Nursing Care For Diabetic Foot Ulcer (DFU) Patients With Skin Integrity Problems With The Application Of Modern Dressing Using Secondery Polyurethane Foam Dressing

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ABSTRACT

Diabetic foot ulcer (DFU) is a disease of the diabetic foot that is characterised by sensory, motor and autonomic neuropathy as well as macro- and microvascular dysfunction. Partial or complete loss of tissue integrity, commonly referred to as deformity, occurs in patients with diabetes mellitus (DM) who develop diabetic ulcers. The aim of this study is to determine and analyse the effect of the application of modern dressings using secondary polyurethane foam dressings on the healing rate of diabetic foot ulcers in patients with impaired skin integrity at the Lampung Wound Care Clinic. This research design uses a qualitative method using a case study approach with a total of 2 subjects. 4 sessions were conducted over 2 weeks at the Lampung Wound Care Clinic using the Winners Scale Observation Sheet instrument. The results of the study were obtained before the application of the advanced wound dresser on the first day for Mr E's score, which is 29, and Mr S's score, which is 29. Mr E is 29 and Mr S is 33. After the 4th session the Winners Scale Observation Sheet for Mr E is 24 and Mr S is 33. Mr E is 24 and Mr S is 28. Although the changes shown are not significant because they are influenced by the respondents' high blood glucose levels and lifestyle and diet, which are beyond the reach of the researchers, the intervention of modern dressing application using secondary polyurethane foam wraps shows quite visible changes in diabetic foot ulcers.

Keywords: Diabetic Foot Ulcer, Impaired Skin Integrity, Modern Dressing, Polyurethane Foam

INTRODUCTION

Diabetes mellitus (DM) is a heterogeneous disorder that occurs when insulin deficiency or insulin resistance causes high blood glucose levels. Prolonged high blood glucose can cause organ damage and contribute to a group of complications associated with diabetes. Types include type 1 diabetes mellitus, type 2 diabetes mellitus and pregnancy diabetes mellitus. In addition, a number of other types of diabetes have been identified, such as monogenic diabetes syndrome, exocrine pancreatic disease and diabetes caused by drugs or chemicals. (Fan et al., 2022).

After China, India, USA, Brazil, Russia and Mexico, the prevalence of diabetes in Indonesia is the seventh highest in the world (Herwin, 2023). The number of people with DM in Lampung Province in 2022 is 89,981, based on the health profile of Lampung Province. (99.0%) and Bandar Lampung City is ranked 1st with the highest number of DM sufferers compared to 15 other districts in Lampung province, with those suffering from DM as many as 18,644 people (Dinas Kesehatan Provinsi Lampung, 2022). In Indonesia, there are 1785 people suffering from DM Complications include neuropathy (63.5%), retinopathy (42%), nephropathy (7.3%), macrovascular (16%), microvascular (6%) and diabetic wounds (15%). Death rates from diabetic ulcers and gangrenous wounds are 17 to 23% and amputation rates are 15 to 30%. (Maulidha et al., 2023).

Diabetic foot ulcers (DFUs) are characterised by sensory, motor and autonomic neuropathy and macro- and microvascular dysfunction. Diabetes mellitus (DM) patients who experience diabetic ulcers experience damage to tissue integrity or what is usually called a deformity, either partial or complete. Deformities may occur in the integument extending to tendon, muscle, bone or joint tissue, caused by hyperglycaemia. If not treated properly immediately, it can cause infection (Dimantika, 2020). To prevent infection or even amputation, in WCCA continues to develop a type of Modern Dressing wound care with the Moisturizer Balance principle. One of the most commonly used wound dressings in treating Diabetic Foot Ulcer (DFU) wounds is polyurethane foam dressing. Polyurethane foam dressing is a dressing designed to absorb large amounts of wound fluid (absorbent dressing) and is used as a primary or secondary dressing. Made from semipermeable polyurethane, polyurethane foam dressings contain a foamed polymer solution with small open cells capable of retaining fluid.

Indications for this polyurethane foam dressing include moderate to severe exudation wounds, prophylactic protection of bony prominences or direct contact areas, moderate to complete wounds, granulating or necrotic wounds, donor wounds, skin lacerations. It can even be used on infected wounds. This dressing can also be combined with topical and enzymatic treatments (Maulidha et al., 2023).

Based on theory and problems in the field, researchers will provide nursing care for Diabetic Foot Ulcer (DFU) Patients with Problems of Skin Integrity Disorders by Applying Modern Dressings Using Secondary Polyurethane Foam Wraps at the Lampung Wound Care Clinic.

METHOD

This study uses a qualitative research design. It uses a case study approach with an experimental design using pre-test and post-test techniques. A convenience sample of 2 patients from the Lampung Wound Care Clinic was used for this study. The sample inclusion criteria are clients who are diagnosed with diabetes mellitus, clients who are male and female, clients who are able to communicate verbally, clients who experience Diabetic Foot Ulcer (DFU) with stage 2 3 with hyper excudate type, and clients who are willing to be respondents. and sign informed consent.

The research was conducted for 2 weeks with 4 treatment visits, April 19 2024 – April 30 2024. The tools used in the implementation of this intervention were as follows: Informed consent form, Standard Operating Procedure (SOP) sheet for Modern Dressing wound care, and a sheet Winners Scale observations adopted of Bates-Jensen Wound Assessment Tool (BWAT).

RESULTS

The findings before applying Modern Dressing Using Secondary Polyurethane Foam Wraps on 2 respondents on April 19 2024 when the pre-test was carried out were as follows:

Table 1. Distribution of respondents on the basis of cure of diabetic patients Wounds Before Implementing Modern Dressing Using Bandages Secondary Polyurethane Foam

Name	Date	Score	Value
Tn. E	April 19th	29	*Wound Regeneration* (the wound is healing)
Tn. S	April 19th	33	*Wound Degeneration* (the wound is healing)

Based on table 1, the results obtained show that the first respondent, namely Mr. On the first day of application on April 19 2024, the results showed that the left feett diabetic wound had a score of 29 in the Wound Regeneration category (the wound was healing) and one GDS from 234 mg/dl. The second respondent, namely Mr. S, on the first implementation day, April 19 2024, the result was a diabetic wound on the right leg with a score of 33 in the Wound Regeneration category (the wound was healing) and a GDS of 486 mg/dl. Previously the 2 respondents only carried out wound care using conventional techniques. The results after applying Modern Dressing using Secondary Polyurethane Foam Dressing to 2 respondents on April 30 2024 when the pre test was carried out are as follows:

Table 2. Distribution of respondents based on cure of diabetic patients Wounds After Applying Modern Dressings Using Secondary Polyurethane Foam Bandages

Name	Date	Score	Value
Tn. E	April 30th	24	*Wound Regeneration* (the wound is healing)
Tn. S	April 30th	28	*Wound Degeneration* (the wound is healing)

From the table above it is explained that after implementation, the first respondent, namely Mr. On the 4th visit after being given the application of Modern Dressing using Secondary Polyurethane Foam dressing, the results showed that the diabetic wound on the left leg had improved with a score of 24, which was still in the Wound Regeneration category (the wound was healing) with a GDS of 182 mg/dl. The second respondent, namely Mr. S, on the 4th visit after applying Modern Dressing using a secondary polyurethane foam dressing, the results showed that the diabetic wound on the right leg had improved with a score of 28, which was still in the Wound Regeneration category (the wound was healing) GDS 527 mg.

DISCUSSION

Respondent Characteristics

Characteristics Based on Age Based on this research (wounds, describing the characteristics of those interviewed according to age is that Mr. E is 42 years old and Mr. Statistical Paired t-test obtained a p-value of 0.000 less than α= 0.05 (0.000> 0.05), so it can be said that H1 is accepted, which means in type II diabetes mellitus, there is a link between age and blood glucose levels. sufferers in Dr. Iskak Hospital Tulungagung Internal Medicine Clinic. Trisnawati et al., (2019) stated that age can increase the incidence of type II DM because aging can reduce insulin sensitivity, which can affect blood glucose levels. Individuals will experience progressive depletion of pancreatic β cells. In general, humans experience physiological decline which decreases dramatically after the age of 40 years, one of which has an impact on the pancreas organ itself.

Characteristics Based on Genetics The first respondent, namely Mr. E said his mother had a history of DM so the client did have factors that could not be changed, namely genetic factors. This is also in line with Simanjuntak's (2023) research. Based on the research results showing genetic factors (heredity), it shows that of the 20 respondents in the case group, the majority have genetic factors, namely 16 (60.0%) respondents and 4 (20%.0) respondents. who do not have genetic factors. Meanwhile, of the 20 respondents in the control group, the majority did not have genetic factors, namely 12 (60.0%) respondents and those who had genetic factors were 8 (40.0%) respondents. People with a family background who have one or more family members with a mother, father or family affected by DM will have a 2 to 6 times greater chance risk of diabetes in comparison to people who do not have diabetes in their offspring (Isnaini et al., 2019).

Based on this research, the description of the respondent's characteristics based on lifestyle is Mr. The client likes sweet food and is not picky about food, the client says he only eats all the food given in the office. In an earlier study by Murtiningsih et al. (2021), Pubmed and Google Scholar search results using the terms risk factors, lifestyle, diet and type 2 diabetes and English terms (risk factors, lifestyle and type 2 diabetes) yielded 9850 Google Scholar articles and 2500 Pubmed articles (n=12,350) matching those terms.

Based on the results of the literature search, 9,850 Google Scholar articles and 2,500 Pubmed articles (n = 12,350) matching these keywords were identified. Murtiningsih et al (20-21) found that poor dietary habits lead to a mismatch of carbs and other nutrients needed by the body. This causes the body to produce more glucose than the pancreas can handle, leading to diabetes.

Characteristics Based on Level of Knowledge Based on this research, describing the characteristics of those surveyed according to level of education is Mr. E who is a high school graduate and the second respondent, namely Mr. S is a junior high school graduate. This is consistent with the results of Pangestika research (2022), information can be obtained that of the 35 case respondents, 20 people (57.1%) were in the low knowledge category and 15 (42.9%) respondents were in the high knowledge category. As for control respondents, 13 people (37.1%) were in the low knowledge category and 22 people (62.9%) were in the high knowledge category. Therefore, an association exists between knowledge and occurrence of type II DM.

According to Pangestika (2022), low awareness is one of the factors contributing to high morbidity, including Diabetes Mellitus type II. Knowledge is important to shape behavior. Based on the results of the survey, the description of the characteristics of the respondents based on their level of compliance is as follows: The second respondent, Mr S, who often does not take metformin, does not comply with the prescribed dosage. So that the wound healing on Mr. S did not improve from visit 1 to visit 2. This is also proven by previous Research carried out by Sulistianingsih et al., (2019) which showed that there has been a significant increase in effect of adherence to taking prescribed medication on perineal wound healing (POR, 10.974 95% CI, 4.183 -28.790), in a multivariate analysis , medication adherence has an effect (ExpB: 9.180).

Obedience is an attitude of following instructions that have been given previously and is not judgmental. Non-compliance with medication therapy is the act of delaying taking a medication prescription or even not taking the medication that has been prescribed, not complying with the prescribed dosage and reducing the frequency of medication (Triastuti et al., 2020).

Discussion before applying Modern Dressing wound care to healing Diabetic Foot Ulcer (DFU)

Based on the results of research before using Modern Dressing wound care on the first respondent, namely Mr. and covered with granulation tissue, score 3, the wound edges clearly do not merge with the wound base, score 3, no caves, score 1, serosanguineous exudate type, score 3, moderately amount of exudate, namely >25% and <75% of the dressing used, score 4, Colour of the skin around the wound - pink or normal skin colour - any part of the wound - score 1, no pitting edema along <4cm around the wound score 3, The granulation tissue is bright red, similar to meat: < 75 % and > 25 % of the wound is filled with granulation tissue Score 3, <25% epithelialization score 5 with a total score of 29 and a GDS result of 234 mg/dl.

The second subject was Mr. Wound size 4 x 4.5 cm, score three, with necrotic tissue covering the depth, score four, wound margins clearly visible, no fusion with the wound bed, score three, no ulceration, score one, type of serous exudation, score four, moderate amount of exudation: Exuding >25% and <75% of the dressing used score 4, skin colour around the wound pink or normal skin colour in any part of the wound score 1, no purulent oedema >4 cm around the wound score 3, no granulation tissue score 5, epithelialisation <25% score 5, with a total score of 33 and a GDS result of 486 mg/dl.

In people with diabetes, wounds get worse quickly and are difficult to heal because diabetes Damage to blood vessels and nerves, resulting in reduced blood flow and sensation in the area of the wound. This causes the wound to receive less oxygen and nutrients, and the sufferer may not immediately notice the wound. In addition, high blood sugar weakens the immune system, which makes it more difficult for the body to fight off infections and repair damaged tissue. (Bratajaya et al., 2023). Prior to its implementation on the first interviewee, M. E., the customer was diabetic for three years and was not taking any medication because, according to the customer, she was on a sugar-free diet.. Meanwhile, the 2nd respondent, namely Mr. S said the client had been suffering from diabetes mellitus for 6 years, and was taking metformin 2x1 500 mg.

Discussion after applying Modern Dressing wound care to healing Dibetic Foot Ulcer (DFU)

On the basis of the research findings, the first participant, Mr. Wund. With the results of the wound assessment with a size of 6.5 x 5 cm, score 3, the depth of the wound until the entire skin layer is lost, subcutaneous damage or necrosis does not reach the fascia and is covered by granulation tissue, score 3, the wound edges are clearly not fused to the wound bed, score 3, there is no cavern, score 1, the type of exudate is improving, blood score 2, small amount of exudate, wound surface is moist, exudate wets <25% of the dressing used, score 3, skin colour around the wound is pink or normal skin colour for any part of the wound, score 1, no oedema, score 1, granulation tissue is bright red like flesh: 75% to 100% of the wound is filled with granulation tissue, score 2, epithelialisation <25%, score 5 and the patient's blood sugar level has also dropped to 182 mg/dl.

In the second patient, Mr. With depth covered with necrotic tissue score 3, clear wound edges not fused to the wound bed score 3, no cavities score 1, serous exudate type score 3, moderate amount of exudate: exudate was >25% and <75% of the dressing used score 4, skin colour around the wound was pink or normal skin colour for any part of the wound score 1, no oedema score 1, granulation tissue had improved pink and pale and black. ie. pink and pale and blackish red or <25% filled with granulation score 4, epithelialisation <25%, score 5, and the client's blood glucose level increased to 527 mg/dl. The results show quite visible changes which show the effectiveness of the Secondary Polyurethane Foam Bandage against Diabetic Foot Ulcer (DFU). The use of Secondary Polyurethane Foam dressing helps absorb excess exudate in the wounds of the 2 respondents, so that there is no excess moisture or maceration on the skin around the wound which can cause the wound healing process to be disrupted.

In the research process the second respondent underwent hyperbaric therapy which was carried out every 3 days which also helped the wound healing process. In the 4 visits the first respondent, namely Mr. E received several wound ointments for primary dressing, including on visit 1 using Metcovazin Silver, visit 2 using honey collagen, visit 3 using red fruit (Pandanus conoideus) ointment and visit 4 using Metcovazin Red while still using Secondary Polyurethane Foam dressing at all visits.

The 2nd respondent, namely Mr. In his 4 visits, S used the same wound ointment as a primary dressing, namely metcovazin silver, while continuing to use the Secondary Polyurethane

Foam dressing in all his visits. Apart from that, the two respondents also consumed snakehead fish vitamins to speed up the healing process.

CONCLUSION

The following conclusions can be drawn from the results of the research and discussion: before applying Modern Dressing with Secondary Polyurethane Foam to Dibetic Foot Ulcer (DFU) on the first respondent, namely Mr. E obtained results for a diabetic left leg wound with a score of 28 in the Wound Regeneration category (the wound was healing) and a GDS of 234 mg/dl. The second respondent, namely Mr. S, before being given the application of Modern Dressing using a secondery polyurethane foam dressing, the result was a diabetic wound on the right leg with a score of 33 in the Wound Regeneration category (the wound was healing) and a GDS of 486 mg/dl.

After applying Modern Dressing Secondary Polyurethane Foam to Dibetic Foot Ulcer (DFU) on the first respondent, namely Mr. At the 4th visit, the results of the diabetic wound on the left leg had decreased with a score of 24, namely still in the Wound Regeneration category (the wound was healing) with GDS also improving, namely 182 mg/dl. The second respondent, namely Mr. S on the 4th visit after applying Modern Dressing using secondary polyurethane foam dressing, it was found that the diabetic wound of the right leg had decreased with a score of 28, which was still in the Wound Regeneration category (the wound was healing) with a worsening GDS of 527 mg/dl.

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