Jurnal Abdi Kesehatan dan Kedokteran (JAKK)
p-ISSN: 2962-8245 | e-ISSN: 2962-7133
Vol. 5, No. 2, July 2026

Original Article

Peningkatan Penyembuhan Luka dan Stabilitas Glikemik pada Pasien Diabetes Melitus Tipe 2 dengan Fasciitis Nekrotikan: Laporan Kasus

Improvement in Wound Healing and Glycemic Stability in a Patient with Type 2 Diabetes Mellitus and Necrotizing Fasciitis: A Case Report

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ABSTRACT

Diabetes Mellitus (DM) is a chronic metabolic disease that frequently leads to serious complications, including severe soft tissue infections such as necrotizing fasciitis. Chronic hyperglycemia contributes to impaired tissue perfusion, decreased immune response, and delayed wound healing, thereby increasing the risk of severe infection and poor clinical outcomes. This case report describes the implementation of comprehensive nursing care for a patient with Type 2 Diabetes Mellitus complicated by necrotizing fasciitis.

This study employed a descriptive case report design involving a 72-year-old male patient diagnosed with necrotizing fasciitis of the left lower extremity, accompanied by Type 2 Diabetes Mellitus and systemic complications. Nursing care was delivered using the nursing process approach, including assessment, nursing diagnosis, planning, implementation, and evaluation. The main nursing variables addressed were skin/tissue integrity, infection risk, and blood glucose stability. Data were collected through patient interviews, physical examination, wound observation, blood glucose monitoring, and review of medical and nursing records.

The primary nursing diagnoses identified were impaired skin/tissue integrity, risk of infection, and unstable blood glucose levels. Nursing interventions focused on aseptic wound care, glycemic control management, infection prevention, pain management, and patient education. Evaluation outcomes demonstrated improvement in wound condition, reduced purulent exudate, stabilization of blood glucose levels, and decreased pain intensity during the course of nursing care.

This case report indicates that comprehensive and evidence-based nursing care, particularly strict glycemic control combined with appropriate wound management, plays a critical role in supporting wound healing and preventing further complications in patients with Type 2 Diabetes Mellitus and necrotizing fasciitis.

Keywords: *Diabetes Mellitus, Necrotizing Fasciitis, Nursing Care, Wound Management, Glycemic Control*

ABSTRAK

Diabetes Melitus (DM) merupakan penyakit metabolik kronis yang sering menimbulkan komplikasi serius, termasuk infeksi jaringan lunak berat seperti fasciitis nekrotikan. Hiperglikemia kronis berkontribusi terhadap gangguan perfusi jaringan, penurunan respons imun, dan keterlambatan penyembuhan luka sehingga meningkatkan risiko infeksi berat dan luaran klinis yang buruk. Laporan kasus ini bertujuan untuk menggambarkan penerapan asuhan keperawatan komprehensif pada pasien Diabetes Melitus Tipe 2 dengan komplikasi fasciitis nekrotikan.

Penelitian ini menggunakan desain laporan kasus deskriptif yang melibatkan seorang pasien laki-laki berusia 72 tahun dengan diagnosis fasciitis nekrotikan pada ekstremitas bawah kiri yang disertai Diabetes Melitus Tipe 2 dan komplikasi sistemik. Asuhan keperawatan diberikan menggunakan pendekatan proses

keperawatan yang meliputi pengkajian, diagnosis keperawatan, perencanaan, implementasi, dan evaluasi. Variabel utama keperawatan yang menjadi fokus adalah integritas kulit/jaringan, risiko infeksi, dan stabilitas kadar glukosa darah. Data dikumpulkan melalui wawancara pasien, pemeriksaan fisik, observasi luka, pemantauan kadar glukosa darah, serta telaah rekam medis dan dokumentasi keperawatan.

Diagnosis keperawatan utama yang ditemukan adalah gangguan integritas kulit/jaringan, risiko infeksi, dan ketidakstabilan kadar glukosa darah. Intervensi keperawatan difokuskan pada perawatan luka secara aseptik, manajemen pengendalian glikemik, pencegahan infeksi, manajemen nyeri, dan edukasi pasien. Hasil evaluasi menunjukkan perbaikan kondisi luka, penurunan eksudat purulen, stabilisasi kadar glukosa darah, serta penurunan intensitas nyeri selama pelaksanaan asuhan keperawatan.

Laporan kasus ini menunjukkan bahwa asuhan keperawatan yang komprehensif dan berbasis bukti, khususnya pengendalian glikemik yang ketat disertai manajemen luka yang tepat, memiliki peran penting dalam mendukung penyembuhan luka dan mencegah komplikasi lebih lanjut pada pasien Diabetes Melitus Tipe 2 dengan fasciitis nekrotikan.

Kata Kunci: Diabetes Melitus, Fasciitis Nekrotikan, Asuhan Keperawatan, Manajemen Luka, Pengendalian Glikemik

Submit: February 1, 2026| ***Accepted***: June 25, 2026| ***Online***: July 1, 2026
Citation: Xavier, J. de C., Luruk, R. C., Bangun, A. V., & Marpaung, L. S. (2026). Peningkatan Penyembuhan Luka dan Stabilitas Glikemik pada Pasien Diabetes Melitus Tipe 2 dengan Fasciitis Nekrotikan: Laporan Kasus: Improvement in Wound Healing and Glycemic Stability in a Patient with Type 2 Diabetes Mellitus and Necrotizing Fasciitis: A Case Report. Jurnal Abdi Kesehatan Dan Kedokteran, 5(2), 605–613.
https://doi.org/10.55018/jakk.v5i2.185

Key Findings

- ⇒ Comprehensive nursing care contributes to improved skin and tissue integrity in patients with Type 2 Diabetes Mellitus complicated by necrotizing fasciitis.
- ⇒ Strict glycemic control plays a critical role in supporting wound healing and preventing further disease complications.
- ⇒ Appropriate wound management combined with infection prevention consistently enhances the patient's overall clinical condition and recovery outcomes.

Pendahuluan

Diabetes Mellitus (DM) is a chronic metabolic disease characterized by persistent hyperglycemia resulting from impaired insulin secretion, insulin action, or both. This condition has become a global public health problem due to its steadily increasing prevalence, particularly among the elderly population. Global data indicate that DM contributes significantly to increased morbidity, disability, and mortality rates, mainly due to the acute and chronic complications associated with the disease (Care & Suppl, 2020; PERKENI, 2021).

Chronic hyperglycemia in patients with Diabetes Mellitus leads to various pathological changes, including impaired microcirculation, decreased immune function, and peripheral tissue damage. These conditions increase susceptibility to infection and delay the wound healing process, particularly in elderly patients and those with long-standing diabetes. Globally, Diabetes Mellitus remains a major public health concern. According to the International Diabetes Federation, the global prevalence of diabetes reached approximately 537 million adults in 2021 and is projected to rise substantially in the coming decades. Diabetes-related complications continue

to contribute significantly to morbidity and mortality worldwide.In Indonesia, the prevalence of Diabetes Mellitus has also shown a consistent upward trend. National health survey data report that the prevalence of diabetes among adults continues to increase, placing Indonesia among the countries with the highest number of people living with diabetes. The Indonesian Endocrinology Association has emphasized that uncontrolled diabetes remains a major contributor to chronic complications, including severe infections and diabetic foot disorders. At the local level, hospitals in urban areas, including the study setting at a tertiary referral hospital in Bandung, frequently manage patients with Diabetes Mellitus complicated by severe soft tissue infections. Clinical reports indicate that diabetic patients with advanced infections, such as necrotizing fasciitis, often require prolonged hospitalization and intensive multidisciplinary care, highlighting the critical role of comprehensive nursing management.

This condition makes patients with Diabetes Mellitus highly susceptible to infections, particularly soft tissue infections and chronic wounds that are difficult to heal. One of the most severe infections that may occur is *necrotizing fasciitis*, a rapidly progressive infection involving the fascia and subcutaneous tissue, characterized by extensive tissue necrosis and a high risk of sepsis and mortality (Smeltzer & Bare, 2013; Widiasari et al., 2021). Necrotizing fasciitis in patients with Diabetes Mellitus has a more complex clinical course compared to non-diabetic patients. Hyperglycemia plays a critical role in impairing neutrophil function, reducing phagocytosis, and disrupting angiogenesis and granulation tissue formation. Consequently, wound healing is significantly delayed, and the risk of limb amputation increases substantially. This condition is often accompanied by comorbidities such as hypertension, electrolyte imbalances, and systemic infections, all of which further worsen patient prognosis (Hardianto, 2020; Masriadi, 2021).

In the context of healthcare services, nurses play a crucial role in managing patients with Diabetes Mellitus and severe infectious complications. Nursing care is not limited to wound management but also includes blood glucose control, infection prevention, monitoring for signs of sepsis, and providing education to patients and their families. A comprehensive nursing care approach based on national standards, such as the Indonesian Nursing Diagnosis Standards (SDKI) and the Indonesian Nursing Intervention Standards (SIKI), is essential to enhance patient safety and accelerate recovery (Tim Pokja SDKI DPP PPNI, 2016; Tim Pokja SIKI DPP PPNI, 2018). Furthermore, the implementation of Evidence-Based Nursing (EBN) is a key component of clinical decision-making, particularly in glycemic control and wound management for patients with Diabetes Mellitus. Scientific evidence indicates that optimal glycemic control significantly reduces infection risk, improves immune function, and accelerates wound healing following surgical interventions. Therefore, the integration of clinical practice, nursing standards, and up-to-date scientific evidence is imperative in the nursing care of patients with Diabetes Mellitus complicated by necrotizing fasciitis (Care & Suppl, 2020; Widiasari et al.,

2021). Based on this background, this case report aims to describe the implementation of comprehensive nursing care for a patient with Type 2 Diabetes Mellitus complicated by necrotizing fasciitis, with a focus on wound management, blood glucose control, and the evaluation of evidence-based nursing care outcomes.

Metode

Design, Participants, and Setting

This study employed a descriptive case report design to provide an in-depth description of comprehensive nursing care for a patient with Type 2 Diabetes Mellitus complicated by severe soft tissue infection in the form of necrotizing fasciitis. The participant was a 72-year-old male diagnosed with Type 2 Diabetes Mellitus and necrotizing fasciitis of the left lower extremity. The patient was hospitalized in the medical–surgical inpatient ward of Immanuel Hospital, Bandung, Indonesia, in January 2026. The participant was selected using purposive sampling based on medical diagnosis and the complexity of nursing problems identified during hospitalization.

Instruments

Data were collected using several assessment instruments and clinical documentation tools. Subjective data were obtained through structured interviews with the patient and family members to identify chief complaints, medical history, and responses to care. Objective data were collected through systematic physical examination using a head-to-toe approach, direct observation of wound characteristics (including tissue condition, exudate, and signs of infection), and routine monitoring of blood glucose levels. Additional data were obtained from medical records, including laboratory results, nursing documentation, and prescribed medical therapies. These instruments were used to support comprehensive nursing assessment and evaluation.

Intervention

Nursing care was implemented using the nursing process framework, which included assessment, nursing diagnosis, planning, implementation, and evaluation. Nursing diagnoses were established based on the Indonesian Nursing Diagnosis Standards (Standar Diagnosis Keperawatan Indonesia/SDKI). Nursing interventions were planned and implemented according to the Indonesian Nursing Intervention Standards (Standar Intervensi Keperawatan Indonesia/SIKI), with expected outcomes guided by the Indonesian Nursing Outcomes Standards (Standar Luaran Keperawatan Indonesia/SLKI). Interventions focused on aseptic wound care, blood glucose management, infection prevention, pain management, and patient and family education. As this study was a case report, no experimental intervention or comparative protocol was applied.

Data Collection and Data Analysis

Data collection was conducted continuously throughout the patient's hospitalization. Data analysis was performed using a descriptive narrative approach by comparing the patient's clinical condition before and after the implementation of nursing care. Changes in wound condition, blood glucose levels, signs of infection, pain

intensity, and patient responses to nursing interventions were analyzed to evaluate the outcomes of nursing care.

Ethical Approval

This study adhered to ethical principles in nursing research, including beneficence, respect for human dignity, justice, and confidentiality. Patient identity was protected by the use of initials, and all data were used solely for academic purposes. Written informed consent was obtained from the patient and family prior to data collection and reporting of this case.

Results

Patient Overview

The patient in this case report was a 72-year-old male admitted to the medical–surgical inpatient ward with a medical diagnosis of necrotizing fasciitis of the left lower extremity accompanied by Type 2 Diabetes Mellitus and several comorbid conditions. The patient was admitted with a chief complaint of a foul-smelling, purulent, and painful wound on the left foot. The medical history revealed long-standing Diabetes Mellitus and a history of hypertension. At the initial nursing assessment, the patient was fully conscious (compos mentis) with vital signs under close monitoring following a previous episode of septic shock. Physical examination of the left lower extremity revealed an open postoperative wound following fasciotomy, exposing muscle and fascial tissue, accompanied by edema, hyperemia, tenderness, and purulent exudate.

Nursing Problems and Diagnoses

Based on the nursing assessment, data analysis, and the application of the Indonesian Nursing Diagnosis Standards (SDKI), three priority nursing diagnoses were identified: (1) impaired skin/tissue integrity related to tissue damage caused by infection and impaired peripheral circulation; (2) risk of infection related to invasive procedures, extensive open wounds, and chronic Diabetes Mellitus; and (3) unstable blood glucose levels related to impaired glucose tolerance and insulin resistance.

Implementation of Nursing Interventions

Nursing interventions were implemented according to the Indonesian Nursing Intervention Standards (SIKI) and the established nursing care plan. The main nursing interventions included aseptic wound care using 0.9% normal saline solution and sterile dressings; monitoring wound characteristics such as wound bed color, amount and type of exudate, and signs of infection; hyperglycemia management through regular blood glucose monitoring and collaboration in insulin administration as prescribed; infection prevention through the application of standard precautions and hand hygiene education; and pain management through collaboration in analgesic administration and monitoring of the patient's pain response.

Patient Clinical Progress

Evaluation during the course of nursing care demonstrated noticeable clinical improvement. The wound on the left lower extremity showed a reduction

in purulent exudate, with the gradual appearance of granulation tissue at the wound base. Edema and surrounding erythema decreased progressively. The patient reported a reduction in pain intensity following nursing interventions and analgesic therapy. Blood glucose monitoring indicated improved glycemic control compared to the initial condition, with random blood glucose levels becoming more stable, although continued monitoring and therapy adjustment were still required. Throughout the observation period, no signs of worsening systemic infection were identified.

Discussion

The patient described in this case report was diagnosed with Type 2 Diabetes Mellitus complicated by necrotizing fasciitis, a severe and life-threatening soft tissue infection. In patients with diabetes, chronic hyperglycemia plays a critical role in worsening disease progression by causing impaired tissue perfusion, immune system dysfunction, and delayed wound healing. This condition is consistent with the pathophysiology of Diabetes Mellitus, which explains that elevated blood glucose levels inhibit leukocyte function, particularly neutrophils, thereby reducing phagocytosis and bacterial elimination (Smeltzer & Bare, 2013; Widiasari et al., 2021). The results of nursing care demonstrated impaired skin and tissue integrity characterized by extensive open wounds, purulent exudate, edema, and localized tenderness. These findings are consistent with the clinical characteristics of necrotizing fasciitis, in which infection spreads rapidly along the fascia and subcutaneous tissue, particularly in individuals with chronic conditions such as Diabetes Mellitus. Hardianto (2020) reported that patients with diabetes have a significantly higher risk of developing severe infections due to the combined effects of hyperglycemia, microcirculatory impairment, and peripheral neuropathy, which often delays the detection of wounds and tissue injury.

Aseptic wound care and continuous monitoring of wound characteristics were shown to have a positive impact on the patient's clinical condition. The reduction in purulent exudate and the appearance of granulation tissue indicated the initiation of the wound healing process. Theoretically, effective wound healing requires adequate oxygen and nutrient delivery through sufficient tissue perfusion. In patients with Diabetes Mellitus, chronic vascular changes frequently compromise tissue perfusion, making nursing interventions focused on wound care and infection prevention particularly essential (Masriadi, 2021). Another important aspect of this case was blood glucose management. The findings demonstrated that glycemic control improved following regular blood glucose monitoring and collaborative insulin administration. This supports existing evidence that optimal glycemic control plays a vital role in accelerating wound healing and reducing the risk of recurrent infection. Care and Supplement (2020) emphasized that effective blood glucose control enhances immune function and promotes angiogenesis and granulation tissue formation during the wound healing process.

The risk of infection in this patient was not only related to the extensive

open wound but was further exacerbated by advanced age and the presence of chronic comorbid conditions. The implementation of infection prevention interventions, including aseptic techniques, hand hygiene education, and collaboration in antibiotic therapy, contributed to preventing the progression of systemic infection. Observations during the evaluation period showed no signs of ongoing or worsening sepsis, indicating that infection control measures were effective. This finding aligns with recommendations from PERKENI (2021), which emphasize strict infection control in patients with Diabetes Mellitus and wound complications. From a nursing perspective, the use of national nursing standards such as the Indonesian Nursing Diagnosis Standards (SDKI) and the Indonesian Nursing Intervention Standards (SIKI) supported a systematic, measurable, and standardized approach to nursing care. This framework enabled nurses to accurately identify priority nursing problems and design interventions tailored to the patient's clinical needs. Furthermore, the application of Evidence-Based Nursing strengthened the nurse's role as a clinical decision-maker guided not only by clinical experience but also by scientific evidence.

Overall, this discussion highlights that comprehensive nursing care focusing on wound management, glycemic control, and infection prevention plays a central role in improving clinical outcomes in patients with Type 2 Diabetes Mellitus complicated by necrotizing fasciitis. The findings underscore the importance of interprofessional collaboration and the consistent application of evidence-based nursing practice in managing complex medical–surgical cases.

Conclusion

This case report demonstrates that patients with Type 2 Diabetes Mellitus complicated by necrotizing fasciitis experience major nursing problems, including impaired skin and tissue integrity, risk of infection, and unstable blood glucose levels. Chronic hyperglycemia and impaired tissue perfusion play a significant role in aggravating infection severity and delaying the wound healing process. The implementation of comprehensive nursing care consisting of aseptic wound management, optimal glycemic control, infection prevention, pain management, and interprofessional collaboration was shown to improve the patient's clinical condition. Improvements were evidenced by reduced purulent exudate, the emergence of granulation tissue, stabilization of blood glucose levels, and decreased pain intensity. These findings highlight the importance of evidence-based nursing practice and standardized nursing care in managing complex medical–surgical cases involving severe diabetic complications.

Acknowledgment

The authors would like to express their sincere gratitude to Immanuel Hospital Bandung for granting permission and providing support during the data collection process and the implementation of nursing care. Appreciation is also extended to the medical and nursing staff of the medical–surgical inpatient ward for their professional guidance,

cooperation, and assistance in the completion of this case report.

Conflict of Interest

There is no conflict of interest.

Author Contribution

Julieta de Carvalho Xavier: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft.

Ricardo Correia Luruk: Data Analysis, Validation, Supervision, Writing – Review & Editing.

Argi Virgona Bangun: Literature Review, Methodology Refinement, Writing – Review & Editing.

Lilis Suryani Marpaung: Supervision, Validation, Clinical Data Interpretation, Writing – Review & Editing (Clinical Perspective).

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