Promotif
Jurnal Kesehatan Masyarakat
Promotive: Journal of Public Health
Online ISSN : 2503-1139

Research Articles Open Access

Effect of Diabetes Self-Management Education on Self-Care Management Among Patients with Type 2 Diabetes Mellitus in Gedangan

Endah Palupi[1]*, Eka Diah Kartiningrum[2], Arief Fardiansyah [3], Revi Ekasetya Pratiwi[4]
[1]Faculty of Public Health, Health Sciences College of Majapahit, Jawa Timur, Indonesia, endahpalupi100@gmail.com
[2]Faculty of Public Health, Health Sciences College of Majapahit, Jawa Timur, Indonesia, ekadiahkartiningrum@gmail.com
[3]Faculty of Public Health, Health Sciences College of Majapahit, Jawa Timur, Indonesia, arieffardiansyah123@gmail.com
[4]Faculty of Public Health, Universitas Muhammadiyah Palu, Sulawesi Tengah, Indonesia, rekasetpra02@gmail.com

***Corresponding Author**: E-mail: endahpalupi100@gmail.com

ARTICLE INFO

Manuscript Received: 04 Sep, 2025
Revised: 09 Jan, 2025
Accepted: 10 Jan, 2026
Date of publication: 12 Jan, 2026
Volume: 15
Issue: 2
DOI: 10.56338/promotif.v15i2.9085

KEYWORDS

Diabetes Melitus;
Self-Management Education;
Self-Care Management;

ABSTRACT

Introduction: Patients with diabetes mellitus continue to face difficulties in performing self-care management based on the information they receive. Diabetes Self-Management Education (DSME) can serve as a reference for health education programs to improve patients' knowledge and self-care management skills. This study aimed to analyze the effect of DSME on self-care management among patients with type 2 diabetes mellitus.
Methods: This study employed a quasi-experimental two-group pre–posttest control design. The sample was 102 patients with type 2 diabetes mellitus selected using simple random sampling. The instrument utilized was the Diabetes Management Self-Efficacy Scale (DMSES). Data were analyzed using Wilcoxon test and multivariate ANOVA.
Results: The results of the multivariate analysis showed a p-value < 0.001, indicating that Diabetes Self-Management Education (DSME) had a significant effect on self-care management, including dietary patterns ($R^2 = 0.313$), physical activity ($R^2 = 0.737$), blood glucose monitoring ($R^2 = 0.430$), foot care ($R^2 = 0.427$), and medication adherence ($R^2 = 0.349$) among patients with type 2 diabetes mellitus. Physical activity demonstrated the most significant effect attributable to DSME.
Conclusion: Diabetes Self-Management Education (DSME) effectively improves self-care management in patients with type 2 diabetes mellitus, with the greatest impact on physical activity. These findings support DSME as an evidence-based strategy to promote independent self-care and as a standard operating protocol in Gedangan Community Health Center.

Publisher: Fakultas Kesehatan Masyarakat Universitas Muhammadiyah Palu

INTRODUCTION

Diabetes mellitus (DM) is a chronic disease characterized by elevated blood glucose levels beyond the normal range (1). DM often remains undetected, leading to high morbidity and mortality rates. The World Health Organization (WHO) projects that the number of individuals living with DM in Indonesia will rise from 8.4 million in 2000 to approximately 21.3 million by 2030. Indonesia currently ranks fifth globally in terms of diabetes prevalence, with 19.47 million affected individuals (2). The highest number of adults (aged 20–79 years) living with diabetes(3). The annual increase in DM prevalence is attributed to multiple factors, including genetic predisposition, aging, stress, and unhealthy lifestyle behaviors such as smoking, poor dietary patterns, physical inactivity, obesity, hypertension, hyperglycemia, and hypercholesterolemia (4). The complications of diabetes mellitus can affect virtually every organ system, from the scalp to the soles of the feet (5). Although diabetes mellitus is not curable (6), patients can effectively manage and control their condition to improve their quality of life and maintain better health

(7). Patient knowledge regarding diabetes can be acquired through education, which significantly influences a patient's ability to understand the disease and engage in effective self-care management (8). Self-care management in diabetes refers to the set of self-care activities necessary to maintain health and well-being, including dietary control, physical activity, regular blood glucose monitoring, medication adherence, and consistent self-care behaviors.

Diabetes Self-Management Education (DSME) refers to an educational intervention delivered to individuals diagnosed with type 2 diabetes mellitus (9). DSME is a continuous process designed to facilitate the acquisition of knowledge, skills, and competencies necessary for effective diabetes self-care (10). Evidence indicates that DSME programs are highly effective in reducing the risk of diabetes-related complications (11). To date, existing efforts have primarily focused on identifying and registering individuals with diabetes mellitus who have never accessed health services, typically through community-wide early detection or screening programs. However, no structured interventions or implementation strategies follow these screenings, leaving diagnosed individuals without adequate support for disease management (12). This gap has motivated the researcher to further investigate the impact of Diabetes Self-Management Education (DSME) on self-care management behaviors among patients with type 2 diabetes mellitus, specifically in the domains of dietary regulation, physical activity, blood glucose monitoring, foot care, and medication adherence. This study aimed to analyze the effect of Diabetes Self-Management Education (DSME) on self-care management among including dietary regulation, physical activity, blood glucose monitoring, foot care, and medication adherence in patients with type 2 diabetes mellitus.

METHOD

The type of research used is quantitative research with a research design that is Quasi quasi-experiment, which aims to reveal cause-and-effect relationships using a control group and an experimental group. The experimental group is the group that receives the intervention. Both groups are given a pre-test, then after the intervention is given, an evaluation (post-test) is conducted.

Research Type

This study employed a quasi-experimental two-group pre–posttest control design. The research sought to determine the effect of DSME to lifestyle, dietary patterns, medication adherence, and blood glucose control. The quantitative approach was chosen because it allows for numerical measurement of variables and statistical analysis to test hypotheses objectively.

Population and Sample

The population consisted of 104 diabetes mellitus patients registered at Gedangan Community Health Center. Sample size calculation was performed using the "Compare Two Proportions" formula, resulting in 47 participants for each group. To anticipate potential dropouts, an additional 10% was added. Therefore, the total required sample size was 102 patients.

Research Location

This study was conducted in the working area of Gedangan Community Health Center, Sidoarjo Regency.

Instrumentation or Tools

The main research instrument was the Diabetes Management Self-Efficacy Scale (DMSES) questionnaire, which consisted of closed-ended questions related to demographic characteristics (age, sex, education, occupation), knowledge about diabetes mellitus, lifestyle factors (diet, physical activity, smoking habits), medication adherence, and blood glucose monitoring behavior.

Data Collection Procedures

Data collection was conducted using the Diabetes Management Self-Efficacy Scale (DMSES) questionnaire, measured on a Likert scale ranging from 1 to 5. Both the intervention and control groups were first administered a pre-test. Subsequently, the intervention group received educational materials in the form of booklets and foot exercise leaflets, delivered through a combination of lectures, discussion, question-and-answer sessions, and demonstrations of foot exercises. In contrast, the control group continued to receive only the routine activities provided by the Community Health Center. Following the intervention period, a post-test was administered to both groups.

Data Analysis

Data analysis was performed using Wilcoxon test and Multivariate ANOVA. Data analysis was conducted using SPSS. Prior to inferential analysis, assumption testing was performed. Normality was assessed using the Shapiro Wilk test. For variables that did not meet the normality assumption, non-parametric tests were applied, including the Wilcoxon signed-rank test for within-group comparisons and the Mann–Whitney U test for between-group comparisons. Multivariate Analysis of Variance (MANOVA) was employed to assess the intervention's effect on multiple related outcome variables simultaneously. Although the outcome variables were measured using Likert-scale items, composite scores were derived by summing multiple items within each construct, allowing the data to be treated as approximately continuous. Assumptions for MANOVA, including homogeneity of variance–covariance matrices and multivariate normality, were tested and met.

Ethical Approval

Ethical approval was received from the Majapahit Health Sciences College, Number 214 / EC-SM / 2025.

RESULTS

Respondent characteristics in this study include name, age, gender, education level, duration of diabetes mellitus, and occupation. Based on the study findings, the age characteristics of respondents in both the intervention and control groups were predominantly 56–65 years, accounting for 70.59% in the intervention group and 68.63% in the control group. Most respondents by gender were female, with the highest proportion in the intervention group at 78.4%. Regarding education level, most respondents had completed senior high school, representing 58.8% in the intervention group and 72.55% in the control group. The highest proportion of respondents with diabetes duration exceeding 10 years was found in the control group, at 23.53%. In terms of occupation, the most common in the intervention group was housewife (IRT), with 20 respondents (39.22%), while in the control group, the largest proportion was self-employed (wiraswasta), with 21 respondents (41.18%).

Table 1. Differences in dietary management among patients with diabetes mellitus before and after receiving Diabetes Self-Management Education (DSME)

Intervention Group		**Dietary Adherence After DSME**		**Statistical Test Results by Group**	**Statistical Test Results Between Groups**
		Non-adherent	Adherent		
Dietary Adherence Before DSME	Non-adherent	14(32,6%)	29(67,2%)	Wilcoxon Test: Z = -5.385 p-value < 0.001*	Pre Test: U=1122 P value = 0,099
	Adherent	0(0%)	8(100%)		
Control Group		Post Test			
		Non-adherent	Adherent	Wilcoxon Test: Z = -1.732 p-value = 0.083	Post Test: U=816 P value<0,001*
Pre Test	Non-adherent	33(91,7)	3(8,3%)		
	Adherent	0(0%)	15(100%)		

Based on the table above, the intervention group showed that before DSME, 14 respondents (32.6%) were non-adherent to dietary recommendations, which decreased to 0 (0%) after receiving DSME. In contrast, the control group indicated that 33 respondents (91.7%) were non-adherent at pretest, and this also decreased to 0 (0%) at posttest. Wilcoxon test analysis for the intervention group yielded a p-value < 0.001, which is less than 0.05. This indicates a statistically significant difference in dietary management among patients with diabetes mellitus before and after receiving Diabetes Self-Management Education (DSME). Meanwhile, the Wilcoxon test analysis for the control group yielded a p-value of 0.083, which is greater than 0.05. This suggests that there was no statistically significant difference in dietary adherence among patients with diabetes mellitus between pretest and posttest in the control group.

Mann-Whitney test results for dietary management at pretest showed a p-value of 0.099, which is greater than 0.05, indicating no statistically significant difference between the intervention and control groups before DSME implementation. In contrast, at posttest, the p-value was 0.001, which is less than 0.05, indicating a statistically significant difference between the intervention and control groups after DSME was administered.

Table 2. Differences in Physical Activity among Patients with Diabetes Mellitus Before and After Receiving Diabetes Self-Management Education (DSME)

Intervention Group		Physical Activity After DSME		Statistical Test Results by Group	Statistical Test Results Between Groups
		Non-adherent	Adherent		
Physical Activity Before DSME	Non-adherent	15(34,9%)	28(65,1%)	Wilcoxon Test: Z = -5.292 p-value < 0.001*	Pre Test: U=994 P value = 0,008
	Adherent	0(0%)	8(100%)		
Control Group		Post Test			
		Non-adherent	Adherent	Wilcoxon Test: Z = -1.000 p-value = 0.317	Post Test: U=814 P value<0,001*
Pre Test	Non-adherent	30(96,8%)	1(3,2%)		
	Adherent	3(15%)	17(85%)		

Based on the table above, the intervention group showed that before DSME, 14 respondents (32.6%) were non-adherent to physical activity recommendations, which decreased to 0 (0%) after receiving DSME. Meanwhile, the control group indicated that 33 respondents (91.7%) were non-adherent at pretest, and this also decreased to 0 (0%) at posttest. Wilcoxon test analysis for the intervention group yielded a p-value < 0.001, which is less than 0.05. This indicates a statistically significant improvement in physical activity adherence among patients with diabetes mellitus before and after receiving Diabetes Self-Management Education (DSME). In contrast, the Wilcoxon test analysis for the control group yielded a p- p-value of 0.317, which is greater than 0.05. This suggests that there was no statistically significant change in physical activity adherence among patients in the control group between pretest and posttest.

The Mann-Whitney test analysis for physical activity at pretest yielded a p-value of 0.099, which is greater than 0.05, indicating no statistically significant difference between the intervention and control groups before DSME implementation. At posttest, the p-value was 0.001, which is less than 0.05, indicating a statistically significant difference between the intervention and control groups after DSME was administered.

Table 3. Differences in Blood Glucose Monitoring among Patients with Diabetes Mellitus Before and After Receiving Diabetes Self-Management Education (DSME)

Intervention Group		Blood Glucose Monitoring After DSME		Statistical Test Results by Group	Statistical Test Results Between Groups
		Non-adherent	Adherent		
Blood Glucose Monitoring Before DSME	Non-adherent	7(16,3%)	36(83,7%)	Wilcoxon Test: Z = -6.000 p-value < 0.001*	Pre Test: U=1198 P value = 0,321
	Adherent	0(0%)	8(100%)		
Control Group		Post Test			
Pre Test		Non-adherent	Adherent	Wilcoxon Test: Z = -3.742 p-value = 0.317	Post Test: U=841 P value<0,001*
	Non-adherent	25(64,1%)	14(35,9%)		
	Adherent	0(0%)	12(100%)		

Based on the table above, the intervention group showed that before DSME, 7 respondents (16.3%) were non-adherent to blood glucose monitoring, which decreased to 0 (0%) after receiving DSME. Meanwhile, the control group indicated that 25 respondents (64.1%) were non-adherent at pretest, and this also decreased to 0 (0%) at posttest. Wilcoxon test analysis for the intervention group yielded a p-value < 0.001, which is less than 0.05. This indicates a statistically significant improvement in blood glucose monitoring behavior among patients with diabetes mellitus before and after receiving Diabetes Self-Management Education (DSME).

In contrast, the Wilcoxon test analysis for the control group yielded a p-value < 0.001, which is less than 0.05. This indicates that there was a statistically significant difference in blood glucose monitoring behavior among patients with diabetes mellitus in the control group between pretest and posttest.

Mann-Whitney test analysis for blood glucose monitoring at pretest yielded a p-value of 0.321, which is greater than 0.05, indicating no statistically significant difference between the intervention and control groups before DSME implementation. At posttest, the p-value was 0.001, which is less than 0.05, indicating a statistically significant difference between the intervention and control groups after DSME was administered.

Table 4. Differences in Foot Care among Patients with Diabetes Mellitus Before and After Receiving Diabetes Self-Management Education (DSME)

Intervention Group		Foot Care After DSME		Statistical Test Results by Group	Statistical Test Results Between Groups
		Non-adherent	Adherent		
Foot Care Before DSME	Non-adherent	8(18,6%)	35(81,4%)	Wilcoxon Test: Z = -5.916 p-value < 0.001*	Pre Test: U=1275 P value = 0,781
	Adherent	0(0%)	8(100%)		
Control Group		Post Test			
		Non-adherent	Adherent	Wilcoxon Test: Z = -1.000 p-value = 0.317	Post Test: U=408 P value<0,001*
Pre Test	Non-adherent	43(97,7%)	1(2,3%)		
	Adherent	0(0%)	7(100%)		

Based on the table above, the intervention group showed that before DSME, 8 respondents (18.6%) were non-adherent to foot care, which decreased to 0 (0%) after receiving DSME. Meanwhile, the control group indicated that 43 respondents (97.7%) were non-adherent at pretest, and this also decreased to 0 (0%) at posttest. Wilcoxon test analysis for the intervention group yielded a p-value < 0.001, which is less than 0.05. This indicates a statistically significant improvement in foot care behavior among patients with diabetes mellitus before and after receiving Diabetes Self-Management Education (DSME). In contrast, the Wilcoxon test analysis for the control group yielded a p- p-value of 0.371, which is greater than 0.05. This suggests that there was no statistically significant change in foot care behavior among patients in the control group between pretest and posttest.

Mann-Whitney test analysis for foot care at pretest yielded a p-value of 0.781, which is greater than 0.05, indicating no statistically significant difference between the intervention and control groups before DSME implementation. At posttest, the p-value was 0.001, which is less than 0.05, indicating a statistically significant difference between the intervention and control groups after DSME was administered.

Table 5. Differences in Medication Adherence among Patients with Diabetes Mellitus Before and After Receiving Diabetes Self-Management Education (DSME)

Intervention Group		Medication Adherence After DSME		Statistical Test Results by Group	Statistical Test Results Between Groups
		Non-adherent	Adherent		
Medication Adherence Before DSME	Non-adherent	9 (23,7%)	29 (76,3%)	Wilcoxon Test: Z = -5.385 p-value < 0.001*	Pre Test: U=1224 P value = 0,512
	Adherent	0(0%)	13(100%)		
Control Group		Post Test			
		Non-adherent	Adherent	Wilcoxon Test: Z = -1.000 p-value = 0.317	Post Test: U=663 P value<0,001*
Pre Test	Non-adherent	34 (97,1%)	1 (2,9%)		
	Adherent	0 (0%)	16 (100%)		

Based on the table above, the intervention group showed that before receiving DSME, 9 respondents (23.7%) were non-adherent, and after DSME, this number dropped to 0 (0%). Meanwhile, the control group showed that at pretest, 34 respondents (97.1%) were non-adherent, and at posttest, this also decreased to 0 (0%). Wilcoxon test analysis for the intervention group yielded a p-value less than 0.001, which is smaller than 0.05. This indicates a significant difference in medication adherence among patients with diabetes mellitus before and after receiving Diabetes Self-Management Education (DSME). However, the Wilcoxon test analysis for the control group yielded a p-value of 0.371, which is greater than 0.05. This indicates no significant difference in medication adherence among patients with diabetes mellitus between pretest and posttest.

Mann-Whitney test analysis for medication adherence at pretest yielded a p-value of 0.512, which is greater than 0.05, indicating no statistically significant difference between the intervention and control groups before DSME implementation. At posttest, the p-value was 0.001, which is less than 0.05, indicating a statistically significant difference between the intervention and control groups after DSME was administered.

Table 6. The Influence of Diabetes Self-Management Education (DSME) on Self-Care Management (Dietary Adherence, Physical Activity, Blood Glucose Monitoring, Foot Care, and Medication Adherence)

Dependent Variable	Multivariate Analysis		
	F count	P value	R^2
Dietary Adherence	7,226	<0,001	0,313
Physical Activity	44,409	<0,001	0,737
Blood Glucose Monitoring	13,687	<0,001	0,430
Foot Care	13,538	<0,001	0,427
Medication Adherence	10,038	<0,001	0,349

Based on multivariate analysis, the p-value < 0.001, which is less than 0.05, indicates that Diabetes Self Management Education (DSME) has a statistically significant influence on dietary adherence, physical activity, blood glucose monitoring, foot care, and medication adherence among patients with type 2 diabetes mellitus. Meanwhile, the highest R^2 value of 0.737 (73.7%) indicates that physical activity demonstrates the greatest influence following the implementation of Diabetes Self-Management Education (DSME).

DISCUSSION

The study findings on dietary management indicate that 38 respondents (74.51%) demonstrated adherence to dietary regulation. According to Putri (12), patients' knowledge of diabetes mellitus significantly influences their adherence behavior in managing their diabetic diet. The success of meal planning is highly dependent on the adherence of patients with diabetes mellitus to the recommended dietary guidelines (15). Respondents' adherence to dietary management is due to their frequent exposure to information related to Diabetes Self-Management Education (DSME). The greater the exposure to such information, the better the respondents' adaptation to their condition, enabling them to effectively control their diet in terms of timing, type, and portion size. When examined across the four domains of the dietary adherence questionnaire, namely food selection, body weight monitoring, meal frequency, and food type, the results indicate that adherence to meal frequency showed better outcomes compared to the other domains. These research findings are consistent with the study conducted by Aminah (14), which stated that Diabetes Self-Management Education (DSME) delivered through booklet media has a significant influence on dietary adherence among patients with type 2 diabetes mellitus.

The findings on physical activity indicate a statistically significant difference between the intervention group and the control group. Patients with diabetes mellitus who demonstrated adherence to physical activity were also found to effectively implement Diabetes Self-Management Education (DSME) (17). This suggests that the more frequently DSME is delivered, the higher the level of adherence to physical activity among patients with diabetes mellitus. These results are consistent with a study conducted at Dr. Zainoel Abidin General Hospital, involving 91 respondents, which reported a significant association between knowledge and adherence to physical activity, with a p-value of 0.023 (18). Patient knowledge regarding Diabetes Self-Management Education (DSME) serves as a critical tool to support individuals in managing their own diabetes (19). Physical activity represents one form of health-promoting behavior that contributes to improved health outcomes (20). It is also one of the core principles in the clinical management of patients with diabetes. Regular physical activity exerts positive effects on glucose balance and other key metabolic risk factors, while also enhancing quality of life (21). Long-term, controlled physical activity has been proven to improve blood glucose control (22).

Moreover, physical activity is highly beneficial because patients with diabetes mellitus often find it easier and more motivating to engage in daily physical activities such as walking and exercise. Physical activity has a positive effect on lowering blood glucose levels. When performed regularly, it yields optimal results (23). Physical activity should be carried out at least three to four times per week, with a minimum duration of 30 minutes per session. It does not require strenuous effort; simply walking for 30 minutes can help reduce blood glucose levels to within the normal range. However, if a person engages in physical activity and then stops for an extended period, it will no longer have a significant impact on blood glucose levels. It is therefore essential for patients with diabetes mellitus to avoid excessive rest or prolonged physical inactivity.

Among diabetes mellitus patients who were classified as non-adherent, limited engagement in physical activity may be influenced by habitual daily behaviors that minimize physical exertion. For instance, routine activities such as shopping, visiting the market, or attending the mosque are predominantly conducted using private motorized transportation (e.g., motorcycles or cars), often with assistance from family members. These transportation choices reduce opportunities for incidental physical activity, such as walking, and may contribute to lower overall physical

activity levels.

Based on the findings regarding blood glucose monitoring, that providing education through Diabetes Self-Management Education (DSME) to the intervention group can positively influence patients with diabetes mellitus, leading them toward adherence. The theory of DSME not only introduces self-care skills but also provides effective strategies for adopting positive behaviors and self-management practices that enhance quality of life. Data analysis also shows that the more frequently patients receive education, the more adherent they become. Delivering DSME to the intervention group improves patients' knowledge and skills in self-care, resulting in a greater reduction in signs and symptoms associated with the risk of type 2 diabetes compared to the control group. Blood glucose monitoring among patients with type 2 diabetes mellitus can be effectively achieved through educational interventions in the form of DSME, which enhances cognitive and affective aspects and strengthens knowledge and skills for both patients and their families in independently managing diabetes care.

The research findings on foot care suggest that providing Diabetes Self-Management Education (DSME) to the intervention group can reduce the occurrence of symptoms such as tingling or numbness in the feet. Significant education delivery has a positive impact on improving adherence to foot care practices. Foot care is a primary prevention measure carried out by individuals, whether their blood glucose levels are normal or elevated. It involves regularly maintaining foot hygiene in patients with diabetes to prevent injury (24). The delivery of Diabetes Self-Management Education (DSME) includes not only education but also skill training through demonstration, specifically foot exercises.

Foot care behavior is preventive in nature and includes practices such as properly washing the feet, drying them thoroughly, and applying moisturizer while ensuring that moisture does not remain between the toes due to water or lotion accumulation. These behaviors may be influenced by multiple factors, including pre-existing self-care habits, routine health education provided by healthcare workers, or patients' prior experiences with foot-related complications, and therefore should not be attributed solely to a single intervention. For patients with impaired vision or reduced joint mobility (especially older adults), a mirror should be provided to view the soles of the feet; if needed, family members should be asked to assist with foot inspection. The inside of shoes should also be checked regularly for rough areas or foreign objects. Daily visual and manual (by hand) examination is an essential practice. Patients who have protruding areas on their feet that are prone to pressure, such as calluses or thick toenails, require special attention to prevent injury.

These research findings are supported by a study conducted by Puspa (23), which demonstrated that education has a significant influence on foot care behavior among patients with diabetes mellitus. Providing information or health counseling enhances adherence to foot care practices and fosters awareness, which in turn motivates individuals to act in accordance with their acquired knowledge. Similarly, a study by Vatankhah (24) showed that delivering foot care health education can effectively improve foot care behavior.

The research findings on medication adherence indicate that the primary goal is to achieve blood glucose levels within or close to the normal range. The researcher assumes that educational activities in the form of DSME can broaden patients' understanding and knowledge of diabetes mellitus. Patients who receive and internalize DSME effectively are more likely to adhere to their treatment, as they develop confidence, self-control in managing their condition, and a clear comprehension of the instructions within their prescribed treatment regimen. Diabetic patients who are adherent to their medication tend to have better-controlled blood glucose levels, as they possess a stronger sense of responsibility toward their therapy and are therefore more committed to following their prescribed treatment.

Meanwhile, non-adherent diabetic patients may be influenced by feelings of boredom or fatigue from routinely taking antidiabetic medications over a prolonged period. A study by Chairunisa (25) found that diabetes patients with negative perceptions of the benefits of medication are 3.5 times more likely to exhibit non-adherent behavior toward antidiabetic drugs compared to those with positive perceptions of their benefits. The researcher assumes that while respondents may recognize the benefits of taking antidiabetic medication, they may simultaneously perceive barriers or obstacles that hinder consistent adherence to their treatment regimen.

Based on multivariate analysis, the p-value < 0.001, which is less than 0.05, indicates that Diabetes Self-Management Education (DSME) has a statistically significant influence on self-care management among patients with type 2 diabetes mellitus. This finding is consistent with the study conducted by Aminah (14), which also reported that DSME significantly affects self-care behaviors in patients with type 2 diabetes mellitus.

This study shows that there was an improvement in self-care behaviors between the pre-intervention and post-intervention phases following the delivery of Diabetes Self-Management Education (DSME) in the intervention group. The implementation of DSME consists of a series of activities directed toward individuals, groups, or

communities, involving the delivery of accurate health messages and information, as well as fostering belief and motivation (28). The goal is not only to raise awareness but also to ensure that individuals understand the information and are capable of carrying out health-related recommendations effectively.

The components of Diabetes Self-Management Education (DSME) provided to patients in this study include basic concepts of diabetes mellitus, healthy eating, physical activity, medication use, blood glucose monitoring, and risk reduction. The theoretical framework applied to enhance patient autonomy in this study is Orem's Self-Care Theory. This theory posits that self-care refers to activities initiated and performed by individuals themselves to maintain health and well-being.

Self-care management in diabetes mellitus refers to actions undertaken by patients to manage and control their condition. These actions include regulating diet, engaging in physical activity, monitoring blood glucose levels, adhering to medication regimens, and performing foot care. The objectives of self-care management are to optimize metabolic control within the body, prevent acute and chronic complications, enhance the patient's quality of life, and reduce the financial burden associated with diabetes care and treatment (29).

Self-care management refers to the ongoing management of life-sustaining needs aimed at maintaining health and well-being, recovering from illness, and coping with emerging complications (30,31). Every individual requires self-care management, regardless of gender, whether female or male.

The authors assume that self-care management among patients with type 2 diabetes mellitus was suboptimal before receiving DSME. One of the contributing factors is insufficient knowledge regarding proper self-care practices. Patients with diabetes mellitus who lack adequate knowledge tend to demonstrate reduced autonomy in self-care, leading to poor glycemic control (32). Generally, the lower an individual's level of knowledge, the higher the risk of non-adherence. According to research by Azmiardi (31), knowledge about diabetes mellitus tends to inform patients about specific actions required in the diabetes management process. Health education delivered through the Diabetes Self-Management Education (DSME) method shows a statistically significant difference in self-care levels between pre-test and post-test. In contrast, the control group showed no statistically significant difference between pre-test and post-test. These research findings are consistent with the study by Simbolon (32), which also found that in the control group, there was no significant effect or difference between pre-test and post-test measurements.

Based on data analysis, there is alignment between empirical findings and theoretical expectations. According to the study results involving 51 patients in the intervention group, the majority of respondents demonstrated a good understanding of the DSME provided by health workers. This understanding led to improved self-care practices, which are effective in reducing the risk of complications among patients with diabetes mellitus. Furthermore, effective self-care contributes to maintaining normal blood glucose levels, mitigating the adverse effects of diabetes, and reducing diabetes-related morbidity and mortality, ultimately enhancing overall quality of life.

Interpretation of Key Findings

Health education interventions play a crucial role in improving diabetic patients' understanding, motivation, and adherence to treatment. Participants who received structured and participatory education sessions showed better knowledge retention, more consistent blood glucose monitoring, and greater dietary compliance. These results suggest that behavioral modification, supported by active community engagement, is an essential determinant of successful diabetes management. The findings also imply that empowering local health cadres and integrating family support mechanisms can significantly enhance the sustainability of health programs aimed at chronic disease control.

Comparison with Previous Studies

These research findings are consistent with the study conducted by Aminah (14), which stated that Diabetes Self-Management Education (DSME) delivered through booklet media has a significant influence on dietary adherence among patients with type 2 diabetes mellitus. These research findings are supported by a study conducted by Puspa (23), which demonstrated that education has a significant influence on foot care behavior among patients with diabetes mellitus. Similarly, a study by Vatankhah (24) showed that delivering foot care health education can effectively improve foot care behavior.

Limitations and Cautions

This study has several limitations. The non-randomized design may lead to selection bias, the use of self-reported data may introduce recall and social desirability bias, and the single-center setting limits the generalizability of the findings. In addition, external factors such as dietary habits, socioeconomic conditions, and access to healthcare

services were not fully controlled. Therefore, the results should be interpreted with caution, particularly when applied to different demographic or cultural contexts.

Recommendations for Future Research

Researchers are also encouraged to integrate qualitative methods to capture patients' subjective experiences, cultural values, and barriers to self-care. Furthermore, future studies could explore the effectiveness of digital health interventions and mobile-based monitoring systems as complementary strategies for diabetes management in community settings.

CONCLUSION

Based on the research conducted among 102 respondents with type 2 diabetes mellitus in the Gedangan Community Health Center area, the results indicate that Diabetes Self-Management Education (DSME) has a significant influence on self-care management among patients with type 2 diabetes mellitus.

AUTHOR'S CONTRIBUTION STATEMENT

Endah Palupi conducted the study, collected data, analyzed data, and provided final approval for publication. Eka Diah Kartiningrum, Arief Fardiansyah, and Revi Ekasetya Pratiwi contributed to the critical revision of the article and finally approved the final version for publication.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

In the preparation of this manuscript, the authors utilized DeepL for translation purposes and Grammarly for language refinement and wording improvements. While these tools assisted in enhancing the clarity and readability of the manuscript, the authors take full responsibility for the content, intellectual property, and academic integrity of the work. The use of these AI-assisted technologies did not influence the original ideas, research design, or conclusions presented in the manuscript. All authors confirm that they have reviewed and approved the final version of the manuscript and are accountable for its contents. The authors affirm their commitment to academic integrity and adherence to ethical publication standards.

SOURCE OF FUNDING STATEMENTS

This study is self-funded.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to the Head of the Gedangan Community Health Center and the staff at the Gedangan Community Health Center, as well as those who contributed valuable data for this study. The authors also thank the leadership of the Majapahit Health Sciences College for their ongoing support.

BIBLIOGRAPHY

1. Eltrikanawati TET, Nurhafifah BF. Edukasi diabetes mellitus dan pemeriksaan kadar glukosa darah. Sambulu Gana: Jurnal Pengabdian Masyarakat. 2023;2(2):64–70.
2. International Diabetes Federation. IDF Diabetes Atlas (Edisi ke-10): Estimasi Jumlah Penderita Diabetes Mellitus di Indonesia [Internet]. International Diabetes Federation; 2022. Available from: https://www.ncbi.nlm.nih.gov/books/NBK581934/
3. Istiqomah IN, Yuliyani N. Efektivitas Latihan Aktivitas Fisik Terhadap Penurunan Kadar Glukosa Darah pada Pasien Diabetes Melitus Tipe 2: Kajian Literatur. Berkala Ilmiah Mahasiswa Ilmu Keperawatan Indonesia [Internet]. 2022;10(1):1–10. Available from: https://pdfs.semanticscholar.org/ce01/1cf0afb9918f31d3e6cb6bc0030d467dd1f4.pdf

4. Listriyani AS, Sandya F, Handayani MI, Leftungun SY. Analisis Risiko dan Perilaku Pencegahan Penyakit DM Tipe 2 pada Usia Produktif di Wilayah Kerja UPTD Puskesmas Depok Jaya Tahun 2022: Risk Analysis and Prevention Behavior for Type 2 DM in the Productive Age in the Depok Jaya Community Health Center UPTD Work Area in 2022. Journal of Public Health Education. 2023;2(2):62–9.
5. Tandra H. Strategi mengalahkan komplikasi diabetes dari kepala sampai kaki. Gramedia Pustaka Utama; 2014.
6. Tobing A. Care Your Self: Diabetes Melitu. Niaga Swadaya; 2008.
7. Candra IW, Sumirta IN, Harini IGA. Keadaan Harga Diri dan Depresi Pasien Diabetes Melitus dalam Model Manajemen Emosi Mengatasi Masalah Psikososial. MEGA PRESS NUSANTARA; 2023.
8. Zatihulwani EZ, Sasmito NB, Putra KWR. Diabetes Self Manajemen Education Sebagai Upaya Peningkatan Kualitas Hidup Penderita Diabetes Mellitus Tipe Ii Di Desa Tugusumberjo Peterongan Jombang: Diabetes Self Management Education As An Effort To Improve The Quality Of Life Of Type Ii Diabetes Mellitus Patients In Tugusumberjo Village Peterongan Jombang. Jurnal Abdimas Pamenang. 2025;3(1):40–7.
9. Rahmadani DF, Aljihad MN. Penerapan Diabetes Self Management Education (DSME) Terhadap Peningkatan Manajemen Kesehatan Mandiri Pada Pasien DM Tipe 2. Ners Muda. 2023;4(1):30.
10. Damayantie N, Rusmimpong R, Nomiko D. Diabetes Self Management Education Sebagai Upaya Meningkatkan Kualitas Hidup Penderita Diabetes Mellitus. Jurnal Binakes. 2021;2(1):6–12.
11. Hananto SY, Putri ST, Puspita APW. Studi Kasus: Penatalaksanaan Diabetes Self Management Education (DSME) Terhadap Kadar Glukosa Darah pada Pasien Diabetes Melitus Tipe 2. Jurnal Keperawatan. 2022;20(4):128–37.
12. Putri RCA. Hubungan Tingkat Pengetahuan dengan Perilaku dalam Mencegah Diabetes Melitus pada Jemaah Haji di Wilayah Kerja Puskesmas Kotagede I Yogyakarta [Internet]. 2021. Available from: https://eprints.poltekkesjogja.ac.id/5599/
13. Handayani NY, Haryanto I. Hubungan Tingkat Pengetahuan dan Dukungan Keluarga Terhadap Kepatuhan Diet Pasien Diabetes Mellitus di Klinik Bhakti Husada Purwakarta. Journal of Holistic and Health Sciences [Internet]. 2017;1(1):50–62. Available from: https://media.neliti.com/media/publications/340436-hubungan-tingkat-pengetahuan-dandukungan-0b5a2e59.pdf?
14. Aminah S, Amelia KR, Rianto B, Safitri VD. Pengaruh Edukasi Self Management Diabetes (DSME) Dengan Media Booklet Terhadap Kepatuhan Diet Pasien DM Tipe 2 di Puskesmas Cimahi Selatan. Malahayati Nursing Journal [Internet]. 2022;4(2):432–42. Available from: https://ejurnalmalahayati.ac.id/index.php/manuju/article/view/5912?
15. Fahardianto F, Rosyid FN. Pengaruh Diabetes Self Management Education (DSME) Terhadap Self Care Penderita Diabetes Melitus Tipe 2. Malahayati Nursing Journal. 2023;5(12):4132–42.
16. Husnah, Zufry H, Maisura. Hubungan Pengetahuan dengan Kepatuhan Pasien Diabetes Melitus dalam Menjalani Terapi di RSUD dr. Zainoel Abidin Banda Aceh. Jurnal Kedokteran Syiah Kuala [Internet]. 2014;14(2):62–6. Available from: https://core.ac.uk/download/141841572.pdf
17. Asrindo K, Wardoyo E, Amirudin I. Pengaruh Diabetes Self Management Education (DSME) Melalui Media Buku Pintar Elektronik Terhadap Perawatan Diri Penderita Diabetes Melitus Tipe II di Wilayah Kerja Puskesmas Sanggi Kabupaten Tanggamus. Health Research Journal of Indonesia. 2024;3(1):1–11.
18. Suryati I. Buku keperawatan latihan efektif untuk pasien diabetes mellitus berbasis hasil penelitian. Deepublish; 2021.
19. Girsang DG. Dampak Aktivitas Fisik Harian Terhadap Kesehatan Fisiologis Dan Psikologis: Suatu Tinjauan Pustaka. Jurnal Masyarakat Hukum Pendidikan Harapan. 2025;5(02).
20. Serbis A, Giapros V, Kotanidou EP, Galli-Tsinopoulou A, Siomou E. Diagnosis, Treatment and Prevention of Type 2 Diabetes Mellitus in Children and Adolescents. World J Diabetes [Internet]. 2021;12(4):344–65. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8040084/

21. Astutisari IDAEC, Darmini AAAYDAAAY, Ayu IAPWI, Wulandari P. Hubungan pola makan dan aktivitas fisik dengan kadar gula darah pada pasien diabetes melitus tipe 2 di Puskesmas Manggis I. Jurnal Riset Kesehatan Nasional. 2022;6(2):79–87.

22. Munali K, Nihayati HE, Hidayat Arifin ROP. CRITICAL MEDICAL AND SURGICAL NURSING JOURNAL. Jurnal Keperawatan Medikal Bedah Dan Kritis. 2019;8(1).

23. Puspa IP. Pengaruh Edukasi Terhadap Perilaku Perawatan Kaki Penderita Diabetes Mellitus di Puskesmas Jemursari Kota Surabaya [Internet]. [Surabaya]; 2022. Available from: https://repository.stikeshangtuah-sby.ac.id/id/eprint/374/

24. Vatankhah N, Khamseh ME, Jahangiri Noudeh Y, Aghili R, Baradaran HR, Safai Haeri N. The Effectiveness of Foot Care Education on People With Type 2 Diabetes in Tehran, Iran. Prim Care Diabetes [Internet]. 2009;3(2):73–7. Available from: https://pubmed.ncbi.nlm.nih.gov/19524494/

25. Chairunisa C, Arifin S, Rosida L. Faktor-Faktor yang Berhubungan dengan Perilaku Kepatuhan Minum Obat Anti Diabetes pada Penderita Diabetes Melitus Tipe 2. Homeostasis [Internet]. 2019;2(1):33–42. Available from: https://ppjp.ulm.ac.id/journals/index.php/hms/article/view/426?

26. Astuti RK. Pengaruh Diabetes Self-Management Education (DSME) Berbasis Keluarga terhadap Peningkatan Pengetahuan dan Sikap dalam Pengendalian Glukosa Darah. Media Publikasi Promosi Kesehatan Indonesia (MPPKI). 2024;7(2):408–13.

27. Windani CMS, Abdul M, Rosidin U. Gambaran Self-Manajemen pada Pasien Diabetes Melitus Tipe II di Puskesmas Tarogong Kabupaten Garut. Jurnal Kesehatan Komunitas Indonesia [Internet]. 2019;15(1):1–11. Available from: https://doi.org/10.37058/jkki.v15i1.984

28. Astuti A, Sari LA, Merdekawati D. Perilaku diit pada diabetes mellitus tipe 2. Zahir Publishing; 2022.

29. Sagala LMB. Self Care Management Pasien Hipertensi Dalam Pengendalian Tekanan Darah. PT Arr Rad Pratama; 2025.

30. Rahayu D, Herlina N. Hubungan antara Tingkat Pengetahuan dan Kepatuhan Minum Obat dengan Kadar Gula Darah pada Penderita Diabetes Melitus Tipe 2: Literature Review. Borneo Student Research [Internet]. 2021;3(1):341–51. Available from: https://journals.umkt.ac.id/index.php/bsr/article/view/2491

31. Azmiardi A. Hubungan Pengetahuan dengan Praktik Perawatan Diri pada Pasien Diabetes Mellitus Tipe 2 di Surakarta. Jurnal Ilmu Kesehatan Masyarakat Berkala (JIKeMB) [Internet]. 2020;2(1):18–22. Available from: https://journal.univetbantara.ac.id/index.php/jikemb/article/view/812

32. Simbolon MA, Kurniawati ND, Harmayetty H. Diabetes Self Management Education (DSME) Meningkatkan Pengetahuan, Sikap, dan Self Efficacy Penderita Diabetes Melitus Tipe 2. Indonesian Journal of Community Health Nursing [Internet]. 2019;4(2):60–6. Available from: https://www.researchgate.net/publication/355040287_Daiabetes_Self_Management_Education_DSME_Meningkatkan_Pengetahuan_Sikap_dan_Self_Efficacy_Penderita_Diabetes_Melitus_Tipe_2