

Lifestyle Management: Differences in Knowledge, Physical Activity and Diet Compliance with Diabetes Self-management Education (DSME) Principles

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Abstract: Lifestyle Management is the foundation for diabetes care including DSME, Medical Nutrition Therapy (MNT), physical activity, smoking cessation counseling, and psychosocial care. DSME facilitates increasing the knowledge and skills of people with diabetes to be able to manage diabetes care independently. This study is to analyze differences in knowledge, physical activity, and dietary compliance with the provision of Diabetes Self-Management Education (DSME). A pre-experimental study with one group pretest-posttest design was conducted on 23 patients with type 2 DM, was carried out at a special DM clinic at Fatmawati Hospital, Jakarta. Subjects were selected by consecutive sampling and received an education with the DSME method 6 times for 6 weeks. Data were analyzed by paired t-test to determine the difference between the mean of variables. There were significant differences before and after the DSME intervention in knowledge ($p=0.000$), physical activity ($p=0.001$), and diet compliance ($p=0.000$). This study showed that there was a significant increase in outcome data of patients who have been given the intervention of the Diabetes Educator team. To increase access to DSME for patients, family support and motivation from the Diabetes Educator team are needed.

1 INTRODUCTION

In 2015, the American Diabetes Association published a Diabetes Self-Management Education and Support (DSMES) program that provides guidance for diabetics in increasing abilities needed to be able to implement supportive behaviors in managing lifestyles according to their disease conditions.

The DSMES program was adopted and developed by Endocrinology Community Indonesia, involving patients and all medical and health workers in an effort to reduce the prevalence of diabetes mellitus in Indonesia.

One of the DSMES programs is nutrition education related to implementing diet therapy and physical activity in order to prevent acute and chronic complications and to improve the quality of life of people with diabetes mellitus.

2 BACKGROUNDS

Diabetes mellitus (DM) is defined as a metabolic disease characterized by high blood sugar levels due to abnormalities in insulin secretion and/or action (Perkeni, 2019). According to the International Diabetes Federation (2019), 1 in 11 adults aged 20 – 79 years worldwide has diabetes (approximately 463 million people) but it turns out that 1 in 2 adults with diabetes are not aware that they have diabetes 232 million people (Indonesian Ministry of Health)

The 2018 Basic Health Research Report by the Ministry of Health showed an increase in the prevalence of DM to 10.9%. The 2017 International Diabetes (IDF) report placed Indonesia as the 6th country in the number of DM sufferers which reached 10.3 million. Predictions from the IDF state that there will be an increase in the number of DM patients from 10.3 million in 2017 to 16.7 million in 2030 (PERKENI, 2019)

Various efforts have been made to prevent the increase in the prevalence of people with diabetes mellitus, one of which is developing self-

management for people with diabetes to be able to control blood sugar conditions and prevent complications in order to achieve a good quality of life, through patient education with the Diabetes Self-Management Education and Support (DSMES) approach.

The purpose of DSMES is to improve the knowledge, skills, and confidence of diabetic patients to accept responsibility for their self-management. This includes collaborating with their health care team, making informed decisions, solving problems, developing personal goals and action plans, and coping with emotions and life stresses. DSME facilitates increasing the knowledge and skills of people with diabetes to be able to manage diabetes care independently. This study is to analyze differences in knowledge, physical activity, and dietary compliance in diabetic patients with the provision of DSMES.

3 METHODS

A quasi-experimental with one group pretest-posttest approach was conducted in diabetic outpatient in Fatmawati Hospital Jakarta in July-August 2019. Subjects were selected with consecutive sampling. Inclusion criteria were Diabetic outpatients in Fatmawati Hospital, aged >25 years, willingly to participate in this study and following all intervention session. Exclusion criteria was absent minimum one of session.

Intervention of education with DSME principles was carried out for 6 weeks (1 week each), and the material was given by the trained Diabetes Mellitus educator team. Educator team consisted of doctors, dietitians, nurses and pharmacists. Education was given 100 - 120 minutes per session.

Topics of education were session about basic knowledge of DM, session 2 was about Diabetes Diet Therapy, session 3 was about physical activity and exercise, session 4 was about Pharmacological Therapy, session 5 was about evaluating care, session 6 was about monitoring blood sugar levels and hypoglycemia.

Knowledge, physical activity and dietary compliance of diabetes mellitus diet were measure by structured questionnaire. Questionnaires were given before and after the nutrition intervention. Data on the level of knowledge, level of physical activity and level of dietary compliance are presented using the good/adherent category if the respondent's score is more than the average, and vice versa with the poor/adherent category. Bivariate data were analyzed

using paired T-test and independent T-test with 95% confidence level.

4 RESULTS

Characteristics subject of this study were average age of 23 respondents is 61 years with the lowest age being 35 years and the highest being 80 years. The results also showed that the number of respondents with diabetes 10 years was 56.5% while those who were more than 10 years old were 43.5%.

According to Hariani et al, there is a relationship between the length of suffering from type 2 DM and the patient's quality of life, namely the longer the patient suffers, the worse the patient's quality of life.

Consensus The Dieabetes Educators, 2015 there are 4 critical times to implement and modify DSMES, namely first times diabetes is diagnosed, annually or when not meet treatment targets, when complications factor developed and transitions in life occur (advanced age).

Physiological changes that occur with age in DM patients, result in a decrease in physiological function in the endocrine system, in addition to an unhealthy lifestyle and non-optimal DM management has the potential to cause various complications, including retinopathy, heart disease and kidney failure. Therefore, it is important for patients and care providers to manage a diabetes lifestyle through the DSMES program, so that the quality of life of DM patients gets better with increasing age and increasing the length of time being a type 2 DM patient.

Lifestyle Management is the foundation for diabetes care including education with DSMES principles, Medical Nutrition Therapy (MNT), physical activity, smoking cessation counseling, and psychosocial care.

Table 1: Distribution of Respondents by Level of Knowledge in Type II Diabetes Patients

Level of Nutrition Knowledge	Pre test		Post Test	
	Freq	%	Freq	%
Low	11	47,8	0	0
Good	12	52,2	23	100
Sum	23	100	23	100

The results showed that after receiving DSME-based education, all respondents (100%) had a good level of knowledge. Most of the respondents are motivated to apply knowledge from the DSME program to improve their own nutritional and health status

Table 2: Results of Statistical Tests before and after the intervention on increasing knowledge of Type II Diabetes Patients

Nutrition Knowledge	Mean	Min - Max	SD	PValue
Before the DSMES-based education	75,5	53,13-90,63	6,7	0,000
after the DSMES-based education	89,9	78,13-100		

The average pretest score for knowledge was 75.5 (standard deviation 10.3). After DSMES-based education was conducted, the posttest score increased to 89.9 (standard deviation 7.04). The results of the study, there was a significant difference between education and DSME principles on the level of knowledge before and after education, with a P value < 0.05 (p = 0.000).

According to MA Simbolon et al, 2015 and CM Yuni et al, 2019, DSME can increase knowledge of self-management of Type 2 DM patients to prevent disease complications.

The DSME learning process aims to provide knowledge to patients so that there is a process of changing information, emotions and decision making that have an impact on the occurrence of the cognator control process in the brain in order to carry out learning and adaptation mechanisms.

The educational process in this study was carried out in groups using the DSME curriculum, the material provided was in the form of material related to general DM knowledge, Diet Management, Physical Activity, knowledge related to drugs, foot care, and monitoring blood sugar levels, with lecture method using props, emo demo and mind maps.

Changes in respondent's knowledge are felt to increase, because of the interest and awareness to be able to control blood sugar levels. Education is given in stages with the lecture method, sharing between sufferers, as well as activities that involve the family. The existence of a booklet provided by the Educator team also makes it easier for respondents to apply it independently at home

Based on the respondents' confessions, participating in DSMES-based DM education was very fun, with an interesting method, being able to gather and play with other diabetic patients. However, the schedule is very long (2 hours per session and takes approximately 1.5 – 2 months), they say it can be done because of the support from the family. Meanwhile, according to the Educator team's admission, quite a lot of diabetes patients cannot

complete the entire education curriculum based on this DSMES, and only 23 people could be respondents in this study.

Family members and peers are an underutilized resource for ongoing support and often struggle with how to best provide help. Including family members in the DSMES process can help facilitate their involvement. Such support people can be especially helpful and serve as cultural navigators in health care systems and as liaisons to the community. Community programs such as healthy cooking classes, walking groups, peer support communities, and faith-based groups may lend support for implementing healthy behavior changes, promoting emotional health, and meeting personal health goals (Diabetes Educator, 2019).

Z Zhouzi et al, 2019, The electronic nutrition education resource (internet based) was found to be an effective means for delivering education. It has potential to bridge the gap between the limited supply of healthcare resources and the increasing demand for diabetes nutrition education. Most participants expressed intentions to make positive dietary and lifestyle choices.

In this COVID-19 pandemic situation, it is worth considering developing and modifying an educational curriculum with this DSMES approach, by utilizing resources such as making videos distributed through social media (youtube, Instagram, Facebook) or comprehensive web-based or digital health educational programs.

Table 3: Distribution of Respondents by Level of Physical Activity in Type II Diabetes Patients

Physical activity level	Pre test		Post Test	
	Freq	%	Freq	%
Low	21	91,3	13	56,5
Good	2	8,7	10	43,3
Sum	23	100	23	100

Most of the respondents (91.3%) had a low level of physical activity. After receiving DSME-based education, respondents were motivated to do various activities such as jogging 1-2 times a week, walking in the morning and evening for 15-30 minutes, doing physical exercise using tools assisted by special trainers at home, and some respondents actively participates in gymnastics with the community 1 time / week

Table 4: Results of Statistical Tests before and after the intervention on increasing Physical activity of Type II Diabetes Patients

Physical activity	Mean	Min - Max	SD	PValue
Before the DSMES-based education	1,42	0,56-97	0,23	0,003
after the DSMES-based education	1,59	0,92-2,1		

The pretest score on physical activity averaged 1.42 (standard deviation 0.29), after the DSMES-based education, there was an increase in the posttest score to 1.59 (standard deviation 0.33). The results of the Paired t-test showed that there was a significant difference between nutrition education and DSME principles on the level of physical activity, with a P value < 0.05 (p = 0.003).

NR Zaky's research, 2018, showed a significant difference between physical activity compliance in patients with type 2 diabetes mellitus before and after being given Diabetes Self-Management Education (DSME) with a p value = 0.000

After every DSME education session, some respondents try to be more active than before, starting from walking in the morning and evening, after lunch, and also starting to sit back and lie down. Respondents are more understanding and motivated about the importance of changing attitudes and healthy living behavior, namely planning an appropriate diet and carrying out regular physical exercise.

Exercise has been shown to improve blood glucose control, reduce cardiovascular risk factors, contribute to weight loss, and improve well-being. However, there are still 56.5% of respondents whose level of physical activity is considered lacking, therefore it is important for the management of the diabetes care team to understand the difficulty that many patients have reached definite treatment targets and to define individual approaches to improving goals achievement.

Physical exercise should be adjusted to age and physical fitness status. The intensity of physical exercise in relatively healthy diabetic patients can be increased, while in diabetic patients with complications, the intensity of exercise needs to be reduced and adjusted to each individual.

Table 5: Distribution of Respondents by Level of Dietary Adherence in Type II Diabetes Patients

Dietary adherence level	Pre test		Post Test	
	Freq	%	Freq	%
Obey	10	43,5	23	100
Not Obey	13	56,5	0	0
Sum	23	100	23	100

All respondents (100%) adhered to dietary recommendations after being given DSEM-based education. Compliance behavior shown by some respondents, such as, "always" considers the value of energy (calories) in daily food, takes medication as recommended, and "never" consumes high-fat foods and high sugar beverages or soft drink

Table 6. Results of Statistical Tests before and after the intervention on increasing Dietary Adherence of Type II Diabetes Patient

Dietary adherence	Mean	Min - Max	SD	PValue
Before the DSMES-based education	78,35	60-97	8,6	0,000
after the DSMES-based education	103,65	87-114		

The average pretest score on dietary compliance was 78.35, after the DSMES-based education, there was an increase to 103.65. The results of paired t-test showed that there was a significant difference between nutrition education and DSME principles on the level of physical activity, with a P value < 0.05 (p = 0.000)

Laili, et al., 2012's study showed that there was an effect of DSME approach on dietary compliance practices with p=0.002 and p=0.564. Nutrition therapy has an integral role in overall diabetes management, and each person with diabetes should be actively engaged in education, self-management, and treatment planning with his or her health care team, including the collaborative development of an individualized eating plan.

A variety of eating patterns are acceptable for the management of diabetes, and a referral to an registered dietitian nutritionist (RDN) is essential to assess the overall nutrition status of, and to work collaboratively with, the patient to create a personalized meal plan that considers the individual's health status, skills, resources, food preferences, and health goals to coordinate and align with the overall

treatment plan including physical activity and medication (Diabetes Educator, 2019)

5 CONCLUSIONS

There was a significant difference between before and after DSME intervention of knowledge; level of physical activity level and dietary compliance. This study showed that there was a significant increase in outcome data of patients who have been given the intervention on the Diabetes Educator team. To increase access to DSME for patients, family support and motivation from Diabetes Educator team are needed. In this COVID-19 pandemic situation, it is worth considering developing and modifying an educational curriculum with this DSMES approach, by utilizing resources such as making videos distributed through social media or comprehensive web-based educational programs.

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