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IMPLEMENTATION OF HOT BATH HYDROTHERAPY AND MOIST WOUND HEALING INNOVATIONS IN NURSING CARE FOR SKIN INTEGRITY DISORDERS IN TYPE 2 DM PATIENTS IN THE ORCHID ROOM OF SUNGAILIAT REGIONAL GENERAL HOSPITAL IN 2026

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Abstract
Background: Type 2 Diabetes Mellitus often causes diabetic ulcers that cause impaired skin integrity and increase the risk of infection, amputation, and decreased quality of life. The combination of Hot Bath Hydrotherapy and Moist Wound Healing is a nursing innovation that has the potential to support wound healing. Objective: To describe the application of Hot Bath Hydrotherapy and Moist Wound Healing innovations in nursing care for type 2 Diabetes Mellitus patients with impaired skin integrity in the Anggrek Ward, Bakti Timah Hospital, Sungailiat in 2026. Method: The study used a descriptive design with a descriptive case study approach. The study subjects were 10 type 2 Diabetes Mellitus patients with diabetic ulcers who met the inclusion criteria. Data were collected using a nursing assessment format, wound development observation sheet, Bates-Jensen Wound Assessment Tool or Pressure Ulcer Scale for Healing, documentation, interviews, observations, and physical examinations. Data analysis was carried out descriptively by comparing the patient's condition before and after the intervention. Results: All patients showed improvement in wound condition in the form of reduced exudate and necrotic tissue, increased granulation tissue, decreased pain, reduced signs of infection, and increased mobility after 3 x 24 hours of intervention. Conclusion: The combination of Hot Bath Hydrotherapy and Moist Wound Healing has the potential to be an evidence-based nursing intervention that supports the healing of diabetic ulcers and improves the quality of nursing care.

Keywords: *Diabetes Mellitus, Diabetic Foot Ulcer, Moist Wound Healing, Nursing Care, Wound Healing*

INTRODUCTION

*Diabetes Mellitus*Diabetes mellitus (DM) is a non-communicable disease that is a global health problem with an incidence rate that continues to increase every year (WHO, 2023). This disease is characterized by hyperglycemia due to impaired insulin secretion, insulin action, or a combination of both (Association, 2022). One of the most common types is type 2 diabetes mellitus, a chronic metabolic disorder that occurs due to insulin resistance or the body's inability to use insulin effectively (WHO, 2023). Long-term hyperglycemia can cause damage to organs such as the heart, kidneys, nerves, blood vessels, and eyes, thereby increasing morbidity and mortality rates and reducing the quality of life of sufferers (Association, 2022). Therefore, diabetes mellitus is a health problem that requires serious attention in prevention and management efforts (WHO, 2023).

The prevalence of diabetes mellitus continues to increase both globally and nationally. Data from the International Diabetes Federation indicates that in 2021, approximately 537 million adults aged 20 to 79 years were living with diabetes, and this number is projected to increase to 643 million in 2030 and 783 million in 2045 (IDF, 2023). In Indonesia, the prevalence of diabetes among people aged 15 years and older increased from 10.9% in the 2018 Basic Health Research (Riskesdas) to 11.7% in the 2023 Indonesian Health Survey (KEMENKES, 2023). Cases also increased in the Bangka Belitung Islands Province, from 26,672 cases in 2021 to 28,559 cases in 2023, with approximately 30,000 sufferers receiving healthcare services by 2025 (DINKES, 2025). In Bangka Regency, 4,898 sufferers were recorded in 2025 (DINKES,

2025), while at Bakti Timah Hospital, Sungailiat, Diabetes Mellitus ranked first in the period from October to December 2025 with 210 cases (RSBT, 2025). This high incidence increases the risk of chronic complications in the form of diabetic ulcers, so effective nursing interventions are needed in wound care (Chen, et al., 2023).

Diabetes Mellitus Uncontrolled, long-term diabetes can lead to peripheral neuropathy and vascular disorders in the lower extremities, which contribute to the development of diabetic foot ulcers (Deng et al., 2023). Peripheral neuropathy causes decreased sensation in the feet, making sufferers unaware of minor trauma that could develop into wounds, while vascular disorders reduce blood flow to the tissues, slowing wound healing (Deng et al., 2023). The combination of peripheral neuropathy, ischemia due to vascular disorders, and poor glycemic control is the primary mechanism for diabetic foot ulcers (McDermott, Fang, Boulton, Selvin, & Hicks, 2023). The International Working Group on the Diabetic Foot emphasized the importance of early detection of these risk factors as part of efforts to prevent diabetic foot ulcers (Bus et al., 2024). If not optimally managed, impaired skin integrity can prolong hospitalization, increase treatment costs, and increase the risk of amputation and mortality (Febrianto, Putra, Zulkarnaini, & Hasni, 2023).

Nursing care plays a crucial role in the management of type 2 Diabetes Mellitus patients with impaired skin integrity through comprehensive wound assessment, diabetic foot care education, blood glucose monitoring, and early detection of infection and perfusion disorders (Bus et al., 2024). An evidence-based nursing approach recommends the application of moist wound healing, debridement as indicated, the use of modern dressings, and offloading strategies to accelerate the wound healing process (Bus et al., 2024). Furthermore, hot bath hydrotherapy can improve peripheral blood circulation through vasodilation, thereby improving tissue perfusion, increasing oxygen and nutrient supply, and supporting tissue regeneration in Diabetes Mellitus patients with peripheral vascular disorders (Sun et al., 2022). Various guidelines also recommend the use of dressings such as hydrogel, hydrocolloid, foam dressings, and alginate dressings because they can maintain wound moisture, thus improving the healing process compared to conventional wound care (Chen, Zhang, Wu, Li, & Mu, 2025).

Various studies have proven the effectiveness of moist wound healing in accelerating the healing of diabetic wounds. Astuti, Hidayah, and Puspasari (2025) reported a decrease in wound scores based on the Bates-Jensen Wound Assessment Tool from 43 to 24 after the application of moist wound healing. Other studies show that the use of hydrogel dressings is able to maintain wound moisture so that the wound score decreases from 45 to 38 (Normalia, Ismail, Musaidah, Palembai, & Andrianys, 2025), while Rahmasari, Musta'in, and AM (2023) reported a decrease in the severity of diabetic ulcers from stage 3 to stage 2. However, during clinical practice in the Anggrek Room of Bakti Timah Hospital, Sungailiat, the application of the combination of hot bath hydrotherapy and moist wound healing has not been carried out consistently, even though out of 25 patients with type 2 Diabetes Mellitus who were treated, there were 10 patients with impaired skin integrity or diabetic ulcers. Literature searches also show that research on the combination of these two interventions is still limited, especially in inpatient services in Indonesia, so there is still a gap between evidence-based nursing recommendations and the implementation of clinical practice.

Based on these conditions, this study aims to describe the application of innovations in hydrotherapy hot bath and moist wound healing in nursing care for patients with type 2 Diabetes Mellitus with impaired skin integrity in the Orchid Room, Bakti Timah Hospital, Sungailiat in 2026. This study is important because it is expected to provide evidence of the application of evidence-based nursing interventions in accelerating wound healing, preventing complications, and improving the quality of nursing care for diabetic ulcer patients. The novelty of this study lies in the application of a combination of hydrotherapy hot bath and moist wound healing as an innovation in nursing care for patients with type 2 Diabetes Mellitus with impaired skin integrity in inpatient services, considering that previous studies have mostly examined each intervention separately.

METHOD

This research uses a descriptive case study approach. The case study approach was used to explore in depth the application of nursing care for patients with type 2 Diabetes Mellitus who experienced

impaired skin integrity due to diabetic ulcers in the Orchid Room of Bakti Timah Hospital, Sungailiat. This approach allows researchers to conduct assessments, determine nursing diagnoses, develop action plans, implement, and evaluate comprehensively for each case so as to illustrate the application of the Hot Bath Hydrotherapy and Moist Wound Healing innovations in nursing practice.

The research instruments included a medical-surgical nursing assessment format, a wound development observation sheet, a sterile ruler for wound measurement, a wound documentation camera with patient consent, a nursing care evaluation format, and a wound assessment instrument using the Bates-Jensen Wound Assessment Tool (BWAT) or Pressure Ulcer Scale for Healing (PUSH Tool) according to institutional policy. Data collection was conducted through interviews with patients and families, observation of wound conditions and patient responses to nursing actions, physical examinations including vital signs, skin conditions, wound size, wound tissue conditions, signs of infection, wound examinations, and documentation studies using medical records, laboratory test results, and patient development notes. Data were analyzed descriptively by comparing patient conditions before and after the implementation of the Hot Bath Hydrotherapy and Moist Wound Healing innovations, then presented in narrative form, tables, images of wound development, and discussions related to theories and previous research results.

The subjects in this case study were patients undergoing treatment in the Orchid Room of Bakti Timah Hospital Sungailiat from October 27 to December 6, 2025. Inclusion criteria included patients diagnosed with type 2 Diabetes Mellitus, experiencing impaired skin integrity or diabetic ulcers, willing to be respondents by signing an informed consent, and able to communicate well or accompanied by family as the person in charge. The exclusion criteria included patients with emergency conditions that require immediate action, patients who are unwilling to follow the entire series of nursing actions, and patients who experience severe complications that hinder the implementation of innovation. The number of subjects involved in this case study was 10 patients according to the characteristics of the cases found during the practice of the nursing profession.

The study began with the selection of subjects based on inclusion and exclusion criteria, followed by an explanation of the research objectives and informed consent. A comprehensive nursing assessment was then conducted to identify the patient's condition and any skin integrity disorders they experienced. Based on the assessment results, the researcher established a nursing diagnosis, developed an action plan, and then implemented the Hot Bath Hydrotherapy and Moist Wound Healing innovations as part of the nursing care. The progress of the wound healing process was continuously evaluated using established wound assessment instruments, and all assessment, implementation, and evaluation results were documented for descriptive analysis. The entire research process was carried out with due regard to the ethical principles of research, including informed consent, confidentiality, beneficence, non-maleficence, autonomy, and justice.

RESULTS AND DISCUSSION

SThis case study was conducted on 10 patients with Type 2 Diabetes Mellitus with diabetic ulcers who were treated in the treatment room. The assessment was comprehensive, including subjective data, objective data, physical examination, supporting examinations, data analysis, determination of nursing diagnoses, interventions, implementation, and evaluation of nursing care during 3 days of treatment. Based on the results of the assessment, it was found that all patients had a history of Type 2 Diabetes Mellitus with a disease duration varying between 5–15 years. The majority of patients experienced suboptimal glycemic control, characterized by increased random blood sugar levels, fasting blood sugar, and HbA1c above normal values. All patients presented with the main complaint of wounds on the lower extremities that were difficult to heal, accompanied by pain, impaired activity, and some patients showed signs of local and systemic infection.

Patient Data Analysis

The results of the data analysis showed that all patients had diabetic ulcers with different characteristics, including wound size, wound depth, amount of exudate, wound tissue condition and level of infection.

The most common main complaints are wounds that are difficult to heal, pain in the wound area, discharge from the wound, tingling or numbness in the lower extremities, and limited mobility due to pain and tissue damage.

Commonly found objective data include:

1. Open wound with granulation tissue and necrotic tissue.
2. Wound exudate in light to large amounts.
3. Hyperglycemia (GDS >200 mg/dL).
4. HbA1c increased (>7%).
5. Leukocytes increase in patients who have infections.
6. Decreased sensation in the lower extremities due to diabetic neuropathy.
7. Impaired ambulation due to pain and tissue damage.

Based on the data analysis, several nursing diagnoses were obtained which appeared most frequently, namely:

Table 1. Nursing Diagnosis

No	Nursing Diagnosis	Frequency
1	Impaired Skin/Tissue Integrity (D.0129)	10 patients
2	Acute Pain (D.0077)	10 patients
3	Infection (D.0142)	6 patients
4	Physical Mobility Impairment (D.0054)	4 patients

The diagnosis of Impaired Skin/Tissue Integrity was found in all patients because all patients experienced diabetic ulcers with different levels of tissue damage.

Nursing Interventions

The main interventions given to all patients were:

Table 2. Interventions

Diagnosis	Intervention
Impaired Skin/Tissue Integrity (D.0129)	**Wound Care** 1. Assessment of wound condition. 2. Wound cleaning using 0.9% NaCl. 3. Hydrotherapy Hot Bath. 4. Debridement according to authority. 5. Moist Wound Healing. 6. Sterile dressing change. 7. Monitoring wound development.
Acute Pain (D.0077)	**Pain Management** 1. Pain assessment using the PQRST method. 2. Providing a comfortable position. 3. Deep breathing relaxation techniques. 4. Distraction. 5. Collaboration in providing analgesics.
Infection (D.0142)	**Infection Prevention and Control** 1. Monitoring for signs of infection. 2. Aseptic wound care. 3. Personal hygiene education. 4. Collaboration in administering antibiotics.
Physical Mobility Impairment (D.0054)	**Mobilization Support** 1. Gradual mobilization. 2. ROM exercises. 3. Activity education according to tolerance.

4. Prevention of injury during ambulation.

1. Comparison of Results in 10 Patients

A. Equality

Based on the results of a case study on 10 patients, several similarities were found:

- **a.** All patients suffered from Type 2 Diabetes Mellitus.
- **b.** All patients had diabetic ulcers on the lower extremities.
- **c.** All patients had uncontrolled blood sugar levels.
- **d.** All patients experienced Impaired Skin/Tissue Integrity.
- **e.** All patients complained of pain in the wound area.
- **f.** All patients received wound care using the principles of moist wound healing.
- **g.** All patients showed improvement in wound condition after 3 days of intervention.

B. Difference

There are several differences in characteristics between patients:

Table 3. Differences in 10 Patients

Variables	Mild Patients	Patient in moderate condition	Serious Patients
Wound size	<3 cm	3–7 cm	>7 cm
Necrotic tissue	A little	Currently	Lots
Exudate	Minimum	Currently	Lots
Signs of infection	There isn't any	Local	Systemic
Pain scale	3–4	5–6	7–8
Mobility	Undisturbed	A little disturbed	Very disturbed
Healing time	Faster	Currently	Slower

Patient 9 was the most complex case, having the largest wound, the most severe infection, and early signs of osteomyelitis. Meanwhile, patient 10 experienced more mobility impairment because the wound was located on the sole of the foot, which supports body weight when walking.

2. Nursing Implementation

Implementation is carried out for 3 x 24 hours according to the diagnosis that appears in each patient. The most frequently performed actions include:

A. Assessment of wound condition.
B. Vital signs check.
C. Hydrotherapy Hot Bath.
A. Sterile wound care using 0.9% NaCl.
B. Moist Wound Healing.
C. Diabetic foot care education.
D. Monitoring blood sugar levels.
E. Non-pharmacological pain management.
F. Collaboration of antibiotic and analgesic therapy.
G. Gradual mobilization according to patient tolerance.

3. Nursing Evaluation

After carrying out nursing actions for 3 x 24 hours, the following results were obtained:
Impaired Skin/Tissue Integrity

A. Wound exudate is reduced.
B. Granulation tissue increases.
C. Necrotic tissue is reduced.

D. The wound looks cleaner.
E. The healing process is increasing.

4. Acute Pain
A. The pain scale decreased.
B. The grimacing expression is reduced.
C. Patients are more comfortable when resting.
D. Sleep quality improves.

5. Infection
A. The redness is decreasing.
B. The smell of the wound is reduced.
C. Purulent exudate decreased.
D. Body temperature improves.

6. Physical Mobility Impairment
A. The patient is better able to walk.
B. Pain during mobilization is reduced.
C. Daily activities increase.

In general, all patients showed improvement in their condition, although not all of them achieved total wound healing because diabetic ulcers require a relatively long healing time.

DISCUSSION

Analysis of Skin Integrity Disorders in Type 2 Diabetes Mellitus Patients

Based on the results of a case study on 10 patients with type 2 diabetes mellitus (DM) who experienced diabetic ulcers, nursing problems were found to be impaired skin integrity, characterized by chronic wounds on the lower extremities, wounds that are difficult to heal, the presence of necrotic tissue, exudate, pain, and impaired sensation such as tingling and numbness in the wound area. Most patients had a history of DM for more than 3 years and did not regularly undergo health checks or take antidiabetic medication.

In patient Mr. L, a wound was found on the right big toe measuring approximately 5 cm x 2 cm and 2 cm deep, accompanied by granulation tissue and partially necrotic tissue. The patient also complained of tingling and numbness in the foot. Similar conditions were found in other patients with various wound locations such as the heel of the foot, distal leg, and sole of the foot. Most of the wounds appeared open, exuding yellowish exudate, had a mild odor, and the skin around the wound appeared dry and reddish.

Impaired skin integrity in patients with type 2 diabetes occurs due to chronic hyperglycemia, which causes peripheral vascular damage and diabetic neuropathy. According to research conducted by(Setiyana & Susilo, 2025)Chronic hyperglycemia in patients with type 2 diabetes is associated with microcirculatory disorders and peripheral neuropathy, which increase the risk of diabetic ulcers and slow wound healing. Prolonged hyperglycemia can lead to microcirculatory disorders, reducing the supply of oxygen and nutrients to tissues. Furthermore, peripheral neuropathy leads to decreased pain sensation, making patients unaware of minor foot trauma that may later develop into diabetic ulcers.

The study found that most patients experienced decreased sensation in their feet, tingling, and cold feet. This indicates impaired peripheral circulation and diabetic neuropathy. This condition aligns with the theory that chronic complications of type 2 diabetes can cause peripheral nerve damage and vascular disorders that inhibit wound healing.

Laboratory tests in several patients showed elevated leukocyte and neutrophil counts, indicating inflammation or infection in the wound. Infection in diabetic ulcers can worsen tissue damage and

delay wound healing. Hyperglycemia also causes decreased leukocyte function, thus reducing the body's ability to fight infection.

Other factors exacerbating impaired skin integrity in the patients in this case study were non-compliance with diabetes medication, irregular eating patterns, and a lack of knowledge about diabetic foot care. Most patients reported rarely undergoing routine foot examinations and only sought medical attention after wounds had enlarged and were difficult to heal.

Based on the results of this case study, it can be concluded that impaired skin integrity in patients with type 2 diabetes is influenced by various factors, such as chronic hyperglycemia, peripheral neuropathy, impaired peripheral circulation, infection, and patient non-compliance with diabetes therapy. Therefore, comprehensive management is necessary to accelerate wound healing and prevent further complications.

The Effectiveness of Hot Bath Hydrotherapy in Treating Diabetic Ulcers

Hot bath hydrotherapy is an innovative treatment for diabetic wounds that uses warm water to improve peripheral circulation and cleanse the wound area. In this case study, hot bath hydrotherapy was administered to a patient with a diabetic ulcer as part of a nursing intervention.

Based on observations during treatment, the hot bath hydrotherapy demonstrated a marked improvement in wound condition. After the gradual procedure, patients appeared more comfortable, pain decreased, and the wound appeared cleaner than before the procedure. Several patients reported a decrease in exudate, necrotic tissue, and an increase in granulation tissue.

The effectiveness of hot bath hydrotherapy occurs because the warm temperature can cause vasodilation of peripheral blood vessels, thereby increasing blood flow to damaged tissue. Research by(Takahashi, Okura, Kaga, & Yoshioka, 2022)explained that warm water hydrotherapy effectively improves peripheral circulation, promotes tissue relaxation, and reduces pain intensity in patients with impaired peripheral perfusion. Increased blood circulation helps distribute oxygen and nutrients to the wound area, accelerating tissue healing. Furthermore, hot bath hydrotherapy helps soften necrotic tissue, facilitating wound cleansing.

In type 2 diabetes patients with impaired peripheral circulation, increasing blood flow is crucial because most patients experience decreased tissue perfusion due to peripheral vascular damage. Increased tissue perfusion allows for optimal cell regeneration and granulation tissue formation.

Besides aiding wound healing, hot bath hydrotherapy also provides a relaxing effect and helps reduce pain in the wound area. Some patients report feeling less pain after the procedure. This is consistent with the theory that warm temperatures can promote muscle relaxation and reduce tension in the tissues surrounding the wound.

The results of this case study demonstrate that hot bath hydrotherapy can be an effective supportive therapy in the treatment of diabetic ulcers. This procedure can help improve peripheral circulation, reduce pain, cleanse the wound, and accelerate granulation tissue formation. However, care must be taken, especially in patients with peripheral neuropathy, to ensure the water temperature is not too hot and causes additional tissue trauma.

Effectiveness of Moist Wound Healing on Diabetic Ulcers

The moist wound healing method is a modern wound care technique that maintains optimal moisture in the wound area to accelerate the healing process. According to research,(Primadani & Nurrahmantika, 2021)The moist wound healing method can optimally maintain wound moisture, thereby accelerating the formation of granulation tissue, reducing necrotic tissue, and accelerating epithelialization in diabetic ulcer patients. In this case study, the moist wound healing method was used in the treatment of diabetic ulcers to maintain wound moisture, accelerate new tissue formation, and reduce the risk of trauma during dressing changes.

Based on observations during treatment, the use of the moist wound healing method demonstrated improved wound development. Most patients found increased granulation tissue, decreased necrotic

tissue, reduced exudate, and a cleaner, more moist wound appearance. Furthermore, patients reported less pain during dressing changes compared to conventional dressings.

Moist conditions in the wound area facilitate epithelial cell migration and granulation tissue formation, accelerating healing. A wound environment that is too dry can cause damage to new tissue and slow epithelialization. Therefore, moist wound healing is an effective method for treating diabetic ulcers.

This case study found that most patients had chronic wounds with necrotic tissue and moderate exudate. The use of modern dressings that retain moisture in the wound helps reduce the risk of infection and accelerates autolytic debridement, the body's natural process of destroying dead tissue.

Besides accelerating wound healing, moist wound healing also helps improve patient comfort because the dressing doesn't adhere easily to the wound bed. This reduces tissue trauma during dressing changes and helps reduce pain intensity.

The effectiveness of moist wound healing in this case study was evident in the gradual improvement of the wound condition, such as a reduction in wound size, decreased exudate, and increased granulation tissue. Therefore, the moist wound healing method can be an effective option in diabetic wound care practices because it can accelerate wound healing and improve the patient's quality of life.

Theory and Case Gap

In theory, healing of diabetic ulcers requires optimal blood sugar control, patient compliance with therapy, adequate nutrition, and appropriate and ongoing wound care. According to research by(Putri, Deliana, & Pusparianda, 2024)Optimal blood glucose control is significantly associated with accelerated wound healing in patients with type 2 diabetes mellitus and diabetic ulcers. However, case studies revealed several gaps between theory and actual patient outcomes.

The theory explains that type 2 diabetes patients should undergo regular health check-ups and take antidiabetic medication to maintain stable blood sugar levels. However, most of the patients in this case study admitted to not having regular check-ups and taking their medication regularly. This condition leads to prolonged hyperglycemia, which slows wound healing.

Theory also suggests that diabetes patients need to perform regular foot checks to prevent diabetic ulcers. However, in reality, most patients only notice the presence of wounds after they have enlarged and become difficult to heal due to decreased sensation in the feet.

Furthermore, optimal wound healing theoretically requires good nutrition, especially protein, to support tissue regeneration. However, case studies have found that some patients experience decreased appetite and irregular eating patterns, which can impact the wound healing process.

Another gap was found in the condition of patients' wounds, most of whom already had mild to moderate infections when they arrived at the healthcare facility. In theory, diabetic ulcers should be treated early to prevent more serious complications such as osteomyelitis and amputation. However, delayed treatment can lead to more complex wound conditions.

Nevertheless, the application of hot bath hydrotherapy and moist wound healing in this case study demonstrated quite positive results in aiding the wound healing process. This demonstrates that innovations in nursing practice can help overcome some of the challenges encountered in the field.

Excellence in Innovation in Nursing Practice

The application of hot bath hydrotherapy and moist wound healing to diabetic ulcer patients in this case study demonstrates an innovation in nursing practice focused on improving the quality of wound care. The combination of these two methods provides a more comprehensive approach to assisting the diabetic wound healing process.

Hot bath hydrotherapy has the advantage of helping improve peripheral circulation, cleanse wounds, reduce pain, and provide a relaxing effect on patients. Meanwhile, moist wound healing helps maintain wound moisture, accelerating the formation of granulation tissue and epithelialization.

Another advantage of this innovation is that it helps improve patient comfort during wound care. With conventional methods, dressing changes often cause pain because the dressing adheres to the wound bed. However, with the moist wound healing method, patients report less pain during dressing changes.

Applying these two methods can also help reduce the risk of further complications, such as severe infections and amputations. Optimal wound care accelerates the healing process, improving the patient's quality of life.

In addition to benefiting patients, this innovation also contributes to nursing practice by improving nurses' skills and knowledge in providing modern, evidence-based wound care. Nurses serve not only as providers of care but also as educators and advocates for patients in maintaining diabetic foot health.

Based on the results of the case study, it can be concluded that the combination of hot bath hydrotherapy and moist wound healing is an effective innovation in diabetic wound nursing practice because it can help accelerate wound healing, increase patient comfort, and reduce the risk of complications.

Nursing Implications

The results of this case study provide several important implications for nursing practice, particularly for patients with type 2 diabetes and diabetic ulcers. Nurses play a crucial role in conducting early assessments of wound conditions, peripheral circulatory disorders, and signs of infection to prevent complications early.

Nurses also play a role as educators, providing health education to patients and their families about the importance of blood sugar control, medication adherence, a healthy diet, and diabetic foot care. According to research,(Cruz, Muñoz, de los Santos, & Domínguez, 2025)Nursing education regarding diabetic foot care and therapy adherence has been shown to improve patient self-care skills and help prevent diabetic ulcer complications. Good education can help increase patient awareness in preventing wounds and more serious complications.

The application of hot bath hydrotherapy and moist wound healing in this case study demonstrates the need for nurses to improve their competency in providing modern, evidence-based wound care. Nurses' knowledge and skills regarding appropriate wound care techniques can help accelerate the wound healing process and improve the quality of nursing care.

Furthermore, nurses also need to collaborate with other healthcare professionals such as physicians, nutritionists, and wound care teams to provide comprehensive management for diabetic ulcer patients. A multidisciplinary approach is crucial for controlling blood sugar levels, meeting patient nutritional needs, and preventing further complications.

Another implication is the importance of regularly monitoring wound progress to evaluate the effectiveness of nursing interventions. Routine evaluation of wound conditions, such as wound size, exudate, granulation tissue, and signs of infection, is essential to ensure appropriate treatment is tailored to the patient's condition.

Thus, the results of this case study demonstrate that innovative wound care through hot bath hydrotherapy and moist wound healing can be an effective alternative nursing intervention in treating type 2 diabetes patients with diabetic ulcers. Nurses are expected to implement professional, holistic, and evidence-based nursing practices to improve patients' quality of life.

LIMITATIONS

In implementing this case study, there are several limitations that can affect the results of nursing care and the data collection process. The first limitation is the relatively short observation time for each patient, so that wound development cannot be observed optimally until the complete healing phase. The second limitation is the different conditions of patients, such as age, duration of diabetes mellitus, blood sugar levels, nutritional status, level of medication compliance, and peripheral

circulation conditions, which affect the speed of wound healing in each patient. Another limitation is that not all patients have the same compliance in following recommendations for wound care, diabetes diet, and blood sugar control during the treatment process. This causes variations in the results of wound development in each patient.

Furthermore, limited facilities and infrastructure for modern wound care also hinder the optimal implementation of moist wound healing in some patients. Documenting wound progression is also limited because wound conditions can change daily depending on the patient's general condition. Despite these limitations, this case study still provides insight into the effectiveness of hot bath hydrotherapy and moist wound healing in assisting the healing process of diabetic ulcers in patients with type 2 diabetes mellitus.

CONCLUSION

The implementation of the innovation of Hot Bath Hydrotherapy and Moist Wound Healing in nursing care for 10 type 2 Diabetes Mellitus patients with impaired skin integrity in the Anggrek Room of Bakti Timah Hospital, Sungailiat showed positive results on the wound healing process. After the intervention for 3 x 24 hours, all patients experienced improvements in wound conditions characterized by reduced exudate and necrotic tissue, increased granulation tissue, cleaner wounds, decreased pain intensity, reduced signs of infection, and increased mobilization ability in patients with impaired mobility. These findings indicate that the combination of Hot Bath Hydrotherapy and Moist Wound Healing can be a nursing innovation that supports the acceleration of diabetic ulcer healing as part of evidence-based nursing care.

This study has limitations in the form of a relatively short observation period so that wound development could not be observed until the complete healing phase, as well as variations in patient characteristics such as duration of diabetes, glycemic control, nutritional status, therapy compliance, and peripheral circulation conditions that affect healing outcomes. In addition, the limitations of modern wound care facilities and variations in patient compliance during treatment also influenced the study results. Therefore, further research is recommended to use a longer observation period with a larger number of subjects so that the effectiveness of the combined intervention can be evaluated more comprehensively. Practically, the results of this study can be a reference for nurses in implementing the combination of Hot Bath Hydrotherapy and Moist Wound Healing as an evidence-based nursing intervention to improve the quality of wound care and prevent complications in patients with type 2 Diabetes Mellitus.

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