diabetes and its management (Rasmussen et al., 2021; Scarton et al., 2019). Traditional dietary practices and beliefs can conflict with recommended dietary changes necessary for effective diabetes management, making it challenging for individuals to adopt healthier eating habits (Wilson et al., 2021; Othman et al., 2022). Additionally, stigma surrounding diabetes may prevent individuals from seeking help or discussing their condition openly within their communities (Scarton et al., 2019). Behavioral barriers include low health literacy, which can affect individuals' understanding of diabetes management practices and the importance of lifestyle changes (Bekele et al., 2020; Chang et al., 2019). Many individuals may also experience diabetes-related distress, which can lead to non-adherence to medication and self-care routines (Adu et al., 2019). Moreover, financial constraints can limit access to necessary medications and healthy food options, further complicating diabetes management (Rasmussen et al., 2021; Sun, 2024). Addressing these barriers through targeted community education and support initiatives is essential for improving diabetes outcomes in rural populations (Tschida et al., 2021; Jeffrey et al., 2019).

Continuous education and follow-up programs are essential components in the effective management of Diabetes Mellitus (DM). These programs ensure that individuals with diabetes receive ongoing support and updated information about their condition, which is critical for maintaining optimal health outcomes. Continuous education helps patients understand the complexities of diabetes management, including medication adherence, dietary choices, and lifestyle modifications (Yazdani & Heidarpoor, 2023; Muwanguzi et al., 2023).

Moreover, follow-up programs facilitate regular monitoring of patients' health status, allowing healthcare providers to identify potential complications early and adjust treatment plans as necessary (Harding et al., 2023). This proactive approach not only enhances patient engagement but also fosters a sense of accountability among individuals managing their diabetes (Guignona et al., 2021). Community engagement in educational initiatives further strengthens these programs by creating a supportive environment where patients can share experiences and learn from one another (Ciucă & Zăvoianu, 2024; Spânu et al., 2024). Additionally, integrating community resources into follow-up care can enhance accessibility and provide patients with practical tools for managing their condition (Tao, 2024). Ultimately, continuous education and follow-up programs are vital for empowering individuals with diabetes, improving their self-management skills, and reducing the risk of complications associated with the disease (Teherani et al., 2020; Caspe & Hernandez, 2024).

CONCLUSION

The educational program on Diabetes Mellitus conducted in Taratara Satu Subdistrict, West Tomohon District, proved to be effective in enhancing public knowledge about the risks associated with the disease. The results demonstrated a significant increase in community awareness following the intervention. This community service initiative contributed to public health by equipping residents with essential knowledge on diabetes prevention and management, encouraging healthier lifestyles, and promoting early detection efforts. For future initiatives, it is recommended to expand the scope of educational activities by incorporating interactive workshops, regular health screenings, and the involvement of local healthcare professionals to provide continuous support and guidance. Additionally, integrating digital platforms such as mobile applications or online seminars could enhance accessibility and outreach, ensuring sustained health education efforts. To maximize long-term impact, it is recommended that healthcare professionals actively engage in regular diabetes

awareness campaigns and community-based interventions. Local authorities and community leaders should collaborate in facilitating ongoing health education programs. Moreover, residents are encouraged to adopt preventive measures, participate in regular medical check-ups, and share knowledge within their social circles to promote a healthier community.

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