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THE EFFECT OF IMPLEMENTING SELF-MANAGEMENT EDUCATION FOR PATIENTS WITH DIABETES MELLITUS IN CONTROLLING BLOOD GLUCOSE LEVELS

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ABSTRACT
With the increasing prevalence of diabetes mellitus, patient self-management education is an important concern. The aim of this study was to determine the effect of community-based self-management education on blood glucose levels in patients with diabetes mellitus. Method this study used a quasi-experimental design through a group pre-test and post-test design. The sampling technique was through convenience sampling, which amounted to 31 respondents. Data analysis includes univariate analysis, namely analysis of demographic data, and bivariate analysis to determine the effect of self-management education on lowering blood glucose levels using paired sample t-test. The results of the paired simple t-test with p-value <0.05 showed that there was a significant effect of self-management education on reducing blood glucose levels, knowledge level, behavior, visits to health facilities and medication adherence. However, there was no effect of self-management education on BMI. Conclusion Community-based self-management education has a significant effect on reducing blood glucose levels in patients with diabetes mellitus in the Ciamis Health Center working area.

Keywords: diabetes mellitus; education; self-management

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INTRODUCTION

The prevalence of diabetes mellitus (DM) in the population aged ≥ 15 years increased from 6.9% to 10.9%. Concerns about the increasing prevalence of noncommunicable diseases (NCDs) have led to a consensus on global strategies for the prevention and control of NCDs, such that it has become a strategic issue in the 2030 SDGs agenda and therefore must be a priority in all countries, especially in developing countries (Direktorat P2PTM, 2019). The number of DM patients in Ciamis Regency in 2021 who received health services according to standards was 5684 (16.4%) patients out of 34730 patients, while in Ciamis Puskesmas area it was 57 (5%) patients out of 1147 patients (Dinkes Kabupaten Ciamis, 2021).Some activity targets have not achieved the expected results, such as productive age and health services for patients with hypertension and hypertension and diabetes mellitus (UPTD Puskesmas Ciamis, 2022). The achievement of health services for diabetes mellitus patients based on minimum service standards (SPM) at Ciamis Health Center for the period January-December 2022 was

1909 cases (28.53%) of the target of 6.692 cases (100%) or coverage. There are still 71.47% of DM patients who have not received services (UPTD Puskesmas Ciamis, 2022).
In view of the above problems, the coverage of DM services must be met based on the minimum service standards (SPM) for health referring to Permenkes No. 4. 2019, which must be implemented according to the target performance of 100%. From this data, it can be seen that it is still underperforming, so improvement efforts must be made immediately (UPTD Puskesmas Ciamis, 2022). One of the improvement efforts that has been scientifically proven to overcome this is the implementation of self-management education for people with diabetes mellitus (Sidiq et al., 2020). Self-management can be achieved with education related to diabetes self-management because with education, patients can prepare themselves regarding their disease and how patients should behave, provide knowledge on how to change their lifestyle, which ultimately patients understand more about their disease and can play an active role in diabetes care (Kurtanty et al., 2023). Good knowledge and understanding are the most important components to empower patients to self-manage their disease (Kumalasari & Asriyadi, 2020).

Patients with diabetes mellitus are at risk of developing complications that can affect their quality of life. These complications can be minimized through self-care management (self-management) (Luthfa & Fadhilah, 2019). Self-management is an activity that is performed to effectively manage the disease they have and to take responsibility for the management of their disease (Anggraeni et al., 2018). Diabetes self-management is an activity to control diabetes, which includes treatment and prevention of complications. The goal is to achieve optimal blood glucose levels (Mulyani, 2019). Self-management as a context of family well-being towards dynamism and sustainability in terms of self-control, evaluation, and changing perspectives from illness to health. Individuals who engage in self-management behaviors have been shown to improve their health (Andriyanto et al., 2019; Nita et al., 2021). The basic form of self-management and diabetes care requires knowledge, skills, and motivation because this program includes dietary changes, blood glucose monitoring, and increased exercise (Kurtanty et al., 2023; Salsabila & Sjaaf, 2022). With the absorption of good education, dietary regulation, exercise, and medication compliance have the effect of stabilizing blood glucose levels and improving quality of life (Yuniarti et al., 2020). With the increasing prevalence of diabetes mellitus, various government efforts have been made to address the problem, but have not yet met the desired expectations. This affects the quality of life of patients and their families. One of the improvement efforts that has been scientifically proven to overcome this is the implementation of self-management education for people with diabetes mellitus. Based on this description, the purpose of this study was to determine the effect of community-based self-management education on diabetes mellitus patients in Ciamis Regency.

METHOD

The type of research used in this study used a quasi-experimental design through a group pre-test and post-test design. The population in this study were patients with type 2 diabetes mellitus in the working area of UPTD Puskesmas Ciamis. The sampling technique was done by probability sampling with random sampling, which amounted to 31 respondents. The inclusion criteria in this study were patients with type 2 diabetes mellitus, patients in outpatient treatment at Ciamis Health Center, and patients willing to become respondents. As for the exclusion criteria, namely patients in critical condition, conditions of reduced consciousness, confused patients (unable to follow instructions) and pregnant patients. The research data collection used the SD Codefree Blood Glucose Test Strip 50T SD Biosensor blood glucose testing device. Blood Glucose Test Strips are compatible with the SD

CODEFREE Blood Glucose Monitoring System. Standard Codefree test strips use 99.9% gold electrodes in the test strips and the system is accredited according to ISO 15197:2015. 581 out of 600 (96.8%) with results met the requirements for blood glucose monitoring, and questionnaires validated and reliable with Cronbach's alpha values.0.893 to collect demographic and health data from the participants were administered at baseline and at the end of the intervention. Data analysis includes univariate analysis, namely analysis of demographic data, and bivariate analysis to determine the effect of self-management education on lowering blood glucose levels using paired sample t-test This study was conducted from October 2023 to January 2024.

RESULTS

Mean age of patients with DM was 54.13 years. Gender is 90.3% female. As many as 80.6% of DM patients are not working. 71.0% of DM patients have completed primary education. Marital status is 74.2% married. Blood glucose levels (GDS) of 31 patients with DM decreased from an average of 304.39 mg/dl to 236.45 mg/dl after self-management education. BMI did not decrease, but increased by 0.065. The knowledge level of patients with DM increased by 15.78% after the intervention. Behavior of patients with DM improved, an increase of 10.22%. Routine care visits/frequency increased by 0.48 times after self-management education. The number of patients with DM taking medications as recommended by their physicians increased by 0.06%.

Table 1.
Respondent Characteristics

Respondent Characteristics	Intervention Grup
Age, *mean (SD)*	54,13 (7,957)
Gender, *n (%)*	
Male	3 (9,7)
Female	28 (90,3)
Work, *n (%)*	
Trader	6 (19,4)
Not Working	25 (80,6)
Education, *n (%)*	
Elementary	22 (71,0)
Secondary	3 (9,7)
Higher	6 (19,4)
Marital Status, *n (%)*	
Married	23 (74,2)
Widowed	8 (25,8)

The results of the paired t-test with a p-value <0.05 showed that there was a significant effect of self-management education on reducing blood glucose levels, knowledge, behavior, visits to health care facilities, and medication adherence. However, there was no effect of self-management education on BMI (Body Mass Index).

Table 2
Results of paired sample test

Respondent Characteristics (n=31)	Intervention grup Mean (SD)		Mean Different (95%CI)	p
	Pre	Post		
GDS	304,39 (68,096)	236,45 (60,723)	67,94 (55,925 sd 79,946)	< 0,000
BMI	25,26 (4,066)	25,32 (3,876)	0,05 (-0,348 sd 0,219)	0,645
Knowledge	69,90 (9,775)	85,68 (5,969)	15,78 (-19,695 sd -11,854)	<0,000
Behavior	66,81 (9,673)	77,03 (3,449)	10,22 (-14,289 sd -6,162)	<0.000
Visit	1,68 (1,222)	2,16 (1,440)	0,48 (-0,895 sd -0,072)	0,023
Medication Consumption	1,52 (0,508)	1,58 (0,502)	0,06 (0,004 sd 0,254)	0,043

DISCUSSION

The self-management education intervention conducted for 6 sessions between October 2023 and January 2024 for 31 patients with DM showed a decrease in blood glucose levels. Blood glucose was measured using Codefree test strips accredited according to ISO 15197: 2015. 581 out of 600 (96.8%) results met the requirements. The measurement of GDS indicators using Codefree test strips as a result of the effect of the intervention is based on several considerations, including ease of testing and convenience of respondents. The respondents are generally primary educated, female and not working, which is another reason to measure with simple, easy and inexpensive tools. This is expected to motivate DM patients to perform regular self-examination in the future to increase the achievement of one of the indicators of the 5 pillars of DM management, namely laboratory examination.

Patients with type 2 DM are more common in women (Srikartika et al., 2016). Factors that cause women to be at higher risk of developing type 2 DM are that women tend to have an increased risk of stress (Bestari, 2020), which can trigger an increase in blood glucose levels, a history of pregnancy, obesity, use of oral contraceptives, and high levels of stress (Willer et al., 2016). The impact of self-management education on DM patients is significant due to the possibility that most of the female respondents do not work, so they have a lot of free time which they use in the process of learning, increasing knowledge and changing themselves.

The increased awareness of DM patients to seek routine care begins with the increased knowledge of DM patients after the intervention until there is no DM patient who lacks knowledge. Increased knowledge leads to behavioral changes for the better (Arlinghaus & Johnston, 2018; Pratiwi et al., 2022). This is in line with Sukma *et al* (2023) who states that high knowledge has a positive impact on awareness of minimizing DM disease and increasing health awareness. Respondents who took medication recommended by doctors also increased in line with their improved knowledge and behavior (Andriyanto et al., 2019). Self-management education has contributed to changes in the body condition of patients with DM, including a decrease in blood sugar levels, as demonstrated in the results of this study. This aligns with Astuti's (2024) findings that self-management education can improve the knowledge and attitudes of individuals with DM. Self-management education has also been shown to effectively reduce blood sugar levels in individuals with DM (Astuti, 2024; Zai et al., 2020).

The number of respondents taking medication as recommended by their doctor also increased in line with the increase in knowledge and behavior (Andriyanto et al., 2019). Increased knowledge, behaviour, visits to the doctor and taking medicines as an effect of self-management education has contributed to a change in the physical condition of patients with DM (Yuni et al., 2020), namely a decrease in blood glucose levels at the time, as in the results of this study. This is in line with Astusi (2024) dan Ernawati *et al* (2021). who state that self-management education has an effect on improving the knowledge and attitudes of people with DM. Self-management education is very effective in reducing blood glucose levels in people with DM (Astuti, 2024; Zai et al., 2020).

The reduction in blood glucose levels has not yet reached normal levels, which is possible due to a number of factors. Lowering blood glucose levels takes time (Silalahi et al., 2021), so 3 months is not enough time to reach normal blood glucose levels (Fathoni, 2018). There is no effect of self-management education on Body Mass Index (BMI), possibly because there is an increase in drug use (Tantu et al., 2023), which lowers blood sugar and allows glucose to enter the cells, This causes weight gain.

CONCLUSION

Community-based self-management education has a significant effect on reducing blood glucose levels in patients with diabetes mellitus in Ciamis Regency.

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