INTERNATIONAL JOURNAL OF RESEARCH AND INNOVATION IN APPLIED SCIENCE (IJRIAS)
ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue II February 2023

Effect of Diabetes Self-Management Education on the Prevention of Diabetic Foot Injuries

Nanda Fitria[1*], Novia Rizana[1], Sri Andala[1], Mursal[1], Dalillah Afifah[1]

[1]STIKes Muhammadiyah Lhokseumawe, Aceh, Indonesia
**Corresponding Author*

Received: 10 February 2023; Accepted: 23 February 2023; Published: 24 March 2023

Abstract - Diabetics are at high risk of developing chronic disease problems such as diabetic foot injuries. Diabetic foot injuries can be prevented if diabetics have good knowledge so that they are able to carry out diabetic foot care. The provision of DSME can facilitate the knowledge and ability of diabetes mellitus clients to carry out self-care. This study aims to analyze the effect of DSME on the prevention of diabetic foot injuries. The method used is a quasi-experiment with one group pre-test post-test design. Data collection uses research instruments in the form of questionnaires. The study sample used was 55 people with a purposive sampling technique. The data analysis technique used is the marginal homoegenity test. The results showed that there was an effect of DSME on the prevention of diabetic foot injuries. It is hoped that the Center for Public Health can make DSME a regular health promotion program to improve the self-care ability of type 2 diabetes mellitus clients while preventing complications from diabetic foot injuries.

Keywords: Diabetes Self-Management, Diabetes mellitus, Diabetic Foot Injuries

I. Introduction

Diabetes is a chronic metabolic disease caused by an increase in blood glucose (blood sugar) levels which can increasingly cause severe damage to the heart, blood vessels, kidneys, eyes and nerves. Generally caused by type 2 diabetes, mellitus occurs in adults, when the patient's body becomes resistant to insulin or cannot produce enough insulin (World Health Organization, 2020).

According to the International Diabetes Federation (IDF), 425 million people worldwide have diabetes, with that figure is expected to rise by 48% to 629 million by 2045. Indonesia is the top 10 countries for the number of adults with diabetes; in 2017, it ranked 6th out of the top 10 countries. Indonesia is one of 22 countries in the world with 425 million diabetics; by 2045, that number will rise to 183 million, or the total number of cases of 10 million diabetes in adults (Diabetes Atlas, 2019).

Data from the Aceh Provincial Office based on the results of a survey of Center for Public Health in 23 districts and cities in 2019, there were 30,555 diabetic patients. Meanwhile, in the working area of the Juang Bireuen City Health Center, diabetics in 2021 totaled 517 people. Based on some of these data, it can be concluded that the prevalence and incidence of type II diabetes mellitus continue to increase from year to year, both in developed and developing countries. The number of people with diabetes mellitus, if not handled properly, will cause various kinds of complications.

The complications resulting from diabetes mellitus are varied. According to the World Health Organization, adults with diabetes mellitus are at an increased risk of heart attack and stroke, blindness, and neuropathy (nerve damage) in the legs, which can lead to diabetic leg injuries, infections, and limb amputation (Jones & Harding, 2015). Leg injuries that last for a long period also have a negative impact on the patient's self-concept, self-esteem, quality of life, physical and emotional health, his or her hope of recovery, and their spiritual level. This shows that handling leg injuries is not enough just to take care of the physical, but also needs attention in handling the psychic, spiritual side, to improve the quality of life of the patient (Akbar et al., 2021).

One aspect that plays an important role in the management of type 2 diabetes mellitus is education. Providing intensive education related to reducing the incidence of diabetic foot injuries (Adiewere et al., 2018), educational programs improve foot care scores and reduce foot problems such as neuropathy, foot defects, lesions, ulcers, tinea pedis, and callus degrees (Sharoni et al., 2018).

DSME (Diabetes Self-Management Education) is an ongoing process carried out to facilitate the knowledge, skills, and abilities of clients with diabetes mellitus to carry out self-care. The implementation of DSME consists of 4 sessions; in its implementation, it not only provides counseling but also teaches the skills of promoting foot care. Proper foot care can prevent the occurrence of diabetic foot injuries. The lack of knowledge and awareness of the sufferer causes a lack of diabetic foot injury prevention behavior (Jannah & Uprianingsih, 2020).

Research conducted by Umaroh (2017) on the Effect of Diabetes Self-Management Education (DSME) Through Calendar Media on Foot Care Adherence of Diabetes mellitus Clients. The results showed a significant difference between attitudes before

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue II February 2023

and after being given health education about diabetes mellitus. In line with other research conducted by Aminah et al. (2022) regarding the influence of DSME with booklet media on dietary compliance of Type 2 diabetes mellitus patients, it shows that DSME with booklet media has a significant influence on dietary compliance of diabetes mellitus patients.

The foot care component consists of six components: daily foot inspection; keeping feet clean and dry; maintaining the softness of the feet; cutting nails that are parallel to the fingertips and straight; protection and first aid in foot trauma; and selection of shoes and socks (Bakker et al., 2016).

The results of the interview phenomenon study conducted on 10 people with diabetes mellitus who visited the Center for Public Health 2 of the sufferers (20%) knew about the diabetic foot care method obtained from the Puskesmas through education on Prolanis (the Chronic Disease Management Program). Because they have not been exposed to foot care education, eight people (80%) with diabetes mellitus do not even know how to treat diabetic feet and have not taken steps to prevent foot ulcers. Based on the above problems, researchers will conduct research on the effect of Diabetes Self-Management Education (DSME) on the prevention of diabetic foot injuries at the Center for Public Health.

II. Method

This study used a quasi-experimental design, with the design of one group pretest and posttest. In this design, there is no comparison group (control) but a first observation (pretest) is carried out which allows researchers to test changes that occur after treatment (posttest).

This study aims to analyze the effect of DSME on the prevention of diabetic foot injuries. The population in this study was all 64 patients with type 2 diabetes mellitus and the sampling technique used was purposive sampling, which was 55 respondents.

III. Result and Discussion

3.1. Univariate Analysis

3.1.1 Demographic Data

Table 1. Demographic Frequency Distribution (n=55).

No	Demographic Data	Frequency (F)	Percentage (%)
1	Age		
	45-59 years	31	56,4
	60-69 years	18	32,7
	> 70 years	6	10,9
	Total	55	100
2	Gender		
	Man	16	29,1
	Woman	39	70,9
	Total	55	100
3	Final Education		
	Primary school	3	5,5
	Secondary School	50	90,9
	High School	2	3,6
	Total	55	100
4	Work		
	Farmer	14	25,5
	Civil servants	1	1,8
	Merchant	12	21,8
	Trader/self-employed	10	12,1
	Not working	13	29,0
	Others	5	
Total		55	100

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue II February 2023

Based on Table 1 above, it is explained that most of the respondents aged 45–59 years were 31 people (56.4%), with the majority of females being as many as 39 people (70.9%). Respondents' most recent education was mostly secondary education graduates, as many as 50 people (90.9%), with the average respondent being a farmer of 14 people (25.5%) and not working 13 people (23.6%).

3.1.2 DSME Pretest and Posttest Knowledge

Table 2. Frequency Distribution of Respondents Based on DSME Knowledge Level (n=55).

No	Knowledge Level	*Pre-test*		*Post-test*	
		n	%	n	%
1	Good	10	18,2	40	72,7
2	Enough	26	47,3	14	25,5
3	Less	19	34,5	1	1,8
	Total	55	100	55	100

Based on Table 2 above, it is explained that most of the knowledge before being given Diabetes Self-Management Education (DSME) is the good category of 10 respondents (18.2%), the sufficient category of 26 respondents (47.3%), and less 19 respondents (34.5%). After being given DSME, most of the categories were good as many as 40 respondents (72.7%).

3.2. Bivariate Analysis

Table 3. Effect of Diabetes Self-Management Education on the Prevention of Diabetic Foot Injuries (n = 55)

Variabel	Mean	Std. Deviation	*p-value*
Pre-test Post-test	76.000	4,301	0,001

Based on Table 3 above, it shows that the mean pretest and posttest values are 76,000, the standard deviation value is 4,301, and the *p value* is $0.001 \leq \alpha$ 0.05, so Ha is accepted. This shows that Diabetes Self-Management Education (DSME) has a significant influence on diabetics' knowledge about the prevention of diabetic foot injuries at the Center for Public Health.

3.3. Discussion

3.3.1 Knowledge of diabetes mellitus patients before being given DSME about the prevention of diabetic foot wounds

The results showed that the knowledge of people with diabetes mellitus at the Center for Public Health before being given DSME about the prevention of diabetic foot injuries was the majority in the sufficient category among 26 respondents (47.3%). According to cognitive theory (the process theory of motivation), the better an individual's education, the greater his knowledge, and the better his actions are to meet his needs. The results of the study showed that the majority of diabetics' education at the Center for Public Health Juang City was provided by mostly graduates of secondary education, as many as 50 people (90.9%), and elementary school graduates, as many as 3 respondents (5.5%). This shows that the education of diabetics at the Juang City Health Center is still low.

According to the researcher's assumption, the respondents' knowledge about diabetic wounds is still lacking, one reason being that the information received is still limited. They are not eager to dig up information related to foot care for diabetics. They only know things related to diabetes but do not know those related to foot care. The results of the study on the knowledge of diabetic foot injury sufferers before being given counseling at the Center for Public Health show that most of the respondents' knowledge in the category is sufficient.

3.3.2 Knowledge of diabetes mellitus patients after being given DSME about the prevention of diabetic foot injuries

The results showed that knowledge among diabetic wound sufferers at the Juang City Health Center after being given counseling about diabetic injuries was mostly in the "good" category for 40 respondents (72.7%). Hendrawijaya (2010) stated that education has an important role in the formation of human intelligence and changes in behavior. Education is able to grow awareness of the responsibility to improve the quality and standard of living, and furthermore, educated people will be more capable and aware of maintaining and restoring their health.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue II February 2023

Knowledge of diabetic wound sufferers at the Juang City Health Center after being given DSME about preventing diabetic foot injuries in the good category where they know that how to avoid diabetic foot injuries by avoiding wearing shoes / sandals with high heels, must pay attention to the selection of sandals / shoes, do not choose narrow shoes / sandals, the need to control blood sugar levels, take care of the feet and the use of creams (lotion / handbody) can reduce the risk of wounds diabetes.

Diabetes mellitus control is also very important and should be implemented as early as possible to avoid very expensive treatment costs and impaired functioning in the family. The family also has an important role in providing motivation, support systems, and care. Optimization of diabetes self-management education (DSME) shows that the interventions given by the group with DSME treatment and family support have a greater influence on the prevention of diabetic foot ulcers. In line with the research conducted by Eben and Astrid (2017) regarding the differences in the level of knowledge and attitudes before and after the administration of Diabetes Self Management Education (DSME) in diabetes mellitus patients after being given DSME, most of them are in the "good" category, namely 82.5%.

Based on assumptions from researchers and existing theories, a person must have a good knowledge of diabetic leg wounds to reduce complications from the diabetes mellitus disease. If the respondent has a good knowledge of diabetic foot injuries, those respondents are more likely to perform foot care properly and correctly. The results of this study regarding the knowledge of diabetics after being given DSME at the Juang City Health Center allow it to be concluded that most of the respondents' knowledge is in the "good" category. This also proves that the provision of counseling has an influence on increasing the knowledge possessed by diabetic foot wound sufferers.

3.3.3 Effect of Diabetes Self-Management Education on the Prevention of Diabetic Foot Injuries

The study's findings revealed that there was an influence of DSME on knowledge of preventing diabetic foot injuries at the Center for Public Health before and after being given a DSME knowledge test on diabetic foot injuries prevention with data analysis (marginal homegeny) p value 0.001, with a value less than $\alpha = 0.05$. Before being given a DSME on the prevention of diabetic foot injuries, the majority of diabetics at the Bireuen City Health Center, namely 26 respondents (47.3%), were knowledgeable. After obtaining a DSME on the prevention of diabetic foot injuries, respondents' knowledge was in the "good" category, namely, 40 respondents (72.7%). The increase in knowledge of diabetics at the Center for Public Health is influenced by the provision of DSME on the prevention of diabetic foot injuries.

Human behavior is essentially human actions or activities, both observable and unobservable. Diabetes mellitus patients' behavior in diabetic foot care refers to how patients carry out diabetic foot care actions. The behavior of diabetic patients in carrying out diabetic foot care must be in accordance with the principles of correct foot care in accordance with health standards. The patient's ability to perform diabetic foot care is influenced by various factors, including knowledge.

Diabetes mellitus patients' knowledge of diabetic ulcers includes the definition, physiology, etiology, and management of diabetic ulcers. The knowledge possessed will then become a foothold or foundation for diabetes mellitus patients towards foot care, where the higher the knowledge of diabetes mellitus patients about foot care of course, the better their foot care behavior will also be much better. The success of health education in changing the actions of people with diabetes mellitus in diabetic foot care is influenced by messaging methods. The demonstration method is considered very effective in changing health behaviors.

Self-care agency is an individual's ability to carry out self-care, which can be influenced by age, development, sociocultural factors, health, and others. The implementation of DSME interventions is not just about providing counseling but also training skills with foot care demonstrations. According to the researchers' assumptions, by teaching the correct foot care skills, diabetes mellitus clients can manage the disease well so that the self-care agency increases.

This study found that Diabetes Self-Management Education (DSME) on diabetic foot injury prevention is extremely beneficial for improving diabetics' knowledge of diabetic foot injury prevention. The provision of DSME is expected to change the behavior of diabetics in an effort to prevent complications. Using the results of research on the effect of Diabetes Self-Management Education (DSME) on the prevention of diabetic foot injuries at the Bireuen Regency Juang City Health Center, it can be concluded that DSME influences diabetics' knowledge about diabetic foot injury prevention.

IV. Conclusion

The results of the statistical test obtained a *p-value* of $0.000 < \alpha$ 0.05, then H_a was accepted. This shows that there is an influence of Diabetes Self-Management Education (DSME) on the prevention of diabetic foot injuries at the Bireuen Regency Juang City Health Center.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS | Volume VIII Issue II February 2023

Acknowledgment

Thank you to the Juang City Health Center and all parties who have supported it so that this research runs smoothly and successfully.

References

1. Adiewere, P., Gillis, R. B., Imran Jiwani, S., Meal, A., Shaw, I., & Adams, G. G. (2018). A systematic review and meta-analysis of patient education in preventing and reducing the incidence or recurrence of adult diabetes foot ulcers (DFU). *Heliyon*, *4*(5), e00614. https://doi.org/10.1016/j.heliyon.2018.e00614.
2. Akbar, Y., Mursal, Hayatun, T., & Rizana, N. (2021). Tingkat kualitas hidup pasien luka kaki diabetik. *Jurnal Keperawatan*, *19*(2), 55–65.
3. Aminah, S., Amelia, K. R., Rianto, B., & Safitri, V. D. (2022). Pengaruh Edukasi Self Management Diabetes (DSME) Dengan Media Booklet Terhadap Kepatuhan Diet Pasien DM Tipe 2 Di Puskesmas Cimahi Selatan. Malahayati Nursing Journal, 5(2), 432–442. https://doi.org/10.33024/mnj.v5i2.5912.
4. Bakker, K., Apelqvist, J., Lipsky, B. A., Van Netten, J. J., & Schaper, N. C. (2016). The 2015 IWGDF guidance documents on prevention and management of foot problems in diabetes: development of an evidence-based global consensus. *Diabetes/Metabolism Research and Reviews*, *32*(30), 2–6. https://doi.org/10.1002/dmrr.2694.
5. Diabetes Atlas, I. (2019). INTERNATIONAL DIABETES FEDERATION. *The Lancet*, *266*(6881), 134–137. https://doi.org/10.1016/S0140-6736(55)92135-8.
6. Eben, D., & Astrid, M. (2019). Perbedaan Tingkat Pengetahuan Dan Sikap Sebelum Dan Sesudah Pemberian Diabetes Self Management Education (DSME) Pada Pasien Diabetes Melitus Di Puskesmas Matraman Jakarta Timur. Journal Health & Science : Gorontalo Journal Health and Science Community, 3(1), 1–7. https://doi.org/10.35971/gojhes.v1i1.2128.
7. Hendrawijaya (2010). Psikologi Keperawatan. Jakarta: EGC.
8. Jannah, N., & Uprianingsih, A. (2020). Optimalisasi Diabetes Self Management Education (Dsme) Dengan Dukungan Keluarga Terhadap Pencegahan Kaki Diabetes Di Kota Bima. *Jurnal Ilmiah PANNMED (Pharmacist, Analyst, Nurse, Nutrition, Midwivery, Environment, Dentist)*, *15*(3), 410–414. https://doi.org/10.36911/pannmed.v15i3.801
9. Jones, N. J., & Harding, K. (2015). 2015 International Working Group on the Diabetic Foot Guidance on the prevention and management of foot problems in diabetes. *International Wound Journal*, *12*(4), 373–374. https://doi.org/10.1111/iwj.12475.
10. Sharoni, S. K. A., Rahman, H. A., Minhat, H. S., Shariff-Ghazali, S., & Ong, M. H. A. (2018). The effects of self-efficacy enhancing program on foot self-care behaviour of older adults with diabetes: A randomised controlled trial in elderly care facility, Peninsular Malaysia. *PLoS ONE*, *13*(3), 1–23. https://doi.org/10.1371/journal.pone.0192417.
11. Umaroh, L. (2018). Pengaruh Diabetes Self Management Education (DSME) Melalui Media Kalender Terhadap Kepatuhan Perawatan Kaki Klien Diabetes mellitus Tipe 2 Di Balai Pengobatan Muhammadiyah Lamongan (Doctoral dissertation, Universitas Airlangga).
12. World Health Organization. (2020). Diagnosis and Management of Type 2 Diabetes. *WHO Publications*, *42*(SUPPL. 1), 2–8. https://doi.org/World Health Organization; 2020 (WHO/UCN/NCD/20.1).