

Effect of Applying Ointment to Diabetic Ulcer before Modern Dressing : A Case Study

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Abstract

Background: Diabetic ulcer is a chronic complication of diabetes mellitus, characterized by open wounds on the feet due to neuropathy, angiopathy, and decreased immunity, which impair healing and increase the risk of infection and amputation.

Objective: This case study aims to describe the nursing care process and evaluate the effectiveness of ointment as a modern dressing in the healing of grade 1 diabetic ulcers.

Methods: The study employed a case study approach using the nursing process (assessment, diagnosis, intervention, implementation, evaluation). The subject was a patient with a grade 1 diabetic ulcer at Clinic in Makassar City from August 6 to 11, 2025. Data were collected through interviews, direct observation, physical examination, and medical record review. The main intervention was wound care using epithelial ointment, patient education, blood glucose control, and wound monitoring. Evaluation was performed at each visit by assessing wound size, granulation, epithelialization, necrosis, exudate, and signs of infection.

Results: On August 6, 2025, the wound measured 2.0×1.8 cm, with approximately 50% granulation, 20% epithelialization, 10% necrosis, and mild exudate. After care until August 11, 2025, granulation increased to $\pm 70\%$, epithelialization to $\pm 30\%$, necrosis decreased to $<5\%$, exudate was minimal, and no signs of infection were observed.

Conclusion: The patient also reported reduced pain and increased comfort during care.

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Keywords

Modern Dressing; Ointment; Diabetic Ulcer

Background

An elevation in blood glucose levels, or hyperglycemia, constitutes one of the hallmark indicators of diabetes mellitus (DM). Under normal physiological conditions, blood glucose derived from dietary intake is regulated by insulin, a hormone produced by the pancreas. Through the regulation of glucose production and storage, insulin functions to maintain glucose concentrations within a normal range. In individuals with DM, body cells no longer respond appropriately to insulin or the pancreas ceases insulin production, resulting in hyperglycemia. This condition may subsequently lead to acute metabolic disturbances and, over the long term, neuropathic complications.

The World Health Organization estimated that 425 million individuals worldwide were living with diabetes mellitus in 2018 (WHO, 2018). This number is projected to increase by 45%, reaching approximately 629 million by 2025.

The International Diabetes Federation (2019) reported that at least 463 million individuals aged 20–79 years globally were affected by diabetes, corresponding to a prevalence rate of 9.3% in this age group. In 2019, the prevalence was 9% among women and 9.65% among men. Prevalence is expected to increase with age, reaching 19.9% (111.2 million individuals) among those aged 65–79 years. The total number of cases is projected to rise to 578 million by 2030 and 700 million by 2045.

A national survey in Indonesia identified approximately 877,531 individuals (1.7%) with diabetes mellitus. DKI Jakarta Province reported the highest prevalence, with 33,552 individuals (3.1%), while Papua Pegunungan Province had the lowest, with 4,563 individuals (0.2%). In South Sulawesi, 29,481 individuals (1.5%) were diagnosed with diabetes mellitus.

Comprehensive wound care is essential for patients with diabetic foot ulcers. Traditional wound care techniques include sterile and clean methods. A more recent approach, known as moist wound healing, involves maintaining a protected and moist environment at the wound site using moisture-retentive, occlusive, or semi-occlusive dressings. This environment promotes natural and accelerated tissue growth and healing. Advantages of this technique include faster wound healing, improved healing quality, and reduced wound care costs (3).

A study by Sri Mulyani (2025) reported significant improvement in diabetic foot ulcers, as evidenced by substantial granulation tissue growth. This improvement was attributed to effective wound care using a modern dressing technique combined with zinc cream, which promoted epithelialization. These findings are consistent with previous research demonstrating differences in diabetic foot wound conditions before and after zinc cream application, indicating that zinc cream enhances wound healing in patients with diabetic foot ulcers (4).

Methods

This study employed a case study approach. The nursing process, including assessment, diagnosis, intervention, implementation, and evaluation, was applied to a single patient with a Grade I diabetic ulcer treated at the Griya Afiat Clinic. The research subject was a patient with a diabetic ulcer on the lower extremity. This patient received care from August 6 to 11, 2025. Data collection involved interviews, direct observation, physical examination, and medical record review. These methods provided a comprehensive overview of the wound condition and the patient's overall health status.

The primary interventions included wound care using epithelial ointment, wound cleansing, and debridement as needed. Patient education about self-care and blood glucose control was also provided. Evaluation was carried out at each visit. Wound size, granulation, epithelialization, exudate amount, necrosis, and signs of infection were assessed. This allowed systematic monitoring of healing progress.

Case

Mrs. N, a 72-year-old woman, presented to Griya Afiat Clinic with a wound on the lower left leg that developed approximately one week after an ant bite and had not healed despite home treatment. Her medical history of diabetes mellitus, hypertension, and mild stroke increased her risk for diabetic ulcer formation due to impaired tissue perfusion, peripheral neuropathy, and reduced immune function. Consequently, she experienced difficulty performing daily activities and required family assistance, particularly with wound care and mobility. Initial assessment revealed a Grade I diabetic ulcer measuring 2×1.8 cm, with healthy red granulation tissue, early epithelialization, minimal exudate, and no signs of infection. Based on these findings, the nursing diagnosis of Impaired Skin/Tissue Integrity (SDKI: D.0129), related to pressure on a bony prominence secondary to the diabetic ulcer, was established. Nursing interventions followed modern wound care principles, including observation of wound characteristics, atraumatic removal of dressings, cleansing with non-toxic solutions, light debridement to remove necrotic tissue, application of epithelial ointment to maintain moisture and promote epithelialization, and coverage with sterile gauze and a protective dressing. The patient responded positively to these interventions; the wound appeared cleaner, moisture was maintained, granulation tissue increased, and no signs of infection were observed. These outcomes suggest that ointment, as a modern dressing, was effective in supporting wound healing in this case.

Result and Discussion

Tabel 1. Comparison of Wound Healing Scores Based on the Bates-Jensen Wound Assessment Tool (BWAT)

	AAA	AAA	SCORE
SIZE	2 x 1.5 cm		8
DEPTH	Superficial (ulcer grade I)		1
EDGE	Well-defined		1
BASE	Pink		1
ESCHAR	Not present		0
NECROTIC TISSUE	Not present		0
EXUDATE	Light		1
ODOR	No		0
WOUND MARGIN	Normal		0
SURROUNDING SKIN	Healthy		1
INFECTION	No		0
TOTAL SCORE			19

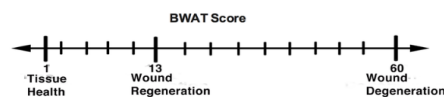


Figure 1. BWAT Score



Figure 2 & 3. First and Second Visiting

During the first visit (August, 06), the patient's diabetic ulcer measured 2 cm × 1.8 cm. The wound appeared moist with a small amount of slough, but there was no foul odor or presence of pus. The wound edges remained attached to the wound base, and granulation tissue had not yet fully formed. The periwound skin showed slight discoloration, although no edema or induration was observed. These findings indicate that the wound was still in the early stages of treatment and required regular interventions to prevent infection and accelerate healing.

The second visit (August, 15), the wound had decreased to 2 cm × 1.5 cm, indicating healing progress. The quality of the wound tissue had also improved, characterized by healthy red granulation tissue, epithelialization reaching 75–100%, and the absence of necrotic tissue. The wound appeared drier, cleaner, and better controlled.

following wound care procedures, including cleansing, debridement, application of epithelial ointment, and placement of a sterile dressing. The surrounding skin also appeared healthier, although slight discoloration remained.

A comparison of the two visits shows that although the initial wound was relatively wide, by the second visit, wound dimensions had decreased and tissue quality had improved. Slough had decreased, granulation tissue became more visible, and epithelialization had expanded. The absence of signs of infection, pus, or foul odor indicates that the interventions provided were effective. Family support, the patient's motivation, and adherence to wound care education all played an important role in the healing process.

Building on these findings, the wound care provided from the first to the second visit using ointment can be considered effective, as it demonstrably reduced wound size and improved the quality of healing tissue. The use of ointment for diabetic ulcers, particularly Grade I ulcers, is chosen because it offers several clinical advantages proven to support healing. First, ointment helps create a moist environment (moist wound healing), which has been shown to accelerate keratinocyte migration, support granulation tissue formation, and enhance epithelialization. (5) Wounds that are allowed to dry form hard scabs that inhibit tissue regeneration. Second, the ointment acts as a protective barrier against secondary infections. Several modern ointment formulations, such as medical honey or silver-based dressings, possess antimicrobial properties that suppress bacterial colonization and inflammation, thereby reducing the risk of wound complications. (6) Third, ointment contributes to stimulating tissue repair. Topical products such as esmolol hydrochloride ointment or PRP gel have been reported to accelerate granulation and epithelialization through bioactive mechanisms on the wound surface, making them more effective than conventional dressings. Fourth, ointment helps reduce trauma during dressing changes. It forms a thin layer over the wound surface, preventing direct adhesion between the dressing and the granulation tissue. This not only reduces pain but also preserves newly formed tissue during dressing replacement. (7)

A study conducted in (8) evaluated the effectiveness of LL-37 ointment on diabetic foot ulcers. The findings showed increased wound closure and reduced inflammation compared with the control group, indicating that bioactive ointments can accelerate granulation and epithelialization in superficial diabetic ulcers. Another study conducted (9) also supported the use of a combination of zinc cream, chitosan, and cadexomer iodine in diabetic ulcers. The results demonstrated a reduction in local infection signs and improvement in wound condition after two applications. This suggests that combining topical agents with antimicrobial and tissue-healing properties may be an effective option for modern dressing therapy in diabetic ulcers. (10)

In summary, ointment use for Grade I diabetic ulcers is recommended because it creates an optimal wound environment, prevents infection, stimulates tissue regeneration, and reduces dressing-related trauma.

Evidence from recent studies supports the effectiveness of topical agents as part of modern dressing protocols in accelerating the healing process of diabetic ulcers.

Conclusion

Based on the case study findings of a patient with a Grade I diabetic ulcer, the application of ointment as a modern dressing has been shown to accelerate wound healing. Continuous wound care over two visits demonstrated a reduction in wound size, increased granulation and epithelialization, and decreased necrosis and exudate, with no signs of infection. In addition, the periwound skin appeared healthier, and the patient reported reduced pain and improved comfort during treatment. These results affirm that the use of ointment in modern wound care practices can create an optimal moist environment, support tissue regeneration, and protect the wound from bacterial colonization, thereby promoting faster, more effective healing. Therefore, the use of ointment as part of wound care intervention can be considered a safe and efficient option for managing Grade I diabetic ulcers, particularly within nursing practice.

Declaration of Conflict of Interest

No conflict of interest declare

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Author Contributions

SMJ, WOSA, HA, NWM contributed to the study's conception and design, data acquisition, and data analysis, wrote the first draft of the manuscript, revised the final draft, and gave final approval of the version to be published.

Data Availability Statement

The dataset generated and analysed during the current study is available from the corresponding author upon reasonable request.

Declaration of the Use of AI in Scientific Writing

There is nothing to declare.

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