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The Influence of Type 2 Diabetes Mellitus Education on Elderly Knowledge in the Pejaten Timur Subdistrict Area, South Jakarta

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Abstract

Education is one of the pillars of managing diabetes mellitus, one of which is type 2 diabetes mellitus which is experienced by many diabetics. This study aims to determine the effect of type 2 diabetes mellitus education on the knowledge of M.T Hubbi Arrassuul's mother at RW. 01 Pejaten Timur Jakarta. This research method is a quasy experiment with one group pre-post design. The results of the study showed that knowledge increased after educational interventions with a p value of 0.000. The conclusion of this study is that education can help prevent type 2 diabetes mellitus by increasing knowledge about diabetes mellitus.

Keywords: Education, Diabetes Mellitus Type 2, Knowledge, Increasing

Introduction

The International Diabetes Organization (IDF) estimates that the prevalence of diabetes increases with age by 19.9% or 111.2 million people aged 65-79 years. This figure is predicted to continue to increase to 700 million in 2045. According to the IDF, of the 10 countries with a projected population suffering from diabetes aged 20-79 years, there are 10 countries and Indonesia is in 7th place with the number of sufferers at 10.7 million, while in Southeast Asia, Indonesia is ranked 3rd with a prevalence of 11.3%. Indonesia is the only country in Southeast Asia that is on the 10th highest ranking list (RI Ministry of Health, 2020). According to the 2018 RISKESDAS results, the prevalence of diabetes aged ≥ 15 years was 2%, an increase of 0.5% from 2013, while according to the results of examinations, blood sugar levels increased by 8.5% compared to 2013, which was 6.9% (Balitbangkes RI, 2018).

Diabetes Mellitus (DM) is a metabolic disease that is related to diet, so preventing DM will be related to regulating diet and controlling appropriate therapy. DM is characterized by increased blood glucose levels caused by type 1 and type 2 DM, and is an autoimmune disease that causes the immune system to destroy the pancreatic β cells that produce insulin. However, type 2 DM is the most common cause (Davis et al., 2022) of 90-95% of all diabetes cases. Type 2 DM causes cells to become resistant to insulin which results in dysregulation of glucose metabolism. The staple food in Indonesia is rice, which is also one of the staple foods of the world's population with a high glycemic index (GI) (64-93%). Besides brown rice, it is relevant in controlling metabolic diseases, especially

in controlling diabetes (Pereira et al., 2021).

Chronic hyperglycemia in diabetes has an impact on long-term damage, dysfunction of several organ systems in the eyes, kidneys, nerves, heart and blood vessels which causes complications of vision problems, kidney failure, cardiovascular disease and neuropathy. This implies structured monitoring to improve the quality of life of DM sufferers from all sectors (Davis et al., 2022). The 4 main pillars in the management of type 2 DM are education, nutritional therapy, physical exercise, and pharmacological intervention. One of the education on diabetes is DSME.

The DSME program is structured based on learning and behavioral theories by adjusting based on the needs of society, ethnicity, culture, knowledge, and geographical factors. Literature review from 10 journals that have obtained DSME delivery methods used are One-toone, Group Based, and Tele-medicine. DSME outcome indicators are generally divided into 3, namely biomedical, behavioral, and psychosocial (Ahdiah & Arofiati, 2020).

The National Standards for Diabetes Self-Management Education and Support provide quality, evidence-based guidance and practice for all diabetes self-management education and support services (DSMES). This standard has been updated in 2022 with the aim of overcoming therapeutic lag for people with diabetes and gaining access to essential health services (Davis et al., 2022).

Because the most diabetics in Indonesia are type 2 DM, self-care based education can also be done as an approach that can reach all sufferers both in health services and at home. The goal is to control blood glucose levels so that blood glucose levels remain within normal limits, increase independence, improve the ability to prevent and manage diabetes so as to comply with the treatment schedule and apply a healthy lifestyle from the education provided by health workers. The ultimate goal of all self-care benefits is to prevent complications due to DM. In the end, self-care management of diabetes if done correctly can prevent complications that can arise from diabetes (Istiyawanti et al., 2019).

Based on the impact of diabetes and efforts to support the 4 pillars of diabetes management and monitoring program, this research was conducted with the aim of increasing public awareness to prevent diabetes from growing through education about type 2 DM.

Method

The research method used is a case study by providing Health Education or Health Education interventions and knowledge evaluation before and after the intervention. This method was chosen because it was in accordance with the respondent's problem, namely the respondent's lack of knowledge about diabetes mellitus. Before carrying out health education activities related to diabetes mellitus, the author conducts *informed* consent as a form of respondents' consent to be carried out health education. This research method uses *a quasi-experiment pretest-posttest design* with one type of treatment. In this design before the start of treatment, the group was given a pre-test to measure the initial condition, then provided Diabetes Mellitus educational intervention to the group, after completion of the intervention the group was given a post test. The data were analyzed using non-parametric Wilcoxon signed test analysis.

The instrument used in this study used a questionnaire about diabetes mellitus, which consisted of understanding, causes, signs and

symptoms, people at risk, supporting examinations, tips on knowing diabetes militus early, tips on healthy living for people with diabetes militus. Diabetes mellitus knowledge questionnaire consists of 10 true/false questions) which aims to see knowledge and compliance related to diabetes mellitus diet before health education is given.

The population in this study is the entire Effect of Type 2 Diabetes Mellitus Education on the Knowledge of elderly mothers in the East Pejaten Village Area of Jakarta who come to regular recitation events every Sunday. The sampling technique is taken by *concentcutive sampling*. The number of research samples was 40 people. The inclusion criteria set are all elderly mothers in the East Pejaten Village Area, South Jakarta.

Results

Table 1 Distribution of Knowledge Frequency of Respondents Before and After Education

Knowledge	Frequency	Percent (%)
Before		
Low	35	87.5
Medium	5	12.5
Total	40	100
After		
Medium	1	2.5
High	39	97.5
Total	40	100

Result from table 1 can be seen that respondents' knowledge before education was low as much as 35 (87.5%) and medium 5 (12.5%) and knowledge after education was moderate as much as 1 (2.5%), high as much as 39 (97.5%). Based on the study, it was found that with the measurements made by giving *pretest* and *post-test* to respondents, there was an increase in knowledge and compliance with diabetes mellitus diet. This is in agreement with research conducted by Yunitasari, et al (2019) that after being given a diabetes mellitus diet health education intervention in the 4 pillars of diabetes mellitus, there was an increase in knowledge change, with a p value result of *0.000* (Yunitasari et al., 2019).

The provision of health education results in understanding related to diabetes mellitus, appropriate and regular drug consumption, regular physical exercise, and how to have the right diet for diabetes mellitus patients. Providing health education to patients aims to allow patients to control blood sugar, control nutritional diet and improve their ability to care for themselves (Efendi et al., 2021).

Table 2. Differences in Average Knowledge Before and After Education

	N	Mean	Std. Deviation	Min-Max	p Value
Before Education	40	24.25	9.306	20-50	0.000
After Education	40	85.50	9.323	60-100	

Result from table 2 can be seen the average knowledge before education of 24.25±9.306, the lowest value is 20 and the highest is 50. The average knowledge after education was 85.50±9.323, the lowest score was 60 and the highest was

100. The results of the statistical test obtained a p value of 0.000<0.005 which shows the influence of education on respondents' knowledge before and after education.

Discussion

At the *question point*, respondents' knowledge about diabetes mellitus increased after the intervention of providing knowledge about type 2 diabetes. Research conducted by Petroni, et al (2021), that knowledge can influence the behavior of individuals, one of which does not comply with a diabetes mellitus diet and can encourage the occurrence of disease severity (Petroni et al., 2021). The importance of providing health education related to diabetes mellitus diet in people with diabetes mellitus can reduce the risk that may occur, according to research conducted by Choi et al (2020) that the results of providing health education regarding diabetes diet in diabetics show satisfactory results after intervention are −0.5% (p <0.001) and −0.42% (p <0.001) in diabetic patients and patients as a whole, respectively, showed clinically relevant improvements in glycemic control (Choi et al., 2020).

Another study was by collecting questionnaires on diabetic patients in Pokhara Metropolitan City, Nepal. Data were collected before the educational intervention program and after the educational intervention program. The results showed significant improvement in each HBM construction and self-management practice after the educational intervention (p<0.0001). Self-management practices consisted of vulnerability increased from 2.94 to 3.49, severity increased from 2.83 to 3.08, perceived benefits increased from 3.09 to 3.55, perceived barrier decreased from 2.44 to 2.00, self-efficacy increased from 3.06 to 3.48 and self-management practices increased from 3.02 to 3.46. The results of this study conclude that educational programs should also focus on behavioral theory because it plays a role in self-efficacy and diabetes control (Bhatta et al., 2022).

The provision of education in this study also reviewed in terms of diabetes prevention diit, especially those that produce body sugar products. Research on the content of compounds in rice which is one of the staple foods that are generally consumed by the public and even throughout the world continues to be studied. This aims to determine the content or benefits for diabetics or even the impact of existing content on increasing blood sugar. The results of the study found that rice content and pathological mechanisms increase the incidence of diabetes in rice obtained contain starch compounds, important dietary energy sources, hypoallergenic proteins, and other bioactive compounds. Rice by-products namely bran contain γ-oryzanol compounds, phytic acid, ferulic acid, γ-aminobutyric acid, tocopherol, and tocotrienol (vitamin E) has several health benefits. Therefore, rice consumption also needs to be included in educational materials (Pereira et al., 2021).

An in vivo and in vitro study that assessed the potential of anti-diabetics as an alternative treatment for diabetes that has side effects. The study assessed dietary polysaccharides derived primarily from natural sources, including medicinal plants, grains, fruits, vegetables, edible mushrooms, and medicinal foods, and as having anti-diabetic potential. In vivo and in vitro trials have hypoglycemic, hypolipidemic, antioxidant, and anti-inflammatory effects, which increase pancreatic β cell mass and reduce β cell dysfunction. Dietary polysaccharides can effectively improve hyperglycemia, hyperlipidemia, low-grade inflammation,

and oxidative stress in type 2 diabetes mellitus. The conclusion of this study is that diit polysaccharides can be a valuable option for diabetes control so that they can be included in educational materials (Ganesan & Xu, 2019).

The study, which identified factors affecting dietary adherence significantly, found 303 participants (55.7%) were found to be non-adherent to the P-<0.05 diet program. Reasons found from respondents were gathering with family and friends and eating out were the causes of dietary non-adherence even though respondents already knew about diabetes (AOR=2.8, 95%, C, 1.97, 5.61) and had a history of diabetes for more than 10 years (AOR 2.9, 95%, CI 1.32, 5.84). Adherence to this practice can reduce glycosylation of hemoglobin (HbA1c) by 1 to 2% with the greatest impact in the early stages of diabetes (Mohammed & Sharew, 2019).

Some research results of the benefits of education about diabetes have been done by combining various other methods such as blood tests. But the study focused on increasing respondents' knowledge about diabetes. The results of a study of patients participating in an 8-hour diabetes education program on glycemic and weight control in adults with type 2 diabetes showed improvement in glycemic control after the intervention (Copeland et al., 2023). Research on the impact of education on diabetic patients in Bisha province, Saudi Arabia for a 30-minute program every two months for one year. The educational impact was controlled with the results of each patient's HbA1c examination and then compared after the intervention. The results showed a significant improvement in glycemic control after one year of participating in a 30-minute diabetes education program (HbA1c 10.41±1.89 to 8.22±1.68, P<0.012) (Al-Shahrani, 2018). The results of the study on the effect of lifestyle modification education on blood sugar as many as eight sessions with a duration of 1.5 hours for two months obtained an average blood sugar level before education of 241 mg / dl SD ± 54.6 mg / dl and decreased after the intervention (p-value=0,01) (Soheili & Khalili, 2021).

Knowledge about the complications of type 2 diabetes is very important to know in order to prevent it as early as possible. Complications of type 2 diabetes include heart disease, peripheral vascular disease, stroke, retinopathy, and nephropathy. The study aimed to determine the importance of dietary influences on diabetes and hypertension patients in patients who came to the hospital during the last 3 months. The study was conducted on 210 respondents who were divided into vegetarian and non-vegetarian diet groups with fasting blood glucose tests, postprandial blood glucose and blood pressure, dietary habits and body mass index. The results found type 2 diabetes mellitus and hypertension correlated with vegetarian diets compared to non-vegetarian diets (Arpith et al., 2020).

In addition to increased knowledge, the results of health education provided made respondents experience increased adherence in diabetes mellitus diets. In line with research conducted by Widyati (2020), this study found an increase in the level of respondent compliance after providing health education interventions and statistically showed that diabetes mellitus diet education interventions had an effect on the dietary compliance of people with diabetes mellitus (Widayati , 2021). Respondents' compliance before being given health education related to diabetes mellitus diet showed 80% non-compliance, and after the provision of health education increased significantly to 70% adherence in a very short period of time it showed good results.

According to research by Mohammed & Sharew (2019), the importance of designing strategies for diabetes mellitus diet adherence is very important to help improve health well-being in diabetes mellitus patients (Mohammed & Sharew, 2019).

Conclusions

The importance of providing health education related to diabetes mellitus diet in the 4 pillars of diabetes mellitus, especially people with diabetes mellitus in order to avoid the risk of complications that may occur and as an effort to increase knowledge and compliance related to diabetes mellitus diet. One of the interventions that can be given to people with diabetes mellitus is the provision of health education related to diabetes mellitus diet in the 4 pillars of diabetes mellitus consisting of: diabetes mellitus education, nutritional diet, pharmacology, and physical activity training.

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