

DIABETES SELF MANAGEMENT EDUCATION (DSME) EFFECTIVELY IMPROVES SELF-CARE BEHAVIOR IN DIABETIC FEET AND REDUCES THE INCIDENCE OF DIABETIC FOOT PROBLEMS

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Abstract

Diabetic foot problems as a result of hyperglycemia and trauma due to lack of patients undergoing examination and foot care. Diabetes Self Management Education (DSME) is giving patients knowledge about self-care strategies independently to improve the quality of life of their patients. Ngaglik I Health Center is one of the health centers with a large number of DM patients in the Sleman region. Based on a preliminary study 7 of 10 DM patients had diabetic foot problems in the form of callus, hallux valgus, thinning leg hair, cracked feet, scaly skin, and ulcers. The purpose of this study was to determine the effectiveness of DSME diabetic self care foot behavior and the incidence of diabetic foot problems in Ngaglik I Sleman Yogyakarta health center. The type of research was Quasi Experiment with a nonequivalent control group design. Sampling techniques are consecutive sampling and simple randomization. The statistical analysis used is using the Wilcoxon Match Pairs Test formula. The results of the study analyzed the mean differences in the behavior of self care foot diabetic pre and post DSME in the intervention group p value 0.018, while in the control group p value 0.720. The results of the analysis of mean differences in diabetic self care foot behavior after DSME in the intervention and control groups with P value 0.001. The results of different mean analysis of pre and DSME diabetic foot problems in the intervention group p value 0.010, while in the control group p value 1,000. The results of the analysis of the mean difference in diabetic foot problems after DSME in the intervention and control groups with P value 0.007. DSME effectively improves diabetic foot self-care behavior and reduces the incidence of diabetic foot problems.

Keywords: diabetic foot, self care, self management

1. INTRODUCTION

Diabetic Foot problem) is a condition that is often experienced by patients with diabetes mellitus namely in the form of foot deformity, decreased sensibility, callus formation, ulceration and foot infection, it is caused by peripheral neurological and vascular abnormalities in the lower extremities. Foot examination and treatment are used for early detection of abnormalities or injuries that occur in the legs, foot care is used to protect or prevent the feet from injury. There are two actions in the basic principle of managing diabetic foot problems, namely preventive measures and rehabilitation measures. Preventive measures include foot care education, foot exercises and the use of footwear or appropriate diabetes shoes. The aim of rehabilitation measures is the return of ambulation function. Efforts that can be used to prevent the occurrence of diabetic foot problems are

education about diabetic foot care to patients with diabetes mellitus, which is the main pillar of the management of DM [1] [2].

Education for DM patients is important as a first step in controlling DM. Education is given to DM patients with the aim of increasing patient knowledge and skills so that patients have preventive behavior in their lifestyle to avoid complications of long-term type 2 diabetes [3]. One form of education that is commonly used and proven effective in improving clinical outcomes and quality of life for DM patients is Diabetes Self Management Education (DSME) [4]. Diabetes Self Management Education (DSME) is an important component in the care of DM patients and is very necessary in an effort to improve the patient's health status. DSME is an ongoing process carried out to facilitate knowledge, skills, and abilities of DM patients to carry out self-care [5]. DSME is a process of providing knowledge to patients regarding the application of self-care strategies independently to optimize metabolic control, prevent complications, and improve the quality of life of DM patients [6] Based on data from the Sleman Health Service, in Sleman Regency, the prevalence of DM patients in 2011 was as many as 12,000 cases of DM, in 2012 it increased by 18,131 cases which then increased in 2013 to 23,806 cases. In 2014 it increased to 25,000 cases of DM from 25 health centers in Sleman Regency [7]. One of the health centers with the most cases of DM in Sleman Regency occurred in Ngaglik I Health Center where in 2012 there were 537 cases, in 2013 there were 921 cases and in 2014 the prevalence of DM still increased to 1,224 cases recorded [8] Of the 1,224 cases recorded 68% of DM patients were irregularly controlled and 32% were always in control on time (Data from Puskesmas, 2014). Until now the Ngaglik I health center has not implemented education with the DSME method, but still uses conventional education. The aim of the study was to determine the effect of the Diabetes Self Management Education (DSME) Method on the behavior of diabetic foot self care and the incidence of diabetic foot problems at the Ngaglik I Sleman clinic.

2. METHODS

This type of research is Quasi Experiment Design with a design using nonequivalent control group design, the sampling technique is consecutive sampling. The total sample of 32 respondents consisted of 16 respondents in the intervention group and 16 respondents in the control group. The intervention group received Diabetes Self Management Education (DSME), a method of providing education to a group of DM patients who went through 4 stages of meeting (1. DM concept, foot examination and foot care. 2. Nutrition Therapy Concepts, 3. Concepts of exercises and activities, 4. Treatment) While the control group is given conventional education. Bivariate analysis using the Wilcoxon Match Pairs Test formula. And the Mann-Whitney U-Test. 3.

3. RESULTS AND DISCUSSION

Table 1. Frequency Distribution and Analysis of Homogeneity Test Characteristics of Respondents in Intervention Groups and Control Groups at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Characteristics	Intervention Group		Control Group	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Age				
• Adult (45-59 years old)	6	37.5	9	56.3
• Elder (60-74 years old)	10	62.5	7	43.8
Gender				
• Man	6	37.5	9	56.3
• Woman	10	62.5	7	43.8
Marital Status				
• Widower/widow	6	37.5	4	25.0
• Married	10	62.5	12	75.0
Length of DM				
• 1-5 years	10	62.5	9	56.3
• >5 year	6	37.5	7	43.8
Education				
• Elementary school	5	31.3	9	56.3
• Junior high school	8	50.0	2	12.5
• SMA/SMK	2	12.5	4	25.0
• PT	1	6.3	1	6.3
Working Status				
• IRT	7	43.8	5	31.3
• Farmer	1	6.3	1	6.3
• Private/private entrepreneur	3	18.8	0	0
• civil servants	0	0	1	6.3
• Retired	5	31.3	9	56.3
Total	16	100	16	100

Based on table 1 characteristics based on age, the majority in the elderly intervention group with the number of respondents 10 (62.5%), in the control group in middle age as many as 9 (56.3%) respondents. Based on gender in the intervention group the majority of women amounted to 10 people (62.5%) and in the majority control group men, amounting to 9 people (56.3%). The duration of DM in the majority intervention and control group was in the range of 1-5 years, as many as 10 people (52.6%) in the intervention group and 9 people (56.3%) in the control group. Based on the last level of education the majority in the intervention group were SMP which numbered 8 people (50%) and in the control group the majority of elementary schools were 9 people (56.3%). Based on the majority of work in the intervention group, namely IRT which amounted to 7 people (43.8) and the least was Farmers, amounting to 1 person and the majority in the occupational control group were pensioners and the least were farmers and civil servants, each numbered 1 person (6.3%).

Table 2 Distribution and Wilcoxon Test Results of self care foot diabetic foot diabetic in the intervention group at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Intervention group	Min-max	Mean	Negative	N Ranks Positive	Ties	Z ^a	p-value
Pre	14-49	29.50					
post	14-49	39.0	5	10	1	-2.360	0.018

Based on Table 2, it is known that the pre test behavior of diabetic foot self-care behavior in the intervention group is at a minimum of 14-49, with a mean of 29.50, with a mean prw test of 29.50 and a post test of 39.00. The test results with the Wilcoxon Signed Ranks Test number of diabetic foot care behaviors that increased after being given intervention as many as 10 people, the value decreased by 5 people and those who remained 1 person with a value of Z-2,360 (Z count <Z table (211)) with P value 0.018 it was concluded that there were significant differences between diabetic foot care behavior before and after DSME treatment.

Table 3 Distribution and Wilcoxon Test Results of diabetic foot self-care behavior at control group at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Control group	Min-max	Mean	Negative	N Ranks Positive	Ties	Z ^a	p-value
Pre	14-48	26.94					
post	8-43	27.25	5	5	6	-0.358	0.720

Based on Table 3, it is known that the pre test behavior of diabetic foot self-care behavior of the control group is at least 14-49, with a mean of 26.94, the post-test minimum value is maximal 8-43 with a mean post test of 27.25, with a mean of 26.94. The test results with the Wilcoxon Signed Ranks Test the number of diabetic foot care behaviors that increased after being given as many as 5 people intervention, the value decreased by 5 people and the remaining 6 people with P value 0.720, it was concluded that there was no difference between diabetic foot self care behavior before and after conventional education.

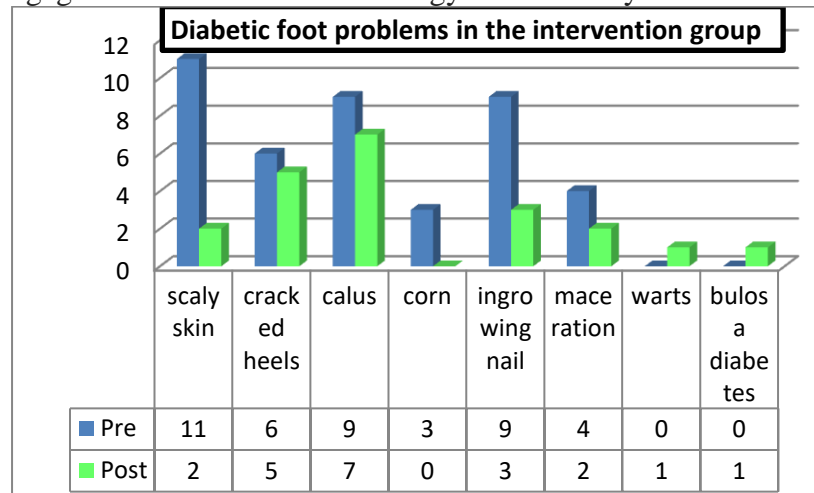
Table 4 Differences in diabetic foot care behavior in the Intervention Group and Control at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Self care	Mean	Z ^a	p-value
Intervention group	21.94		
Control group	11.06	-3.286	0.001

Based on table 4, the average value of the pre-care self-care test for diabetic foot care intervention group was 21.94 and the post-test for diabetic foot care behavior in the control group 11.06, with a value of Z -3.286 (Z count <Z table (211)) P value in the intervention and control groups that is 0.001 so that it can be concluded that there are

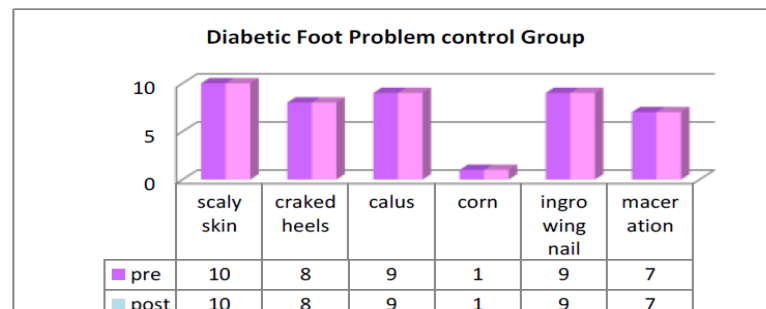
differences in diabetic foot care behavior after being given DSME in the intervention and control groups.

Diagram 1 Overview of diabetic foot problems in the intervention group at Ngaglik 1 Puskesmas Sleman Yogyakarta in May-June 2017



In the intervention group before DSME the highest diabetic foot problem was scaly dry skin, as many as 11 people, then followed by callus, nail ingrowing, cracked heels, maceration between fingers and corn. After DSME diabetic foot problems all decreased, only found the presence of warts and bullous.

Diagram 2. Overview of diabetic foot problems in the control group at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017



Based on diagram 2, diabetic foot problems in the control group before and after DSME are still the same, in finding diabetic foot problems most scaly dry skin, cracked heels, there are calluses, maceration between fingers and corn.

Table 5 Distribution and Wilcoxon Test Results Signed Rank Test foot problems in the Intervention group at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Intervention group	Min-max	Mean	Negative	N Ranks Positive	Ties	Z ^a	p-value
Pre	1-6	2.63	11	3	2	-2.592	0.010
post	0-3	1.31					

Based on Table 5, it is known that the pre-test value of diabetic foot problems in the intervention group is at a minimum of 1-6, with a mean of 2.68. The value of post-test is at least-maximum 0-3 with mean 1.31. Test results with Wilcoxon Signed Ranks Test the number of occurrences of diabetic foot problems that decreased after being given intervention as many as 11 people, increased by 3 people and a fixed 2 people with a value of Z -2,592 (Z count < Z table (211)) with P value 0.010 it was concluded that there were significant differences between diabetic foot problems before and after the DSME treatment.

Table 6 Distribution and Wilcoxon Signed Rank Test results of foot problems in the control group at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Control group	Min-max	Mean	Negative	N Ranks Positive	Ties	Z ^a	p-value
Pre	1-5	2.75	0	0	16	0.000	1.000
post	1-5	2.75					

Based on table 6, it is known that the pre-test value of diabetic problems in the control group is at a minimum of 1-5, with a mean of 2.75. The value of post-test is minimal - maximal 1-5 with mean 2.75. The test results with the Wilcoxon Signed Ranks Test the number of diabetic foot problems in all control group respondents before and after the treatment were the same as the Z value of 0,000 (Z count < Z table (211)) with a P value of 1,000 then concluded that there was no difference between diabetic problems before and after treatment.

Table 7 Differences in foot problems in the Intervention and Control Group at Ngaglik 1 Health Center Sleman Yogyakarta in May-June 2017

Self care	Mean	Z ^a	p-value
Intervention group	21.16	-2.681	0.007
Control group	20.84		

Based on table 7. The average value of the pre-test foot problems in the intervention group was 21.16 and the control group post was 20.84, with a Z -2.681 (Z count < Z table (211)) P value in the intervention and control groups was 0.007 so that it could be concluded that there were differences in foot problems after being given DSME in the intervention and control groups.

a. The behavior of diabetic self care feet before and after DMSE was given in the intervention group.

Based on Table 2, there was an increase in the behavior of diabetic foot self care before and after DSME in the intervention group, whereas in the control group there was no difference in behavior before and after treatment. DMSE is education and training about the knowledge and skills of DM patients so that an understanding of DM disease increases and a form of intervention or effort aimed at conducive behavior to health. Health education aims to change people's or people's behavior

from unhealthy behavior to healthy behavior. Patients who have sufficient knowledge about DM will change their attitudes and lifestyle, then DM patients will change their behavior [9]. Behavior is an individual response to a stimulus or action that can be observed and has a specific frequency, duration and purpose, both consciously and unconsciously [10]. Behavior changes can be influenced by age, gender, duration of diabetes, education and employment. The majority of the respondents' age in the intervention group was elderly (60-74). Age affects a person's ability to do self-care [11]. cognitive abilities of inductive reasoning, spatial orientation, vocabulary, and verbal memory have increased at half age [12]. American Filipino women who are <65 years old routinely clean their feet and ≥ 65 years need optimal support for foot care.

According to the theory the researcher can conclude that the older a person is, the better his knowledge, this can be caused due to previous experience, but the elderly need support for doing foot care [13]. The majority of the duration of DM in the intervention group is ≥ 5 years. According to the theory, it can be concluded that the longer a person has diabetes, the foot care behavior will be better [14]. The majority of the sexes in this study were women. the majority of respondents were female in the intervention group and women were more diligent and skilled in doing foot care. The majority of education in the intervention group is junior high school. The higher a person's education will influence the decision making for foot care [15]. The majority of jobs in the intervention group are IRT. The type of work affects a person in performing self-care and describes physical activities that are carried out daily for patients [13]. Someone who has social activities outside the home will get more information and experience [16]. One of the factors that influence a person's behavior is the reach of information [17]. According to the theory the researcher can conclude that the more information obtained then the tendency to do good behavior.

b. The behavior of diabetic self care feet after being given DMSE in the intervention and control groups

Based on research that there is no increase in foot care behavior before and after treatment in the control group with a value of 1,000, this indicates that there is no difference in behavior before and after treatment in the control group. the mean value of behavior after treatment in the intervention group was 21.94 and in the control group 11.06 with a value of P value $0.001 < 0.05$. Then H_a was accepted and H_0 was rejected, so it could be concluded that there were differences in foot care behavior in the intervention and control groups. The aim of health education is to increase knowledge, change attitudes, change behavior, improve compliance, improve quality of life, change the behavior of individuals, families, special groups and communities in fostering and maintaining healthy behaviors and playing an active role in realizing optimal health degrees [9] [18]. There are several factors that influence behavior change, namely predisposing factors (knowledge, attitudes, beliefs, etc.), enabling factors and reinforcing factors. In addition, other factors that can influence behavior are intention, support from the people around them, information affordability,

autonomy and possible conditions and situations [17]. The most dominant factor changing behavior in this study is through health education, because in this study health education was given for 4 meetings with a distance of 1 week for each meeting.

The method of education in this study was carried out with several methods, namely discussion lectures, videos and demonstrations. Respondents were also given leaflets to recall the material that had been delivered. This can be avoided from the results of a preliminary study where there were still respondents who did not use footwear when they left the house and the average respondent never checked footwear before using it. Whereas after being given health education the average respondent uses footwear when going out and checks footwear before use, besides that there is an increase in other foot care including nail care, prevention of injury and the use of footwear. The highest score of behavior change in this study is washing the feet with soap and running water and the lowest score is to use socks in winter. Information can be obtained through health education with the DSME method, which is to provide education in stages, starting from a simple concept to how to self-manage. The purpose of health education is to change knowledge, attitudes and behaviors that will improve quality of life [9]. In this study the control group did not experience changes, due to the lack of information obtained. Whereas in the intervention group behavior changes have been made better because of getting information through health education given 4 times in 1 month, supported also by leaflets so that respondents can remember the material that has been taught. The results of this study indicate that footcare behavior in patients given DSME is better than those without DSME. This proves that through DSME there was a change in the behavior of respondents in doing foot care.

c. Diabetic Foot Problems before and after DMSE in the Intervention and control group

Based on the results of the study there was an influence of DSME on the incidence of diabetic foot problems in the intervention group. In the intervention group before DSME the highest diabetic foot problem was scaly dry skin, as many as 11 people, then followed by the presence of callus, nail ingrowing, cracked heels, maceration between fingers and corn. After DSME diabetic foot problems all decreased, only found the presence of warts and bullous. In the control group who experienced an increase in foot problems and decreased foot problems the same as many as 5 people while the condition of the legs was the same as before as many as 6 people. With P Value 0.720 which means there is no difference in foot problems before and after the control group. Diabetic foot problems in the control group most dry scaly skin, cracked heels, there are callus, maceration between fingers and corn.

Diabetic foot care health education gives respondents the skills to care for their feet that have problems so that they can be treated properly and properly, regular foot care can reduce diabetic foot disease by 50 - 60% which can affect quality of life. Diabetic foot care itself is further divided into 6 aspects, namely visual examination

of the feet, cleaning the feet, cutting nails, choosing footwear, diabetic foot exercises and periodic foot control. Based on the results of the study, 66.7% of patients with Diabetic Foot Ulcers had a bad habit of performing routine foot visual examinations. While patients without diabetic foot ulcers in this study were only 19% included in the bad category on the aspect of routine foot visual examination. From the results of statistical tests that have been done there is a significant relationship between routine visual examination of the foot with the incidence of Diabetes Foot Ulcer. This means, DM patients who have a bad habit in their visual examination of their feet, the risk of the incidence of Diabetes Ulcers is greater [19]. d. Diabetic Foot Problems before and after DMSE in the Intervention and control group Based on table 7. The average value of the pre-test foot problems in the intervention group was 21.16 and the control group post was 20.84, with a Z -2.681 (Z count < Z table (211)) P value in the intervention and control groups was 0.007 so that it could be concluded that there were differences in foot problems after being given DSME in the intervention and control groups.

The number of respondents who experience diabetic foot problems after health education has also experienced a decrease in Daily Self Inspection on the feet is an effective and inexpensive independent practice to prevent foot complications such as Diabetes Ulcers [20]. This study supports Dewi's research, another aspect that also plays a role in foot care as an effort to prevent the occurrence of diabetic foot ulcers is a nail care habit, one of which is toenails, 71.43% of patients with diabetes foot ulcers fall into the bad category when cutting nail. Statistical tests showed that there was a significant relationship between aspects of cutting nails with the incidence of diabetic foot ulcers. Some of the points taken into account are nail cutting techniques, callus management, foot soaking with warm water and the use of hand body lotion [19]. This certainly proves the theory of health education about its goal of changing the behavior of respondents towards healthy behavior so that a healthy society is created [21].

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