

CASE STUDY OF DM GANGRENE WOUNDS WITH SKIN INTEGRITY DISORDERS

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ABSTRACT

According to data according to the World Health Organization (WHO), Indonesia is ranked 7th among the 10 countries with the highest number of sufferers, namely 10.7 million people. Complications from diabetes mellitus with diabetic gangrene rate in Indonesia is around 15%, and the amputation rate is 30%. In diabetes mellitus patients there are many nursing problems, one of which is impaired skin/tissue integrity. Diabetes mellitus is a disease caused by metabolic disorders as a result of the pancreas being unable to produce enough insulin needed by the body. A complication that often occurs in diabetes mellitus sufferers is gangrenous wounds where tissue deformity occurs either partially (Partial Thickness) or completely (Full Thickness). This study used a qualitative research design with a case study approach. The sample was 2 (two) Diabetes Mellitus patients with Gangrene Wounds with nursing problems of Skin/Tissue Integrity Disorders. The case study was carried out at Karawang District Hospital. Data collection techniques were carried out by: interviews, observation, physical examination and documentation studies. The data was analyzed narratively based on a comparison of 2 (two) patients who were processed based on the stages of the nursing process. Based on the assessment, it was found that patient 1 and patient 2 had gangrenous wounds which is one of the complications that occurs in diabetes mellitus sufferers. The nursing problem that occurred was disruption of skin/tissue integrity and the implementation carried out for these two patients was wound care. The nursing problem of skin/tissue integrity disorders in both patients showed that the problem was not resolved and the intervention was continued by the nurse who was on duty in the room. Further research with another intervention and larger sample size needed to find out the best intervention for gangrene.

Key words: Diabetes Mellitus, gangrene, skin integrity

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INTRODUCTION

Diabetes mellitus is a chronic metabolic disease characterized by hyperglycemia due to impaired insulin secretion, insulin activity or both (Alfaqih. M. R., Anugerah. A., 2022). Gangrenous wounds are wounds that occur in people with diabetes mellitus and peripheral neuropathy occurs which causes loss of sensation in the area of the wound (Haryono, 2019).

From data according to the World Health Organization (WHO), the Southeast Asia region, where Indonesia is located, is ranked 3rd with a prevalence of 11.3%. Indonesia is ranked 7th among the 10 countries with the highest number of sufferers, namely 10.7 million people (Riskesdas, 2018). Data from the Indonesian Ministry of Health's Basic Health Research (Riskesdas) in 2018 shows that the prevalence of diabetes mellitus in West Java reached 1.74% (estimated at 570,611 diabetes sufferers). In 2021, the West Java Health Service found 46,837 people with diabetes and 17,379 or 37.1% of them did not receive adequate health care according to government standards. Likewise in Karawang, the prevalence of patients diagnosed with diabetes mellitus is 1.0% and with symptoms is 1.2% (Riskesdas, 2018).

The prevalence of diabetes mellitus in Indonesia based on a doctor's diagnosis at ages over 15 years is 2%. And the prevalence of diabetes mellitus in women is higher than in men with a ratio of 1.78 to 1.21%. As well as complications from diabetes mellitus with a diabetic gangrene rate in Indonesia of around 15% and an amputation rate of 30% (Riskesdas, 2018). With the high prevalence of diabetes mellitus sufferers in Indonesia, the government itself is making efforts through promotive and preventive strategies. Promotive and preventive efforts include inviting people to adopt good lifestyle patterns such as low sugar and low salt diets, as well as health screening education. The Ministry of Health is also collaborating with BPJS Health to launch the Basic Health Needs (KDK) program, which plays a role in facilitating the public to check blood sugar regularly, the costs of which are borne by the state.

Diabetes mellitus is an important public health problem because the causal factors that influence the occurrence of complications in diabetes mellitus patients are uncontrolled blood sugar levels, poor diet, increased body weight, lack of activity or exercise and lack of regular health control and non-compliance in taking medication. A complication that often occurs in diabetes mellitus sufferers is gangrenous wounds where tissue deformity occurs either partially (Partial Thickness) or completely (Full Thickness). There are several components to the cause of diabetic gangrene, including peripheral sensory neuropathy, trauma, deformity, ischemia and infection (Dhillon, 2022). The things that patients with chronic diabetes mellitus must pay attention to independently are changing their lifestyle which includes exercise, weight loss and managing a good diet, controlling blood sugar levels regularly and stopping smoking.

In patients with diabetes mellitus, there are many nursing problems, one of which is impaired skin/tissue integrity. Skin/tissue integrity disorders are conditions where a person experiences or is at risk of damage to the epidermis and dermis or tissue (mucous membranes, cornea, fascia, muscles, tendons, bones, cartilages, capsules, joints and ligaments) (Sari & Mukhamad, 2021).

These nursing problems can be prevented by management in providing nursing care to diabetes mellitus patients with impaired skin/tissue integrity, namely non-pharmacological and pharmacological care such as providing health education about wound care, exercise, diet management, blood glucose monitoring, routine insulin administration, giving antibiotics and carrying out wound care on patients who have experienced diabetic gangrene regularly so that the wound does not spread quickly (Rusmiyanti, 2018). Based on the data above, researchers became interested in exploring nursing care for patients

METHODS

The research design used in this research was case study. Case study research is a study that explores a nursing problem with detailed limitations, has in-depth data collection and includes various sources of information. Case study research is limited by time and place, and the cases studied are events, activities or individuals. This case study research is a study to explore the problem of nursing intervention at RSUD Karawang, the time of this research was 25-27 November 2022.

RESULTS

In patient 1, 57 years old, with a diagnosis of diabetes mellitus with gangrene pedis and patient 2, 63 years old, with a diagnosis of diabetes mellitus with gangrene pedis. Patient 1 and patient 2 are in the productive age of DM sufferers, namely (15-64 years) which is related to the risk and vulnerability influenced by lifestyle, unhealthy lifestyle, poor diet and lack of activity as well as having previous illnesses that have been suffered. such as hypertension, history of heart disease and obesity (Sukmana et al., 2019).

The main complaint felt by patient 1 and patient 2 was a wound that was difficult to heal on the left leg, which was caused by both patients having diabetes mellitus with blood sugar levels that were above normal and uncontrolled. This condition occurs due to damage to the nervous system and blockage of small blood vessels, resulting in reduced blood supply that carries oxygen to the injured area and causes reduced sensation in the feet.

The history of the current disease was obtained from before being admitted to the hospital until being admitted to the hospital and had complaints that were in accordance with the theory, namely that both patients experienced signs and symptoms such as frequent fatigue and weakness which occurred because blood glucose (blood sugar) was above normal due to abnormalities in insulin secretion or insulin work. (Siregar & Batubara, 2022). As well as the presence of gangrene wounds which indicate complications of DM, namely peripheral neuropathy which is damage to the nervous system that occurs due to blockages in small blood vessels and blood glucose levels that are not well controlled which results in reduced blood supply to the wound area and reduced sensation of pain in the legs and feet. feels numb (Yuhelma, Hasneli, Y., & Nauli, 2014). In the past medical history of patient 1 and patient 2, it is consistent according to (Dhillon, 2022) that diabetes mellitus itself can be influenced by factors such as poor diet, increased body weight, lack of activity or exercise and lack of regular health control and non-compliance with drinking. drug. According to the author's assumption, these two patients are like the theory that triggered the disease, namely that the patient had suffered from diabetes mellitus for 5 years. Complications that occur in diabetes mellitus show gangrenous wounds in patients who have suffered from DM for more than 5 years (Kirana, 2019a).

The family health history obtained from patient 1 is in accordance with the theory (Bhatt, H., Saklani, S., & Upadhayay, 2017) that genetic factors from both parents or a family history of diabetes mellitus will increase 2 - 6 times greater compared to someone without a family history of diabetes mellitus. Meanwhile, patient 2 of the illnesses he suffered were caused by unhealthy lifestyles ranging from careless eating patterns, lack of activity and exercise and lack of concern for his health.

The daily habit history from the data for patient 1 and patient 2 has a habit of eating sweet foods, which triggers an increase in blood glucose levels in the body. The pattern of fluid needs for patients 1 and 2 has increased because both patients often feel thirsty, and both patients have unhealthy habits, namely often drinking coffee and sweet tea at home. From the pattern of nutritional and fluid needs, the pattern of nutritional needs of patients 1 and 2 is not good in accordance with theory according to (Lukman et al., 2023) nutritional needs in DM patients are basic physiological needs, poor patterns of fulfilling nutritional needs can affect Unstable blood sugar control can result in hypoglycemia or hyperglycemia. The pattern of fluid requirements is very important for DM patients in accordance with the theory that during hyperglycemia, the kidneys excrete excess glucose through urine, the more glucose excreted, the more body fluid

the kidneys absorb for urine, which is one of the causes of frequent thirst. in DM patients. In both patients, frequent urination occurs at night, this occurs because the cells in the body cannot absorb glucose and the kidneys try to excrete as much glucose as possible through urination. From the sleep rest patterns, there are similarities between patient 1 and patient 2, namely that they both have difficulty sleeping due to frequent urination at night and feel anxious about the condition they are experiencing.

Physical examination of patient 1 and patient 2 was generally weak. According to (Khasanah, 2016) the general condition of DM sufferers often looks weak, this weakness is due to carbohydrates being excreted together with urine, so the body lacks calories and can also be caused by instability of blood glucose levels in the body, namely hyperglycemia or hypoglycemia. On physical examination of the endocrine system of patient 1 and patient 2 there was an increase in blood glucose levels. According to (Litrianti et al., 2023) hyperglycemia can trigger a decrease in insulin secretion which results in increased insulin resistance. Insulin resistance will form a circle which can cause an increase in hyperglycemia so that insulin production in the body decreases. On physical examination of the integumentary system, there were similarities in both patients, namely patient 1 and patient 2, who had gangrenous wounds on their left legs. According to (Kirana, 2019b) disorders of the integumentary system that occur in DM sufferers who experience complications, namely gangrene wounds caused by infection and then necrosis of tissue damage by embolism of large arterial blood vessels in parts of the body so that the blood supply stops, gangrene wounds occur due to neuropathy and disorders. vascular in the leg area, gangrene appears in the leg area in the form of open wounds followed by local tissue death.

Supporting examinations from laboratory data showed that both patients had a decrease in hemoglobin in patient 1 with a value of 7.6 g/dL and patient 2 9.8 g/dL. According to (Gustimigo, 2021), the result of a decrease in Hb levels which functions as a medium for transporting nutrients and oxygen throughout the body results in DM sufferers experiencing anemia or a lack of red blood cells which can be used as a parameter to determine nutritional status so as to minimize the occurrence of other disease complications. And there was an increase in leukocytes in patient 1, namely 17.6 mm and patient 2, namely 20.18 mm. Leukocytes are blood components that can detect infections caused by bacteria and viruses and can see the body's immunity, because leukocytes play a role in the body's defense system. The number of leukocytes can help diagnose organ damage and be a source of information regarding the immune deficiency disease process in uncontrolled DM. , an increase in the number of leukocytes can indicate the presence of an infection from the development of DM with gangrenous wounds (Chodijah, S., Nugroho, A., & Pandelaki, 2021).

A nursing diagnosis is a clinical assessment of an individual's experience or response to a health problem (IDHS, 2017). Based on the results of the review of the data found in the patient, the major and minor signs are appropriate to raise the issue of nursing diagnosis based on the IDHS, namely impaired skin/tissue integrity b.d Peripheral neuropathy. The major data is that there is damage to the tissue and/or layers of the skin and the major data is the presence of pain, bleeding, redness and hematoma. From the major and minor data that was obtained by patient 1, he complained that his body felt weak and since the wound on his left leg made it difficult for him to move his left leg, there appeared to be a gangrenous wound on the left foot in the sole area with a wound area of 12 cm which already showed damage to the tissue. and layers of skin as well as wet wounds and redness in the area around the wound which creates an unpleasant odor and the patient looks weak and patient 2 complains of pain in his left leg due to the wound and makes his body feel weak, there appears to be gangrene on the left leg in the instep area and big toe with a wound area of 5 cm which appears to damage the tissue and layers of the skin, the wet wound is reddish and black and gives off an unpleasant odor and the patient looks weak lying in bed, which is in accordance with the theory. Both patients were in accordance with the major and minor data stated in the theory.

DISCUSSION

The nursing planning carried out for patients 1 and 2 with nursing problems of skin/tissue integrity disorders related to peripheral neuropathy was made based on the Indonesian Nursing Intervention Standards (SIKI). With outcome criteria: Skin and tissue integrity is based on the Indonesian Nursing Outcome Standards (SLKI), namely: decreased tissue damage, decreased skin layer damage, decreased pain, decreased redness and decreased necrosis. By planning and taking the main intervention, namely wound care, including: monitoring wound characteristics (color, size and odor), monitoring signs and symptoms of infection, removing the dressing and plaster slowly, cleaning with NaCl solution, cleaning necrotic tissue, applying a dressing according to the type of wound and maintain sterile technique when carrying out wound care and collaborating with antibiotics.

Not all wound care interventions were carried out, such as not shaving the hair around the wound area because there was no hair on the soles of the feet, not giving appropriate ointment to the skin/lesions because the doctor couldn't order it and because of the condition of the wound, this intervention was not received, no Scheduled position changes every 2 hours or according to the patient's condition because the patient is still able to move and change body position, not given a diet with calories of 30-35 kcal/kgBB/day and protein 1.25-1.5 g/kgBB/day due to diet has been adjusted by a nutritionist, not given vitamin and mineral supplements (eg vitamin A, vitamin C, zinc, amino acids) because there is no indication and no doctor's order, not given TENS therapy (transcutaneous nerve stimulation) because the patient's condition is still capable to carry out movement, the signs and symptoms of infection were not explained because the condition of the two patients' wounds was already infected, it was not recommended to consume foods high in calories and protein because the patient's nutritional needs had been regulated by a nutritionist at the hospital, they were not taught independent wound care procedures because of the treatment procedures Wounds must use sterile techniques and must not be careless, and do not collaborate with debridement procedures (eg. enzymatic, biological, mechanical, autolytic) because the procedure is carried out according to a doctor's indication.

The implementation of nursing actions was carried out in the Teluk Jambe Room at Karawang District Hospital. In patients 1 and 2, the implementation was carried out starting from 25 – 27 November 2022. Based on the plans made, researchers carried out appropriate nursing actions to overcome the nursing problem of skin/tissue integrity disorders related to peripheral neuropathy.

Implementation for patients 1 and 2 was carried out in accordance with what had been prepared and selected according to the patient's condition. The intervention provided is wound care. In patient 1, from the first day to the third day, nursing actions were carried out, namely: monitor wound characteristics (color, size and odor), monitor signs and symptoms of infection, remove the dressing and plaster slowly, clean with NaCl solution, clean necrotic tissue, install dressing according to the type of wound and maintaining sterile technique when carrying out wound care and collaborating with antibiotics.

Meanwhile, in patient 2, from the first day to the third day, nursing actions were carried out, namely: monitoring wound characteristics (color, size and odor), monitoring signs and symptoms of infection, removing the dressing and plaster slowly, cleaning with NaCl solution, cleaning necrotic tissue, apply a dressing according to the type of wound and maintain sterile technique when carrying out wound care and collaborating with antibiotics.

The nursing actions for both patients were the same, namely wound care from day 1 to day 3. Wound care is the act of treating wounds with an effort to prevent or inhibit the growth of germs/bacteria on the skin and other body tissues (Kartika RW, 2017).

According to (Supratti & Ashriady, 2018), nursing evaluation is the fifth stage of the nursing process. The evaluation stage is a systematic and planned comparison of the patient's health with predetermined goals, carried out in a sustainable manner involving the patient, family and other health workers.

The results of the 3 day evaluation of patient 1 with a diagnosis of impaired skin/tissue integrity were not resolved, with subjective data: the patient said the weakness in his body had

begun to decrease and objective data: tissue damage in the gangrene wound had decreased quite a bit (4) but was still visible,

The damage to the skin layer in the wound appears to have decreased quite a bit (4) and the redness in the area around the wound is still clearly visible.

Evaluation of patient 2 with a diagnosis of unresolved skin/tissue integrity disorders, which was shown by subjective data: the patient said the pain and soreness in his left leg had decreased slightly and objective data: the damage to the patient's gangrene scar tissue was still visible but had decreased quite a lot (4), layer damage the skin looks quite saggy (4) and the redness of the skin around the wound is quite decreased (4).

To achieve the goals set in the nursing plan, interventions must be continued. Apart from improving the patient's condition, the intervention given will also prevent the gangrene wound from widening and infecting the patient's skin. In nursing actions, further evaluation needs to be carried out to produce the goals to be achieved in the nursing care that has been carried out.

CONCLUSION

The nursing assessment carried out on patient 1 and patient 2 was in accordance with existing theory, the data obtained was in accordance with the existing theoretical review so that the data could be used as material to determine action at the next stage.

The nursing diagnosis that emerged in both patients was in accordance with the theory taken between patient 1 and patient 2, namely based on this case study, the diagnosis used was impaired skin/tissue integrity b.d. peripheral neuropathy.

The nursing intervention used is that the main intervention is wound care carried out independently or collaboratively, namely monitoring wound characteristics (color, size and odor), monitoring signs and symptoms of infection, removing the dressing and plaster slowly, cleaning with NaCl solution, cleaning necrotic tissue, apply a dressing according to the type of wound and maintain sterile technique when carrying out wound care and collaborating with antibiotics.

Nursing implementation was carried out on patient 1 and patient 2 in accordance with existing plans, namely monitoring wound characteristics (color, size and odor), monitoring signs and symptoms of infection, removing the dressing and plaster slowly, cleaning with NaCl solution, cleaning necrotic tissue, applying a dressing according to the type of wound and maintaining sterile technique when carrying out wound care and collaborating with the administration of antibiotics. This cannot be separated from the support of the nurses in the Teluk Jambe Room and good cooperation with the patient's family.

The nursing evaluation carried out by the researcher on patient 1 and patient 2 was made in SOAP form. The results of the final evaluation on the nursing problem of skin/tissue integrity disorders carried out on patient 1 and patient 2 showed that the problem was not resolved in both patients and the intervention was continued by the nurse who was on duty in the room.

RECOMMENDATION

It is hoped that future researchers will develop the results of this research by using more detailed methods such as interviewing clients in detail and clearly, and developing the title of this research in a more interesting way using the latest sources.

REFERENCES

- Alfaqih. M. R., Anugerah. A., K. B. A. (2022). *Manajemen Penatalaksanaan Diabetes Mellitus*. Guepedia.
- Bhatt, H., Saklani, S., & Upadhayay, K. (2017). Anti-oxidant and anti-diabetic activities of ethanolic extract of *Primula Denticulata* Flowers. *Indonesian Journal of Pharmacy*, 27(2), 74–79. <https://doi.org/10.14499/Indonesianjpharm27iss2pp74>
- Chodijah, S., Nugroho, A., & Pandelaki, K. (2021). Hubungan Kadar Gula Darah Puasa Dengan Jumlah Leukosit Pada Pasien Diabetes Mellitus Dengan Sepsis. *Jurnal E-Biomedik*, 1(1). <https://doi.org/10.35790/ebm.1.1.2013.460>
- Dhillon. (2022). *Insidensi Gangren Diabetikum Pada Pasien Diabetes Melitus Tipe 2 Di Rumah Sakit Royal Prima*. Under the license CC BY-SA 4.0.
- Gustimigo, Z. P. (2021). Kualitas Tidur Penderita Diabetes Melitus The Sleep Quality Of Patient With Diabetes Mellitus. *Medical Journal Of Lampung University*, 4(8), 133–138.
- Haryono, B. dan B. A. D. (2019). *Keperawatan Medikal Bedah II*. Pustaka Baru Press.
- Kartika RW. (2017). Pengelolaan gangren kaki diabetik. *Continuing Medical Education*, 44(1).
- Khasanah, U. (2016). Upaya Memenuhi Kestabilan Gula Darah pada Pasien Diabetes Melitus DI RSUD dr. Soehadi Prijonegoro. *Nursing News*, 2, 1–10.
- Kirana. (2019a). Faktor-Faktor Yang Berhubungan Dengan Timbulnya Gangren Pada Pasien Diabetes Mellitus Di Rsud K.R.M.T. Wongsonegoro Semarang. *Jurnal Kesehatan Masyarakat (E-Journal)*, 7(1), 192–202.
- Kirana, S. et al. (2019b). Faktor-Faktor Yang Berhubungan Dengan Timbulnya Gangren Pada Pasien Diabetes Melitus Di RSUD K.R.M.T Wongsonegoro Semarang. *Jurnal Kesehatan Masyarakat*, 7, 192–202.
- Listrianti, M., Garna, H., & Mutiara, G. (2023). Studi Literatur: Kecemasan pada Penderita Diabetes Melitus Tipe 2. *Bandung Conference Series: Medical Science*, 3(1), 453–459. <https://doi.org/10.29313/bcsms.v3i1.6243>
- Lukman, Aguscik, & Agustini, V. A. (2023). Penerapan Manajemen Nutrisi Pada Asuhan Keperawatan Diabetes Melitus Tipe Ii Dengan Masalah Keperawatan Defisit Nutrisi. *Jurnal Aisyiyah Palembang*, 8, 26–42.
- Riset Kesehatan Dasar (Riskesdas). (2018). *Badan Penelitian dan Pengembangan Kesehatan Kementerian RI tahun 2018*. [http://www.depkes.go.id/resources/download/infoterkini/materi_rakorpop_20%0A18/Hasil Riskesdas 2018.pdf](http://www.depkes.go.id/resources/download/infoterkini/materi_rakorpop_20%0A18/Hasil_Riskesdas_2018.pdf) –
- Rusmiyanti, P. N. (2018). *GAMBARAN ASUHAN KEPERAWATAN PADA PASIEN DM TIPE II DENGAN GANGGUAN INTEGRITAS KULIT DI RUANG OLEG RSUD MANGUSADA*

BADUNG TAHUN 2018. Doctoral dissertation, Jurusan Keperawatan 2018.

- Sari, D. N. M., & Mukhamad, M. (2021). Gambaran Pengelolaan Gangguan Integritas Kulit/Jaringan pada Pasien Post Op Debridement atas Indikasi Ulkus Dm Pedis Dextra di Desa Lungge Kabupaten Temanggung. *Indonesian Journal of Nursing Research (IJNR)*, 4(2), 99–105.
- SDKI. (2017). *Survey Demografi Kesehatan Indonesia (SDKI)*. BKKBN, BPS.
- Siregar, R. I., & Batubara, K. (2022). Pendidikan Kesehatan Tentang Kepatuhan Diit Pada Pasien Diabetes Mellitus Tipe II Di Rumah Sakit TK II Putri Hijau Medan. *MAHESA : Malahayati Health Student Journal*, 2(4), 730–742.
<https://doi.org/10.33024/mahesa.v2i4.7245>
- Sukmana, M., Sianturi, R., & Aminuddin, M. (2019). Pengkajian Luka Menurut Meggit-Wagner dan Pedis Pada Pasien Ulkus Diabetikum. *Jurnal Kesehatan Pasak Bumi Kalimantan*, 2(2), 79–88.
- Supratti, S., & Ashriady, A. (2018). Pendokumentasian Standar Asuhan Keperawatan Di Rumah Sakit Umum Daerah Mamuju. *Jurnal Kesehatan Manarang*, 2(1), 44.
<https://doi.org/10.33490/jkm.v2i1.13>
- Yuhelma, Hasneli, Y., & Nauli, F. A. (2014). *Identifikasi Dan Analisis Komplikasi Makrovaskuler Dan Mikrovaskuler Pada Pasien Diabetes Mellitu*. Universitas Riau.