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THE APPLICATION OF DIABETES EXERCISE ON CHANGES IN RANDOM BLOOD GLUCOSE LEVEL AMONG OLDER ADULYS IN GUWOSARI

PENERAPAN SENAM DIABETES TERHADAP PERUBAHAN KADAR GLUKOSA DARAH SEWAKTU PADA LANSIA DI GUWOSARI

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Abstract

Background: ype 2 diabetes mellitus is a chronic disease marked by elevated blood glucose levels due to impaired insulin function. Blood glucose control is important to prevent complications, including through diabetes exercise as a non-pharmacological therapy. Objective: To determine changes in random blood glucose levels in older adults after diabetes exercise in Guwosari Village, RT 02 RW 27, Jebres, Surakarta City. Method: This descriptive case study involved two older adults with type 2 diabetes mellitus. The intervention was diabetes exercise performed for five consecutive days, 45 minutes per session. Random blood glucose levels were measured before and after the intervention using a glucometer. Results: Both respondents showed a decreasing trend in random blood glucose levels. Respondent 1 changed from 488 mg/dL to 256 mg/dL, while Respondent 2 from 218 mg/dL to 163 mg/dL. Conclusion: Diabetes exercise showed a decreasing trend in random blood glucose levels, indicating its potential as a non-pharmacological intervention in managing type 2 diabetes mellitus in older adults.

Keywords : Type 2 Diabetes Mellitus, Older Adults, Diabetes Exercise, Random Blood Glucose.

Abstrak

Latar Belakang: Diabetes melitus tipe 2 merupakan penyakit kronis yang ditandai dengan tingginya kadar glukosa darah akibat gangguan fungsi insulin. Pengendalian kadar glukosa darah penting untuk mencegah komplikasi, salah satunya melalui senam diabetes sebagai terapi non-farmakologis. Tujuan: Untuk mengetahui perubahan kadar glukosa darah sewaktu pada lansia setelah melakukan senam diabetes di Desa Guwosari, RT 02 RW 27, Jebres, Kota Surakarta. Metode: Studi kasus deskriptif ini melibatkan dua orang lansia dengan diabetes melitus tipe 2. Intervensi yang diberikan berupa senam diabetes yang dilakukan selama lima hari berturut-turut, dengan durasi 45 menit per sesi. Kadar

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glukosa darah sewaktu diukur sebelum dan sesudah intervensi menggunakan glukometer. Hasil: Kedua responden menunjukkan tren penurunan kadar glukosa darah sewaktu. Responden 1 mengalami perubahan dari 488 mg/dL menjadi 256 mg/dL, sedangkan Responden 2 dari 218 mg/dL menjadi 163 mg/dL. Kesimpulan: Senam diabetes menunjukkan tren penurunan kadar glukosa darah sewaktu, yang mengindikasikan potensinya sebagai intervensi non-farmakologis dalam pengelolaan diabetes melitus tipe 2 pada lansia.

Kata Kunci : Diabetes Melitus Tipe 2, Lansia, Olahraga untuk Penderita Diabetes, Gula Darah Sewaktu.

1. INTRODUCTION

Diabetes mellitus (DM) is a health condition characterized by high blood glucose levels (Harreiter, 2023). It represents a significant global health issue. DM is a chronic condition marked by elevated blood glucose levels, which can lead to various serious complications such as cardiovascular disorders, kidney damage, vision impairment, and peripheral nerve problems. The rising prevalence of DM is primarily attributed to lifestyle changes, unhealthy dietary habits, and a lack of physical activity (Zubir et al., 2024).

Diabetes mellitus (DM) is a health issue that continues to rise both globally and nationally. According to the IDF (2025), there are 589 million people aged 20–79 living with DM worldwide; Indonesia ranks fifth with approximately 20.4 million cases and a prevalence of 11.3%. In Central Java, the number of people with DM in 2025 reached 467,365, while in the city of Surakarta, the figure stood at 17,328.

In the service area of the Ngoresan Community Health Center (Puskesmas), Type 2 diabetes cases totaled 990 in 2023, rising to 995 in 2024 and 999 in 2025. Among the elderly population, the highest number of cases was found in RW 27 (24 individuals), with the highest concentration in RT 02, Kampung Guwosari (8 individuals). These figures indicate an upward trend in diabetes cases and a concentration of patients in specific areas, highlighting the need for more optimal control measures.

Blood sugar control in patients with diabetes mellitus can be achieved through pharmacological and non-pharmacological therapies. Pharmacological therapy involves the use of oral antidiabetic medications and insulin, whereas non-pharmacological therapy encompasses physical exercise—such as diabetes-specific exercises—education, and nutritional management. One effective non-pharmacological physical exercise therapy for helping to control blood sugar levels is diabetes exercise. Diabetes exercise is a form of low-intensity aerobic activity that can help lower blood glucose levels, reduce stress and anxiety, improve stamina, and maintain body weight (Abidin, 2025).

Diabetes exercises are physical activities that individuals with diabetes can perform to prevent wounds and improve blood circulation in the feet. These exercises can be done independently by patients, as they are easy to perform and low-cost (Prasetiyo and Purwanti, 2026). Diabetes mellitus exercises are typically performed in the morning for 45 minutes, with a frequency of 3 to 5 times per week (Putradana et al., 2025).

An initial assessment conducted on March 31, 2026, revealed that most elderly residents in Kampung Guwosari (RT 02/RW 27) manage their blood glucose levels by visiting healthcare centers, purchasing medication from pharmacies, or using traditional herbal remedies. Additionally, two individuals with diabetes mellitus (DM)—both with a history of the condition—were unaware of and had never practiced diabetes mellitus exercises. Data indicated that the majority of these DM patients frequently experienced frequent urination, excessive thirst, frequent hunger, and fatigue. These findings served as the basis for implementing diabetes mellitus exercise as a complementary nursing intervention to control blood glucose levels among the elderly in the community.

Therefore, this study aims to describe the "Application of Type 2 Diabetes Mellitus Exercise and Its Effect on Changes in Random Blood Glucose Levels Among the Elderly in Kampung Guwosari, RT 02 RW 27, Jebres" The study results are expected to provide scientific evidence

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supporting the effectiveness of diabetes mellitus exercise therapy—a simple, safe, affordable, and practical complementary nursing intervention—in controlling blood glucose levels among the elderly, and to serve as a reference for nurses and other healthcare professionals in community nursing practice.

2. RESEARCH METHOD

1. This study employed a descriptive case study design to describe the implementation of type 2 diabetes mellitus exercises and their effect on random blood glucose levels among elderly individuals in Kampung Guwosari (RT 02/RW 27), Jebres, Surakarta. The study subjects consisted of two elderly individuals aged 60 years or older with a history of type 2 diabetes mellitus (blood glucose >200 mg/dL) who were able to communicate effectively, willing to participate, and had signed an informed consent form; individuals with severe diabetes complications, cardiac complications, or renal failure were excluded.
2. Blood glucose levels were measured using a glucose testing device. Measurements were conducted using a pre-test and post-test design. A pre-test was performed to measure random blood glucose levels prior to the intervention; following the diabetes exercise session, a post-test was conducted using the same method—measuring random blood glucose levels—to compare the levels before and after the exercise.
3. The intervention consisted of diabetes mellitus exercises performed once daily for five consecutive days, with each session lasting approximately 45 minutes. The procedure began with an assessment of baseline blood glucose levels and an explanation of the intervention. Sit upright on a chair with both feet on the floor, Lift and lower the forefoot while keeping the heels on the floor 8 times, Lift and lower the heels while keeping the toes on the floor 8 times, Lift both feet and rotate the ankles 8 times to the right and 8 times to the left, Straighten and raise the right leg, hold briefly, then lower it. Repeat 8 times, Straighten and raise the left leg, hold briefly, then lower it. Repeat 8 times, Straighten both legs and rotate the ankles 8 times to the right and 8 times to the left.
4. Data were collected through direct observation, interviews, blood glucose level measurements (initial and final tests), and documentation during the intervention period. The collected data were analyzed descriptively by comparing blood glucose levels before and after the intervention for each participant and describing the changes in blood glucose levels throughout the five-day implementation period.
5. This study was conducted in accordance with research ethics principles, including respect for participant autonomy, informed consent, confidentiality of participant information, beneficence, non-maleficence, and justice. Participants were provided with information regarding the study objectives, intervention procedures, potential benefits, and the right to withdraw from the study at any time without consequence prior to providing written consent.

3. RESULT AND DISCUSSION

Diabetes mellitus exercises were administered to two elderly individuals with high blood glucose levels in Kampung Guwosari (RT 02/RW 27), Jebres, Surakarta. The intervention was conducted once daily for five consecutive days, with each session lasting approximately 45 minutes. Blood glucose levels were assessed before and after the intervention.

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Table 1. Blood Glucose Levels Before and After Diabetes Mellitus Exercise

Day/Date	Responden 1		Responden 2	
	Before	After	Before	After
Wednesday, May 13, 2026	488 mg/dL	459 mg/dL	218 mg/dL	216 mg/dL
Thursday, May 14, 2026	400 mg/dL	386 mg/dL	201 mg/dL	197 mg/dL
Friday, May 15, 2026	361 mg/dL	293 mg/dL	192 mg/dL	186 mg/dL
Saturday, May 16, 2026	272 mg/dL	266 mg/dL	178 mg/dL	158 mg/dL
Sunday, May 17, 2026	256 mg/dL	246 mg/dL	163 mg/dL	155 mg/dL

Primary Data: 2026

Prior to the intervention, changes in blood glucose levels were observed in the patients with diabetes mellitus following the diabetes exercise regimen. Both respondents showed changes in their blood glucose levels. On the fifth day, Respondent 1's blood glucose level was 256 mg/dL before the intervention and 246 mg/dL after the intervention. For Respondent 2, the blood glucose level on the fifth day was 163 mg/dL before the intervention and 155 mg/dL after the intervention.

Discussion

Pre-intervention data showed that Respondent 1 had an initial blood glucose level of 488 mg/dL, while Respondent 2 had an initial level of 218 mg/dL. The difference in the reduction of blood glucose levels between the two respondents may be attributed to several factors, such as physical condition, age, daily activities, medical history, and the severity of each respondent's initial random blood glucose (GDS) level. Furthermore, neither respondent had previously received education regarding diabetes mellitus exercises as a non-pharmacological strategy for blood glucose control.

Following the implementation of a 45-minute diabetes exercise routine performed daily for five consecutive days, both respondents experienced a decrease in blood glucose levels. For Respondent 1, the blood glucose level was 459 mg/dL on the first day of the exercise regimen. On the second day, the level showed a downward trend, reaching 386 mg/dL. By the third day, the level dropped to 293 mg/dL; on the fourth day, it fell to 266 mg/dL; and on the fifth day, it decreased to 246 mg/dL. For Respondent 2, the level was 216 mg/dL on the first day of the exercise regimen. The second day showed a downward trend to 197 mg/dL, followed by 186 mg/dL on the third day and 158 mg/dL on the fourth day. On the fifth day, the level continued to decline, reaching 155 mg/dL.

Differences in the reduction of blood glucose levels between the two respondents may be attributed to several factors, such as physical condition, age, daily activities, medical history, and the severity of each respondent's initial random blood glucose (GDS) level. Respondent 1 continued to consume high-sugar foods and beverages—such as bread, sweet iced tea, root vegetables, and deep-fried snacks—causing blood glucose levels to remain high during the intervention period. In contrast, Respondent 2 rested more, reduced their intake of high-sugar foods, and maintained a healthy diet, allowing the diabetes exercise regimen to work more effectively.

These findings align with research by Oktavia (2025), which identifies diabetes mellitus exercises as an effective non-pharmacological method for helping to lower blood sugar levels in patients with the condition. Diabetes exercises are physical activities that patients can perform to prevent wounds and improve blood circulation in the feet. These exercises can be done independently by patients, as they are easy to perform and low-cost (Prasetiyo and Purwanti, 2026).

4. CONCLUSION

1. Prior to the diabetes mellitus exercise intervention, the random blood glucose levels were 488 mg/dL (high) for Respondent 1 and 218 mg/dL (moderate) for Respondent 2. Both respondents

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reported symptoms—frequent urination, excessive thirst, frequent hunger, and fatigue—that interfered with their daily activities.

2. Random blood glucose levels showed changes in both respondents following the diabetes mellitus exercise intervention. By the end of the implementation period, Respondent 1's level dropped from 488 mg/dL to 256 mg/dL, while Respondent 2's level decreased from 218 mg/dL to 163 mg/dL.
3. Changes in random blood glucose levels observed before and after the diabetes mellitus exercise intervention indicated a shift in both respondents over the five-day implementation period. These results demonstrate that a regimen of diabetes mellitus exercises can help reduce random blood glucose levels in the elderly.
4. A comparison of the final results shows that both respondents experienced changes in random blood glucose levels after performing diabetes mellitus exercises for five consecutive days. Respondent 1's level changed from 488 mg/dL to 256 mg/dL, while Respondent 2's level changed from 218 mg/dL to 163 mg/dL.

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