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Community empowerment for diabetes mellitus awareness through the SAM MARIADI program in Malang City

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Abstract

Purpose: This study aimed to evaluate the impact of the SAM MARIADI (Sadar Diabetes Mellitus Mari Berdaya) program on improving knowledge and attitudes among the elderly in Bakalan Krajan Village, Malang City. **Method:** This quasi-experimental study involved 20 elderly participants with type 2 diabetes mellitus. The intervention consisted of educational and practical activities designed to promote awareness of and self-management for diabetes. Pre- and post-intervention assessments were conducted to measure changes in knowledge and attitudes. **Results:** There was a significant improvement in participants' knowledge and attitudes after participating in the SAM MARIADI program (p = 0.000). Before the intervention, only 20% of participants had good knowledge, which increased to 65% after the intervention. Those with poor knowledge decreased from 65% to 10%. Similarly, good attitudes have risen from 20% to 55%, and poor attitudes decreased from 60% to 10%. These results indicate that the program successfully enhanced awareness and behavioral readiness for diabetes self-management among the elderly. **Conclusion:** The SAM MARIADI program effectively improved knowledge and attitudes about diabetes management among the elderly, supporting its potential as a community-based health empowerment initiative aligned with the Sustainable Development Goals (SDGs).

Keywords: community empowerment; diabetes mellitus; elderly; self-management education

INTRODUCTION

Type 2 diabetes mellitus is a non-communicable disease that continues to pose serious global public health challenges [1]. In Indonesia, the Basic Health Research (Riskesdas) data indicate an increase in the prevalence of diabetes from 6.9% in 2013 to 8.5% in 2018 [2]. This situation aligns with the World Health Organization (WHO) report, which identified diabetes as the direct cause of approximately 1.5 million deaths globally in 2019 [3]. The International Diabetes Federation further projects that by 2045, diabetes prevalence may rise to 12.2%, affecting an estimated 783.2 million people worldwide [4].

One of the key contributors to the increasing prevalence of diabetes is the lack of knowledge among patients, which significantly impacts self-care behaviors and their ability to manage the disease effectively [5,6]. Poor participation in diabetes management is reflected in behaviors such as irregular

medication adherence, inadequate dietary regulation, and limited self-awareness regarding disease control [7,8]. Although urban areas tend to report higher prevalence rates, the highest proportion of undiagnosed cases is often found in rural communities [9]. In these areas, local beliefs and perceptions—often influenced by health myths—can further hinder effective disease prevention and treatment efforts [10,11].

To address these issues, the Indonesian government promotes the implementation of Sustainable Development Goals (SDGs) at the village level, aiming to foster empowered, health-conscious communities through improved education and welfare [12]. Achieving sustainable health outcomes requires long-term strategies that integrate community empowerment and lifestyle modification [13,14]. One proven approach is the Diabetes Self-Management Education (DSME) model, which emphasizes knowledge enhancement and behavioral change as foundations for better disease control [15]. Studies have shown that DSME interventions can significantly improve patients' understanding and self-care practices [16].

Recent innovations in community-based diabetes management have highlighted the importance of localized, culturally relevant empowerment models. The SAM MARIADI (Sadar Diabetes Mellitus Mari Berdaya) program represents one such model, integrating DSME principles with practical components such as myth-busting education, self-care training, dietary guidance, acupressure therapy, and the utilization of herbal medicine. These multidimensional interventions reflect a growing trend in public health efforts that combine education, behavior modification, and local resource optimization to improve diabetes outcomes, particularly among vulnerable elderly populations in rural areas. This study contributes to the evolving body of knowledge by evaluating the effectiveness of such an integrated program within the framework of the SDGs.

METHODS

This study employed a quasi-experimental design with a pre-posttest approach to evaluate the effectiveness of the SAM MARIADI program in improving knowledge and attitudes related to diabetes mellitus among the elderly population. The research was conducted in Bakalan Krajan Hamlet, Malang City, over two months, from December 2023 to January 2024.

The study involved 20 elderly individuals selected through purposive sampling. Participants were included if they were aged 51 years and above, had a history of type 2 diabetes mellitus, did not suffer from visual or hearing impairments, and had not received complementary therapies such as acupressure within the past month. Participants were excluded if they had physical conditions such as wounds, swelling, fractures, or sunburn, neurological disorders, especially affecting the limbs, or comorbid complications including stroke, heart failure, or kidney failure.

The intervention provided to participants was a structured program named SAM MARIADI (Sadar Diabetes Mellitus Mandiri dan Terintegrasi) is an acronym for *Community Empowerment Unit for Diabetes Mellitus Awareness*. This program included: 1) education about diabetes, which consists of an understanding of the disease, its symptoms, classification, and associated risk factors; 2) a quiz on facts and myths about diabetes to reinforce participants' memory and comprehension; 3) diabetes self-management, which comprises light physical activities such as diabetic foot exercises, diabetic acupressure for blood glucose control, and a balanced diet to optimize previous treatments; 4) education on TOGA (family medicinal plants) for herbal therapy, presented in the form of herbal extracts made from turmeric, ginger, temulawak (*Curcuma xanthorrhiza*), bay leaves, and sambiloto (*Andrographis paniculata*) leaves.

The research employed the Diabetes Self-Management Questionnaire (DSMQ) to assess participants' self-care behaviors across four domains: blood glucose monitoring, diet, physical activity, and healthcare utilization [17]. Responses were categorized using a four-point Likert scale ranging from strongly agree (score 3) to disagree (score 0) [18]. This instrument had previously been tested for reliability and validity, yielding a reliability coefficient of 0.789 and validity values ranging from 0.349 to 0.661 [19].

Data analysis was performed using SPSS version 25. Since the data did not follow a normal distribution, the Wilcoxon signed-rank test was used to examine differences in knowledge and attitude scores before and after the intervention. A significance level of $p<0.05$ was used to determine statistical significance.

RESULTS

Table 1 presents the demographic characteristics of the study participants, highlighting factors that may influence their health behaviors and responsiveness to diabetes education. Most of the respondents were elderly, with low levels of formal education and limited employment status, which may contribute to reduced health literacy and self-management capacity. The predominance of female participants could reflect

gender-based differences in health-seeking behavior, where women are often more proactive in community health involvement. These characteristics underscore the importance of designing empowerment programs that are contextually relevant, easily understandable, and capable of reaching populations with diverse educational and socioeconomic backgrounds.

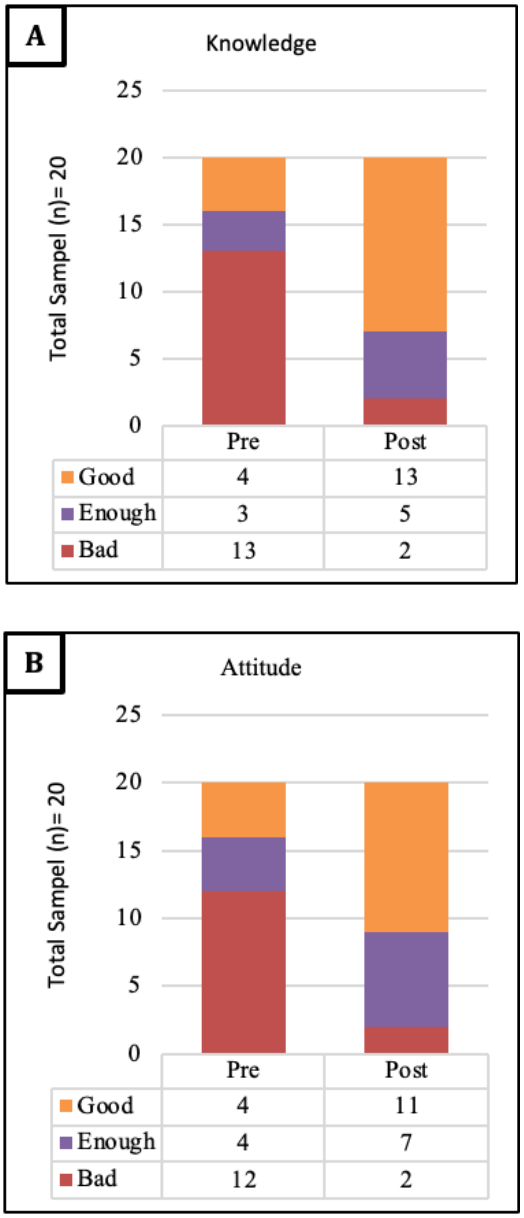

Figure 1. A. Differences in knowledge of diabetic elderly after education; B. Differences in attitude of diabetic elderly after education. Wilcoxon test p=0.000 (<0.05)

Figure 1 illustrates a clear improvement in both knowledge and attitudes among participants following the implementation of the SAM MARIADI program. The data demonstrate a marked shift from poor to good levels in both domains, indicating the effectiveness of the intervention in empowering participants with accurate health information and motivating them to change their behavior. The increase in positive attitudes also suggests enhanced confidence and readiness to engage in diabetes self-management practices. This improvement not only reflects cognitive gains but also implies a broader potential for long-term behavioral impact, primarily when such interventions are supported by continuous education and community involvement.

Table 1. Characteristics of respondents (n=20)

Variable	n	%
Gender		
Man	8	40
Women	12	60
Age (years)		
45-59	3	15
60-74	14	70
75-90	3	15
Marital		
Married	12	60
Widao	7	35
Divorced	1	5
Occupation		
Work	5	25
Unemployed	8	40
Pension	7	35
Education		
No school	5	25
SD	12	60
SMP	2	10
SMA	1	5

DISCUSSION

The results of this study indicate that the SAM MARIADI program is efficacious in improving knowledge and attitudes related to diabetes mellitus among elderly participants. Health empowerment is a proven strategy to enhance individual awareness, motivation, and skills, particularly in managing chronic diseases [20]. Knowledge serves as the foundation for behavior change and plays a central role in determining a person's ability to engage in self-care practices [21]. The improvement observed in this study is consistent with findings that health education using methods such as lectures, demonstrations, and visual media significantly enhances public understanding [22,23].

Educational components such as diabetes awareness and myth clarification were instrumental in addressing misinformation and cultural beliefs that often hinder disease management in rural settings. Interactive tools like quiz games have been shown to improve memory and understanding in elderly populations [24,25], and this study supports that such tools contribute meaningfully to health learning processes. Furthermore, involving participants in

group discussions and role-play encouraged peer engagement and active participation.

The self-management aspect of the program, particularly diabetic foot exercises and acupressure, aligns with previous research indicating their efficacy in improving blood sugar control and enhancing physical activity among individuals with diabetes [26-28]. These activities not only promote physical health but also foster a sense of agency and routine in managing chronic conditions.

The findings support the integration of community-based diabetes education into broader public health strategies, especially in underserved rural areas. Empowerment models such as SAM MARIADI can help reduce disparities in chronic disease outcomes by equipping at-risk populations with culturally appropriate knowledge and practical skills. As a model aligned with the Sustainable Development Goals (SDGs), it contributes to strengthening health literacy, promoting preventive behaviors, and enhancing community resilience against non-communicable diseases.

This study has several limitations. The sample size was relatively small and limited to a single hamlet, which may limit the generalizability of the findings. Additionally, the short follow-up period did not permit an evaluation of long-term behavioral change or sustained knowledge retention. Future research should consider larger, more diverse populations and more extended observation periods to assess the durability and scalability of the intervention's impact.

CONCLUSION

The SAM MARIADI program demonstrated significant effectiveness in increasing knowledge and shaping positive attitudes toward diabetes mellitus management among the elderly in Bakalan Krajan village, Malang city. By integrating health education, myth clarification, self-management training, and the use of local medicinal plants, the program addressed both informational and behavioral barriers commonly found in rural communities. These results support the role of community empowerment in enhancing disease awareness and promoting healthier lifestyles, aligning with the Sustainable Development Goals.

Future studies should consider increasing the sample size and involving diverse populations from different geographical areas to improve the external validity of the findings. Incorporating a control group in the study design is recommended to strengthen causal inferences. It is also advisable to include a longer follow-up period to evaluate the sustainability of knowledge and behavior changes over time. Moreover, future research should explore the integration of objective health outcome measures—such as HbA1c levels or other biomarkers—to provide a more comprehensive assessment of the intervention's effectiveness. Finally, qualitative methods such as interviews or focus groups could be employed to gain deeper insights into participants' experiences and perceptions regarding the SAM MARIADI program.

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