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Case Study

Application of Foot Exercises in Diabetes Mellitus Clients with Blood Glucose Levels Instability: A Case Study

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Abstract

Diabetes is a metabolic disorder caused by a lack of the hormone insulin in a person's body. Lack of the hormone insulin in a person's body. Lack of the insulin hormone causes the sugar (glucose) consumed by the body to be imperfect. This situation causes the patient to experience hyperglycemia or excess blood sugar. In diabetes, the condition of excessive blood sugar levels can result in long-term damage, dysfunction and failure of various organs, especially feces, kidneys, nerves, heart and blood vessels. This study aims to determine blood glucose levels before and after the application of foot exercises. With the method of writing in this study using data collection methods, with 2 clients affected by Diabetes Mellitus. The tool used to measure blood glucose is using a glucometer. The results showed that management to overcome instability of blood glucose levels in clients with diabetes mellitus can be done by applying foot exercise techniques. From this study it can be concluded that there are changes in blood glucose in diabetes mellitus clients before and after implementing foot exercises. The application of diabetic foot exercises can be used to improve blood circulation in the legs and prevent swelling and injuries to the feet. Further researchers are advised to increase the number of respondents so that they can reduce blood glucose levels more from this study

Keywords: Diabetes mellitus, blood glucose levels, foot exercise

INTRODUCTION

Diabetes caused 1.5 million deaths in 2012. Blood sugars higher than the maximum result in an additional 2.2 million deaths, increasing the risk of cardiovascular and other diseases. Forty-three percent (43%) of these 3.7 million deaths occurred before the age of 70. The percentage of deaths due to diabetes occurring before the age of 70 is higher in low-income and preventative countries than in high-income countries.[1–3]

The National Basic Health Research in 2018 reported that cases of Diabetes Mellitus had increased from 6.9% to 8.5%. Data from the South Sumatra Provincial Health Office stated that the number of people with diabetes in South Sumatra in 2013 reached 21.418 people and continued to increase where in 2018 it was reached 49.432 people.[4] With the prevalence of Diabetes Mellitus of 6.7% in the population aged > 15 years, the estimation of people with Diabetes Mellitus in Ogan Komering Ulu Regency is 17,326 people (male 8.861 people and female 8.465 people). The number of people with Diabetes Mellitus who received services according to standards was 1.728 (10%) consisting of 705 men (8%) and 1.023 women (12%).

Diabetes mellitus is a metabolic disorder disease caused by a lack of the hormone insulin in a person's body. The lack of insulin causes the sugar (glucose) consumed by the body cannot be perfect. This situation causes the patient to experience hyperglycemia or excess blood sugar. In diabetes, the condition of excessive blood sugar levels can lead to long-term damage, dysfunction and failure of various organs, especially feces, kidneys, nerves, heart, and blood vessels.[5–7]

Starches (carbohydrates) in the diet are broken down by the digestive system into glucose which is released into the bloodstream. When glucose levels rise, the pancreas secretes a hormone called insulin that allows the body's cells to absorb glucose to use as a source of energy. Glucose that is not needed immediately, is stored in the liver as fat and can be released when needed, for example used as muscle fuel during exercise, or when not eating for a long time.[8,9]

Diabetes Mellitus is called the silent killer because this disease can affect all organs of the body and cause various kinds of complaints. Diseases that will be caused include impaired eye vision, cataracts, heart disease, kidney disease, sexual impotence, wounds that are difficult to heal and rot/gangrene, infections lungs, blood vessel disorders, stroke etc.[5,10]

Efforts to overcome diabetes mellitus can be done with non-pharmacological techniques, namely, the application of foot exercises to reduce blood glucose instability. Diabetic foot gymnastics is an activity by doing exercises on the feet of people with diabetes mellitus which is useful for improving blood circulation in the legs and preventing swelling and sores on the feet. Physical exercise can be done at any time according to the condition of people with diabetes mellitus, because this exercise is carried out in a sitting position and relaxed state.[11]

Diabetic foot exercises can also increase the strength of the calf muscles and thigh muscles and can also maintain normal joint movement. Actively moving muscles will affect changes in blood

glucose levels, namely actively moving muscles can increase contraction so that the permeability of cell membranes to glucose breakdown.[12,13]

Based on the observations of the Tanjung Agung Health Center, generally clients with Diabetes Mellitus, then from the data above carry out "the application of foot exercises on diabetes mellitus clients with unstable blood glucose levels at the Tanjung Agung Health Center, Baturaja Barat District, Ogan Komering Ulu Regency in 2021.

CASE REPORT

The case study was carried out on April 14-16, 2021 for client 1, on April 19-21 2021 an assessment was carried out on client 2 and this assessment was carried out with 3 visits. This study was conducted on both clients with the same case problem, namely diabetes mellitus.

There are data obtained from the study of the first client in Mr.B case, namely a 66-year-old client and a retiree. Has complaints: tired, lethargic, dizzy, often sleepy, his legs feel tingling and sometimes feel numb. On vital sign examination there is blood pressure: 120/80 mmHg, temperature: 36.5°C, pulse: 80x/m, breathing: 20x/m and weight: 62 kg and when checking blood sugar on Mr.B the client's blood sugar is obtained on day one: 273 mg/dL. Based on the results of the assessment conducted on Mr. B starting on April 14, 2021, the researcher can formulate and conclude that the nursing diagnosis that appears on the client is instability of blood glucose levels related to pancreatic dysfunction (D.0027) (IDHS, 2017)

The second client, Mrs. S is 58 years old, a housewife, the client's complaints are: easy to feel tired, lethargic, dizzy, often sleepy, her legs feel tingling and sometimes feel numb. On vital sign examination, the client's blood pressure is: 120/70 mmHg, temperature: 37.0°C, pulse: 82x/m, breathing: 20x/m, and client's weight: 56 kg. And checking blood sugar on Mrs.S before applying on the first day: 286 mg/dL. Based on the results of the assessment conducted on Mrs. S starting on April 19, 2021, the researcher can formulate and conclude that the nursing diagnosis that appears on the client is the instability of blood glucose levels associated with pancreatic dysfunction (D.0027) (IDHS, 2017)

Based on the nursing problems experienced by client 1 (Mr. B) and client 2 (Mrs. S) with a diagnosis of unstable blood glucose levels related to pancreatic dysfunction. So researchers can develop a nursing plan, namely by teaching the application of diabetes mellitus foot exercises which function to lower blood glucose levels. In planning nursing actions, clients are guided by the existing theory that this theory can increase the strength of the calf and thigh muscles and can also maintain normal joint movement. Actively moving muscles will affect changes in blood sugar levels, namely actively moving muscles can increase contraction so that the permeability of cell membranes to glucose breakdown (Kurniasari, Nurachman, & Gayatri, 2008).

The implementation of nursing actions must be in accordance with the nursing action plan that has been established. Nursing actions are carried out with 3 visits to the client's home, starting on April 14-16, 2021.

The implementation that was carried out in case 1 and case 2 was Mr. B and Mrs. S by educating foot gymnastics by teaching non-pharmacological techniques, namely by applying foot exercises that function to lower blood glucose levels. First, we carry out vital signs and provide education or health education about Diabetes Mellitus and teach and monitor clients independently.

DISCUSION

This evaluation process is found in client 1, namely Mr. B and client 2, namely Mrs. S by doing a vital sign, before implementing the blood sugar check first to see if there is a change in blood sugar after the application. It can be seen from the results of the study, after doing diabetic foot exercises for 3 days starting on April 14-16, 2021 with a frequency of 1 time a day for approximately 30 minutes. There was a decrease in blood glucose in the case of client 1 and client case 2, namely pretest and posttest measurements, it was found that before the application of the foot exercise the client's blood sugar could reach 200≥ and after the application, the client's blood sugar could decrease below 200≥. So it can be concluded that there is an effective application of diabetes mellitus foot exercise which is useful for stabilizing blood glucose levels.

According to Wahyuni, concluded that the application of foot exercises was very effective in reducing blood glucose levels seen from the normal number of respondents as many as 7 (46.7%). Meanwhile, after diabetic foot exercise the number of respondents normally increased to 11 (73.3%) respondents. The purpose of this study was to identify the effect of foot exercise therapy to reduce blood glucose levels.[14]

According to Katuk et al, most of the respondents aged 51-60 years are female, with diabetes mellitus for approximately 5 years and no history of smoking. Before doing or being given diabetic foot exercises, most patients with diabetes mellitus have an ankle bronchial index value of mild anterial disorders. After doing or being given diabetic foot exercises, the Ankle Bronchial Index value changes significantly with the Ankle Bronchial Index value increasing to normal. There is a significant effect on the value of the Ankle Bronchial Index before and after being given diabetic foot exercises.[15] Research Hardika of results that have been carried out can be concluded that diabetic foot exercises can significantly reduce blood sugar levels, diabetes patients should do diabetes foot exercises regularly to control their blood sugar levels.[16]

Bronchial pressure did not show a significant difference in diabetic patients who only did 1-3 leg exercises a week. Leg exercise in Diabetes Mellitus clients can significantly reduce blood sugar levels since the first treatment. People with Diabetes Mellitus should do regular foot exercises so that blood sugar levels and Bronchial Index pressure can be stable so that complications do not occur, either ulcers or hyperglycemia.[17]

CONCLUSION

After conducting an assessment and application to Mr. B and Mrs. S with problems with diabetic clients, case data was obtained from client 1, namely Mr. B. Blood glucose before applying foot exercises was: 215 mg/dL and after the application of foot exercises, namely: 194 mg/dL. And in the second case, namely Mrs. S blood glucose before the application was: 211 mg/dL and after the application was: 183 mg/dL. Then the foot exercise intervention was given for 3 days regularly from April 14-16, 2021 with a frequency of 1 time a day for approximately 30 minutes for 3 visits and there was a decrease in blood glucose in case 1 and case 2. The application of foot exercises for diabetic clients to stabilize blood glucose levels, because there is a significant difference before and after implementing diabetes foot exercises. Besides being effective in lowering blood glucose levels, leg exercises can prevent obesity and help overcome complications (blood lipid disorders or fat deposition in the blood, increased blood pressure, hyper blood coagulation or blood clots).

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CONFLICT OF INTEREST

The author declared that don't have conflict of interest.

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