



EDUCATION AND ASSESSMENT OF FOOT HEALTH STATUS TO PREVENT DIABETIC ULCERS

Fitri Suciana*, Fitriyan Rayasari, Dewi Anggraini

Faculty of Nursing, Universitas Muhammadiyah Jakarta, Jl. Cempaka Putih Tengah I No.1, Cempaka Putih
Timur, Cempaka Putih, Jakarta Pusat, Jakarta 10510, Indonesia

*andhikazka@gmail.com

ABSTRACT

Lifestyle changes and urbanization are important causes of health problems, especially diabetes mellitus and have continued to increase throughout this millennium. Diabetes mellitus is listed as the sixth leading cause of death in the world. If prevention and treatment is not carried out, diabetes mellitus can cause complications. One complication can be diabetic ulcers. Prevention of diabetic ulcers can be done, among other things, by evaluating the feet and the shape of the feet so that they can determine appropriate footwear, examining the feet and legs, checking the pulse, and assessing the strength of the feet. The aim of this research is to determine the effectiveness of education and assessing foot health status in preventing the occurrence of diabetic ulcers. The method uses a quasi-experimental design. The population in this study was 30 posyandu cadres in Dukuh Village, Bayat District. The sampling technique in this research was the Total Sampling method. Instruments using leaflets for conducting education and HFSQ questionnaires for assessing foot health status. Data were tested using the Mann Whitney test. The result is a P value of 0.00, which means there is a difference in the average foot health status score after being given education about foot care. The average pretest score was 16.84, increasing to 18.15. The conclusion is that education can change foot care behavior by assessing foot health status.

Keywords: diabetes mellitus; education; efforts to prevent diabetic foot

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INTRODUCTION

Diabetes mellitus (DM) is a medical condition in the form of a metabolic disorder with an increase in blood glucose levels that exceed normal limits. The general symptoms of hyperglycemia occur due to abnormalities in insulin secretion, insulin action, or both (Maryana et al., 2023). Diabetes mellitus is listed as the sixth leading cause of death in the world (Wahjoedi et al., 2018). The incidence of Diabetes Mellitus in Indonesia is increasing every year. This is supported by the results of the 2018 Indonesian Basic Health Research which stated that the prevalence of diabetes in Indonesia based on doctor's diagnosis among people aged ≥ 15 years was 2% increased compared to the 2013 Riskerdas results, namely 1.5%. All provinces showed an increase in cases in 2013-2018, except for the province of East Nusa Tenggara (NTT). There are three provinces with the highest prevalence in 2013 and 2018, namely DI Yogyakarta, DKI Jakarta, North Sulawesi. Central Java Province is in 9th place in the 2013-2018 Riskerdas results (Kemenkes RI, 2018). Lifestyle changes and urbanization are important causes of health problems, especially diabetes mellitus and have continued to increase throughout this millennium. This is supported by globalization trends which cause lifestyle changes which tend to have implications for unhealthy lifestyles. Consumption of fast food which is high in calories, carbohydrates, fat and protein but low in fiber and nutrients is increasing among Indonesian people. Such a lifestyle can increase the

risk of insulin resistance which causes blood glucose levels to increase (Tamami, 2022)

The prevalence of overweight, which is one of the biggest risk factors for diabetes, continues to increase (Yazdanpanah et al., 2018). Various serious complications can occur in the body system of diabetes sufferers. One of the complications of diabetes mellitus is diabetic ulcers caused by peripheral neuropathy in diabetes mellitus sufferers (Care & Suppl, 2021). One of the primary prevention measures for foot ulcers is foot care for diabetes mellitus patients. Actions that must be taken in foot care to detect foot abnormalities early. Things that should not be done by yourself if you have problems with your feet or using tools or objects. Patients need to know how to care for diabetic feet well so that gangrene ulcers and amputations can be avoided (Pal, 2014)(Bakker et al., 2012). Improving foot care behavior is one of the most effective strategies in preventing foot ulcers in Diabetes Mellitus patients (Oktorina et al., 2019). Efforts to keep blood sugar close to normal and prevent foot ulcers depend on the patient's knowledge of recognizing the disease because knowledge is closely related to the behavior he will take (Schaper et al., 2020).

Prevention of diabetic ulcers can be done, among other things, by evaluating the feet and foot shape so that appropriate footwear can be determined, examining the feet and legs, checking the pulse, assessing the strength of the feet, treating foot pain due to neuropathy and the importance of collaboration with various disciplines. science in prevention (Yamin & Sari, 2018). Efforts to prevent diabetic foot in general include carrying out recommended physical activity, controlling blood sugar regularly, preventing complications, and living a healthy lifestyle (Suciana et al., 2024). Diabetic foot care efforts can be carried out using foot health education and screening. Education is carried out with the aim of increasing knowledge so that it can influence attitudes and behavior. Effective education for patients is education provided to patients and families (Hananto et al., 2022). The existence of family support can increase an individual's ability to carry out promotive, preventive and rehabilitative actions. To determine an individual's ability to carry out general foot care, it is necessary to carry out a foot health screening, so that patients understand the presence of abnormalities in the feet so that they can prevent wounds on the feet of diabetes mellitus patients (Meiriana et al., 2019).

Prevention of diabetic foot can start with the patient and family support. This preventative behavior can be carried out by screening the patient at home by assessing the daily health status of the feet. Assessment of foot health status in Diabetes Mellitus patients can be done using an assessment sheet which has been tested for validity but is rarely done in Indonesia. The assessment sheet uses the HFSQ (health foot status questionnaire) to assess evaluation of foot shape, gait, determine the risk of developing diabetic ulcers, and the ability to do exercise (Liao et al., 2019). Based on the existing background analysis, the aim of this research is to determine the effectiveness of education and assessing foot health status in preventing the occurrence of diabetic ulcers.

METHOD

The research has undergone ethical testing under number 11/KEP-PKU/V/2024. The population of this study was 19 respondents using accidental sampling technique. Inclusion criteria in selecting respondents included patients with diabetes mellitus, patients who had never experienced diabetic ulcers or had experienced diabetic ulcers but had reached grade 0 wounds, patients with grade 0-1 wounds, patients who did not experience mental disorders and were taking medication. psychotropic. The research was conducted in May with 15

minutes of data collection time allocated for screening. The instrument used was the FSHQ (foot health status questionnaire) questionnaire with 29 questions with a Likert measurement scale and the final result was a score of 0-100. The second instrument uses a foot care educational leaflet prepared by the author himself. The research design uses quasi-experiment. The technical implementation is to carry out an assessment (screening) using the HFSQ instrument for the pretest, then education is carried out until the patient goes home, and the posttest is by conducting another screening using the HFSQ questionnaire 7 days after the patient is hospitalized. Data were analyzed using the Mann Whitney test

RESULT

Table 1.
Characteristics of Respondents based on Age, Gender, Occupation, Education level, complications, medication taking habits (n = 19)

Characteristics of Respondents	Category	f	%
Age	Mean = 59,89	19	
	Median = 59,00		
	Min=47		
	Max=70		
Gender	Male	8	42,1
	Female	11	57,9
Occupation	IRT	11	57,9
	Civil servants/retired	3	15,8
	Private	5	26,3
Education level	Elementary school	3	15,8
	Junior high school	6	31,6
	Senior high school	9	47,4
	PT	1	5,3
Complications	There isn't any	12	63,2
	There is	7	36,8

Based on the data above, the data shows that the characteristics of the respondents are an average age of 59.89 years with the most common gender being female, 11 people (57.9%). The majority of respondents worked as housewives, 11 people (57.9%), with the highest level of education being high school, 9 people (47.4%). The majority of respondents did not have complications from their diabetes.

Table 2.
Frequency distribution of drug taking habits, smoking habits and physical exercise (n=19)

Variable		Category	f	%
Drug taking habits	Pre-test	Take medicine	10	52,6
		Don't take medicine	9	47,4
	Post-test	Take medicine	14	73,7
		Don't take medicine	5	26,3
Smoking habits	Pre-test	Do not smoke	12	63,2
		Smoke	7	36,8
	Post-test	Do not smoke	11	57,9
		Smoke	8	42,1
Physical exercise	Pre-test	Physical exercise	10	52,6
		No Practice	9	47,4
	Post-test	Physical exercise	10	52,6
		No Practice	9	47,4

Based on the table 2, it shows that before the education on preventing diabetic ulcers was carried out, there were 10 patients who were taking medication, and 9 patients were not taking medication. After being given education and the patients went home, a posttest was carried out and 14 patients took medication and 5 patients did not take medication. Before the

education on preventing diabetic ulcers was carried out, 12 patients did not smoke, while 7 patients smoked. After being given education and the patients going home, a posttest was carried out for 11 patients who did not smoke, and 8 patients who smoked. Before the education on preventing diabetic ulcers was carried out, 10 patients stated that they had done physical activity, while 9 patients had not done any exercise. However, after being given education there was no change in patients doing physical exercise.

Table 3.

Mean pretest and posttest results after providing education on preventing diabetic ulcers (n = 19)

Variable	t	df	SD	Mean difference	p
Before	16,84	18	12,57	48,58	
After	18,15	18	10,93	45,53	0,000

Based on table 3 using one sample T test analysis, it shows that the calculated t value was 16.84 before the education was carried out and after the education was 18.15. The degree of freedom value is 18. The average score before education is 48.58 and the average score after education is 45.53 with a standard deviation before education is 12.57 and after education is 10.93. In its interpretation, the lower the score, the better the prevention of diabetic foot ulcers. Meanwhile, the average score for assessing foot health status has a p value of 0.000, which means there is a difference in the average score after being given education on preventing diabetic ulcers.

DISCUSSION

Age

From these results, data was obtained that the average age of respondents with diabetes mellitus was 59.89 years. This is in accordance with research (Komariah & Rahayu, 2020) the results of the research show that the elderly age category is 46-65 years. The risk of diabetes mellitus increases with age over 40 years. This is due to the aging process which reduces the ability of pancreatic cells to produce insulin. In the elderly there is a decrease in mitochondrial cell activity in muscle cells by 35% and can trigger an increase in fat levels in muscles by 30%, giving rise to insulin resistance (Annesi et al., 2014). In the elderly, insulin sensitivity can decrease, which can affect blood glucose levels. Several risk factors that play a role in the incidence of diabetes mellitus are age over 45 years, excess body weight, high blood pressure, disorders of fat metabolism, a hereditary history of diabetes mellitus, and a history of giving birth to children weighing more than 4 kg (Graciella & Prabawati, 2020). The average age of patients in the implementation of EBNP is elderly. Ages over 60 years will experience physical, psychological, emotional and cognitive decline. Elderly people are advised to read diligently to improve cognitive function and reduce the incidence of dementia. As age increases, a person's thinking patterns and memory will get better, but this is limited to the age of 40.

Gender

The research results showed that most patients were women with 11 respondents (57.9%). Women have a greater risk of suffering from diabetes mellitus compared to men because physically women have a greater chance of increasing their body mass index. According to research results (Komariah & Rahayu, 2020) 58% of patients suffering from diabetes mellitus are women, but there is no relationship between gender and fasting blood sugar levels. In line with this research, namely research conducted by Lestari, (2018) that the results of the research were based on an analysis between gender and the incidence of diabetes mellitus in women had a risk of 1.007 times higher than in men, but there was no relationship between gender and fasting blood sugar levels. In women, pregnancy can occur, which is a greater risk factor for developing type 2 diabetes mellitus than in men. Monthly cycle syndrome

(premenstrual syndrome), post menopause, which causes the distribution of body fat to easily accumulate due to hormonal processes, so that women are at risk of suffering from type 2 diabetes mellitus. All of the male patients in this study were smokers, namely 8 respondents. The nicotine in cigarettes can damage cell function and mass so that it can affect insulin production and the regulation of glucose production, this can increase blood sugar levels. Smoking habits resulting from the nicotine contained in cigarettes can cause endothelial damage and ultimately platelet sticking and aggregation. This can result in leakage so that lipoprotein lipase will slow down blood fat and make it easier for atherosclerosis to occur. Atherosclerosis results in vascular insufficiency so that blood flow to the pedis, popliteal and tibial arteries will decrease. This can cause diabetic ulcers (Hidayatillah et al., 2020).

Work

Most of the patients' jobs were housewives (housewives), namely 11 people (57.9%). Housewives can do physical activity every day. Physical activity is one of the pillars of managing diabetes mellitus to improve insulin sensitivity and maintain body fitness. Physical activity can help glucose be absorbed into cells without insulin. This is in accordance with the research results (Arania et al., 2021) that there is a correlation between physical activity and the incidence of diabetes mellitus with a correlation of -0.489 , which shows that the higher a person's physical activity, the more they can reduce the incidence of diabetes mellitus. Physical activity is different from work. Respondents in implementing EBN were mostly housewives, most of whom were housewives doing physical activities involving skeletal muscles as energy expenditure. Physical activity is different from work. Some of the respondents in implementing EBN worked as civil servants or were self-employed. Carrying out work depends on the physical activity carried out. Someone who works has great benefits because blood glucose levels are still controlled through physical activity and prevent complications. Work with light physical activity will cause a lack of energy burning by the body so that excess energy in the body will be stored in the form of fat, resulting in obesity (Handari et al., 2023).

Level of education

Patients in the application of EBN had the highest level of education, namely high school, namely 9 people (47.4%) while there was 1 respondent with the highest level of education, namely tertiary education. The education level of most of the respondents is a high level of education, because the higher the education, the better a person's mindset will be. It is hoped that with a high level of education, patients can improve their behavior in preventing the occurrence of diabetic ulcers. Patients with higher education will try to obtain information about Diabetes Mellitus and its complications through mass media, print media, electronic media and social media. It is hoped that a high level of education can create a positive attitude which is a determinant of preventing further complications from Diabetes Mellitus, such as complications in the eyes, brain, kidneys and limbs. If patients have a good attitude in managing blood sugar levels, it is hoped that various complications can be prevented early (Aryani et al., 2022).

Complications

Most of the patients did not have complications, namely 12 patients. Complications in patients can arise due to several factors, including medication compliance/dietary compliance control, this is in line with research conducted by (Setiyorini & Wulandari, 2016). Diabetes Mellitus is the main cause of non-traumatic blindness, chronic kidney failure, risk of cognitive dysfunction, and dementia. How to control these complications is by diet, exercise

and medication. Controlling blood sugar levels, blood pressure and blood lipid levels can prevent or delay the onset of diabetes mellitus complications.

Analysis of the patient's foot health status before and after being given education on preventing diabetic ulcers.

In implementing this EBNP, prevention of diabetic ulcers is carried out by assessing foot health status using the FSHQ (Foot Scale Health Questionnaire) format. This format is to assess the health status of the feet subjectively, while the assessment is objective by taking foot varus measurements. Subjective assessments include assessing the level of pain in the feet, activities that are disrupted because of the feet, difficulty finding footwear/shoes, assessing the feet in general, the patient's emotional condition with the condition of the feet, disruption of social activities due to the condition of the feet, feelings of fatigue, activities that can be done every day, and checked at the nearest health service center. The assessment is graded with a score of 0-100. The lower the score, the better the foot health status and the better the patient's behavior in prevention. Prevention of diabetic foot ulcers can be done by people with type DM supported by clear knowledge and attitudes about how to prevent and care for the feet. Increasing knowledge can be done with maintenance actions in the form of education. Education includes recognizing signs that feet are experiencing changes and disorders, checking feet on an ongoing basis, the need to consult a specialist if you experience foot problems, and how to care for feet, use footwear and education on keeping feet healthy.

The EBNP results showed that the mean score had changed in the posttest group with a P value of 0.000. Which means that education can improve preventive measures for diabetic foot ulcers. Leg pain in patients in the application of EBNP was assessed in the categories of pain level, how often they experienced pain, how often they had pain and how often they felt sharp pain and overall the score decreased in the posttest group, which means that the intensity of the pain decreased after the patient was given education. Leg pain is an early sign of diabetic neuropathy. Peripheral foot circulation in diabetes mellitus patients often occurs due to damage characterized by peripheral arterial disease (PAD). Delays in capillary refill time (CRT) can indicate tissue ischemic conditions which will accelerate the occurrence of diabetic ulcers. The reduction in pain can be caused by patients implementing the 4 pillars of management, namely education about diabetes mellitus, following a diet, physical exercise and taking medication (Graciella & Prabawati, 2020).

Most of the patients took medication, namely 10 patients before being given education and 14 patients after being given education. Treatment compliance is the patient's compliance with the medication recommendations that have been prescribed regarding time, dose and frequency. The relationship between patients, health care providers and social support is a determining factor in the success of medication adherence. Meanwhile, non-compliance with treatment can be caused by several factors, such as forgetting, boredom, the medication has run out without being able to control it, the body has improved so there is no need for control. Obstacles to compliance can be caused by taking too much medication so that the patient is confused and afraid to take the medication, the patient forgets the type of medication and its use, socio-economic problems because there is no transportation to the hospital, the problem of insufficient family support because there is no one to take control and other problems. the belief that he has been cured and there is no need to take medication. Apart from taking medication, physical exercise can also affect the patient's general health status. The recommended physical exercise is aerobic exercise such as walking, cycling, jogging, swimming and leg exercises. Physical exercise will have a direct impact on peripheral microvascular and macrovascular circulation. Blood circulation will be smooth so that

peripheral vascularization status improves as indicated by a strong pulse and CRT < 2 seconds. Exercise will burn blood sugar, hemoglobin oxygen affinity and blood viscosity.

CONCLUSION

Education is one of the nursing actions that can be used to increase patient knowledge. With increasing patient knowledge, it is hoped that patient attitudes and behavior can improve. One of the 4 pillars of DM treatment is education. Education is carried out as an effort to prevent complications. One of the results of this research was an increase in foot health status scoring before and after education.

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