Diabetic foot exercise intervention in family nursing care with ineffective family health management

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Abstract
Family nursing is one of the areas of community nursing services that places the family and its components as the focus of care. Ineffective family health management, can worsen the health status of family members due to suboptimal handling of health problems. Globally 70% of deaths are caused by non-communicable diseases such as cancer, heart disease, stroke, and diabetes. Management of ineffective family health related to diabetes mellitus can be addressed through both pharmacological and non-pharmacological interventions. One form of non-pharmacological intervention is diabetic foot exercise. The goals of diabetic foot exercise are to improve blood circulation, strengthen small muscles, prevent foot deformities, increase the strength of calf and thigh muscles, and overcome joint mobility limitations. This study aims to determine the effectiveness of non-pharmacological therapy, specifically diabetic foot exercise. Data collection was carried out using assessment sheets, interviews, and demonstrations. Leaflets were used as media to assist in the practice of diabetic foot exercises. The results showed a decrease in blood glucose levels after the diabetic foot exercise was performed routinely. This demonstrates that diabetic foot exercise is an effective technique to help reduce blood glucose levels.

Keywords: diabetes; exercise; family; foot; nursing

1. Introduction

Family nursing is one of the areas of community nursing services that places the family and its components as the focus of care. It involves family members in the assessment, planning, intervention, and evaluation processes in a holistic manner by mobilizing available health service resources within the family and those from other healthcare providers in the community (Salamung et al., 2021). One of the key problems in family nursing is ineffective family health management, defined as unsatisfactory patterns of addressing health issues within the family that hinder the recovery of a family member's health condition (SDKI, 2017).

Indonesia is facing a double burden of disease, involving both communicable and non-communicable diseases (NCDs). Globally, 70% of deaths are attributed to NCDs. Mortality caused by NCDs such as cancer, heart disease, stroke, and diabetes is expected to increase by 80% in low- and middle-income countries (Ministry of Health, 2023). Based on population growth projections, by 2030, Indonesia is expected to have 194 million people aged over 20 years. With an assumed prevalence of diabetes mellitus at 14.7% in urban areas and 7.2% in rural areas, this translates to an estimated 28 million people living with diabetes in urban areas and 13.9 million in rural regions (PERKENI, 2019). The 2018 Basic Health Research Report (RISKESDAS), using data from the PERKENI 2015 consensus, estimated the prevalence of diabetes mellitus (DM) at 10.9%. The prevalence of NCDs such as DM in Indonesia varies across provinces (Ministry of Health, 2018). This data indicates a significant burden of DM in the country, which cannot be handled solely by specialists/subspecialists and other healthcare professionals.

DM patients require lifelong management to prevent complications. Lifestyle changes can lead to feelings of despair, making acceptance of the disease a critical component of management. Low acceptance can result in poor disease management (Marlina et al., 2021). Lack of health awareness and knowledge can be a major barrier to adopting healthy behaviors and utilizing healthcare services effectively. Many individuals are unaware of risk factors, disease symptoms, or the benefits of prevention and treatment, all of which influence health outcomes (Chou in Akhriansyah, 2023). Ineffective and prolonged family health management may worsen a family's overall health status due to unresolved health issues.

Management of ineffective family health related to diabetes mellitus can be addressed both pharmacologically and non-pharmacologically. One non-pharmacological approach is diabetes foot

exercise. Diabetes foot exercise is a physical activity involving the movement of foot muscles and joints (Sanjaya et al., 2019). Its goals include improving blood circulation, strengthening small muscles, preventing foot deformities, increasing calf and thigh muscle strength, and enhancing joint flexibility. Physical exercise can lower blood glucose levels by increasing glucose utilization by active muscles (Prihantoro, 2022). Research by Prihantoro (2022) showed that after performing diabetes foot exercises, participants experienced a reduction in blood glucose levels. Similarly, a study by Pasiak (2022) indicated that diabetes foot exercises significantly reduced blood glucose levels in DM patients in Sendangmulyo District.

Based on an assessment conducted on Mr. P's family, it was found that the family exhibited ineffective health management, particularly related to non-compliance with pharmacological therapy, physical activity, and dietary management of DM, as well as a lack of knowledge about the disease process. Therefore, the author chose to explore the issue of ineffective family health management and its non-pharmacological intervention through diabetes foot exercises.

2. Methods

This study aims to evaluate the effectiveness of diabetes foot exercises in reducing blood glucose levels. The subject of the study is Mr. P's family, who presented with ineffective family health management related to diabetes mellitus. The tools used in this research include assessment sheets covering Stage I data collection, such as general family information, physical examination, family history and developmental stage, family structure, function, stress exposure and coping mechanisms, environmental characteristics, and family expectations. Stage II assessment included evaluation of the five family health tasks.

The study involved seven home visits for assessment through to evaluation. Data collection was done through interviews, and diabetes foot exercise demonstrations and practice sessions were carried out to improve family health management in Mr. P's household.

3. Results and Discussion

3.1. Results

Mr. P's family is a nuclear family consisting of Mr. P (31 years old) as the head of the family, and Mrs. G (27 years old), with no children. The family is in the early stage of development. Mr. P works as a private employee. Based on interviews, Mr. P was diagnosed with type II DM and required routine medication and insulin injections. However, he was unwilling to follow treatment due to concerns about potential kidney damage. Mr. P stated he did not feel ill despite having high blood sugar levels and preferred non-pharmacological over pharmacological treatments.

Following the assessment, the diagnosis of Ineffective Family Health Management was established. This diagnosis was supported by clinical findings, causes, and major/minor signs and symptoms, including Mr. P's HbA1c level of 8% and random blood glucose of 415 mg/dL, along with his refusal to take medication or insulin. Ineffective family health management is defined as unsatisfactory patterns of addressing health problems within the family, hindering recovery (SDKI, 2017).

An appropriate intervention is Health Behavior Education, aimed at teaching and facilitating behavior change to support health (SIKI, 2018). This was carried out with Mr. P's family by assessing readiness and ability to receive information, identifying barriers to education, and teaching health maintenance strategies. The chosen strategy was diabetes foot exercise.

Health behavior education using diabetes foot exercise techniques was provided to Mr. P and Mrs. G using leaflet media. The education process included joint demonstrations and practice sessions. Both Mr. P and Mrs. G participated actively and were able to independently perform the exercise. The leaflet served as a guide for Mr. P to continue the exercises at home, and he agreed to practice regularly.

Evaluation over one week showed that Mr. P's family was able to perform the foot exercise twice daily, in the morning and evening. They reported relaxed leg muscles after exercises. On the first day, Mr. P's blood glucose level was 415 mg/dL. After one week, it dropped to 387 mg/dL. This reduction motivated the family to continue the exercise, although Mr. P still refused to take any diabetes medications.

3.2. Discussion

Implementing diabetes foot exercise as a non-pharmacological intervention for ineffective family health management in Mr. P's case, from assessment to evaluation, showed improved compliance with health maintenance. Practicing foot exercises regularly for one week resulted in a measurable reduction in blood glucose levels. These findings align with Trijayanti's (2019) study, which reported significant blood glucose reduction among type 2 DM patients at the Mawar Posyandu, Balerejo Village, with a p-value of 0.000.

Similarly, Prihantoro (2022) reported a decline in blood glucose levels in four respondents following three days of diabetes foot exercise, particularly with a consistent diet. While Mr. P also experienced a reduction in blood glucose levels, the result was less significant due to a lack of dietary regulation.

Pasiak's (2023) study showed that, prior to foot exercise, 75% of respondents had moderate glucose levels (200–300 mg/dL) and one respondent had a high level (>300 mg/dL). After the intervention, 50% had low levels (<200 mg/dL), and the remaining 50% were in the moderate range, confirming the effectiveness of foot exercises in reducing blood glucose.

Diabetes foot exercises, especially when targeting reflexology points related to the pancreas, stimulate insulin production. Enhanced peripheral circulation also reduces peripheral nerve damage, alleviating neuropathy and improving foot sensitivity. Daily physical activity and regular exercise remain fundamental pillars in diabetes management (PERKENI in Trijayanti, 2019). The management of diabetic foot exercise techniques within Mr. P's family has been proven to lower Mr. P's blood sugar levels, thereby increasing the family's motivation to take efforts in maintaining their health status. However, the results have not been optimal, as the implementation of the foot exercise technique has not been supported by a proper Diabetes Mellitus diet and pharmacological therapy.

According to Damayanti in Trijayanti (2019), the steps for performing diabetic foot exercises are as follows:

1. If in a sitting position, the patient should sit upright on a chair with both feet touching the floor. The exercises can also be done in a lying position with the legs extended.
2. With the heels on the floor, stretch the toes of both feet upward, then bend them downward as if gripping, for 10 repetitions. In the lying position, point the toes upward and then bend them downward like a chicken claw, also for 10 repetitions.
3. Place the heel of one foot on the floor, lifting the sole upwards. At the same time, place the toes of the other foot on the floor with the heel lifted. Alternate this movement between both feet for 10 repetitions. In the lying position, move the toes and heels alternately between the left and right feet 10 times.
4. With the heel placed on the floor, lift the front of the foot upward and make circular movements using the ankle joint 10 times. In the lying position, lift the leg straight upward and make the same circular ankle movements 10 times.
5. Place the toes on the floor, lift the heel, and perform circular movements using the ankle joint 10 times. In the lying position, lift the foot slightly to allow for the circular ankle movements, also for 10 repetitions.
6. Straighten and lift one leg, then rotate the foot at the ankle to "write" numbers in the air from 0 to 10. Repeat alternately with both legs. This movement is the same when done in a lying position.
7. Place a sheet of newspaper on the floor. Use both feet to crumple the paper into a ball. Then, use both feet again to unfold the ball back into a flat sheet. This is done once. Afterward, tear the newspaper into two pieces and separate them. Tear one of the pieces into small fragments using both feet. Gather the torn pieces with both feet and place them on the intact sheet. Then, wrap everything into a ball again using both feet.

4. Conclusion

Ineffective family health management is one of the problems in family nursing. It is influenced by various factors such as lack of knowledge or information, denial of illness, complexity of health care systems, treatment programs, conflicts in decision-making, economic difficulties, family conflicts, poor family coping ability, and lack of social support. Ineffective family health management in Mr. P's

family led to a decline in his health status. Continuous uncontrolled health status carries a high risk of progressive complications. As an alternative effort, Mr. P's family chose a non-pharmacological therapy in the form of diabetic foot exercise. The implementation of diabetic foot exercise for one week resulted in a reduction of Mr. P's blood glucose level, an improvement in overall health status, and positive behavioral changes in the family toward maintaining health. Based on the evaluation, it can be concluded that diabetic foot exercise is effective in enhancing family health maintenance efforts.

Recommendations for future research: diabetic foot exercise techniques can be optimized by combining them with proper diabetes dietary management and pharmacological therapy to achieve maximum outcomes.

References

Akhriansyah, M. (2023). *KEPERAWATAN KELUARGA.* Padang: GET PRESS INDONESIA.

Kemenkes RI. (2018). *Hasil Riset Kesehatan Dasar (Riskesdas) 2018.* Jakarta: Badan Penelitian dan Pengembangan Kesehatan Republik Indonesia.

Marlina, S., Rosidin, U., & Pebrianti, S. (2021). Studi literatur: Gambaran penerimaan diri penderita diabetes mellitus tipe II. *Holistik Jurnal Kesehatan*, 117-132.

Pasiak, N., & Arifianto. (2022). Pengaruh Senam Kaki Diabetes Terhadap Penurunan Kadar Glukosa Darah Pada Pasien Diabetes Mellitus Di Sendangmulyo Tembalang. *Jurnal Ners Widya Husada*, 39-52.

PERKENI. (2019). *PEDOMAN PENGELOLAAN DAN PENCEGAHAN DIABETES MELITUS TIPE 2 DEWASA DI INDONESIA.* Jakarta: PB PERKENI.

Prihantoro, W., & Aini, D. N. (2022). Penerapan Senam Kaki Diabetes Terhadap Nilai Kadar Gula Darah Pada Penderita Diabetes Mellitus Di Kel. Krapyak Kec. Semarang. *Jurnal Ilmu dan Teknologi Kesehatan Universitas Widya Husada*, 3(1).

Salamung, N. (2021). *KEPERAWATAN KELUARGA (FAMILY NURSING).* Pamekasan: Duta Media Publising.

Sanjaya, P. B., Yanti, N. P., & Puspita, L. M. (2019). Pengaruh Senam Kaki Diabrtik Terhadap Sensitivitas Kaki Pada Pasien DM Tipe 2. *Community Of Publishing In Nursing (COPING)*, 97-102.

Tim Pokja SDKI DPP PPNI. (2017). *Standar Diagnosa Keperawatan Indonesia: Defenisi dan Indikator Diagnostik (Edisi 1).* Jakarta: DPP PPNI.

Tim Pokja SIKI DPP PPNI. (2018). *Standar Intervensi Keperawatan Indonesia: Definisi dan Tindakan Keperawatan (Edisi 1).* Jakarta: DPP PPNI.

Trijayanti, L. W. (2019). *PENGARUH SENAM KAKI TERHADAP PERUBAHAN KADAR GULA DARAH PADA LANSIA PENDERITA DIABETES MELLITUS TIPE 2 DI POSYANDU MAWAR DESA BALEREJO KECAMATAN KEBONSARI KABUPATEN MADIUN.* Madiun: Sekolah Tinggi Ilmu Kesehatan Bhakti Husada Mulia.