JURNAL PENELITIAN SEKOLAH TINGGI ILMU KESEHATAN NAHDLATUL ULAMA TUBAN
https://ejournal.iiknutuban.ac.id/index.php/jp
E-ISSN: 2686-4959
P-ISSN: 2338-5898
VOL. 6 NO. 2 Desember. Page 105-112

EFFECTIVENESS OF COMPLEMENTARY TREATMENTS IN DIABETIC WOUND HEALING

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Article Info:
Submitted: Dec 17, 2024
Accepted: Dec 31, 2024
Published: Dec 31, 2024

Handling Editor:

Keywords:
Complementary, Foot Diabetic, Honey

ABSTRACT

Background: Diabetic foot ulcers are typical wounds that are serious and common complications in people with diabetes with a long healing time. The cost of treating diabetic foot ulcers is relatively expensive because the price of modern dressings is less affordable and the recovery time is long. Complementary dressing interventions are expected to heal diabetic foot ulcers effectively. Method: The study method in this research uses a quantitative descriptive design with a case study approach based on the application of Evidence-Based Nursing Practice, specifically diabetic wound care using the complementary dressing method. This case study was conducted at Besole Community Health Center in August to September 2024. Result: The results obtained were an improvement in the wound as indicated by an increase in the score on the assessment sheet with an average difference of 3 points, the data collection tool used the Bates-Jensen Wound Assessment Tool (BWAT) assessment sheet. Conclusion : Wound care using the complementary dressing method can be an option as a wound care treatment to accelerate the reepithelialization of tissue and the success of healing diabetic foot wounds at a more affordable cost.

1. INTRODUCTION

Diabetic foot ulcers are a serious and common complication of type 1 and type 2 diabetes caused by peripheral neuropathy, affecting 9.1–26.1 million people worldwide each year and approximately 19–34% of diabetes patients at least once in their lifetime (Chen et al., 2024). In all patients with diabetes, 15% of patients have diabetic foot ulcers (Kiliçoglu et al., 2018). Where those patients have a higher risk of amputation in the lower extremities compared to patients without diabetes (Jia et al., 2018).

The global prevalence of diabetes continues to increase substantially, with a

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prediction of 642 million people worldwide by 2040. The complex and costly management of these debilitating and recurrent wounds remains a therapeutic challenge (Kemenkes, 2024). The prognosis for patients with diabetic foot ulcers is greatly influenced by the high prevalence of infections and amputations associated with these wounds (Djuma et al., 2024). The 5-year mortality risk for patients with diabetic foot ulcers is 2-5 times higher compared to patients without foot ulcers, and up to 70% of patients may die within 5 years after amputation (H. K. R. R. Nair et al., 2020). One of the primary prevention measures for Foot Ulcer is foot care for patients with diabetes mellitus (Katayama et al., 2017).

Wound care nowadays has developed rapidly, where complementary wound care is gradually being abandoned and shifting towards modern nursing. The actions that must be taken in foot care aim to detect foot abnormalities early (Holland-Carter et al., 2017; Imai et al., 2017). In the treatment of diabetic foot ulcers, various actions have been implemented, including debridement, blood glucose control, and infection prevention; however, the clinical effectiveness of these methods remains poor.Currently, wound dressings play an integral role in managing foot ulcers (H. K. R. R. Nair et al., 2020; Vas et al., 2020). Various types of wound dressings can be applied to foot ulcers, including conventional dressings (such as iodine dressings), functional dressings (such as hydrocolloid dressings), and honey dressings (complementary therapy) (Emral et al., 2017). Foot care for patients with diabetic ulcers is crucial to prevent infection in the wounds and accelerate wound healing (Zhang et al., 2019). The current wound care techniques are experiencing rapid development, where wound care has already adopted modern "Moist Wound Healing (MWH)" treatments such as alginate, metcovazine, foam, hydrocolloid, hydrogel, and complementary therapy using natural honey, while conventional treatments still use NaCl, betadine, and gauze (Kiliçoglu et al., 2018).

Complementary therapy is a non-conventional treatment that does not originate from the country in question. whereas according to Indonesia, complementary therapy is a method of disease management that is performed as a support to conventional medical treatment or as an alternative treatment outside of conventional medical treatment (Yang et al., 2020). This can be linked to the fact that complementary therapy for foot ulcers has not been widely used.Until now, there is still little research that provides sufficient evidence that. Complementary therapy is more effective in the treatment of foot ulcers compared to other dressings (Sari et al., 2019). This study aims to evaluate the effectiveness of complementary therapy interventions as an effective treatment for diabetic foot ulcers and to be applicable in clinical practice.

2. METHODE

The study method in this research uses a quantitative descriptive design with a case study approach based on the application of Evidence-Based Nursing Practice, specifically diabetic wound care using the complementary dressing method. The variable measured is the diabetic foot ulcer that has received one intervention.

The subjects in this study are patients with diabetes mellitus accompanied by diabetic foot ulcers. There are 2 subjects with

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the same case, the subjects were obtained randomly according to the established criteria. The inclusion criteria for selecting study subjects are patients who are willing, do not have cognitive impairment, can read, and have diabetic foot ulcers of grade 1-2, while the exclusion criteria are patients who are unwilling, patients who have received previous treatment, patients who have just been discharged from the hospital, and patients who have foot ulcers but not due to diabetes.

This case study was conducted at Besole Community Health Center in August to September 2024. The intervention or treatment was carried out at 10:00 AM WIB, with each treatment session taking approximately 30 minutes for each subject. The complementary treatment for the diabetic foot wound used honey. All the equipment used was partially provided by the community health center, such as sterile gauze, rolled gauze, 0.9% saline solution, and adhesive bandages, while the honey was brought by the researcher.

Before performing wound care, an observation of the diabetic foot ulcer condition was conducted, measured on the first day before treatment and on the third day using the BWAT (Bates-Jensen Wound Assessment Tool) observation sheet, which consists of 13 items. The author, in providing assessments for each item, pays close attention and observes carefully to describe the wound and enter scores in the score column according to the observation date. If a high score is obtained, it will indicate the severity level of the diabetic foot wound of the subject. The author can conduct this case study after obtaining approval from the health center, the patient, and the family. Before the therapy is conducted, the patient and family are provided with an explanation of the purpose and procedure of the treatment.

The author also explains that the patient's privacy, including their full address and full name, will be maintained. After the patient or subject and their family agreed, wound care was then performed using the complementary dressing method. The initial implementation carried out by the author involved wound washing using 0.9% NaCl, tissue debridement, drying the wound with sterile gauze, applying honey to the wound, closing the wound with gauze, and securing it with plaster. Implementation will be carried out every three days at each meeting, followed by an evaluation.

3. RESULTS AND DISCUSSION

The results of the research conducted by the researchers are as follows

Table 1 Characteristics of Respondents Intervention Group and Control Group

Variable	Group	
	Intervention Group	Control Group
Gender	Woman	Woman
Age	56 years	52 years
Relegion	Islam	Islam
Job	Merchant	Fisherman
Type Of Wound	Signs of inflammation, there is exudate fluid, it has an odor, there is necrotic tissue	There is slough on the foot
Grade Of Wound	2	2
Gda	➢ 250 mg/dl	➢ 300 mg/dl

Based on Table 1 above, data was obtained about the research subject, who complained because the wound had been present for quite some time, the wound had not healed, and there was discomfort in the wound due to occasional pain. The ulcer wound of the study subject is classified as grade 2 with the wound showing signs of inflammation, namely pain at the wound site, redness, swelling, slight exudate, odor, necrotic tissue, and the skin around the wound feeling warm. Meanwhile, in patient

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2, there is slough present in the wound. The vital signs of the study subject are within the normal range, with Hb and leukocytes also within normal limits. The nutritional intake of the study subject is poor, the study subject reported still frequently consuming sweet foods/drinks. In addition, the study subject often feels anxious at night. So the patients do not rest very soundly.

The nursing diagnosis for the case study subject is impaired tissue integrity (D.0129) related to peripheral neuropathy (diabetes mellitus), characterized by major symptoms such as tissue/skin damage, and minor symptoms such as pain, redness, and bleeding (PPNI, 2017). The intervention provided to the case study subject is wound care (I.14564) with outcome criteria including increased wound edge approximation, increased granulation tissue, increased scar tissue, decreased pain, decreased exudate, decreased infection, and decreased inflammation (PPNI, 2018). The action plan includes wound assessment and infection signs, wound care with cleanliness and moisture, providing appropriate dressings, education on improving adequate nutrition, education on blood sugar control, and education on stress management, as well as collaboration on antibiotic administration and collaboration with a nutritionist for a diet appropriate to the patient's condition.

The implementation on the study subject involves examining the wound characteristics, performing wound irrigation using 0.9% NaCl solution to cleanse the wound, drying the wound with sterile gauze, trimming dead tissue if necessary, cleaning the wound, applying honey, and covering the wound with sterile gauze. The dressing is changed every 3 days. Wound care started at 10:00 AM WIB, accompanied by the nurse responsible for the patient. During the procedure, the patient complained of pain, marked by the patient expressing discomfort and occasionally grimacing. The patient expressed that the use of complementary care was quite comfortable and did not incur much cost.

The evaluation results of the second intervention showed that the study subjects preferred using complementary care, dressings that do not stick to the wound, odorless wounds, affordable costs, non-painful, and dressings that do not seep. Meanwhile, the results of the wound observation using the BWAT instrument on the first day of the intervention showed a total score of 33 and 35 from 13 assessment items, while in the second intervention, the scores were 30 and 31.

Table 2 Scoring the Progress of Diabetic Foot Ulcer Healing using BWAT

Subject	Intervention 1 (Pre)	Intervention 2 (Post)
Subject 1	33	30
Subject 2	35	31

Based on Table 2, the scoring values for diabetic foot wounds show a decrease between before and after, although not very significant. In subject 1, there was a decrease in score by 3 points, and in subject 2 by 4 points, indicating that the wound tissue improved compared to before. This is in line with the research conducted by Karimi, which explains that complementary treatment can accelerate the healing process of diabetic wounds (ANANDA MUHAMAD TRI UTAMA, 2022; Efendi et al., 2020; Primadani & Safitri, 2021).

The subjects of the case study are in the age range of 50-60 years (Feet, 2018). According to research by Cousart & Handley (2017), it was mentioned that the majority of respondents with DM ulcers, amounting to 45.9%, were in the age range of 50 years and above. According to Efendi et al., (2020), individuals over the age of 50 are at risk of experiencing prolonged wound healing. According to WHO, individuals aged 30 and above will experience an increase in blood sugar levels, both fasting and post-meal (Bowering, 2001). As age increases, there

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will be a decline in vision, body endurance, and bodily functions, making it easier to sustain injuries and experience perfusion disturbances, which are examples of organ function deterioration. Additionally, there will be a decrease in collagen elasticity and a reduction in fat reserves, affecting cell regeneration (Sukartini et al., 2020). Old age will result in a decline in the immune system, making wounds difficult to heal (Andrade-Castellanos et al., 2016; Boulton et al., 2005).

The subjects of the case study are female with the same proportion (Chen et al., 2024). Harahap (2017) stated that more than half of the respondents were female. Based on hormonal factors, the estrogen possessed by women helps maintain blood sugar stability and store fat reserves, but its function declines after menopause, increasing the risk of diabetic wounds (American Diabetes Association, 2018). Whereas men do not have estrogen hormones and, in addition, bad habits such as smoking, making men also prone to diabetic wounds (Mitasari et al., 2014). Therefore, both men and women have the same risk of developing diabetic wounds and are also at risk of experiencing prolonged wound healing (Sukartini et al., 2020).

The next risk factor is blood sugar instability in the case study subjects. According to Efendi et al., (2020) in their research, they stated that abnormal blood sugar levels affect wound healing. A low-carbohydrate diet, calorie restriction, and energy control can improve glycemic control and reduce the risk factors for complications in patients with diabetes mellitus (David G. Armstrong, D.P.M., M.D. et al., 2017; Pradanie et al., 2019; Snyder et al., 2014). High blood sugar levels cause decreased immunity, increased blood viscosity, and impaired blood circulation, leading to prolonged tissue repair (Normahani et al., 2020). The wound environment of diabetes mellitus patients is highly favored by microorganisms for reproduction, leading to prolonged infections (Shah et al., 2019).

Disruption of tissue/skin integrity is damage that occurs to the skin (epidermis, and/or dermis), tissues (mucous membranes, cornea, fascia, muscles, tendons, bones, cartilage, joint capsules, and/or ligaments) caused by changes in circulation, decreased mobility, irritants, extreme temperatures, humidity, mechanical factors, peripheral neuropathy, hormonal changes, and so on (Singh et al., 2013). Disruption of tissue/skin integrity is characterized by major symptoms such as tissue/skin layer damage and minor symptoms like pain, redness, bleeding, and hematoma (PPNI, 2017). decrease in points on the evaluation sheet (Djuma et al., 2024).

The results of the research conducted by Rashidi et al., (2016) show an improvement in skin healing and accelerated wound repair in diabetic and non-diabetic rats. In the study (Harikrishna K.R. Nair et al., 2020), wound cleaning was first applied using a local cleaning protocol, honey was then applied, and covered with a secondary dressing, with the changes being performed in a clinic or healthcare facility. Meanwhile, in the study by Putu E.P. Kefani et al., (2018), it is recommended to change the dressing daily. A 40% honey dressing with the addition of gel up to 100% is applied over the tendon and wound, then covered with sterile gauze sufficient to absorb exudate with the dressing slightly pressed (Teobaldi et al., 2018). These studies are comparable to the author's findings that after 3 days of wound care, the wound experienced good cell regeneration, resulting in improved and accelerated healing at a relatively economical cost (Linertová et al., 2020).

The author cannot deny that modern wound care is more effective compared to complementary care because it is easy to apply, can conform to body shapes, easy to remove, comfortable to wear, does not require frequent dressing changes, absorbs drainage, compresses and immobilizes the wound, prevents new wounds from mechanical injuries, prevents infections, and

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P-ISSN: 2338-5898
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enhances hemostasis by compressing the dressing (Maryunani, 2013). But with complementary wound care for diabetic foot wounds, it provides a significantly positive effect on the wound healing process, especially when using honey. Additionally, the cost factor is also a concern for the author when providing complementary wound care. The relatively low cost can help the subjects because with modern wound care, subjects have to incur quite high expenses as diabetic wound care takes a considerable amount of time (Primadani & Safitri, 2021).

Therefore, modifiable factors that play a role in wound healing need to be improved, such as nutritional management and blood sugar control (Sheikhrabori et al., 2016). Basically, the wound healing process is a physiological process of the body, where living tissue cells will regenerate back to their previous structure. The wound healing process consists of 3 phases, namely the inflammatory phase which occurs on days 0-3 or up to day 5, the proliferative phase (granulation phase) which occurs on days 2 to 24, and the maturation phase which occurs from day 24 to 1 year or more (Sakamoto et al., 2020). The wound of patient 1 entered the proliferative phase on the 3rd day, marked by the appearance of granulation tissue, while patient 2 is still in the inflammatory phase, characterized by the presence of some necrotic tissue (slough). Psychological conditions such as mental burden and stress during diabetes treatment and prolonged wound care also affect the wound healing process because they impact the immune system.

4. CONCLUSION

The application of wound care using the complementary dressing method (honey) greatly helps patients in accelerating the healing process of wounds such as diabetic foot ulcers and at a low cost. Wound care using the complementary dressing method can be an option as a wound care treatment to accelerate the reepithelialization of tissue and the success of healing diabetic foot wounds at a more affordable cost.

5. ACKNOWLEDGMENTS

We would like to thank STIKES Hutama Abdi Husada Tulungagung, related stakeholders and all respondents who have taken the time to participate in this study, so that the necessary data can be collected properly. We also appreciate the valuable input from the editor and reviewers who helped improve the quality of this manuscript until it is worthy of publication.

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E-ISSN: 2686-4959
P-ISSN: 2338-5898
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