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

Thomas Ari Wibowo¹, Anita Dwiastuti¹
¹ Universitas Muhammadiyah Kalimantan Timur, Samarinda, Kalimantan Timur

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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, Sciences 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.

Keywords
Foot Exercise, Type 2 Diabetes Mellitus, Blood Glucose Levels

Correspondence
taw965@umkt.ac.id,
anitadwia27@gmail.com

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.

<table>
<thead>
<tr>
<th>Kriteria</th>
<th>Inklusi</th>
<th>Eklusi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jangka waktu</td>
<td>2017-2021</td>
<td>Tidak 2017-2021</td>
</tr>
<tr>
<td>Bahasa</td>
<td>Bahasa Indonesia dan Bahasa Inggris</td>
<td>Selain Bahasa Indonesia dan Bahasa Inggris</td>
</tr>
<tr>
<td>Subyek</td>
<td>Pasien DM Tipe</td>
<td>Selain Pasien DM</td>
</tr>
<tr>
<td>Jenis Jurnal</td>
<td>Original penelitian (bukan review penelitian)</td>
<td>Bukan jurnal original penelitian</td>
</tr>
<tr>
<td>Tema isi jurnal</td>
<td>Pengaruh Senam kaki terhadap penurunan kadar gula darah pada DM</td>
<td>Bukan pengaruh Senam kaki terhadap penurunan kadar gula darah pada DM</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**
### Table 2. Results

<table>
<thead>
<tr>
<th>No</th>
<th>Author/year</th>
<th>Journal name, volume, number</th>
<th>Journal Title</th>
<th>Methods (Design, Sample, Variables, Instruments, Analysis)</th>
<th>Results</th>
</tr>
</thead>
</table>
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 |  
P-Value  
0,001 < (0,05)  
(There is influence) |
S : 30 respondents  
V : blood sugar levels, diabetes foot exercise.  
I : measuring blood sugar (glucometer).  
A : Paired t-test |  
P-Value  
0,01 < (0,05)  
(There is influence) |
| 3  | Muchtar & 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 |  
P-Value  
0,001 < (0,05)  
(There is influence) |
S : 26 respondnet |  
P-Value  
0,000 < (0,05)  
(There is influence) |
<table>
<thead>
<tr>
<th>No.</th>
<th>Authors</th>
<th>Journal</th>
<th>Year</th>
<th>Title</th>
<th>Design</th>
<th>Variables</th>
<th>Sample Size</th>
<th>Instrumentation</th>
<th>Analysis</th>
<th>P-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Fadlilah et al., 2019</td>
<td>Belitung Nursing Journal, Volume 5, Issue 6, November - December 2019, ISSN: 2477-4073</td>
<td>2019</td>
<td>Effectiveness of Diabetic Foot Exercise Using Sponge and Newspaper on Foot Sensitivity in Patients with Diabetes Mellitus</td>
<td>quasi-experimental study with pretest posttest with a control group research design</td>
<td>foot exercise, foot sensitivity</td>
<td>108 responden</td>
<td>monofilament test, sponge, newspaper</td>
<td>Wilcoxon Test</td>
<td>0.000 &lt; (0.05)</td>
<td>There is influence</td>
</tr>
<tr>
<td>6</td>
<td>Mustikawati et al., 2020</td>
<td>Journal of Nursing Care (JNC)-Volume 3, February 2020</td>
<td>2020</td>
<td>Effect of the Exercise on the Blood Sugar Levels in Diabetes Mellitus Patients</td>
<td>quasi experimental applying the non equivalent control group</td>
<td>exercise diabetic, blood glucose levels</td>
<td>68, intervention group 34, and control 34</td>
<td>GDS measurement, observation</td>
<td>Wilcoxon Test</td>
<td>0.001 &lt; (0.05)</td>
<td>There is influence</td>
</tr>
<tr>
<td>7</td>
<td>Halajur, 2021</td>
<td>International Journal of Science, Technology &amp; Management 2(1), ISSN: 2722-4015, 2021</td>
<td>2021</td>
<td>The Influence Of Gymnastics Diabetic Foot to Decrease Blood Sugar Levels In Patients With Type 2 Diabetes Mellitus</td>
<td>preexperimental design, the design of the study one group pre post test design</td>
<td>diabetic foot gymnastics, blood glucose levels</td>
<td>30</td>
<td>data retrieval using questionnaire, observation</td>
<td>Wilcoxon Test</td>
<td>0.00 &lt; (0.05)</td>
<td>There is influence</td>
</tr>
<tr>
<td>8</td>
<td>Yulianti &amp; Januari, 2021</td>
<td>Jurnal Lentera Volume 4, nomor 2, Desember 2021</td>
<td>2021</td>
<td>The Effect of Leg Exercises for Diabetes Mellitus on Blood Sugar Levels Type 2 DM sufferers in the Ciemass Community Health Center working area</td>
<td>quasi experiment yaitu pretest-posttest</td>
<td>diabetic foot exercises, blood sugar levels</td>
<td>18 respondent</td>
<td>SOP, Glucotest tool</td>
<td>Paired t-test</td>
<td>0.000 &lt; (0.05)</td>
<td>There is influence</td>
</tr>
</tbody>
</table>
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


