

BLOOD SUGAR REGULATION DURING PHYSICAL EXERCISE: REVIEW ARTICLE

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Abstract

One of the causes of diabetes mellitus is physical activity. Management of physical exercise is one of the 5 pillars of diabetes management apart from diet, medication, education and monitoring. The purpose of this study was to determine the effect of diabetic exercise on reducing blood sugar levels in diabetics. This research is a simple review article research. There were 5 articles reviewed. All articles are themed on physical exercise and blood sugar control. All articles conclude that physical exercise can control blood sugar in diabetes mellitus patients.

Keywords: Diabetic Exercise, Decreased Blood Sugar Levels.

INTRODUCTION

With time, the pattern of illnesses people experience has changed from malnutrition and infectious diseases to degenerative illnesses like diabetes mellitus. Diabetes mellitus is a chronic condition in which the body has trouble using insulin or the pancreas cannot produce enough of it. This is consistent with the assertion made by that diabetes mellitus (DM) is a degenerative disease that has been on the rise every year in nations worldwide (Ginanjar et al., 2022).

Diabetes Mellitus (DM) is a chronic metabolic disorder with characteristics of hyperglycemia. According to the Indonesian Endocrinology Association (PERKENI) in 2011, there are several diagnostic criteria, namely a person is said to have diabetes if there are symptoms of diabetes mellitus with plasma glucose when ≥ 200 mg/dl or the presence of classic symptoms of diabetes mellitus with fasting glucose levels ≥ 126 mg/dl or levels plasma sugar 2 hours on oral glucose tolerance test (TPGO) ≥ 200 mg/dl (Ruben et al., 2016).

Diabetes Mellitus, better known as diabetes, is a condition of disturbed metabolism in the body due to the body's inability to produce the hormone insulin, causing an increase in blood sugar levels beyond ordinary. The prevalence of this disease in developing countries, including Indonesia, is increasing. The WHO report cited that the DM prevalence of 1.5% - 2.3% will be 5.7% at the age of more than 15 years, and there is estimated that there will be an estimated 178 million people who suffer from diabetes mellitus. Based on the classification of DM, the number of people with type 2

DM in 2000 is estimated to have reached 12.3 million people and will increase to 19.4 million. This increase occurs in line with increasing life expectancy, unhealthy food intake, less physical activity, obesity, and a modern lifestyle (Rehmaita et al., 2017).

Lifestyle changes like poor eating and exercise habits predispose insulin resistance. People with Diabetes must work towards leading a healthy lifestyle, which includes changing their eating habits to prevent overeating and increasing their physical activity to keep their bodies healthy and prevent complications. The development of various diseases in different body organs, such as the eyes, kidneys, heart, leg blood vessels, and nervous system, are complications that frequently occur when Diabetes is not controlled and handled correctly. Because of this, treating and managing diabetes patients requires effective collaboration between patients, families, communities, and health professionals (Fadhila, 2019)

Components Physical exercise or exercise is crucial in the management of diabetes because of its effect on lowering blood sugar levels by increasing glucose uptake by muscles and improving insulin use. Physical exercise will cause an increase in blood flow, so more capillary nets open so that there are many insulin receptors available, and the receptors become more active, which affects the decrease in blood glucose in diabetics (Indriani, 2004).

The four pillars of managing Type 2 DM are non-pharmacological management, diabetes education, meal/diet planning, exercise, and antidiabetic medication. One of the pillars of managing Type 2 DM is physical exercise. If type 2 diabetes mellitus patients' hyperglycemia is not treated right away, it may persist and lead to complications. By engaging in aerobic exercise, complications can be avoided. The goal of aerobic exercise is to increase cardiovascular endurance to a more usable level. This physical activity is performed for 30 to 60 minutes gradually, intensely, and at low intensity (Indriani, 2004).

Research methods

This article review method uses simple data analysis (simplified approach). Article search adjusted to Medical Subject Heading (MeSH). This search is done by looking at the title of the article that has keywords like the following:

Table 1. MeSH

Latihan Fisik	Gula Darah	Terapi Pengganti Insulin
Or	Or	Or
Physical Exercise	Blood Glucose	Suntik insulin

Journal searches certainly have inclusion and exclusion from article searches. The inclusion and exclusion of this study are as follows:

Table 2. Criteria for Scientific Articles

Inklusi	Ekklusi
Quasi Experimental Design (One or Two Group Pre Test - Post Test and Time Series Design	Literature Review, correlation research
The study sample of patients experiencing blood sugar levels in the insulin room	The study sample of patients who did not experience blood sugar levels in the insulin room
Journal articles published from 2016	Journal articles published before 2016
Articles in Indonesian and English	Articles do not use Indonesian and English

Tabel 3. Hasil Pencarian Jurnal

Peneliti dan Jurnal	Judul Penelitian	Metode	Kesimpulan
Yoga Ginanjar Iga Damayanti Jurnal Keperawatan Galuh (2022)	The Effect Of Diabetic Exercise On Reducing Blood Sugar Levels In Patients With Diabetes Mellitus In The Working Area Of Pkm Ciamis, Ciamis District In 2021	Quantitative research method, using pre design experimental in the form of one group pre-post test design.	The effect of diabetes exercise on reducing blood sugar levels in people with diabetes mellitus
Graceistin Ruben Julia Villy Rottie eJournal Keperawatan (2016)	The Effect Of Diabetic Foot Exercises On Changes In Blood Sugar Levels In Type 2 Diabetes Mellitus Patients In The Working Area Of Enemawira Puskesmas	The research method used is Pre Experimental with the one group pre test post test design method.	Effect of diabetic foot exercise on changes in blood sugar levels in diabetes.
Rehmaita, Mudatsir, Tahlil Jurnal Ilmu Keperawatan (2017)	The Effect Of Diabetic Exercise And Walking On Reducing Blood Sugar Levels	Using a quasi-experimental method with a pre- and post-test two group design	Physical activity, both diabetes exercise and walking, lowers blood sugar levels.
Maria Lousiana, Sr. Hermana, Sondang Sianturi Jurnal Keperawatan Soedirman	Effectiveness Of Physical Yoga Exercise On Blood Sugar Levels In Type 2 Diabetes Mellitus In Kramat- Jakarta	Using a quasi-experimental Quantitative method with a cross-sectional research design.	Controlling or lowering blood sugar levels during type 2 diabetes mellitus
Puji Indriyani Heru Supriyatno Agus Santoso	The Effect Of Aerobic Physical Exercise On Decreasing Blood Sugar Levels In Type 2 Diabetes Millitus Patients	This research is quantitative with the type of pre-experimental research without a comparison group	There is an effect of physical exercise: aerobic exercise on decreasing blood sugar levels in patients with type 2 DM

The Benefits of Physical Exercise on Blood Sugar Levels in Patients with Diabetes Mellitus.

Patients can learn the significance of leg exercises or activities from the research. Blood sugar management requires more than just medication. This is due to the fact that damage to the pancreas' ability to produce insulin, which regulates blood sugar levels, causes diabetes mellitus in patients. It is necessary to support other factors that serve the same purpose as the damaged pancreas, namely by influencing blood sugar production. Exercise and FIIT are the other important components. Choosing and sticking to foods that contain the recommended amounts of sugar is related to FIIT. especially those with a low sugar content. Moderate Walking, body, and leg exercises, as well as other suggested exercises, can help lower blood sugar levels (Westcott, 2012).

The results of this study indicate that people with diabetes mellitus have decreased blood sugar levels. This shows that there is an effect of foot exercise in lowering blood sugar levels as an indication of an improvement in diabetes mellitus. Therefore providing foot exercise activities is an effective way to manage diabetes mellitus. This is because diabetes exercise plays a role in regulating blood sugar levels. In this type, insulin production is generally not disturbed, especially at the onset of diabetes mellitus. In addition to regulating blood sugar levels, exercise can also reduce body weight and prevent complications. Physical activity that is carried out consistently affects physiological changes and adaptations in the human body. Physical activity is any bodily movement produced by skeletal muscles that results in energy expenditure that can be measured in kilocalories (Wlodek & Gonzales, 2003).

Physical exercise is one type of physical activity. Physical exercise is body movement carried out by muscles in a planned, structured, repetitive manner which causes an increase in energy use to increase body fitness. Physical exercise is often used as the first step in lifestyle modification to prevent and manage chronic diseases, including type 2 diabetes mellitus (Støa et al., 2017).

Regarding reducing blood sugar levels in clients with type II diabetes mellitus by doing diabetes exercise, which states that there are significant differences between fasting blood sugar at baseline and the end of diabetes exercise intervention. This proves that by doing diabetes exercise regularly, it can control or reduce blood sugar levels. The frequency of exercise per week should be done 2-5 times per week; the intensity of exercise is light and moderate, namely 60% -70% MHR (maximum heart rate), and the duration of exercise is 30-60 minutes (Diyah, 2014).

Yoga Practice, Based On Research, Can Control Blood Sugar And Can Reduce Body Weight, Blood Pressure, Lipid Profile, Oxidative Stress, And Cortisol Levels. In Addition, Yoga Practice Can Overcome Problems In Type II Diabetes By Controlling Impaired Glucose Tolerance. The Duration Of Regular Yoga Practice Shows More Effective Results Than Other Physical

Exercises (Syamsuryadin et al., 2022).

Conclusion

From several journals that have been reviewed, it is concluded that physical exercise that is carried out regularly and pays attention to the principles of FITT (Frequency, Intensity, Time, Type) can reduce blood glucose levels in people with type 2 diabetes mellitus. There are several types of physical exercise that are recommended for people with DM Type 2 includes aerobic exercise, strength training, flexibility training and balance training.

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