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The Effectiveness of Diabetes Self-Management Education on Changes in Blood Sugar Levels in Type II DM Patients at the Klatak Public Health Center, Banyuwangi Regency

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ABSTRACT

Introduction: *Providing self-skills education and training to improve the ability of type II DM sufferers to carry out self-care management (DSME) including 8 important components and applying peer support to increase motivation and improve their health, avoid complications to early death.*
Objective: *This study aimed to determine the effectiveness of Diabetes Self-Management Education on changes in blood glucose levels in patients with type II DM at Banyuwangi Regency in 2023.*
Method: *Experimental research with the design of True Experimental Pretest pos-ttest control group design. The population were all type II DM patients who were treated regularly at the Klatak Public Health Center. A sample of 24 respondents in the control and 24 in the intervention groups used the MSD sample size formula. Respondents in this study were examined pre- & post-test venous plasma blood glucose levels. The sampling technique used is an RCT. Data analysis used SPSS 21 for Windows statistical T-test.*
Result: *The paired T-test results indicated that the P-value for the intervention group was less than 0.05, specifically 0.000. It means Ha is accepted. So, the blood glucose levels differ before and after undergoing DSME with the Peer Support Group method. Then, with a significance value of 0.015 being less than 0.05, it can be inferred that there is a noteworthy difference. Statistical test results of the N-gain score in the intervention group were 50.3% in the Less Effective category, while in the control group was -4.4% in the Ineffective category.*
Conclusion: *There is a significant mean difference between the two groups. The N-gain score test results in the intervention group were higher than control group. It is hoped that the implementation of DSME with the Peer Support Group will be more systematic, sustainable, and focused on changing behavior.*

Introduction

The biggest challenge in less developed countries in the world of health with a significant increase every year is Diabetes mellitus, therefore this disease is a priority and major concern that must be addressed (Tjahjono, 2019). this disease causes premature death worldwide, to be the leading cause of complications of vision loss, cardiovascular disease, and kidney damage (Kementerian Kesehatan RI., 2020). chronic conditions in people with diabetes require intensive interventions that involve individuals in managing their own care, one of which is the Diabetes Self-Management Education (DSME) approach combined with the Peer Support Group method. This type of care management can be used to help people with diabetes increase their

knowledge and activate their self-care function. Hopefully, support from peers (who have diabetes) can increase motivation in self-care.

IDF stated 463 million people between 20 to 79 years old worldwide were diagnosed with DM in 2019, representing approximately 9.3% of the total population within that age group. The projected numbers are expected to rise steadily, reaching 578 million by 2030 and 700 million by 2045. Indonesia stands at 7th place globally with 10.7 million diabetes sufferers, making it the sole Southeast Asian country in the top 10 list, indicating its significant role in the prevalence of diabetes cases in the region (Kementerian Kesehatan RI., 2020).

Primary health research data from the Kementerian Kesehatan RI. (2018), In East Java, the rate of individuals affected by diabetes mellitus ranks within the top 5 in Indonesia. Among individuals aged over 15 years diagnosed by a doctor, the prevalence of diabetes mellitus stands at 2.6%. Banyuwangi Regency Health Office Data showed the DM sufferers was 28,951 (Dinas Kesehatan Kabupaten Banyuwangi, 2019). The total of DM recorded at the Klatak public Health Center in 2019 was 1,737 people. The results of interviews with nurses who work at the Klatak Community Health Center show that the Community Health Center has a Prolanis program, namely a group management program for chronic hypertension and diabetes mellitus. Still, there has never been any discussion, let alone utilizing a Peer Support Group to make its care function independent.

Trend epidemiology shows the incidence of type II diabetes is projected to rise in the future because of unhealthy habits, higher rates of urban living, less physical exercise, shifts in dietary patterns, and growing obesity rates. Certain risk factors such as gender, age, and genetics are beyond our control, while factors like smoking, alcohol consumption, physical activity, education, and obesity can be modified. Neglecting to address these modifiable risk factors could lead to nursing challenges affecting individuals in biological, psychological, and social dimensions (Hapsari et al., 2017).

Type II DM is marked by elevated blood sugar levels resulting from reduced insulin production by pancreatic beta cells and/or hindered insulin effectiveness. This type is identifiable through elevated fasting blood sugar levels, challenges in managing it, and notable weight loss. Misunderstandings arising from a lack of understanding about individuals with type II diabetes lead to psychological impacts and hinder their ability to manage their condition, resulting in a high prevalence of depression among many patients Farhangi, 2017 in (Fajriyah et al., 2019)

One of the efforts that can be made to overcome type II diabetes mellitus is increasing knowledge and self-care through a Peer Support Group approach with DSME. The existence of providing knowledge and skills in providing care to type II diabetes mellitus sufferers can help improve their condition, prevent issues and early mortality, and lessen the financial strain; this is confirmed by (Suardi et al., 2021) "Implementing DSME intervention can help improve the conditions experienced by type II DM sufferers if carried out routinely."

According to (Agustiningrum & Kusbaryanto, 2019), DSME is efficacious in improving patient self-care, but one factor supports the success of self-care, namely family support. Therefore, it can be concluded the key success in diabetes self-management lies in self-management training and management, as well as other supporting factors. In addition, DSME interventions must be developed by considering various forms of education for illustrated leaflets, telephone calls, videos, handbooks, or face-to-face or direct education (Suardi et al., 2021). Thus, this research adds to the role of peers in providing support (Peer Support Group) and education about managing diabetes patients.

DSME is health education about the risks and how to treat them so that complications do not occur. When people with diabetes cannot fully understand, they are negatively affected. The lack of knowledge among DM sufferers about the causes of diabetes, the importance of

controlling blood sugar, and how to control blood sugar through exercise and proper nutrition causes an unhealthy lifestyle. This condition disrupts body functions and can cause pathological conditions like elevated blood sugar, cholesterol, blood pressure, and obesity. In most cases, bodily organ dysfunction causes people to feel sick, weak, and helpless and lose their role in the family and social environment. Loss of roles due to low knowledge of Diabetes sufferers can cause psychological impacts or mental disorders such as stress, depression, anxiety, withdrawal, and low self-esteem.

Previous research related to DSME has a significant effect on increasing the self-care behavior of patients with type II diabetes mellitus (Pratiwi, 2020). Monitoring the progress of self-care management can increase the independence of patients with type II DM in caring for themselves (Azami et al., 2018). In addition, the support of fellow diabetics can change self-care behavior until there is a significant decrease in HbA1c levels (Peimani et al., 2017).

Self-care management education programs are systematic interventions that encouraging proactive involvement of patients in monitoring their own health and making decisions, especially in diabetes management. This approach provides individuals with the necessary information and abilities to engage in self-care tasks, empowering them to handle emergencies, choose wisely, and successfully adopt healthier habits (Zhang et al., 2016).

The integration of two methods—self-care management and peer support—aims to enhance the knowledge and independence of diabetes patients in self-care, and to reduce blood sugar levels within the normal range by monitoring HbA1c. Therefore, the primary focus of this study is to determine whether Diabetes Self-Management Education with a peer support method can alter blood sugar levels in type II diabetes patients at Klatak Public Health Center, Banyuwangi Regency.

Methods

The research type is True Experimental. The intervention provided was DSME with the peer group method in the intervention group, where samples were taken randomly. The design used in this research is that the control and intervention group population will be randomly selected to be used as samples, or what is usually called a Randomized Control trial / RCT.

In this study, a double-blind method was used to reduce bias. Participants, respondents, and researchers do not know whether they are in a particular group. This method is also useful for reducing the influence of researchers by providing results, assessments, and even treatments that match the researchers' expectations. Another approach to reducing bias in the research process will be assisted by research assistants as a DSME team of health workers at the research site.

The population of type 2 DM patients is 191 people in the working area of the Klakak Community Health Center and will be randomly selected to be included in each intervention and control group. Then, blood sugar levels will be assessed before treatment (DSME using the peer group method in the intervention group and Prolanis education, which is usually carried out by research sites in the control group). The final results will be determined by measuring blood sugar levels in each group. Sampling used Probability sampling, namely Simple randomization with random selection using Microsoft Excel software. The sampling test in this study was based on the formula outlined by (Sopiyudin, 2019), specifically designed for comparative analytic numeric research with paired measurements, known as the Multiaxial Sopiyudin Dahlan (MSD) formula.The research sample consisted of 24 respondents for each group. The respondent selection technique uses inclusion criteria, namely type II DM patients who seek treatment at the Klatak Health Center, get insulin therapy for the last 3 months, age less than 40 years to the elderly. Type II DM patients who could not read and write and who had psychiatric disorders were not taken as research respondents.

The implementation of peer support is implemented by explaining the support process of friends who have the same condition. Furthermore, a small-scale discussion group will be formed and one of the

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patients will be appointed as a peer leader in the group. The group activities include a review of the problem and the concept of solving it according to the agreement at the previous meeting, group members have the opportunity to express the problems experienced according to the meeting on the DSME SOP, followed by an open discussion related to the current condition and feelings that are currently being felt. In this session other group members can provide suggestions or personal experiences in overcoming the disease problem and in the end all group members agree on the agreed problem-solving strategy arrangement and implement it in daily activities.

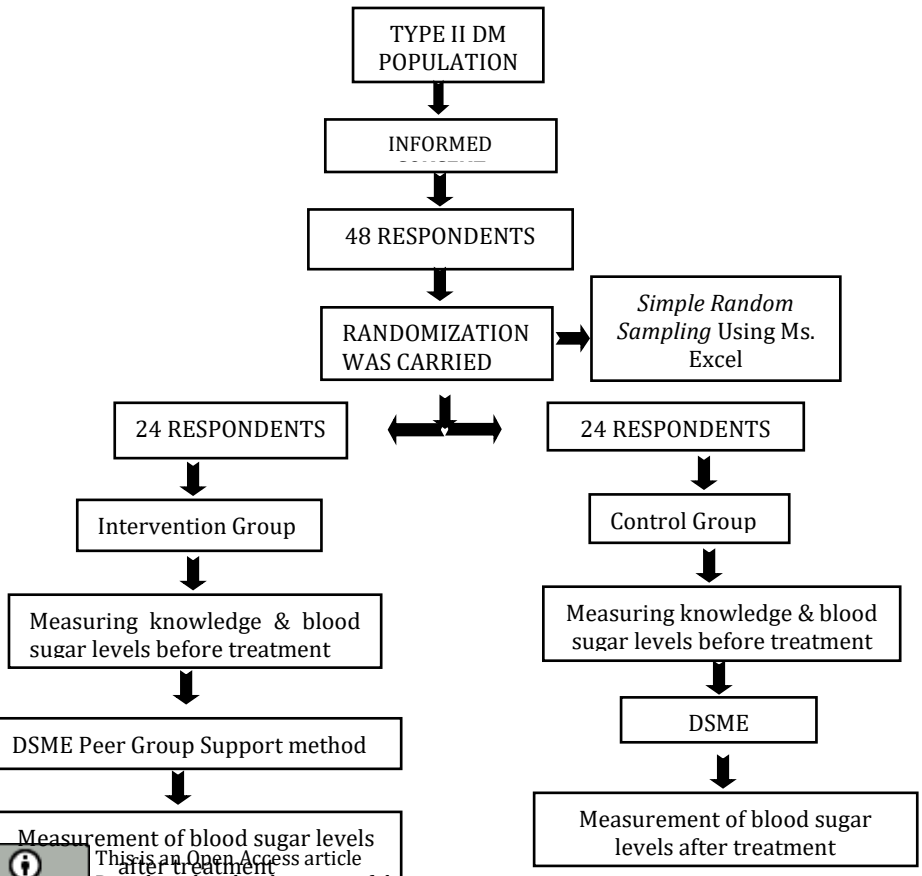
The independent variable research tool uses DSME SOP and Peer Group Support SOP. The dependent variable measures blood sugar levels using pre and post-test venous plasma glucose. This examination is in collaboration with the largest laboratory in Banyuwangi Regency. The data from the results of the study were then tested for normality using Kolmogorov Smirnov and Sig. 2 tailed output in all pre-post groups > 0.05, so the research data were normally distributed so that they could continue using the T-test. The N-Gain score test was performed to determine the level of effectiveness between the intervention group and the control group using SPSS For Windows. The following is a description of the results of the data normality test

Table 1. Test of normality

	Kolmogorov Smirnov			
	Kelompok	**Statistic**	**df**	**Sig.**
Hasil Kadar gula darah	Pre test intervensi	127	24	.200
	Pos test intervensi	125	24	.200
	Pre test kontrol	139	24	.200
	Pos test kontrol	168	24	.080

The following is a sample selection flow scheme and intervention mechanism:

Scheme 1. Sample Selection Flow



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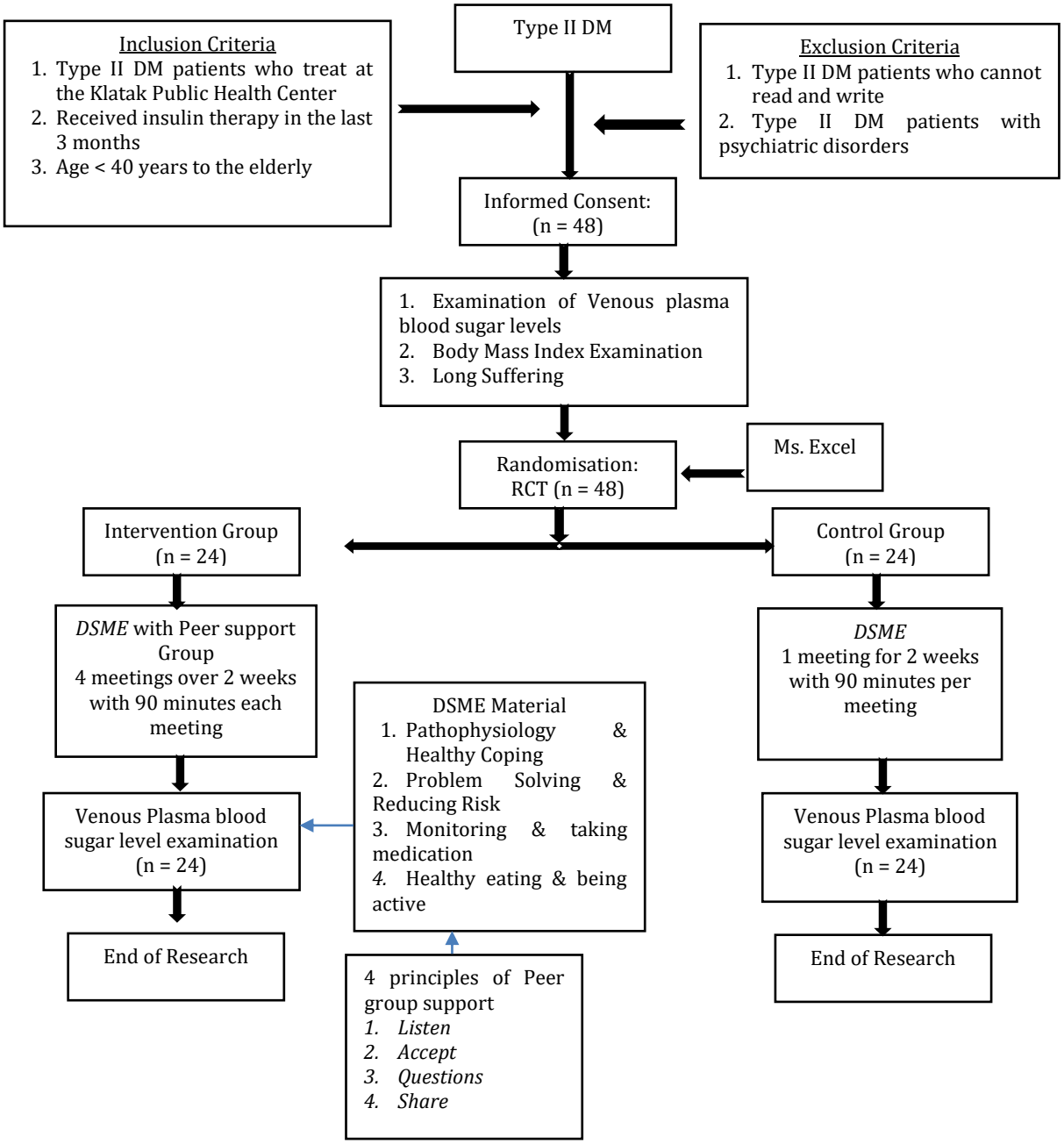
Scheme 2. Intervention Mechanism



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Results

Table2. Characteristics of respondents in the intervention group and control group

No	Respondent Characteristics	Total sample (n = 48)	Intervention Group (n = 24)	P Value Intervention Group	Control Group (n = 24)	P Value Control Group
1.	**Gender**					
	○ Man	18(37.5%)	12 (50%)	,140	6 (25%)	,439
	○ Woman	30(62.5%)	12 (50%)		18 (75%)	
2.	**Age**					
	○ Young Adult < 40 years	1 (2.1%)	-	,902	1 (4.2%)	,243
	○ Older Adults > 40 years	28(58.3%)	11(45.8%)		17(70.8%)	
	○ Elderly > 60 years	19(39.6%)	13(54.2%)		6 (25%)	
3.	**Education**					
	○ No school	7 (15%)	2 (8.3%)	,658	5 (20.8%)	,252
	○ elementary school	16 (33%)	7 (29.3%)		9 (37.5%)	
	○ Junior high school	7 (15%)	4 (16.7%)		3 (12.5%)	
	○ Senior high school	12 (25%)	6 (25%)		6 (25%)	
	○ D3	1 (2%)	1 (4.2%)		-	
	○ S1	5 (10%)	4 (16.7%)		1 (4.2%)	
4.	**Work**					
	○ Jobless	33 (69%)	13(54.2%)	,064	20(83.3%)	,605
	○ Laborer	5 (10%)	3 (12.5%)		2 (8.3%)	
	○ Trade	1 (2%)	1 (4.2%)		-	
	○ Private sector employee	4 (8%)	4 (16.7%)		-	
	○ Self-employed	1 (2%)	1 (4.2%)		-	
	○ Driver	2 (4%)	1 (4.2%)		1 (8.3%)	
	○ Civil servants	2 (4%)	1 (4.2%)		1 (4.2%)	
5.	**Long Suffering**					
	Short Duration 0 – 5 years	28(58.3%)	12 (50%)	,336	16(66.7%)	,293
	Medium Duration 6–10 years	17(35.4%)	9 (37.5%)		8 (33.3%)	
	Long Duration >10 years	3 (6.3%)	3 (12.5%)		-	
6.	**Body Mass Index**					
	○ Normal	20 (42%)	11(45.8%)	,275	9 (37.5%)	,530
	○ Overweight	20 (42%)	7 (29.2%)		13(54.2%)	
	○ Obesity	8 (8%)	6 (25 %)		2 (8.3%)	
	Amount	**48(100%)**	**24 100%)**		**24 100%)**	

From Table 2, the characteristics of respondents were found to be more than 50% female, namely 30 respondents (63%), 12 from the intervention and 18 from the control. More than

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50% of respondents were > 40 years old, 28 respondents (58%), 11 in the intervention, and 17 in the control. Less than 50% of respondents had elementary school education, 16 respondents (33%) consisting of 7 respondents in the intervention group and 9 respondents in the control group. Based on research on respondents' work, more than 50% were unemployed, 33 respondents (69%), 13 in the intervention and 20 in the control, and less than 50% were obese, namely 8 respondents (8%), 6 in the intervention and 2 in the control. The P value of each respondent's characteristics is more significant than α, namely 0.05, so there is no significant relationship.

Table 3. Results measurement blood sugar levels before and after on group control

Category	n	*Mean ± s.d. deviation*	*Std. Error Mean*	*t*	*95% Confidence Interval*		*P value*
					Lower	*Upper*	
Pre Test	24	217.75±59.548	12,155	-2,621	-8,201	-.966	,015
Post Test	24	222.33±58.661	11,974				

The average blood sugar in the control group was 217.75 with SD of 59.548. The average value of blood sugar levels experienced an increase post-test, namely 222.33 with SD of 58.661.

Table 4. Results of measuring blood sugar levels pre-post treatment in the intervention group

Category	n	*Mean ± s.d. deviation*	*Std. Error Mean*	*t*	*95% Confidence Interval*		*P value*
					Lower	*Upper*	
Pre Test	24	244.83±56,407	11,514	7,266	25,363	45,554	,000
Post Test	24	209.38±53.171	10,854				

The average blood sugar before treatment in the Intervention group was 244.83 with SD of 56.407. The average value of blood sugar levels decreased after treatment, namely 209.38 with SD of 53.171.

Table 5. Differences in blood sugar levels in the intervention group before and after treatment in type II DM sufferers at the Klatak Community Health Center

Category	n	*Mean ± s.d. deviation*	*Std. Error Mean*	*t*	*95% Confidence Interval*		*P value u*
					Lower	*Upper*	
Pre Test	24	244.83±56,407	11,514	7,266	25,363	45,554	,000
Post Test	24	209.38±53.171	10,854				

Table 6. Differences in blood sugar levels in the control group before and after in type II DM sufferers at the Klatak health center

Category	n	*Mean ± s.d. deviation*	*Std. Error Mean*	*t*	*95% Confidence Interval*		*P value*
					Lower	*Upper*	
Pre-Test	24	217.75±59.548	12,155	-2,621	-8,201	-.966	,015
Post-Test	24	222.33±58.661	11,974				

The table above shows the results of checking blood sugar levels in the intervention and control groups using the Paired T-test with α=0.05. In the intervention group, the significance was 0.000 < 0.05, namely receiving Ha, there was a difference in blood sugar levels before and after

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DSME treatment in the intervention group. Meanwhile, in the control group, the T-test results with α=0.05 showed a significance of 0.015 <0.05, namely Ha acceptance, there was a difference in blood sugar levels observed in the control group before and after.

Table 7 Effectiveness of Diabetes Self-Management Education on changes in blood sugar levels in type II DM sufferers at the Klatak Public Health Center

No	N Gain Score (%)	
	Intervention Group	*Control Group*
1	42.86	7.69
2	27.78	.00
3	94.59	-17.24
4	28.33	-11.97
5	37.65	-4.76
6	14.62	.00
7	40.63	-3.54
8	46.55	-3.85
9	16.17	-19.40
10	41.74	13.33
11	142.00	-32.00
12	20.13	9.09
13	15.27	-2.37
14	11.52	.00
15	54.17	-11.11
16	22.22	.00
17	18.63	-15.29
18	17.83	.00
19	26.67	-1.82
20	19.69	-13.25
21	32.17	.00
22	35.29	.00
23	128.57	.00
24	21.85	.00
Average	50.2886	-4.43
Minimum	11.52	-32.00
Maximum	27.78	13.33

Based on the table of N-Gain Score test results above, the score for the Intervention Group (DSME) is 50.2886 or 50.3%, including in the less effective category, with a minimum N-gain score of 11.5% and the maximum score is 27.8%. For control group (Conventional) was less than 40%, namely -4.4%, and the category deemed ineffective had a minimum N-gain score of -32% and a maximum of 13%.

Discussion

Blood sugar levels before and after in the control group of type II DM sufferers

Table 3 above indicated the average blood sugar level in the control group was 217.75, with SD of 59.548. The average value of blood sugar levels increased post-test by 222.33 with a standard deviation of 58.661. This suggests there was a rise in the control group's mean post-test blood sugar levels. This finding do not align with (Megawaty et al., 2023), who reported there were changes in blood sugar levels in both intervention groups and the control group,

with the control group showing a smaller average decrease compared to the intervention group. The trigger for increased blood sugar levels in the control group could occur due to poor diet patterns, lack of physical activity, as well as the emergence of factors that trigger stress in DM patients in the control group. (Puspita et al., 2019) The researcher assumes that the average rise in blood sugar levels within the control group is due to most diabetes sufferers only know the basic concepts of diabetes mellitus in general. They do not know how to self-care for diabetes mellitus sufferers, such as foot care, nutritional management, blood sugar levels monitoring, physical activity, and the eight management components. Independent self-care in type 2 DM.

Judging from the respondents' characteristics based on age, 97.9% are more than 40 years old; according to the statement (ADA, 2018), someone over 45 years old has the most significant possibility of suffering from type II diabetes. The researcher assumes that the aging process in individuals affects the balance system in the body and causes a decrease in the function of the body's organs, one of which occurs in the pancreas so insulin production is damaged.

Blood sugar levels before and after intervention group treatment in type II DM sufferers

Table 4 indicated the average blood sugar level before treatment in the Intervention group was 244.83, with SD of 56.407. The average value of blood sugar levels decreased after treatment, namely 209.38, with a standard deviation of 53.171. It shows a reduction in glucose levels following the administration of DSME intervention combined with the Peer Support Group method. The researchers assume that changes in blood glucose levels in this group occurred due to a combination of providing self-care management education to type II DM patients with support from peers. Providing this education emphasizes that respondents need to know more, understand, and be skilled in carrying out care independently, and with support or motivation from peers, sharing with people living with diabetes can add great enthusiasm to become better. The success of people living with diabetes in controlling low or even regular blood sugar requires high enthusiasm, a strong desire, and the ability to reduce the risk of complications with independent treatment. These results align with research (Megawaty et al., 2023), showing that the administration of DSME affects changes in blood sugar levels. In line with research results (Nuradhayani & Arman A, 2017), the DSME intervention group can prevent increases in blood sugar in type II DM patients.

There were 63% more women than men. Gender is one of the trigger factors for diabetes and changes in blood sugar levels, proven by (Nababan et al., 2018) that age, gender, diet, and genetics influence fasting blood sugar levels. The findings are not in line with the statement that men are also known to dominate women in increasing blood sugar levels, according to (Rismayanti et al., 2021). However, it is in line with (Sudirman & Modjo, 2021), Women are more prone to developing diabetes due to disruptions in their hormonal balance such as menstruation, pregnancy, and menopause, which can disrupt productivity and insulin secretion.

Differences in blood sugar levels in the intervention group and control group before and after Diabetes Self-Management Education

From Table 5, in the Intervention group, the significance is 0.000 < 0.05, namely receiving Ha, indicating a difference in blood sugar level values before and after DSME treatment. Meanwhile, from Table 5, the T-test result with α=0.05 show a significance of P value 0.015 <0.05, namely Ha acceptance, there is a difference in blood sugar levels before and after in the control group. This means there is a significant difference between the two groups before and after treatment. Judging from the P value in the intervention group of 0.000, it is smaller than the P value of the control group of 0.015, indicating that the treatment in the form of DSME using the Peer Support Group method is better than the treatment given to the control group. The researchers assume DSME is an essential means of good care for all diabetes sufferers,

especially type II diabetes mellitus. DSME helps patients develop knowledge, skills, and the ability to behave positively and treat their condition independently. 8 self-care management educational concepts not only focus on strengthening patient knowledge of the disease and its treatment, but this program also teaches type II DM patients to always think and behave positively, such as regular physical activity, maintaining a healthy diet by measuring plates, taking medication, monitoring, behaviour to prevent the risk of complications, problem-solving and holistically healthy health management (Healthy Coping) as well as emphasizing so that patients can collaborate or partner with family, peers, loved ones, and even have to regularly consult with health workers or diabetes education team for a better quality of life. This program is also integrated with a peer support group approach in its implementation as a form of quality education development, cost prevention, and problem prevention, as well as support that can provide high spirits to diabetes sufferers who have joined it. This aligns with research (Suardi et al., 2021) that DSME prove to change the level of knowledge, behaviour, and self-management for the better in people with type II DM.

The control group with P value 0.015 < 0.05 consisting of 24 respondents who experienced a change in blood sugar levels for the better, namely 13% and 38% of blood sugar levels after treatment in the control group were in the fixed category, and 50% sugar levels blood after treatment with conventional methods in the control group increased. There was a decrease in blood sugar levels in the control group, but the percentage was smaller than in the intervention group. This is in line with research (Megawaty et al., 2023) that the control group's blood sugar levels decreased by a smaller percentage. The researcher assumes that increasing blood sugar levels after treatment using conventional methods does not increase knowledge and ability to maintain health conditions so that there is no risk of more severe complications. Type II diabetes mellitus sufferers in the control group were treated only in the form of general diabetes education so that the understanding of type II DM sufferers did not increase so that these sufferers were unable to carry out self-care independently with diabetes.

Effectiveness of Diabetes Self-Management Education on changes in blood sugar levels in type II DM sufferers

Table 7 shows the average N-gain Score test for the Intervention Group (DSME) is 50.2886 or 50.3%, including in the less effective category, with a minimum N-gain score of 11.5% and a maximum of 27.8%. In the control group (Conventional) was less than 40%, namely -4.4%, included in the ineffective category, with a minimum of -32% and a maximum of 13%. Normalized gain or N-gain score aims to determine the effectiveness of a particular research method or treatment. Calculating the difference between the pre-test and post-test scores helps determine whether the technique used in the research is compelling. This N-Gain effectiveness interpretation category is ineffective if the percentage (%) < 40, less compelling if 40% - 55%, quite effective if the result is 56% - 75%, and effective if the result score is > 76%.

Providing DSME and peer support groups in the intervention group is less effective in lowering blood sugar levels in people with type II DM at the Klatak Public Health Center, Banyuwangi Regency. Providing education using conventional methods in the control group was not effective in lowering blood sugar levels in people with type II DM. It aligns with (Suardi et al., 2021), implementing the DSME intervention effectively improves the conditions of people with type II diabetes if carried out routinely. Research (Peimani et al., 2017) on 200 respondents over 6 months stated that there was a significant reduction in the intervention group with peer support in the form of reductions in HbA1c, BMI, self-care behaviour, self-efficacy, and life quality. The research results from (Azami et al., 2018) on 142 respondents over 24 weeks saw changes in HbA1c values and lifestyle of type II DM patients. HbA1c levels after treatment reached <7% without hypoglycaemia and Plasma Glucose <63mg/dL in the study

(Boels et al., 2019). Researchers assume that the success of an educational process requires many factors to be considered. The research site has provided more than adequate supporting facilities for this research. Human resources, in this case, the Klatak Public Health Center Education Team, which was formed and whose perception has been equalized for implementing DSME education, is considered very good. The methods and media for implementing DSME are well-systemized as evidenced by the existence of standard operational procedures for DSME, Peer support group, Module 8 components of DSME for type II DM patients, and there is a Log Book for the daily agenda of type II DM patients with 8 components the same one. However, one of the factors that caused DSME to be less effective in the intervention group was time and behaviour change. This education was provided in four meetings over two weeks. Ideally, this research was carried out over 3 months. Every month, an assessment of DSME effectiveness is carried out. This short time can be a significant factor in changing the behaviour of type II diabetes mellitus sufferers into behaviour that is adaptive to their health. Changing a person's behaviour takes a long time, apart from the patient's desire and determination to determine success in lowering their blood sugar levels until they fall into the Normal blood sugar level category.

Conclusion

rom the effectiveness results of DSME on changes in blood sugar levels in type II DM sufferers at the Klatak Public Health Center, it was found that the N-gain score in the intervention group was in the less effective category (50.3%) and -4.4% in the control group was in the category Ineffective. Nevertheless, this research provides a fundamental basis for developing more effective educational programs for Type II Diabetes mellitus patients. Using more complete research instruments such as physical examination, measuring depression levels using PHQ-9, using more exciting media in the digital & society 5.0 era, and the ideal time for research is 3 - 6 months to focus on changing the behaviour of type II DM patients into adaptive behaviour, to his health.

Ethics approval and consent to participate

This research has received ethical approval from the central ethics committee for research, community service & innovation, Institut Tekhnologi dan kesehatan muhammadiyah Kalimantan Barat, with ethical review decision letter number 256/II.I.AU/KET.ETIK/VII/2023

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