

THE EFFECT OF FOOT EXERCISES ON REDUCING NEUROPATHY PAIN IN DIABETES MELLITUS TN.S AT *ROUJIN HOME INAHOKAI OKINAWA*

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ABSTRACT

Diabetes mellitus is caused by insufficient or absent insulin, leading to elevated blood sugar levels. According to data from the International Diabetes Federation, the number of adult diabetes cases in Indonesia is projected to exceed 20 million by 2024. Individuals with diabetes mellitus may experience symptoms such as neuropathic pain. The objective of this case study is to provide a reference for future treatment interventions by incorporating foot exercises for diabetes mellitus patients, thereby preventing further complications. Foot exercises are beneficial for improving blood circulation and reducing neuropathic pain in individuals with diabetes mellitus. This type of research is descriptive using a case study approach method. The subject in this case study was a patient with neuropathic pain at Roujin Home (Nursing Home) Inahokai Okinawa. The results of the study showed that doing foot exercises on diabetic patients for one week resulted in the patient reporting a reduction in pain in their feet, assessing pain using a numerical rating scale (NRS). Foot exercises have been proven to be effective in reducing pain due to diabetic neuropathy.

Keywords: diabetes mellitus; diabetic neuropathy; foot exercises

INTRODUCTION

Diabetes mellitus describes a group of metabolic diseases, the common finding of which is elevated blood glucose levels, known as hyperglycemia. Severe hyperglycemia causes symptoms of polyuria, polydipsia, polyphagia, unexplained weight loss, fatigue and decreased performance, visual disturbances, and susceptibility to ketoacidosis or non-ketoacidosis infections. Chronic hyperglycemia causes impaired insulin secretion and/or function, which is associated with long-term damage and functional impairment of various tissues and organs. A total of 41 million people die from non-communicable diseases (NCDs) each year, equivalent to 71% of all deaths worldwide. There are over 15 million people aged 30 to 69 who die from NCDs, 85% of whom come from low- and middle-income countries (Widiasari et al., 2021). According to data from the Basic Health Research, the prevalence of DM (Diabetes Mellitus) diagnosed by doctors in Indonesia is 2.0%, with the highest prevalence found in DKI Jakarta at 3.4%, East Kalimantan at 3.0%, Yogyakarta at 2.8%, and Central Java ranking 12th with 2.2% (Riskseddas, 2018). According to Infodatin Diabetes Mellitus in 2020, Indonesia ranks 7th out of 10 countries with the highest number of diabetes mellitus sufferers, namely 10.7 million people (Indonesian Ministry of Health, 2020).

METHOD

This case study aims to determine the effect of foot exercises on reducing neuropathic pain at the Inahokai nursing home in Okinawa, Japan. In compiling this case study, the author used a descriptive method with a nursing process approach consisting of assessment, nursing diagnosis, intervention, implementation, and evaluation. This intervention was carried out on one patient, Mr. S, aged 86, who complained of tingling, numbness, and frequent pain in his legs due to neuropathy at Roujin Home Inahokai Okinawa, Japan. The case study was conducted every two days for one week after the patient finished lunch, at 2 p.m. in the nursing home hall, under the guidance of Inahokai rehabilitation staff, performing foot exercises in accordance with the Standard Operating Procedures (SOP). The nursing plan to be implemented for patients with neuropathic pain at the Inahokai nursing home is to perform diabetic foot

exercises in accordance with standard operating procedures (SOP) for one week, assisted by Inahokai staff. The hope is that this will reduce neuropathic pain in patient Mr. S at the Inahokai nursing home.

RESULT

After performing diabetic foot exercises on Mr. S, the results showed that the exercises had an effect on the pain caused by neuropathy. The patient said that the pain had decreased and he felt comfortable. After conducting an examination using a Numeric Rating Scale (NRS) of 0-10, the score decreased from 5 to 3 within a week.

DISCUSSION

In this discussion, the author discusses nursing care for elderly patients with diabetes mellitus in accordance with existing concepts and theories. Nursing care for patients with a medical diagnosis of diabetes mellitus. The application of diabetic foot exercises to reduce neuropathic pain with nursing care for Mr. S, carried out at Roujin Home (nursing home) Inahokai Okinawa, Japan. The data collection process follows the phases of the nursing process, which include assessment, establishing nursing diagnoses, planning, implementation, and evaluation of nursing care.

Assessment

Assessment is the first step in the nursing process, which involves collecting data or obtaining accurate information from clients in order to identify various problems. To carry out this first step, nurses must possess a range of knowledge and skills, including knowledge of human biopsychosocial and spiritual needs, which view humans from biological, psychological, and social perspectives, as well as spiritual perspectives. knowledge of human developmental needs (growth and development of basic needs), knowledge of the concepts of health and illness, knowledge of the pathophysiology of the disease experienced, knowledge of the family system and cultural values and beliefs held by the client (Hidayat, 2021). The assessment of Mr. S was conducted on Tuesday, May 6, 2025. Data collection in this case used methods such as interviews, observation, and physical examination.

The results of a head-to-toe physical examination of Mr. S revealed that his head was clean and there was no hair loss, and that all of Mr. S's hair had turned gray. The conjunctiva of the eyes was anemic, the sclera was normal white, and Mr. S's vision was blurred. The nose was symmetrical, with no swelling or discharge. The mucous membranes of the lips were moist, the mouth was clean, and he wore dentures. There was no gum inflammation, and he had no difficulty swallowing. The ears are clean, hearing function is good, and there are no complaints about the ears. Mr. S admits that he has never consumed herbal medicines, but he takes oral medication, namely Metformin HCL 500 mg, which is given by the nursing home to lower his blood sugar levels. The main problem that occurs in Mr. S is in the lower extremities.

The client's identity has been assessed, including name, age, gender, and address. The data obtained is as follows: Mr. S will be 86 years old in 2025, which is no longer young and has entered the elderly age group. Factors that greatly influence the increase in the number of elderly people with diabetes mellitus are age, genetic factors, lifestyle, increased BMI, and lack of physical activity (Vira et al., 2023). Data shows that the client has been suffering from diabetes mellitus for 6 years. The client also complains of frequent tingling, numbness, and pain in the feet. Prolonged elevated blood sugar levels (hyperglycemia) can cause macrovascular and microvascular complications in people with diabetes mellitus, such as heart attacks, kidney disease, and nerve disease (Vira et al., 2023).

Nursing Diagnosis

Nursing diagnosis is a clinical decision about an individual, family, or community as a result of actual or potential health problems or life processes. This nursing diagnosis can provide the basis for selecting interventions to be carried out by nurses (Hidayat, 2021). In a theoretical review, the following diagnoses may arise in patients with diabetes mellitus with neuropathic pain:

1. Risk of Skin/Tissue Integrity Impairment (D.0139) due to peripheral neuropathy due to diabetes mellitus
2. Blood Glucose Level Instability (D.0027) due to hyperglycemia (insulin resistance) due to high blood/urine glucose levels
3. Chronic Pain (D.0078) due to nervous system damage due to grimacing and restlessness

The primary nursing diagnosis in this case is chronic pain associated with damage to the nervous system. This diagnosis of chronic pain is based on data obtained from Mr. S, who often complains of tingling, numbness, pain, and occasional cramps in his legs, CRT>3. It is therefore concluded that the diagnosis of chronic pain is associated with damage to the nervous system.

Intervention

Nursing intervention or nursing action plan is a process in problem solving which is an initial decision about what to do, how to do it, when to do it, and who will do all nursing actions (Ridwan, 2024). Nursing interventions aim to provide nurses with the opportunity to formulate action plans aimed at addressing patient problems (Ridwan, 2024). In the diagnosis of chronic pain associated with nervous system damage, the author adopted a nursing plan involving non-pharmacological techniques, namely physical exercise. The physical exercise referred to is diabetic foot exercises.

Implementation

The implementation carried out on Mr. S, who was diagnosed with chronic pain, was physical exercise in the form of diabetic foot exercises using newspapers. There are four treatments for diabetes mellitus, namely diet, exercise (physical exercise/sports), health education, and medication (oral hypoglycemic agents, insulin) (Rosyidah & Cahyono, 2025). One form of physical activity for diabetes mellitus patients is diabetic foot exercises. Diabetic foot exercises are moderate-intensity physical exercises that can be performed by people with diabetes mellitus to improve blood flow and prevent foot injuries. In addition, foot exercises can be used to reduce pain, increase comfort, maintain blood glucose stability, improve blood circulation, and prevent nerve damage in the feet (Vira et al., 2023).

Diabetic foot exercises are moderate-intensity physical exercises. The implementation of diabetic foot exercises has enormous benefits for people with diabetes to prevent complications in the lower extremities. Foot exercises involve easy movements, and the materials used are relatively easy to find. The materials used are newspapers and chairs, and foot exercises do not cause fatigue or require a lot of energy for the elderly (Vira et al., 2023). The movements in diabetic foot exercises aim to improve blood circulation and enhance the process of breaking down glycogen molecules into glucose, which is then distributed to muscle cells without the help of insulin. In addition, diabetic foot exercises also aim to increase muscle sensitivity to insulin. The use of newspapers in diabetic foot exercises increases activity in the toes or fine motor movements in the feet, and this condition increases sensitivity in the feet due to motor system control and improved circulation in the peripheral nerve endings (Oktorina et al., 2022).

Evaluation

Evaluation of client response after performing diabetic foot exercises using newspaper media three times a week showed that clients were able to perform foot exercises with good and correct movements on the

second and third days, although on the first day clients experienced slight difficulties with one of the final movements in the diabetic foot exercises using newspaper media. The client reported difficulty in tearing the newspaper into small pieces due to their toes being unaccustomed to movement, feeling stiff, tingling, and slightly numb. This may be attributed to the prolonged duration of the illness. The client has been living with diabetes mellitus for over five years.

Diabetic foot exercises positively affect other pathological factors associated with peripheral neuropathy. Improved microvascular function and fat oxidation can reduce oxidative stress and increase neurotrophic factors. In addition, foot exercises can improve peripheral perfusion, thereby preventing the worsening of diabetic neuropathy. Foot exercises can reduce the risk and progression of peripheral neuropathy disorders, improve blood flow to the periphery, increase muscle strength, and improve sensory, motor, and autonomic functions. Foot exercises have been proven effective for the treatment of diabetic neuropathy in patients with diabetes mellitus. Foot exercises can also prevent diabetic foot ulcers and help improve blood circulation in the feet (Qurotulnguyun et al., 2023).

After receiving non-pharmacological intervention, the results were obtained, namely foot exercises three times a week for one week, carried out regularly and with the correct steps, with the foot exercises lasting 20 minutes. The client experienced a decrease in pain intensity. The client said that their feet felt more comfortable to move and the pain was better than before. Before the foot exercise intervention, the client always complained of tingling, numbness, and severe pain in their feet. Using a numerical rating scale (NRS) of 0-10 to assess pain, the results showed that the client experienced a reduction in pain to mild pain.

CONCLUSION

The nursing care process was carried out on an 86-year-old client, Mr. S, at the Inahokai Okinawa nursing home. Nursing care was provided three times a week, with assessments beginning on May 6, 2025. The assessment results showed that the client had been suffering from diabetes mellitus for six years. The client often complained of tingling, numbness, occasional cramps, and pain in both legs. Based on the assessment and analysis of the client's data, the nursing diagnosis established according to the SDKI was chronic pain. One intervention that can be done for chronic pain is physical exercise. The physical exercise chosen by the author was diabetic foot exercises using paper. The results of applying foot exercises using paper media three times a week showed that foot exercises can reduce pain intensity in patients with neuropathy due to diabetes mellitus. This was proven by a numerical rating scale assessment, where the client's score before the foot exercises was 5 (moderate pain), and the client's score after the foot exercises was 3 (mild pain). This proves that performing foot exercises using paper media can improve blood flow and reduce pain levels in diabetes mellitus patients.

REFERENCES

- Az Zahra, S. (2022). *Lampiran 1 SOP Senam Kaki Diabetik Definisi*.
- Cambell, N.A., Reece, J.B., & Mitchell, L.G. (2015). *Biologi Edisi Kelima*. Jakarta: Erlangga.
- Dr. Graha, A.S. 2019. *Masase Terapi Penyakit Degeneratif*. Yogyakarta: UNY Press.
- Dr. Prihaningtyas, R.A. 2015. *Hidup Manis Dengan Diabetes*. Yogyakarta: Media Pressindo.
- Dr. Silviani, I. & dr. Sibarani, J.P. 2023. *Komunikasi Kesehatan Pada Pasien Diabetes Melitus Tipe 2*. Surabaya: Scopindo Media Pustaka.

- Dr. Setiawan, M. (2021). *Sistem Endokrin Dan Diabetes Mellitus*. Malang: Universitas Muhammadiyah Malang Press.
- Dr. Gusty, R.P., & Ns. Sariyani, R.E. (2024). *Senam Kaki Meningkatkan Sensasi Kaki Pasien Diabetes Melitus dengan Gagal Ginjal*. Indramayu: Adanu Abimata.
- Dr. Kasmawati, H.,dkk. (2023). *Farmakoterapi Penyakit Diabetes Melitus Tipe 2 Tinjauan Terapi Konvensional Dan Terapi Herbal*. Yogyakarta: Deepublish Digital.
- Dinas Kesehatan Provinsi Jawa Tengah. 2020. Profil Kesehatan Provinsi Jawa Tengah Tahun 2020. Semarang: Dinas Kesehatan Provinsi Jawa Tengah.
- Dr. Pinzon, R,T. (2016). *Pengkajian Nyeri*. Yogyakarta: Betha Grafika Yogyakarta.
- Effendy, F. (2024). *Metode Penelitian Kuantitatif Dan Kualitatif*. Sumatera Barat: Takaza Innovatix Labs.
- Gilad James. (2023). *Pereda Nyeri*. Amerika Serikat: Gilad James Mystery School.
- Hidayat, A.A. (2021). *Proses Keperawatan; Pendekatan NANDA, NIC, NOC dan SDKI*. Surabaya: Health Books Publishing.
- Hesfianto, S. (2018). Case Report: Type 2 Diabetes Mellitus. *Review of Primary Care Practice and Education (Kajian Praktik Dan Pendidikan Layanan Primer)*, 1(2), 45. <https://doi.org/10.22146/rpcpe.33890>
- Kadir, Ayu, R.C.,dkk. (2021). Case Report: Type 2 Diabetes Mellitus Treatmen. *Jurnal Medical Profession*, 3(1), 27.
- Lenggogeni, D.P. (2023). *Buerger Allen Exercise Pada Pasien Diabetes Mellitus Tipe 2*. Bantul: Mitra Edukasi Negeri.
- Misnadiarly. (2016). *Diabetes Mellitus: Gangren, Ulcer, Infeksi. Mengenal Gejala, Menanggulangi, Dan Mencegah Komplikasi*. Jakarta: Pustaka Populer Obor.
- Oktorina, R., Kartika, Y., Wahyuni, A., Fort, U., Bukittinggi, D. K., Studi, P., Ners, P., Kesehatan, F., Muhammadiyah, U., & Barat, S. (2022). Perbandingan Sensitifitas Kaki Antara Senam Kaki Menggunakan Koran Dan Kelereng Pada Pasien Diabetes Melitus Tipe Ii. *Jurnal Endurance*, 6(2), 385–392. <https://doi.org/10.22216/jen.v6i2.380>
- Pradana, L. N., & Pranata, S. (2023). Penerapan Senam Kaki Diabetik Untuk Menurunkan Nyeri Neuropati: Case Study. *Ners Muda*, 4(1), 72. <https://doi.org/10.26714/nm.v4i1.12090>
- Qurotulnguyun, L., Rahmayani, F., & Sutarto, S. (2023). Pengaruh Senam Kaki Diabetik terhadap Neuropati pada Pasien Diabetes Melitus. *Medical Profession Journal of Lampung*, 13(1), 53–58. <https://doi.org/10.53089/medula.v13i1.455>
- Rahmi, A. S., Syafrita, Y., & Susanti, R. (2022). Hubungan Lama Penderita DM Tipe 2 dengan Kejadian Neuropati Diabetik. *Jambi Medical Journal: Jurnal Kedokteran Dan Kesehatan*, 10(1), 20–25.
- Rosyidah, N. N., & Cahyono, E. A. (2025). Diabetes Melitus Tipe 2 ; Artikel Review. *Enfermeria Ciencia*, 3(1), 44–63. <https://doi.org/10.56586/ec.v3i1.74>

- Riset Kesehatan Dasar (RISKESDAS) 2018. Data Penyakit Diabetes Melitus. Hasil Riskesdas Tahun 2018 (Online), <<http://www.depkes.go.id/>>.
- Ridwan, H. (2024). *PROSES KEPERAWATAN*. Purbalingga: Eureka Media Aksara.
- Sidabutar, P. T., Halawa, Y. F., Ziliwu, N., Zandrato, P. D., Rofil, S., Mendrofa, S., Nurhayati, E., Debora, T., & Rahmi, I. M. (2025). *Nyeri Pada Pasien Diabetes Melitus Neuropati Di Rsu Royal Prima Medan 2024*. 9(3), 2702–2707.
- Simamora, F. A., Siregar, H. R., & Hidayah, A. (2020). Pengaruh Senam Kaki Diabetik Terhadap Penurunan Neuropati Pada Penderita Diabetes Melitus Tipe 2. *Education and Development*, 8(4), 431–434.
- Sukma, F. R. (2024). Implementasi Senam Kaki Untuk Melancarkan Peredaran Darah Kaki Pada Pasien Diabetes Melitus Tipe Ii Di Wilayah Kerja Puskesmas Lendah 2. *Karya Tulis Ilmiah*, 8–11. www.smapda-karangmojo.sch.id
- Vira, N. Y., Febriana, D., Program, M., Pendidikan, S., Ners, P., Keperawatan, F., Syiah, U., Keilmuan, B., Gerontik, K., Keperawatan, F., & Syiah, U. (2023). Penerapan Terapi Senam Kaki Diabetes Pada Lansia Dengan Diabetes Melitus : Suatu Studi Kasus. *Studi Kasus JIM Fkep*, VII(1), 75–81.
- Widiasari, K. R., Wijaya, I. M. K., & Suputra, P. A. (2021). Diabetes Melitus Tipe 2: Faktor Risiko, Diagnosis, dan Tatalaksana. *Ganesha Medicine*, 1(2), 114. <https://doi.org/10.23887/gm.v1i2.40006>
- World Health Organization*. 2020. WHO reveals leading causes of death and disability worldwide: 2000-2019. <https://www.who.int/news>.
- Widiyastuti, N.E.,dkk. (2023). *INOVASI & PENGEMBANGAN KARYA TULIS ILMIAH*. Jambi: Sonpedia Publishing Indonesia.