



Implementation Of Wound Care Education In A Diabetic Ulcer Patient With Knowledge Deficits

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ABSTRACT

Background: Diabetes mellitus is a metabolic disease that can cause various complications, one of which is diabetic ulcers. These ulcers occur due to impaired circulation and peripheral neuropathy which causes wounds to heal. In an effort to manage diabetic ulcers, an educational approach is needed to increase patient awareness of the importance of proper wound care and infection prevention efforts. Nursing education plays an important role in helping patients understand the relationship between uncontrolled blood glucose levels and the impaired wound healing process. Increased patient understanding is expected to encourage behavioral changes in self-care and improve compliance with medical recommendations.

Objectives: This case study aims to evaluate the implementation of wound care education with impaired knowledge deficits in diabetic ulcer patients through a nursing approach. This research method is in the form of a case study using a descriptive

Method: with a research design using a nursing care approach which includes assessment, nursing diagnosis, nursing intervention, nursing implementation, nursing evaluation which is carried out for 3 meetings at the patient's home in the rose ray neighborhood, RT. 001 RW. 008, cigembor village, ciamis sub-district

Results: After implementing education for three meetings, the results showed that the client's understanding of wound care had increased. The client showed the ability to recite the correct wound care steps, recognize signs of infection, and understand the importance of controlling blood glucose levels in accelerating wound healing. The family also began to play an active role in assisting the wound care process at home.

Conclusion: The implementation of wound care education can improve client knowledge and skills in caring for diabetic ulcers to prevent infection. This education can be an important part of promotive and preventive nursing interventions to support the wound healing process and prevent further complications.

Keywords: Diabetes Mellitus, Diabetic Ulcer, Wound Care Education

Introduction

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by high blood glucose levels (hyperglycemia), which occurs due to insufficient insulin production or the body's inability to respond effectively to insulin. This disease belongs to the group of non-communicable diseases (NCDs) with an increasing incidence rate globally, including in Indonesia (Almaini & Heriyanto, 2019). Based on data from the International Diabetes Federation (IDF), in 2021 there were more than 537 million adults living with diabetes worldwide, and this number is projected to increase significantly in the next decade. This condition has a major impact on the quality of life of patients and places an additional burden on the health care system, especially because of the chronic complications that can arise, such as diabetic ulcers (Rewasan et al., 2022).

Diabetic ulcer is a chronic complication in patients with diabetes mellitus that occurs due to a combination of peripheral neuropathy, vascular disorders, and decreased immune system. Diabetic ulcers generally form on parts of the body that experience high pressure, especially the feet, and are often unnoticed by patients due to sensory impairment. This causes the wound to become chronic, difficult to heal, and easily infected. If not treated properly, diabetic ulcers can lead to serious complications, such as osteomyelitis, gangrene, and lower limb amputation. The World Health Organization (WHO) notes that around 15% of diabetic patients will develop diabetic foot ulcers during their lifetime, and more than half of them are at risk of amputation if they do not receive adequate treatment (Lutfikasari, 2024).

One of the factors that contribute to worsening the condition of diabetic ulcers is the low level of patient knowledge regarding wound care and infection prevention. The patient's ignorance of proper wound care steps, the importance of maintaining wound hygiene, and the lack of ability to recognize signs of infection are the main obstacles in the wound healing process. In addition, the lack of family involvement in accompanying patients during treatment was also a significant obstacle. These conditions indicate that educational interventions are needed to improve the understanding, skills, and active participation of patients and families in performing wound care independently at home (Widodo et al., 2024).

Providing education is one of the main functions of nurses in carrying out promotive and preventive roles. The purpose of nursing education is to improve the patient's ability to understand their health condition, make the right decisions, and carry out care independently. In patients with diabetic ulcers, educational materials include how to clean wounds, dressing change procedures, identification of infection symptoms, and the importance of monitoring blood glucose levels regularly. With sufficient knowledge, patients are expected to prevent further complications and accelerate the wound healing process (Raihan, 2023).

Several studies have shown that effective education can increase the level of patient independence in wound care and reduce the incidence of infection. A study by (Sulistya Muvarizka, 2023) mentioned that patients with low knowledge have a higher risk of uncontrolled wound progression. In addition, educational approaches that involve the family have also been shown to be effective in improving compliance and success of home wound care programs. Education must be provided repeatedly and consistently, and adapted to the patient's level of understanding so that the material presented can be well received.

In this case study, the authors implemented wound care education for a diabetic ulcer patient with a knowledge deficit. The subject was purposively selected based on clinical criteria and the patient's ability to be actively involved in the education process. Interventions were carried out in three meetings with a nursing approach that included assessment, diagnosis, intervention, implementation, and evaluation. The educational material provided was tailored to the patient's needs, using leaflet media, live demonstrations, and interactive discussions.

The implementation of education is expected to increase patient understanding of the importance of proper wound care and encourage behavior change towards effective self-care. In addition, education is also directed to invite families to play an active role as the main support in the home care process. With comprehensive education, nurses not only help patients in physical aspects, but also empower patients psychosocially to maintain and improve their quality of life.

Based on this background, this study aims to evaluate the implementation of wound care education for patients with knowledge deficits in diabetic ulcer management. This study is expected to contribute to the development of nursing practice that focuses on an educational approach, as well as a reference in developing strategies to increase patient knowledge in wound management.

Objective

This study aims to evaluate the implementation of wound care education in diabetic ulcer patients who experience knowledge deficits, in order to improve their understanding and ability to perform wound care independently and prevent infection.

Method

Design and setting

This study used a descriptive case study approach with a nursing care method consisting of five stages: assessment, nursing diagnosis, intervention, implementation, and evaluation. The case study was conducted on a patient with diabetic ulcers who experienced a knowledge deficit in wound care. The research was conducted directly in the patient's living environment, namely Sinar Mawar Hamlet RT 001 RW 008, Cigembor Village, Ciamis District, Ciamis Regency. The selection of this location considers access that allows for the implementation of continuous education and direct observation of the development of the patient's condition.

Population and sampling

The population in this study consisted of patients with diabetic ulcers who had knowledge deficits regarding wound care. This target population was selected based on the high prevalence of diabetes mellitus in the region and the high incidence of diabetic foot wound complications that often lead to infection and amputation. The population focus was directed at individuals with limited knowledge in performing wound care independently, who need educational interventions as part of preventive and promotive efforts.

In selecting research subjects, purposive sampling technique was used, which is a sampling method based on special considerations relevant to the research objectives. The

inclusion criteria used include patients who have been diagnosed with diabetic ulcers, experience knowledge deficits in wound care, are willing to become participants by signing informed consent, and can be actively involved in the education process. Meanwhile, the exclusion criteria included patients who had received intensive wound care education before, patients who underwent full wound care in health facilities (hospitalization), and patients who were not possible to be met continuously at home during the education process.

The subject selected in this study was one elderly female patient who lived with her family and had a history of diabetes mellitus for more than five years. The single sample size was determined because this research is a case study with a comprehensive and in-depth nursing care approach. This patient was considered representative because she exhibited the common characteristics of diabetic ulcer patients who have difficulty in understanding and implementing wound care measures at home, as well as a lack of family involvement in supporting daily care. The selection of a single sample allowed in-depth exploration of changes in patient knowledge and skills during the education process. The patient was a 67-year-old female who had been diagnosed with diabetes mellitus for approximately six years. She presented with a diabetic ulcer on the right sole of her foot, measuring approximately 3x2 cm in size. The ulcer had been present for about three weeks prior to the intervention and showed early signs of infection. She was concurrently undergoing oral antidiabetic medication (metformin) and was applying topical antibiotic ointment prescribed by a local clinic. Initially, the family showed preference for traditional treatments due to cultural beliefs but agreed to modern wound care after further discussion.

Instrument and measurement

Data collection instruments used in this study included observation sheets, structured interview sheets, and nursing action documentation records. Data validity was strengthened by triangulation techniques through direct observation, in-depth interviews with patients and families, and review of medical record documentation. The measurement of educational success was evaluated from the patient's increased knowledge of wound care, which was observed through the patient's ability to mention the steps of wound care, recognize signs of infection, and active participation in self-care actions. In addition, family involvement was also measured as an indicator of successful implementation of holistic education. Each educational session covered distinct content: the first focused on hand hygiene and wound cleaning procedures; the second included signs of infection and proper dressing techniques; the third emphasized blood glucose control and the link to healing. Interview questions included prompts like: 'What are the steps for wound care?', 'What are signs of wound infection?', 'Why is controlling blood sugar important for healing?'. Evaluation of understanding was performed through direct observation and verbal repetition by the patient.

Data collection and analysis

Data collection was conducted in three scheduled sessions during the education process, with the time span adjusted based on patient and family readiness. Each session consisted of wound condition assessment, delivery of verbal and visual educational materials (using leaflets), and direct wound care practice with the guidance of the nurse. The entire process was systematically recorded in a nursing evaluation sheet.

Data analysis was carried out descriptively qualitatively through four stages, namely: (1) field data collection through observation and interviews, (2) data reduction by filtering information relevant to the research focus, (3) data presentation in the form of thematic narratives based on the nursing process, and (4) drawing conclusions about the effectiveness

of educational implementation in improving patient and family understanding. This technique was chosen so that the data obtained can be thoroughly examined and reflect changes in understanding and patient behavior before and after education is given.

Result

After three meetings of wound care education at the patient's home, there was a significant increase in the patient's understanding of diabetic ulcer wound care. In the initial session, the patient showed limited knowledge in terms of wound hygiene, how to change dressings, and ignorance of signs of infection. Patients also did not understand the importance of maintaining blood glucose levels in relation to the wound healing process.

At the second meeting, the education began to show a positive impact. Patients began to be able to repeat the wound care steps presented, including how to wash hands before changing dressings, using the correct antiseptic fluid, and recognizing signs of infection such as redness, swelling, and odorous discharge. The family also began to show interest and active participation in learning wound care procedures.

By the third meeting, the patient showed increased independence in practicing wound care independently. He was able to re-explain the educational material coherently and precisely, and identify positive changes in the wound that began to show signs of healing, such as reduced exudate and granulation tissue formation. The patient's family also assisted in preparing the treatment tools and accompanying during the practice. This shows that the education provided not only increases patient knowledge, but also strengthens family support in the healing process.

Discussion

In this case study, the author evaluated the effectiveness of wound care education for diabetic ulcer patients with knowledge deficits. Education was provided in three sessions using a nursing approach that included assessment, diagnosis, intervention, implementation, and evaluation. During the process, educational materials were delivered verbally, using leaflets, and through direct demonstrations, with the hope of improving the understanding and skills of patients and their families in caring for wounds independently.

Based on the findings obtained, the education provided was able to have a positive impact on improving patients' knowledge about wound care. These results are in line with research by (Asmaria et al., 2022) which states that wound care education provided to patients and their families at home can increase independence and accelerate the healing of diabetic ulcers. Additionally, family involvement in the care process has been shown to support positive outcomes, as highlighted by (Harun et al., 2024) in their journal, which emphasizes the importance of enhancing family knowledge and independence in supporting wound care.

This discussion aims to examine the research findings in greater depth and relate them to previous theories and studies. By evaluating the impact of educational implementation, the author seeks to provide a comprehensive overview of how nursing education not only enhances patient knowledge but also strengthens the role of families as primary supporters in wound healing. Additionally, this discussion will cover the interpretation of results, comparisons with previous studies, implications for

nursing practice, limitations of the research, and suggestions for future studies. It is also important to recognize that during the care process, the patient's cultural and spiritual values were considered. Initially, the patient and her family had a strong inclination towards traditional herbal remedies due to long-standing beliefs, which required culturally sensitive communication by the nurse to integrate modern wound care practices effectively.

Restate the Key Findings

The results of this case study show that the implementation of wound care education in diabetic ulcer patients with knowledge deficits has a significant positive impact on improving patients' understanding of wound care independently. After three meetings of education, patients showed improvement in understanding the steps of wound care, recognizing signs of infection, and understanding the importance of maintaining blood glucose levels to accelerate the wound healing process. In addition, there was active involvement from the family in supporting the home care process, which also strengthened the effectiveness of the education provided.

Interpret the Results

These results indicate that a structured and communicative educational approach is highly effective in shaping behavior change and improving wound care skills in patients with diabetes mellitus. Previously, patients had limited information and did not understand the link between wound care and infection control. However, after being given educational materials tailored to the patient's condition and level of understanding, accompanied by demonstrations and direct interaction, there was a significant increase in understanding. Education was delivered in stages using leaflet media and two-way discussion methods to ensure patients understood the material provided. These results emphasize the importance of effective communication in the health education process, especially for patients with chronic complications such as diabetic ulcers.

Compare with Previous Studies

The results of this study are in line with several previous studies (Putri, 2024) states that health education can increase patient awareness and skills in maintaining wound hygiene, controlling blood glucose levels, and preventing infection. Continuous education, especially when involving the family, is proven to accelerate the healing process and reduce the risk of complications. (Sulistya Muvarizka, 2023) also confirms that the low level of knowledge of diabetic patients correlates with the high incidence of diabetic foot ulcers that are difficult to heal and the increased risk of amputation. Furthermore (Sulistyawati & Hilfida, 2025) emphasizes that education should be an integral part of nursing practice because it contributes to improving healthy living behavior, especially in infection control and independent wound care.

Highlight the Implications

The implications of the results of this study are quite broad and strategic, especially in the context of community nursing services. By providing appropriate education, patients are able to perform wound care independently, thereby reducing the burden on health services and preventing complications early on. This education also supports a promotive and preventive nursing approach, not just a curative one. In the long run, such an educational

approach has the potential to save costs, reduce dependency on health care facilities, and improve the overall quality of life of patients. Nurses as frontline health workers in the community are expected to have competence in providing education that is communicative, evidence-based, and adapted to the culture and characteristics of the community.

The education in this study also emphasizes the importance of the family's role in supporting the success of patient care. Families who understand wound care, recognize signs of infection, and the importance of maintaining diet and blood glucose levels, are important partners in the patient's healing process. In this case, family involvement was very helpful in ensuring that the education provided did not stop at the cognitive aspect, but was also applied in daily life. This reinforces the concept of holistic nursing that focuses not only on the individual patient, but also on the surrounding social support system

Discuss the Limitations

However, this study has several limitations that need to be addressed objectively. First, the single case study design does not allow generalization of the results to a wider population. Although the findings provide an in-depth picture of the changes in the study subjects, these results cannot be used as a basis to conclude the effectiveness of the intervention in general without further research. Second, the limited duration of the educational intervention of only three meetings over a short period of time cannot evaluate the long-term impact on patient independence in wound care. Third, the measurement of outcomes was done qualitatively through observations and interviews, not equipped with standardized quantitative instruments such as knowledge scales or compliance indices. The subjective nature of outcome assessment—based on patient interviews and nurse observations—also limits objectivity. Future studies should incorporate standardized knowledge scales or third-party evaluations for more robust measurement.

In addition, this study did not conduct a follow-up evaluation after the educational intervention, so it is unknown whether patients maintain proper wound care behavior over a longer period of time, as well as the impact on reducing the rate of recurrent infections. External factors such as social support, economic conditions, and the availability of wound care facilities and materials at home have also not been thoroughly analyzed, even though these factors have the potential to influence the successful implementation of education in the field.

Suggest Future Research

Further research is therefore recommended. Studies with quasi-experimental designs or experiments on larger samples can provide a more comprehensive picture of the effectiveness of wound care education in reducing the risk of infection and accelerating wound healing in diabetic ulcer patients. Longitudinal studies are also needed to assess the long-term impact of educational interventions, including on wound recurrence rates, patient quality of life and amputation rates. In addition, technology-based educational approaches, such as learning videos, mobile apps or digital booklets, can be innovative in delivering education that is more flexible, affordable and reaches more patients.

Equally important, future research needs to identify factors that influence the success of education, such as patient motivation, health literacy level, family involvement, and the availability of supporting facilities in the patient's living environment. With a comprehensive

and sustainable approach, education will not only be an information delivery activity, but also an integral part of an individualized patient needs-based care system.

Conclusion

This study concludes that the implementation of wound care education in diabetic ulcer patients with knowledge deficits has a positive impact on increasing patient understanding, skills, and involvement in independent wound care at home. Structured and communicative education not only strengthens patients' awareness of the importance of proper wound care, but also optimizes the family's role in infection control. These findings underscore the importance of integrating nursing education as part of promotive and preventive interventions to accelerate the wound healing process and prevent further complications.

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Author Contribution

Riska Fitri Oktavianti acted as the main author who carried out data collection, provided education to patients, analyzed data, and prepared research reports and scientific articles. Ade Fitriani contributed in providing methodological direction, content validation, and conducting critical reviews and final editing of the article manuscript. Both authors contributed actively in all stages of research and manuscript preparation.

Conflict of Interest

The authors declare that there is no conflict of interest either financially, academically, or personally in the conduct of research or in the process of writing this article.

Ethical Clearance

This study has obtained ethical approval from the Health Research Ethics Committee of the Muhammadiyah Ciamis College of Health Sciences. All research procedures have been carried out by upholding the principles of research ethics, including informed consent, maintaining the confidentiality of subjects' personal data, and ensuring the absence of risks that harm participants.

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