

The Effect of Foot Exercise Therapy on Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus

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ABSTRACT

Diabetic foot exercise aims to improve blood circulation, strengthen muscles, prevent deformities, and overcome joint motion limitations. After doing foot exercise therapy, it can be seen changes in the patient's blood sugar levels, whether blood sugar levels return to normal and can be overcome. Purpose: This research was conducted in the form of a literature review. Methode: This research method is library research, which is a series of studies related to the method of collecting library data or researching and using library information (scientific journals) for the object of research.. Result : This study has found 10 research articles based on the following journal databases, namely Researchgate, Google Scholar, Scinences Direct that there is an effect of foot exercise therapy on reducing blood sugar levels in patients with type 2 diabetes mellitus. Conclusion: From 10 research journals, it was concluded that 10 journals reported the effect of giving foot exercise therapy on reducing blood sugar levels in Type 2.

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action, or both. Diabetes is a serious chronic disease that occurs when the pancreas does not produce enough insulin (a hormone that regulates blood sugar or glucose), or when the body cannot effectively use the insulin it produces. The incidence of diabetes

mellitus sufferers in 2015 worldwide reached 415 million people, and it is estimated that by 2040 the number of diabetes mellitus sufferers will be 642 million people. According to the International Diabetic Federation (IDF), diabetes mellitus sufferers in Indonesia rank 7th worldwide with 8.5 million people and 6th for cases of death before the age of 70

years due to diabetes mellitus (Abidin et al., 2021).

There are 4 (four) pillars of Diabetes Mellitus management, namely: education, medical nutrition therapy, physical exercise, and pharmacological therapy. There are 3 (three) ways to manage Diabetes Mellitus, namely: managing food, exercise, and medication. In addition to medical therapy, currently complementary therapies have been developed to help overcome patient health problems. Complementary therapy is therapy that is complementary to medical therapy and has proven benefits (Widiasari et al., 2021).

One of the complementary therapies that is also recommended to be carried out routinely by patients with Diabetes Mellitus is diabetic foot exercise. efforts to do foot exercises that aim to improve blood flow in the legs so that it is hoped that the nutrients in the tissues will run more smoothly, strengthen the calf and sole muscles so that when walking they become more stable, increase joint flexibility so that the feet avoid the risk of stiff joints, and maintain nerve function (Hardika, 2018).

METHOD

This research is research using the literature study method or literature review of 10 journals or articles that researchers took with a period of the last 5 years, both national and international journals obtained from previous research.

Diabetic foot exercises are carried out to improve blood circulation, strengthen small muscles, prevent foot deformities, increase the strength of the calf and thigh muscles, and overcome limitations in joint movement. The sensitivity of contracting muscle cells to insulin will increase so that high levels of blood glucose in the blood vessels can be used by muscle cells as energy. Decreasing blood glucose levels will also reduce the accumulation of glucose, sorbitol, and fructose in nerve cells. This will improve circulation and nerve cell function or increase the sensitivity of the foot nerves and reduce the risk of/prevent the occurrence of diabetic foot ulcers (Wibisana & Sofiani, 2017).

The advantage of this foot exercise therapy is that it can be done at any time, by anyone, and does not have a negative impact on sufferers. Apart from the description above that has been described, research related to foot exercise therapy has also been widely carried out and supported by previous research journals that have been widely published so that this research can be carried out using the Literature Review method (Mughtar & Dingin, 2018).

Table 1. Inclusion and exclusion criteria

Kriteria	Inkulusi	Ekklusi
Jangka waktu	2017-2021	Tidak 2017-2021
Bahasa	Bahasa Indonesia dan Bahasa Inggris	Selain Bahasa Indonesia dan Bahasa Inggris
Subyek	Pasient DM Tipe	Selain Pasien DM
Jenis Jurnal	Original penelitian (bukan review penelitian)	Bukan jurnal original penelitian
Tema isi jurnal	Pengaruh Senam kaki terhadap penurunan kadar gul darah pada DM	Bukan pengaruh Senam kaki terhadap penurunan kadar gul darah pada DM

RESULTS AND DISCUSSION

Table 2. Results

No	Author/year	Journal name, volume, number	Journal Title	Methods (Design, Sample, Variables, Instruments, Analysis)	Results
1	Wibisana, E., & Sofiani, Y. (2017)	JKFT Journal: University Muhammadiyah Tangerang Vol. 2, July-December, 2017 : 107-114 ISSN : 2502-0552	The Effect of Foot Exercise on Blood Sugar Levels of Diabetes Mellitus Patients at Serang General Hospital, Bantengg Province	D : Quasi experimental one group pretest-posttest S : 22 respondents V : changes in blood sugar levels I : observation of foot exercises, a tool for assessing blood sugar levels, namely a glucometer. A: Paired t-test	<i>P-Value</i> 0,001 < (0,05) (There is influence)
2	Hardika, B. D. (2018)	MEDICINES:Journal Health Sciences, 16 No. 2	Reducing Blood Sugar in Type II Diabetes Mellitus Patients Through Diabetes Leg Exercises	D : using a pre-experimental quantitative method with a one group pretest posttest approach. S : 30 respondents V : blood sugar levels, diabetes foot exercise. I : measuring blood sugar (glucometer). A : Paired t-test.	<i>P-Value</i> 0,01 < (0,05) (There is influence)
3	(Mughtar & Dingin, 2018)	IJECA(International Journal of Education and Curriculum Application) vol. 1, No. 1, April 2018, PP. 1-6	The Influence of Diabetic Foot Exercise on Sugar Levels In Type 2 Diabetes Mellitus Patients at Tanjung Buntung Public Health Center	D : quasi eksperimen dengan metode penelitian pretest dan posttest S : 20 responden V : diabetes mellitus, sugar level, diabetic foot exercise I : measurement of blood sugar levels A : Paired t-test.	<i>P-Value</i> 0,001 < (0,05) (There is influence)
4	Nuraeni, N., & Arjita, I. P. D. (2019)	Jurnal Kedokteran: Fakultas Kedokteran Universitas Islam Al-Azhar Vol. 3 No. 2 tahun 2019 :	The Effect of Diabetic Foot Exercises on Decreasing Blood Sugar Levels in Sufferers DiabetessMellitus Type II	D : pre-experimental with a pre test-post test design approach S : 26 respondent	<i>P-Value</i> 0,000 < (0,05) (There is influence)

		618-627 ISSN 2620-5890		V: leg exercise, blood sugar levels I : interviews, observations A : one sample t-test	
5	(Fadlilah et al., 2019)	Belitung Nursing Journal, Volume 5, Issue 6, November - December 2019, ISSN: 2477-4073	Effectiveness of Diabetic Foot Exercise Using Sponge and Newspaper on Foot Sensitivity in Patients with Diabetes Mellitus	D : quasi- experimental study with pretest posttest with a control group research design V : foot exercise, foot sensitivity S : 108 responden I : monofilament test, sponge, newspaper A : Wilcoxon Test	<i>P-Value</i> 0,000 < (0,05) (There is influence)
6	(Mustikawati et al., 2020)	Journal of Nursing Care (JNC)- Volume 3, February 2020	Effect of the Exercise on the Blood Sugar Levels in Diabetes Mellitus Patients	D : quasi experimental applying the non equivalent control group V : exercise diabetic, blood glucose levels S : 68, intervention group 34, and control 34 I : GDS measurement, observation A : paired t test	<i>P-Value</i> 0,001 < (0,05) (There is influence)
7	(Halajur, 2021)	International Journal of Science, Technology & Management 2(1), ISSN: 2722- 4015, 2021	The Influence Of Gymnastics Diabetic Foot to Decrease Blood Sugar Levels In Patients With Type 2 Diabetes Mellitus	D : preexperimental design, the design of the study one group pre post test design V : diabetic foot gymnastics, blood glucose levels S : 30 I : data retrieval using questionnaire, observation A : wilcoxon test	<i>P-Value</i> 0,00 < (0,05) (There is influence)
8	(Yulianti & Januari, 2021)	Jurnal Lentera Volume 4, nomor 2, Desember 2021	The Effect of Leg Exercises for Diabetes Mellitus on Blood Sugar Levels Type 2 DM sufferers in the Ciemass Community Health Center working area	D : quasi experiment yaitu pretest- posttest S : 18 respondent V : diabetic foot exercises, blood sugar levels I : SOP, Glucotest tool A : paired t-test	<i>P-Value</i> 0,000 < (0,05) (There is influence)

9	Nurhayati, N. (2022)	Journal of Drug Delivery & Therapeutics. 2022 ; 12(2-s) : 58-62, ISSN : 2250-1177	The Effect of Foot Exercise on Daily Activities and Blood Sugar Levels of Elderly in South Bangka, Indonesia	D :quasi - experimental one-group pre posttest design S : 30 responden V : ALD, Blood sugar level I : Instrumental Activities of Daily Living (IADL), kuisisioner, observasi A : Paired T-Test	<i>P-Value</i> 0,000 < (0,05) (There is influence)
10	(Parellangi et al., 2022)	Health Notions, volume 6 number 2 (February 2022)	Endurance Diabetes Foot Exercise Based on Family Centered Care (EDFE BFCC) to Reduce Blood Sugar Levels Patient Diabetes Mellitus Type 2	D : pre experimental research design with pre post research design without control group S : 13 responden V : diabetes foot exercise, eudurance, family centerecare, diabetes mellitus type 2 I : lembar observasi A : Wilcoxon	<i>P-Value</i> 0,001 < (0,05) (There is influence)

DISCUSSION

Based on the results of literature review research from 10 journals, it is known that there is an effect of foot exercise therapy on reducing blood sugar levels in diabetes mellitus patients with a significant p value of <0.05. This is because blood flow in actively moving muscles can increase contraction so that the permeability of cell membranes to glucose increases, insulin resistance is reduced and insulin sensitivity increases. So that circulation in the blood increases and there is a decrease in blood sugar levels in patients with diabetes mellitus. The contractility of the blood vessels will also increase due to the muscle pumps in the veins which help smooth them Blood flow returns to the heart, smooth blood circulation will carry oxygen and nutrients to cells and nerve tissue which will increase metabolic processes (Nuraeni & Arjita, 2019).

CONCLUSIONS AND RECOMMENDATIONS

There is an effect of foot exercise therapy on reducing blood sugar levels in patients with diabetes mellitus, it is hoped that the results of this study will be given during discharge planning as a control measure.

BIBLIOGRAPHY

- Abidin, J., Nina, N., Sitanggang, B. Y. E., Mulyani, D. S., Nandya, L., & Adiyaksa, R. (2021). Kelola Diabetes Mellitus Usia Produktif Dengan Prowidme (Productive with Diabetes Mellitus) di Wilayah Depok Tahun 2021. *Jurnal Pengabdian Masyarakat Indonesia Maju*, 2(3), 78–86.
- Fadlilah, S., Sucipto, A., & Rahil, N. H. (2019). Effectiveness of Diabetic Foot

- Exercises Using Sponges and Newspapers on Foot Sensitivity in Patients with Diabetes Mellitus. *Belitung Nursing Journal*, 5(6), 234–238.
- Halajur, U. (2021). The Influence Of Gymnastics Diabetic Foot To Decrease Blood Sugar Levels In Patients With Type 2 Diabetes Mellitus. *International Journal of Science, Technology & Management*, 2(1), 363–367.
- Hardika, B. D. (2018). Penurunan gula darah pada pasien diabetes melitus tipe II melalui senam kaki diabetes. *Medisains*, 16(2), 60. <https://doi.org/10.30595/medisains.v16i2.2759>
- Muchtar, R. S. U., & Dingin, I. T. (2018). The Influence of Diabetic Foot Exercise on Sugar Levels In Type 2 Diabetes Mellitus Patients at Tanjung Buntung Public Health Center 2018. *International Journal of Education and Curriculum Application*, 1(1), 1–6.
- Mustikawati, D., Erawati, E., & Supriyatno, H. (2020). Effect of the Diabetes Exercise on the Blood Sugar Levels in Diabetes Mellitus Patients. *Journal of Nursing Care*, 3(1), 19–25.
- Nuraeni, N., & Arjita, I. P. D. (2019). Pengaruh Senam Kaki Diabet Terhadap Penurunan Kadar Gula Darah Pada Penderita Diabetes Mellitus Type Ii. *Jurnal Kedokteran*, 3(2), 618–627.
- Parellangi, P., Wahyuni, E. P., Mustofa, K., Seda, B., & Tini, T. (2022). Endurance diabetes foot exercise based on family centered care (EDFE-BFCC) to reduce blood sugar levels patients diabetes mellitus type 2. *Health Notions*, 6(2), 51–54.
- Wibisana, E., & Sofiani, Y. (2017). Pengaruh Senam Kaki Terhadap Kadar Gula Darah Pasien Diabetes Melitus Di Rsu Serang Provinsi Banten. *Jurnal Ilmu Dan Teknologi Kesehatan*, 2(2), 107–114.
- Widiasari, K. R., Wijaya, I. M. K., & Suputra, P. A. (2021). Diabetes Melitus Tipe 2: Faktor Risiko, Diagnosis, Dan Tatalaksana. *Ganesha Medicina*, 1(2), 114–120.
- Yulianti, Y., & Januari, R. S. (2021). Pengaruh senam kaki diabetes mellitus terhadap kadar gula darah penderita DM Tipe 2 di wilayah kerja puskesmas ciemas. *Lentera: Jurnal Ilmiah Kesehatan Dan Keperawatan*, 4(2), 87–94.