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Effect of Diabetes Self Management Education on Blood Sugar Level Control for Diabetics in Padangsidimpuan City

Adi Antoni [1], Eva Decroli [2], Afriwardi [3], Irwan Prayitno [4], Nur Indrawati Lipoeto[5], Nursyirwan Efendi[6], Mudjiran[7], Hardisman[8]

Abstract

Diabetes mellitus (DM) is a chronic disease whose number is always increasing every year in the world. DM requires serious treatment in order to reduce the complications of this disease. The purpose of this study was to determine the effect of diabetes self-management education on controlling blood sugar levels in diabetics in the city of Padangsidimpuan. This study used a one group pretest-posttest only design involving 40 respondents based on sample size calculation using sample size determination in health studies. The sample technique uses proportional random sampling. The sample criteria are type 2 diabetes mellitus, diabetic patients who do not experience cognitive impairment, can communicate verbally and nonverbally. Measuring blood sugar levels using HbA1c. The results of this study indicate that the average before the DSME intervention obtained an HBA1c value of 8.828% (SD=.17725) and the average after the DSME intervention obtained an HBA1c value of 7.940% (1.1502) (p value = <0.001). DSME is effective in reducing HBA1c values in people with diabetes mellitus. So it is hoped that DM sufferers can take advantage of DSME as an independent intervention that can be done at home to prevent various problems from DM.

Keywords: *diabetes self management education, diabetes mellitus, blood sugar levels, HBA1c.*

Introduction

Diabetes mellitus is an epidemic disease throughout the world with an ever-increasing prevalence and is a global health burden. It is estimated that 537 million people have diabetes at the age of 29-79 years and it is predicted to increase to 783 million people in 2045(1). Approximately 422 million people worldwide have diabetes, the majority of whom live in low- and middle-income countries, and 1.6 million deaths are directly attributed to diabetes each year (2). There are 536.6 million people suffering from diabetes in the world in 2021 and 205.6 million people in the WP (Western Pacific) Region and will increase in 2045 to 260.2 million (3).

[1] Student of Doctoral Program of Public Health Sciences, Faculty of Medicine, University of Andalas, Padang, Indonesia, e-mail: adiantoni100@gmail.com
[2] Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia
[3] Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia
[4] Universitas Muhammadiyah Jakarta, Jakarta, Indonesia
[5] Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia
[6] Department of Anthropology, Andalas University, Padang, West Sumatra, Indonesia
[7] Guidance and Counselling Department, Universitas Negeri Padang, West Sumatera, Indonesia
[8] Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia

The total cases of diabetes in Indonesia are 19.5 million people in 2021 and will increase to 28.6 million people in 2045 while Indonesia is ranked 5th in the world with the most diabetes sufferers, namely 10.2 million people and in 2021(4). The 2018 Riskesdas results found an increase in the prevalence of people with diabetes mellitus (age > 15 years) from 6.9% in 2013 to 10.9% in 2018 (5). North Sumatra is one of the provinces with the fourth most diabetes sufferers in Indonesia. Types of diabetes mellitus control in North Sumatra based on eating arrangements were obtained at 78.3%, exercise at 46.1%, and herbal alternatives at 37.1%(6).

Controlled blood sugar levels are one measure of the success of self-management of people with diabetes mellitus, however, the target for achieving glycemic control is still not satisfactory and most of them are still above the desired target of 7% (7). One of the causes of low glycemic control is low adherence to taking medication and long duration of illness affects the low glycemic control of DM patients (8)

Higher diabetes knowledge and higher medication adherence were significant predictors of good glycemic control (9). There is a negative correlation between knowledge about diabetes and HbA1c values. This means that the higher the knowledge about diabetes, the lower the HbA1c value. In addition, there is a positive correlation between knowledge about diabetes and self-care management (10). In addition, DSME can increase the chances of glycemic control with an estimated value before intervention of 0.53 to 0.82 (14).

Based on the description above, researchers are interested in researching the effect of diabetes self-management education on controlling blood sugar levels of diabetics in Padangsidimpuan City.

Method

This study used a Cluster Randomized Controlled Trial (CRCT) based on the CONSORT (Consolidated Standards of Reporting Trials) guidelines. The design of this study was a quasy experiment with a one group pre test post test only design which was carried out in the city of Padangsidimpuan. The number of samples in this study were 40 respondents using the Sample Size Determination in Health Studies formula. The sample technique uses proportional random sampling. The sample criteria in this study were type 2 diabetes mellitus, diabetic patients who did not experience cognitive impairment, were able to communicate verbally and nonverbally.

Measurement of blood sugar levels using Glycated hemoglobin (HbA1c). Measured using HPLC (High Performance Liquid Chromatography). This research was conducted for 3 months. Data analysis using the Paired t Test

Results

Table 1. Average HBA1c values before and after the DSME educational intervention in diabetes mellitus patients (n = 40)

Variable	Before intervention (n=40)			After Intervention (n=40)			p value
	Mean	SD	95%CI	Mean	SD	95%CI	
HBA1c	8.828	1.17725	8.453 - 9.202	7.940	1.1502	7.572 – 8.308	<0.001

The table above shows the results of the paired t test on HBA1c in the first measurement (pretest) obtained an average HBA1c value of 8.828% while the average HBA1c after the intervention was 7.940%. the difference in HBA1c before and after the intervention was 0.888%. Based on the results of the statistical test, it can be concluded that there is an effect of diabetes self-management on blood sugar levels in people with diabetes mellitus.

Discussion

The results of this study indicate that DSME is able to control blood sugar levels. This is in accordance with previous studies, namely there is a decrease in HbA1c values (15). Chai stated that out of 118 respondents (63 intervention groups, 55 control groups) DSME could significantly reduce anxiety, depression, and HbA1c scores (before 7.2%, after 6.2%), blood sugar levels 2 hours after the tolerance test oral glucose or OGTT and fasting blood sugar (16).

DSME can reduce HbA1c values (before 10.51% and after 9.89%) (14). In addition, DSME can lower HbA1c values in the absence of hypoglycemia (17). DSME also affects physical activity and dietary habits of people with diabetes mellitus (18).

Adequate glycemic control or HbA1c is very difficult for diabetics (19). Diabetes self-management is influenced by four factors, namely self-efficacy, level of knowledge, spiritual level and social support (20). Several studies have shown that education in diabetes patients that refers to self-efficacy is very effective in improving self-care (21)(22)(23).

Diabetics who did not receive education about diabetes had a knowledge score of 15.3% lower than those who received education and had an average HbA1c value of 0.89% higher than those who received education (24). In addition, poor disease knowledge and non-adherence to treatment among DM patients has been an ongoing problem for both patients and healthcare providers (25).

Educational programs that emphasize lifestyle modification with the importance of adherence to the overall medication regimen, especially diet, exercise, and regular follow-up will be more beneficial in glycemic control than adherence to medication alone (26) (27).

Management of diabetes mellitus is very important in preventing the dangers of complications as well as reducing the number of people with diabetes and reducing the cost of expensive treatment (28). In general, the management of diabetes mellitus aims to improve the quality of life. Management of diabetes mellitus specifically in the form of education, medical nutritional therapy, physical exercise, and pharmacological therapy (7).

Diabetes self-management is at the heart of diabetes management (29). Diabetics need about 99% self-care independently in managing their disease (30). Things that are needed in the self-management of diabetes patients are proper education, lifestyle modification, medication and blood glucose control. Education or education is the foundation in achieving the success of diabetes management (31).

In order to improve the health status of the people in Indonesia and the success of the social security program in the health sector, in accordance with Presidential Regulation Number 12 of 2013 concerning Health Insurance Article 21 Paragraph 1, one of Prolanis' activities through group education is a form of promotive and preventive efforts related to chronic diseases experienced by people, especially diabetes. An indicator of the success of implementing Prolanis in a health center is that 75% of participants have "good" results on specific examinations for diabetes mellitus according to clinical guidelines (32).

Even though the implementation of the educational program has been implemented for a long time, there are still deficiencies in its application. Based on the research by Raraswati, Keryawan and Soetedjo in 2018, it was found that the implementation of education in the prolanis program at the Jatinangor District Health Center had been carried out but was not optimal. This is caused by several factors, among others. The doctor's factor that might occur is the lack of education of the doctor to the patient about the disease he is suffering from and it is important to carry out monitoring so that the

patient's awareness to check fasting blood sugar every month is low. The patient factor, that most patients only come to the health center when there are complaints or just to take medicine do not do routine fasting blood sugar checks (33).

Conclusions and recommendations

Based on this study it can be concluded that diabetes education through DMSE can be a way to control blood sugar levels in patients with diabetes mellitus. So that the blood sugar levels of diabetics remain stable. Because diabetes is a chronic disease that requires lifelong intervention.

The results of this study are expected to be one of the independent interventions for people with diabetes mellitus at home.

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