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INDEPENDENT FOOT CARE IMPLEMENTATION FOR PATIENTS WITH TYPE II DIABETES MELLITUS

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ABSTRACT
Food care is a practice for individuals with normal or high blood sugar levels, performed regularly to maintain personal hygiene, especially to kill or inhibit the growth of germs/ bacteria on the skin and other body tissues. Proper food care aims to educate diabetes Mellitus patients about the risk factors for diabetic wounds and reduce the incidence of complications among high-risk patients. Objective to examine and implement independent foot care for patients with type II diabetes mellitus. This study employed a case study design with a single respondent. Data were collected using interview sheets to evaluate the outcomes. The findings indicate that implementing independent foot care is highly effective. According to the researcher's observations, this intervention helps prevent complications such as gangrene. Post-treatment results showed significant improvements: the respondent's feet appeared clean and moisturized, nails were neatly trimmed, calluses were reduced, and overall foot health was enhanced.

Keywords: foot care; independent; type II diabetes mellitus patients

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INTRODUCTION

Indonesia is currently experiencing a shift in disease patterns, marked by increasing rates of morbidity and mortality due to non-communicable diseases (NCDs) such as diabetes mellitus and cardiovascular diseases. These chronic conditions, often characterized by long durations and complex origins, result from a combination of genetic, physiological, environmental, and behavioral factors. While non-communicable diseases are a predominant health concern in industrialized nations, their prevalence is rising rapidly in developing countries undergoing demographic transitions and lifestyle changes. Non-communicable diseases affect individuals across all age groups, regions, and socioeconomic backgrounds. Although often associated with older populations, evidence indicates that 17 million annual deaths occur before the age of 70, with 86% of these premature deaths taking place in low- and middle-income countries. Contributing risk factors include unhealthy diets, physical inactivity, tobacco exposure, alcohol consumption, and harmful environmental pollutants. These risk factors are linked to metabolic conditions such as diabetes mellitus and cardiovascular diseases, which are leading causes of premature mortality. Consequently, effective prevention strategies should focus on controlling these modifiable risk factors as a priority.

Diabetes mellitus (DM) is a metabolic disorder characterized by elevated blood glucose levels (hyperglycemia) due to abnormalities in insulin production, insulin activity, or both. Persistent hyperglycemia in diabetes patients is associated with long-term complications, including dysfunction or failure of multiple organs such as the eyes, kidneys, nerves, heart, and blood vessels (Setiawan, 2021). As an endocrine disorder, diabetes plays a critical role in disrupting essential bodily functions, including stress responses, growth and development, ionic homeostasis, and metabolism. According to

the Indonesian Ministry of Health (2019), diabetes mellitus occurs when the pancreas fails to produce sufficient insulin or when the body cannot effectively use the insulin it produces. The chronic nature of the disease contributes to significant complications, affecting the eyes, kidney function, nerve function, cardiovascular health, and vascular integrity. Addressing these challenges requires a comprehensive approach to prevention, early detection, and management of diabetes to mitigate its impact on public health.

Diabetes mellitus is often referred to as a "silent killer" because it progresses slowly and can lead to fatal complications if left untreated. Many individuals are unaware that they have diabetes until significant symptoms or complications arise (Eva, 2019). Diabetes encompasses a group of metabolic disorders characterized by hyperglycemia due to abnormalities in insulin secretion, insulin action, or both. These abnormalities result from either insufficient production of the insulin hormone or the body's inability to use insulin effectively (IDF, 2021). Diabetes mellitus is classified into four categories: type I diabetes mellitus, type II diabetes mellitus, gestational diabetes, and other specific types (Perkeni, 2021). Of these, type II diabetes mellitus accounts for approximately 90% of all cases and is primarily characterized by decreased insulin sensitivity and secretion (Eva, 2019). Genetic predisposition and environmental factors play significant roles in the development of type II diabetes, with additional risk factors including obesity, diets high in fat and low in fibre, and physical inactivity. The pathophysiology of type II diabetes mellitus stems from insulin resistance, where target cells fail to respond to insulin effectively, leading to excessive glucose production (Nabyl, 2019). Type II diabetes mellitus has emerged as a global public health concern due to its increasing prevalence in both developed and developing countries, including Indonesia. This condition has reached epidemic proportions, causing substantial individual suffering and significant economic losses (Eva, 2019).

According to the World Health Organization (WHO), approximately 422 million people worldwide are living with diabetes mellitus. WHO has identified diabetes as one of the top 10 causes of death globally as of 2022. The International Diabetes Federation (IDF, 2021) ranks Indonesia as the seventh-highest country for diabetes prevalence, with an estimated 10.7 million adults aged 20–79 years affected. Similarly, the Indonesian Ministry of Health (2020) reported that Indonesia is among the top 10 countries with the highest diabetes prevalence, with 1.5 million deaths attributed to diabetes in 2015. Historical data from the IDF Atlas (2015) revealed that 415 million adults were living with diabetes globally, a dramatic increase from 108 million in the 1980s. Projections indicate that by 2040, this number could rise to 642 million, underscoring the urgent need for preventive and management strategies to address this growing epidemic.

According to the International Diabetes Federation (IDF), Indonesia ranked fifth globally for the highest number of diabetes cases in 2021, with 19.5 million sufferers. This number is projected to rise to 28.6 million by 2045. Diabetes mellitus is categorized into several types, including type I diabetes, which is insulin-dependent and affects approximately 5–10% of all diabetes patients. Meanwhile, type II diabetes mellitus, which is non-insulin-dependent, accounts for 90–95% of cases. Poorly controlled diabetes mellitus can lead to serious complications, significantly increasing the burden of disease both at cellular and anatomical levels (Sujati, Erlika, & Akbar, 2022). The prevalence of gangrene among diabetes patients remains significant. In the United States, 15–20% of type II diabetes mellitus patients develop gangrene. In Indonesia, approximately 15% of diabetic patients experience gangrene, and the risk of amputation is 15–46% higher in diabetics than in non-diabetics. Hospitalization for diabetes-related complications accounts for 80% of type II diabetes mellitus admissions, with an amputation rate of 30%, a mortality rate of 32%, and a high prevalence of diabetic wounds (Ministry of Health, 2020).

In East Nusa Tenggara Province, the health profile data from 2019 recorded 4,535 diabetes mellitus cases. In Sikka District, the number of patients has steadily increased over the years: 1,171 cases in 2019, 1,350 in 2020, 1,529 in 2021, and 1,654 in 2022. However, there was a decrease to 1,070 cases in 2023. Data from BLUD RSUD dr. Tc Hillers Maumere shows a similar trend, with 452 cases in 2019, decreasing to 425 in 2020 and 230 in 2021 before rising to 412 in 2022 and slightly decreasing to 405 in 2023. In the working area of the Kopeta Community Health Center, 146 diabetes mellitus

cases were reported in 2023, decreasing to 38 cases by May 2024. Despite some fluctuations, diabetes prevalence in Sikka District remains a significant health concern, with patients at high risk for complications.

One major complication of type II diabetes mellitus is gangrene, a condition characterized by tissue death due to ischemic necrosis, caused by blocked blood vessels. This blockage often results from peripheral vascular disease, a long-term complication of diabetes. Gangrene is associated with sensory nerve damage in the lower extremities, leading to undetected minor traumas or infections that progress to tissue necrosis. Chronic gangrene wounds are a common complication in type II diabetes mellitus patients, who have a 29 times higher risk of developing gangrene compared to non-diabetic individuals. Gangrene wounds in the feet can expand and take an extended time to heal due to persistent infections. Elevated blood sugar levels provide a favorable environment for bacterial growth, exacerbating the infection. Without prompt and effective treatment, these infections can lead to severe gangrene (Nabila et al., 2021).

Individuals with diabetes mellitus, particularly those with type II diabetes, are at a significant risk of developing foot wounds. These wounds are often chronic and challenging to heal due to the heightened susceptibility to infections associated with elevated blood glucose levels. High glucose concentrations provide an ideal environment for bacterial growth, exacerbating the risk of infection. One essential preventive measure against diabetic foot complications is proper foot care. Preventive practices include washing the feet thoroughly, drying them carefully (ensuring that spaces between the toes remain dry), trimming toenails, and inspecting the feet daily for signs of redness, blisters, fissures, calluses, or ulcerations. Additionally, foot exercises play a critical role in maintaining foot health (American Diabetes Association, 2021). For type II diabetes sufferers, understanding proper foot care techniques is essential to prevent complications such as gangrenous ulcers or even amputation. Education is critical in shaping an individual's attitudes and actions toward regular and effective foot care. Evidence suggests that consistent foot care can reduce diabetic foot disease by up to 50%, significantly improving the quality of life for those affected (Akbar, 2019). Proper diabetic foot examination and care should be routine for individuals at risk of type II diabetes mellitus as a proactive approach to preventing gangrene or diabetic ulcers (Pourkazemi et al., 2020). The financial implications of amputation due to diabetes-related complications are considerable, often requiring tens of millions of rupiahs. Therefore, regular foot care by both healthcare professionals and patients is a cost-effective strategy to prevent infections and other complications that could lead to amputation.

Foot care involves routine actions to maintain personal hygiene, particularly for the feet, and is crucial for both individuals with normal and elevated blood sugar levels. It includes measures aimed at preventing infections and inhibiting bacterial growth on the skin and underlying tissues. The primary goal of foot care is to enhance the knowledge of diabetes sufferers about the risk factors for diabetic wounds and reduce the incidence of complications. Education about foot care has proven effective in preventing diabetic ulcers by improving diabetic neuropathy status, vascular health, skin integrity, and wound healing capacity. Healthcare professionals play a vital role in educating diabetes mellitus patients about foot care and specific foot exercises. These preventive measures are critical to reducing the risk of complications and improving overall foot health (Prasetya et al., 2021).

Properly executed foot care significantly enhances the healing process for individuals with diabetes mellitus. Nurses play a crucial role in managing diabetes patients by developing preventive plans to mitigate the risk of complications. These plans typically include daily foot inspections, maintaining proper foot moisture levels, using appropriate footwear, and engaging in foot exercises. Foot care is particularly vital for preventing complications in diabetes patients and should be consistently practiced not only in hospital settings but also at home. Home-based foot care ensures that patients can maintain their foot health and minimize the risk of severe complications. Effective foot care for diabetes mellitus patients is primarily aimed at reducing risks associated with poor blood circulation to the feet and nails. Regular maintenance of the feet and nails is essential to prevent infections, foul odors, and soft tissue injuries. Through proper care, patients can significantly lower their risk of developing foot ulcers and other complications. The process involves routine cleaning, moisturizing, inspecting for

injuries or signs of infection, and trimming nails correctly to ensure overall foot health. This research focuses on type II diabetes mellitus patients in Madawat Village, East Nusa Tenggara. It employs a case study approach, conducting foot care procedures directly in the respondents' homes to prevent complications. Recognizing the causes and impacts of inadequate foot care among diabetes mellitus patients, this study investigates the "Implementation of Independent Foot Care in Patients with Type II Diabetes Mellitus in Madawat Village, Alok District, Sikka Regency, Flores, East Nusa Tenggara."

METHOD

Case study research involves a detailed exploration of a nursing issue within defined boundaries, employing in-depth data collection from various sources. This approach is constrained by time and location, focusing on events, activities, or individuals (Kartika & Handajany, 2021). This case study aims to provide a clear understanding of the implementation of independent foot care among patients with type II diabetes mellitus.

RESULT

This study gathered data from the Kopeta Health Center in Sikka Regency and conducted direct research at the subject's residence.The subject lives in Madawat Village, Alok District, Sikka Regency, specifically in the Old Religious Court Hallway at RT 006 RW 008. The residence is directly opposite the ASP Paud building, near the entrance to the Old Religious Court office. The area is characterized by flat terrain and low-lying land.

Table 1.
Respondent characteristics

Name	Age	Date/Place of Birth	Address	Family Status
Mr. A.J.B	62 years	Alor, August 28, 1962	Jalan Wairklau, Pengadilan Alley, RT 006 RW 008, Madawat Village, Alok District, Sikka Regency.	Mr. A.J.B is a husband and has one child and two nieces/nephews. His highest level of education is a Bachelor's degree, and he worked as a civil servant (PNS) before retiring four years ago. Mr. A.J.B's family is Catholic.

Table 2.
Respondent's Blood Sugar Levels Over the Last 3 Months

Month	Blood Sugar Levels
April	186 mg/ dL
May	173 mg/dL
June	178 mg/ dL

DISCUSSION

Implementation of Foot Care

In this study, researchers performed foot care on Mr. A.J.B, a type II diabetes mellitus patient with the following foot conditions before treatment: dry feet, not moist, calluses, short and long nails, cracked skin, toes other than the big toe are difficult to move and the soles of the feet feel numb, not wearing socks or footwear. The foot conditions found are in line with the theory according to Sihombing, Dhora et al. (2012), where the foot conditions of type II diabetes mellitus patients will look dry, not moist, dry skin, calluses, long toenails. These conditions are indicators for foot care. Foot care is preventive in nature which includes washing feet properly, cutting toenails, and doing foot exercises. Foot inspection should be done every day for symptoms of redness, blisters, calluses, or ulceration.

Washing feet

Washing feet is an action taken to maintain the cleanliness and health of the skin of the feet (PPNI, 2021). In the actions taken for this foot care, there are materials that are not in accordance with or different from the SOP, but their use is the same according to the SOP. taking action there are differences in the SOP. Preparation of materials in the SOP according to PPNI (2021) consists of a foot care set (nail clippers, foot brush, foot sandpaper, large gauze), clean gloves, clean water, liquid soap, skin moisturizer, towels, masks, plastic aprons, 4% clohexidine, underlay, scalpel
(if necessary). However, in its implementation, the researcher did not have 4% clohexidine but replaced it with bar soap. The researcher also cleaned or cut the rough and thick skin of the feet and after washing it was dried with a towel and smeared with lotion (Marina Avokado) which functions to moisturize the skin. After washing the feet, Mr. A.J.B said that the feet felt lighter with inspection of clean feet, moist skin and cracked skin began to decrease

Cutting Toenails

Cutting nails is an action taken to prevent complications of diabetes mellitus such as gangrene. (Ns. Agus Santosa. 2019). The purpose of cutting nails is to maintain nail health and prevent wounds or infections due to scratching from the nails. In the action taken to cut toenails, the researcher took action in accordance with the SOP from Ns Agus Santosa (2019). Before cutting nails, the researcher observed the respondent's nails which looked hard and abnormal as usual and the condition of the nails that were long and short, so before cutting the respondent's toenails, they were soaked in slightly warm water for 10 minutes. After that, the researcher cut the long nails, namely the nails of the index finger, ring finger and little finger on the right foot and the nails of the index finger and middle finger on the left foot. Cutting nails is not in the same direction as the toenails because the condition of the nails is irregular. After cutting nails, Mr. A.J.B said the nails were short, with inspection the nails looked short and clean.

Foot Exercise

Foot exercise is an activity carried out by patients with diabetes mellitus to prevent wounds and help smooth blood circulation in the legs (Ns.Agus Santosa, 2019). The purpose of foot exercise is to smooth blood circulation, strengthen small muscles, and prevent foot deformities. In the actions taken for this foot exercise, the researcher took action in accordance with the SOP in Ns Agus Santosa (2019). The researcher took action starting by asking the respondent to sit up straight, then asking the respondent to lift the left and right legs alternately, rotating clockwise, lifting both feet with the heels on the floor, moving the toes apart, and lifting the heels. The action was carried out for 20 minutes, in carrying out the action the Respondent (Mr. A.J.B) sometimes complained of fatigue so that the action was carried out slowly. After the foot treatment, Mr. A.J.B said that the feet were not stiff and not numb, with inspection the feet were easy to move in the soles of the feet and toes. This foot care action was carried out for 3 days with the same procedure as this treatment action, the researcher wanted to know the effectiveness of foot care. After carrying out foot care for approximately 3 days, the condition of the respondents' feet was found to be: moist, clean feet, short and even toenails, cracked skin had decreased, calluses were starting to thin, the soles of the feet began to feel up to the back of the foot, the toes could be moved except for the ring and little toes which could not be moved and still could not be felt. These results are in line with research conducted by Rasyid, Yulanda, & Fauzan (2020) which revealed that carrying out routine and continuous foot care such as examining the feet, washing the feet with soap, cutting nails, drying between the toes, wearing appropriate footwear or soaking the feet in warm water can improve blood circulation in the feet so that nutrients can flow to the

peripheral area and encourage the peripheral nerves of the feet to be more sensitive, the symptoms of peripheral neutropenia that are complained of will decrease and can prevent further complications from diabetes mellitus. This condition is very different from the condition found before treatment where the feet were dry, dirty, thick calluses, short nails, cracked skin, numb soles and toes of the index and little fingers.

From the results of the study according to Anggraini Dwi Kurnia, et al. (2022) foot care is effective in reducing symptoms of gangrene complications. This foot care consists of bathing the feet every day with mild soap, using a soft brush to clean the nails, drying the feet with attention. especially between the toes, using oil or lotion to avoid dryness, wearing socks that absorb sweat. This regular foot care can also be a good preventive effort in preventing further complications in people with diabetes mellitus. As for the pictures or photos, evidence that before and after treatment. By seeing the changes in the condition of the feet, it can be concluded that foot care is very effective, although the long-term effects cannot be seen, namely no gangrene complications, but with moist feet, not dirty, nails not long, skin not cracked, reduced calluses, soles of the feet and toes starting to feel this will help prevent complications.

CONCLUSION

Based on the findings, the respondent exhibited characteristics such as being a 62-year-old male, holding a bachelor's degree, and previously working as a civil servant. Before the implementation of foot care procedures, the respondent's feet exhibited various conditions indicative of neglect, including dryness, dirt accumulation, cracked skin, long and uneven nails, calluses, numbness in the soles, and diminished sensation in the toes (except for the big toes). Despite these conditions, the respondent was still able to walk. Foot care was introduced as a non-pharmacological intervention utilizing simple yet effective techniques, such as proper foot washing, toenail trimming, and foot exercises. When performed daily, these practices proved beneficial in preventing the development of gangrene and other complications. After a three-day foot care regimen, the respondent's feet showed noticeable improvements, including cleanliness, moisture retention, reduced dryness, trimmed nails, and a gradual decrease in calluses. Additionally, the soles and toes regained some sensation. This case study demonstrated that foot care practices are highly effective in preventing complications. Although the long-term effects were not fully observed during the study period, the immediate improvements, such as clean, moist feet, reduced skin cracks, and increased sensation—suggest the potential to significantly mitigate future complications associated with diabetes mellitus.

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