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Research Article

The Effect of Supportive Education on Foot Care Knowledge in Type 2 Diabetes Mellitus

Saiful Gunardi

Faculty of Health Sciences, Universitas Indonesia Maju,
Indonesia

*Email Correspondent: saiful.gunardi@gmail.com



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Abstract

Background: Diabetes Mellitus is a disease that hides before real symptoms appear, such as easy hunger, thirst and frequent urination. Other symptoms are skin disorders such as itching, tingling, numbness due to neuropathy, physical weakness, and wounds on the feet that heal slowly, so foot care is needed for DM patients who have wounds on their feet.

Objectives: To determine the effect of supportive education on knowledge of diabetic foot care in type 2 diabetes mellitus patients.

Methods: This study used a one group pre-test – post-test design using the Wilcoxon test, with a population and sample of 30 respondents, the instrument was a questionnaire on knowledge of foot care in DM patients.

Results: Based on the results of analysis using the Wilcoxon Signed Ranks Test method, it was obtained that the P value was $0.000 < 0.05$, so it can be concluded that there is an influence of supportive education on knowledge of diabetic foot care in type 2 DM patients.

Conclusion: With the influence of supportive education on knowledge of diabetic foot care in DM patients, in providing nursing care you can apply this supportive education in the care of DM patients.

Keywords: DM type 2, knowledge, supportive education

Introduction

Diabetes Mellitus (DM) is a chronic metabolic disorder characterized by an increase in blood sugar (hyperglycemia) caused by an imbalance between insulin supply and demand.¹ Diabetes mellitus (DM) is a disease caused by a metabolic disorder characterized by an increase in blood sugar levels called hyperglycemia. Diabetes Mellitus is a disease that hides before real symptoms appear, such as easy hunger, thirst, and frequent urination. These symptoms are often seen when patients complain, which is why it is called the silent killer. There are several types of DM, one of which is type 2 diabetes.² Type 2 diabetes often occurs in patients aged 45 years and over due to aging and damage to body tissue. Insulin resistance and impaired insulin secretion are caused by a decrease in the response of body cells and tissues to insulin, causing an increase in

blood sugar levels.³ Type 2 diabetes occurs due to the failure or inability of insulin target cells to respond normally to insulin. This condition is called insulin resistance. The causes of insulin resistance are obesity, a sedentary lifestyle, and aging. Type 2 diabetes can occur due to impaired insulin secretion and excessive hepatic glucose production but without autoimmune damage to pancreatic beta cells.⁴ The International Diabetes Federation (IDF) in 2021 shows that 537 million adults (20-79 years) live with diabetes – 1 in 10. This number is expected to increase to 643 million in 2030 and 783 million in 2045. More than 3 of 4 adults with diabetes live in low- and middle-income countries. Diabetes is responsible for 6.7 million deaths in 2021 – 1 death every 5 seconds. Diabetes causes health spending of at least USD 966 billion – an increase of 316% over the last 15 years. 541 million adults suffer from Impaired Glucose Tolerance (IGT), which puts them at high risk of developing type 2 diabetes.⁵

Clinical manifestations in diabetes sufferers are polyuria (increased urine production), polydipsia (increased thirst), polyphagia (increased hunger), fatigue and muscle weakness, as well as increased infection rates, increased glucose concentration in mucus, impaired immune function, and decreased blood flow. blood in chronic diabetes sufferers. Skin disorders such as itching, tingling, numbness due to neuropathy, physical weakness, and wounds on the feet that heal slowly, so foot care is needed for DM patients who have wounds on their feet.⁶ Foot problems are the main cause of morbidity and mortality in people with diabetes mellitus. Foot problems are a common problem in patients with diabetes mellitus and this can become quite severe due to ulcers and infections, and can even eventually lead to amputation. The occurrence of ulcers is due to non-compliance with preventive measures, foot examinations, and hygiene, lack of medical treatment, inappropriate client activities, overweight, use of inappropriate footwear, lack of patient education, blood glucose control, and foot care. One of the important pillars in managing DM sufferers is providing health education, as an effort to increase knowledge and attitudes and change healthcare behavior.⁷ According to Gondal et al (2007) health education regarding foot care is needed for DM sufferers who are at risk of developing diabetic ulcers regarding appropriate knowledge and understanding. Knowledge is the main basis for the success of a treatment. Knowledge is closely related to a person's behavior, because with this knowledge the sufferer has reasons and a basis for making a choice, influencing a person's actions and attitudes.⁸ One of the educational techniques that can be used is supportive education.

Supportive education is education which is an interactive process to encourage learning and is an effort to increase new knowledge, attitudes, and skills through strengthening certain practices and experiences.⁹ One of the studies entitled Effectiveness of the Supportive Educational Model for Implementing Diabetes Mellitus in the Elderly with Diabetes Mellitus shows that the supportive educational model is effective for diabetes mellitus exercises in elderly people suffering from diabetes mellitus in the Posyandu Sumberbendo Elderly Village.¹⁰ Another study titled Supportive Educational System in Increasing Independence in foot care in Type II diabetes mellitus patients shows that a supportive educational system in increasing independent foot care in Type II diabetes mellitus patients is proven to have a relationship with foot care behavior, providing education so that a person can improve their ability. , knowledge, skills, and attitudes, where the process of understanding DM patients can occur through health education, by providing information so that awareness will arise in individuals or society to behave on the knowledge they have.¹¹ Based on the explanation above, the author is interested in conducting research with the title The Effect of Supportive Education on Foot Care Knowledge in Type 2 Diabetes Mellitus Patients.

Methods

This research is quantitative research using a one-group pre-test-post-test design. This research was conducted in RW 05 Depok Jaya. The population and sample in the

study were 30 respondents. The research sample was taken using purposive sampling with the inclusion criteria being patients with type 2 DM in RW 05 and patients willing to be respondents and the exclusion criteria being type 2 DM patients who refused to be respondents. The independent variable in this study is Supportive Education and the dependent variable is knowledge of foot care in Type 2 diabetes mellitus patients. Data were collected using a DM foot care knowledge questionnaire with 13 questions. During the research, before respondents received health education on diabetic foot care using lecture and demonstration methods, respondents were asked to fill out a pre-test questionnaire and then given health education regarding diabetic foot care after that respondents were again asked to fill out a post-test questionnaire and data analysis using the Wilcoxon test because the data was distributed. abnormal.

Results

The univariate analysis carried out aims to see a description of the characteristics of students in this study consisting of categorical data, namely age, gender, education, and income, a pre-test description of patient knowledge before being given Supportive Education, and a post-test description of patient knowledge after being given Supportive Education. The results of the analysis can be seen in the following table:

Table 1. Frequency distribution of patient characteristics Diabetes Mellitus Type 2 in RW 05 Depok Jaya (n= 30)

Characteristics	Results	
	Frequency	Percentage (%)
Age		
24 - 44	12	40
45 - 60	15	50
60 - 75	3	10
Total	30	100
Gender		
Women	20	67
Man	10	33
Total	30	100
Education		
Junior High School	4	13,3
Senior High School	21	70
Collage	5	16,7
Total	30	100

The results of the analysis show that the distribution of age characteristics of the majority of respondents is in the age range of 45 - 60 years, 15 respondents (50%), 20 people (67%) are female, 21 people have a high school education (70%).

Table 2. Pre and Post-test Frequency Distribution Knowledge of Supportive Education in RW 05 Depok Jaya (n: 30)

Variable	Pre-test		Post-test	
	n	%	n	%
Supportive Education Knowledge				
Good	4	13,3	27	90
Enough	4	13,3	2	6,3
Less	22	73,3	1	3,3
Total	30	100	30	100

The results of data analysis showed that there was an increase in respondents' knowledge of 76.7% regarding diabetes mellitus foot care, from a good level of knowledge of 13.3% at the pre-test to 90% at the post-test.

Bivariate analysis describes the influence of supportive education on knowledge of diabetic foot care in type 2 DM patients in RW 05 Depok Jaya. The statistical test used in this research was the Wilcoxon test. The results of the analysis can be seen in Table 3 below:

Table 3. Effect of supportive education on knowledge of diabetic foot care in type 2 DM patients in RW 05 Depok Jaya (n: 30)

	Knowledge	n	Mean Rank	Sum of Ranks	Ranks Test	P value
Post-test-	Negatif Ranks	0(a)	,00	,00	-4,625	0,000
Pre-test	Positif Ranks	25(b)	13,00	,325,00		
	Ties	5(c)				
	Total	30				

Based on the table above, shows that the mean positive rank value (sample with the second group (post-test) value is higher than the first group (pre-test) value of 13.00. After receiving supportive education, knowledge was found to increase significantly by 0.000. Based on the output of the Wilcoxon Signed Ranks Test of knowledge Sig (2-tailed) value is $0.000 < 0.05$, so it can be concluded that there is an influence of supportive education on knowledge of diabetic foot care in type 2 DM patients.

Discussion

Based on the table above, shows that the Mean Rank value of pre-test knowledge is 13.00. After receiving supportive education, knowledge has increased significantly by 0.000. Based on the output of the Wilcoxon Signed Ranks Test knowledge value Sig. (2-tailed) is $0.000 < 0.05$, so it can be concluded that there is an influence of supportive education on knowledge of diabetic foot care in type 2 DM patients. The aging process that takes place after the age of 30 years results in anatomical, physiological, and biochemical changes. Changes start at the cellular level, continue at the tissue level, and finally at the organ level which can affect homeostatic function. Body components that can experience changes are pancreatic beta cells which produce the hormone insulin, target tissue cells which produce glucose, the nervous system, and other hormones that affect glucose levels. This research is also in line with other research which states that 37 people aged over 45 years suffer from diabetes mellitus. Based on the results of the chi-square analysis, it states that there is a relationship between age and diabetes mellitus, p-value of 0.000 (Continuity correction). The results of the OR analysis stated that the OR value was 0.373, 95% CI 0.268-0.519. It can be concluded that age over 45 years is a protective factor, namely preventing, this is because ages 45 years and over have a high risk of suffering from diabetes mellitus but with the presence of protective factors, ages 45 years and over are better able to control the risk factors that will occur than someone. those aged 45 years and under.¹²

Based on the results of the analysis, the dominant respondents were 20 women (67%). This is in line with research entitled Influence of Gender in Diabetes Mellitus and Its Complications which states that diabetes mellitus has several gender characteristics and some data shows that women suffer from the disease longer on average than men and have a higher body mass index. In women, diabetes mellitus appears to be less controlled considering every metabolic parameter, especially because they tend to have lower insulin sensitivity than men, thereby leading to the use of greater insulin units to maintain optimal glycemic values and comply with therapeutic goals. The prevalence of type 2

diabetes is also characterized by gender differences. Overall, the global prevalence of diabetes is higher in men, but more women than men have type 2 diabetes.¹³ This is also in line with other research which shows that the percentage of diabetes patients in women is greater than in men. Women have a higher body fat composition compared to men, so women get fat more easily, which is associated with the risk of obesity and diabetes.

Looking at the results of the analysis regarding education, the majority had a high school education of 21 people (70%). This is in line with other research which states that education level and age are included in the risk factors for diabetes mellitus which cannot be changed/modified but have a close relationship with the incidence of diabetes mellitus by knowing these two factors, people who are at risk of suffering from diabetes mellitus can carry out prevention by controlling other factors related to the incidence of diabetes mellitus. Education level influences the incidence of diabetes mellitus. People with a high level of education will usually have a lot of health knowledge. With this knowledge, people will have an awareness of maintaining their health. The level of knowledge also influences a person's physical activity because it is related to the work carried out. People with a high level of education usually work more in offices with little physical activity. Meanwhile, people with low levels of education are more likely to become laborers or farmers with sufficient or heavy physical activity. Increasing the level of education will increase awareness of healthy living and paying attention to lifestyle and eating patterns. Individuals with low education are at risk of paying less attention to lifestyle and diet and what should be done to prevent DM.¹² This is also supported by research by Falea, et al (2014) that educational factors influence the incidence and prevention of diabetes.¹²

The results of data analysis, and frequency distribution showed that there was an increase in respondents' knowledge of 76.7% regarding diabetes mellitus foot care, from a good level of knowledge of 13.3% at the pre-test to 90% at the post-test. Health education is a process of change in a person that is linked to achieving individual and community health goals. This increase in knowledge is due to health information through health education. The results of this research support the opinion of Notoatmodjo (2007) who states that health education can also be a process of planned behavior change in individuals, groups, and communities to be more independent in achieving healthy living goals. Health education is a learning process for individuals, groups, or communities from not knowing about the value of health to knowing, and from being unable to overcome health problems to becoming independent. Thus, health education is an effort or activity to help individuals, groups, and communities improve their abilities in terms of knowledge, attitudes, and skills to achieve optimal healthy living.⁴

Based on the results of the pre-test and post-test knowledge analysis, the Sig. (2-tailed) is $0.000 < 0.05$, so it can be concluded that there is an influence of supportive education on knowledge of caring for diabetic feet in type 2 DM patients in RW 05 Depok Jaya. The results of the study are in line with research by Frisca et al., (2019) which stated that patients who were given education had an increase in foot care behavior of 94.64% while the increase was only 50% in patients who were not given foot care.¹³ Patients with chronic disease conditions such as DM require a continuous and open learning system so that patients can carry out good self-care. This is justified by Orem's theory which states that a person has the basic ability to care for himself. Prevention of diabetic foot complications which have the potential to result in diabetic ulcers which ultimately result in foot amputation, but they have limitations in this treatment such as limited information, so nurses have the responsibility to provide education to patients so that it has an impact on minimizing the incidence of complications.¹⁴ This follows the theory expressed by Orem that one of the methods used in the 6 methods to improve self-care in patients is by providing education. DM patients who are not managed well will increase the risk of complications because DM patients are susceptible to complications due to insulin deficiency or inadequate insulin action.¹⁵ Other research that is in line with the results shows that there is an influence of education and support groups based on self-

care theory on diet compliance ($p=0.000$), medication compliance ($p=0.000$), activity compliance ($p=0.000$), foot care independence ($p=0.000$) and blood glucose levels ($p=0.008$). Education and support groups based on self-care theory can help to increase compliance, and independence in foot care and reduce blood glucose levels in type 2 diabetes mellitus patients.¹⁶ Other research that is in line is that there is an influence of DSME/S on increasing knowledge of self-management in type 2 DM patients, namely 0.0001 ($p<\alpha$; $\alpha=0.005$), with an increase of 15.97%. DSME/S is effective in increasing knowledge of type 2 DM patients, so it can be given to type 2 DM patients as self-management education to prevent complications.¹⁷

Education is one of the fundamental factors that allow a person to improve their skills, knowledge, skills, and attitudes. In this case, the process of understanding DM patients can be carried out through health education by providing information to increase individual awareness, and society must act based on this knowledge. Education aims to provide patients with correct and accurate information about diabetes so they can feel healthier, manage their diabetes, and prevent complications. This research can increase patient knowledge in carrying out foot care with type 2 DM. There were no significant limitations in the research, only a more extra approach was needed for respondents who did not on time.

Conclusion

The results of the analysis show that the majority of respondents are in the age range of 45-60 years, female, and have a high school education. The results of data analysis showed that there was an increase in respondents' knowledge of 76.7% regarding diabetes mellitus foot care, from a good level of knowledge of 13.3% at the pre-test to 90% at the post-test. The results of the analysis test show that there is an influence of supportive education on knowledge of diabetic foot care in DM patients, so in providing nursing care, you can apply this supportive education in the care of DM patients.

Conflict of Interest Declaration

No potential conflict of interest is relevant to this article.

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