



STUDY LITERATURE EFFECTIVENESS OF AEROBIC GYMNOW TO BLOOD GLUCOSE LEVELS IN PATIENTS DIABETES MELLITUS TYPE 2

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ABSTRACT

Diabetes mellitus is a type of non-communicable disease that can cause high morbidity and mortality. This disease is not a new disease, it's just that it doesn't get enough attention in the community, especially those who have a high risk of suffering from the disease. The purpose of this literature study is to identify recommendations about the effectiveness of aerobic exercise on blood glucose levels in type 2 Diabetes Mellitus patients. This literature search was conducted to find articles that fit the topic through the Google Scholar database using keywords or *Keyword aerobics "OR" blood. sugar level "AND" type 2 diabetes mellitus*. A Google Scholar search was carried out for screening years (2010-2020) and using the phrase "*aerobics blood sugar level*". Based on the results of a literature search from 17 articles obtained, there were 10 articles that met the inclusion criteria and through a review it was found that 8 out of 10 journal articles obtained were 75% of the effectiveness of aerobic exercise on blood glucose levels in type 2 diabetes mellitus patients. And 25% experienced an increase in blood glucose levels after doing aerobic exercise in other words, it was found that aerobic exercise was not effective against blood glucose levels in patients with type 2 diabetes mellitus. aerobics.

Keywords : Aerobic Exercise, Blood Glucose Levels, Diabetes Mellitus Type 2

Introduction

Diabetes mellitus is a type of non-communicable disease that can cause high morbidity and mortality. This disease is not a new disease, it's just that it doesn't get enough attention in the community, especially those who have a high risk of suffering from the disease¹.

The prevalence of people with diabetes mellitus globally in 2019 is around 387 million cases. Based on data from kesehatan organization in the world of *the World Health*

Organization (WHO 2019) the number of diabetics has increased from 108 million people in 2016 to 422 million people in 2018²³.

According to the IDF (*International Diabetes Federation*) prediction results in 2018, it was found that 1.6 million cases of death were directly caused by DM and almost all of these cases occurred before the age of 70 years. This is reinforced by data from the South Sulawesi Basic Health Research in 2019 concerning the prevalence of DM of 1.3% diagnosed by doctors of all

ages. The increase in DM cases has occurred at the district / city level, especially in the city of Makassar in the last 4 years. 2016 was 14,067 cases, 2017 was 14,604 cases, 2018 was 16,755 cases and in 2019 there were 20,470 cases (*Makassar City Health Office*).

The causes of the increasing number of DM in Indonesian is due to a lack of lifestyle health and lack of exercise. State hyperglycemia that persists in the long term a long time will cause various kinds of complications. And to prevent hyperglycemia is by doing sports regular. Due to regular exercise is an important element of the pillar DM management that can prevent hyperglycaemia and can reduce the risk of complications.

According to the results of research by Witriyani (2018), one of the factors in increasing the incidence of Diabetes Mellitus is lack of physical activity. The results of this study also proves that b M any people with diabetes mellitus were more focused and priority handling only diet, and medication , na mun handling correct diet will not guarantee that uncontrolled blood sugar levels, but this must be balanced with appropriate physical exercise. Therefore it is necessary to control efforts that must be carried out by people with Diabetes Mellitus by referring to the four supporting pillars, namely ; education, diet, exercise, and medicine.

Research by Sitti Mukhta Sharoh (2018) on the Effect of Diabetes Exercise on Blood Sugar Levels in Type II Diabetes Mellitus Patients conducted at Puskesmas Gamping 1 Sleman Yogyakarta in line with Witriyani's research (2018) concluded that there was a significant effect of diabetes exercise on reducing blood glucose levels. . From the results of this study, blood glucose levels before doing diabetes mellitus in type 2 diabetes mellitus patients in the intervention group had a mean of 224.2 with

a standard deviation of 21 and blood glucose levels after diabetes exercise in type 2 diabetes mellitus patients in the intervention group had a mean of 205 with standard deviation of 25.6%.

One effort exercise that can be performed in patients with diabetes mellitus is gymnastics aerobics d of natural control glucose levels of blood required aerobics routine activity to be able to control blood glucose levels. S six is also useful in helping insulin work because the sugar in the blood will be flowed through the muscle cells and then converted into energy for the body, causing the body's blood sugar levels to decrease.

Methods

This type of research is literature study research. Where this type of research, the researcher is required to find and collect various journals and articles and then conclude it as an argument to strengthen the research data.

Sources of data in this study are secondary data, this data is data obtained indirectly. This data is taken from documents related to research. These documents are obtained through written data or by accessing sites that contain descriptions of supporting information in investigating the effectiveness of aerobic exercise on blood glucose levels in type 2 DM patients.

This literature search was carried out to obtain articles that match the topic through the Google Scholar database using keywords or *keyword aerobics "OR" blood sugar level "AND" type 2 diabetes mellitus* . A Google Scholar search was carried out for screening years (2010-2020) and using the phrase "*aerobics blood sugar level* ".

Based on the results of a literature search from 17 articles obtained, there were 10 articles that met the inclusion criteria and

through a review of 8 out of 10 journal articles covering journals and scientific publication texts that were appropriate and relevant to aerobic exercise variables to reduce blood glucose levels in type 2 DM patients.

Results

Based on the results of a literature search on Google Scholar, 10 of 17 scientific literature includes articles, journals and scientific publication manuscripts that match the inclusion criteria and are relevant to aerobic exercise variables on blood glucose levels in type 2 diabetes mellitus patients. between aerobic exercise on blood glucose levels in patients with type 2 diabetes mellitus in controlling their blood sugar levels.

According to Dewi, et al. (2019) there are several demographic data collected based on age, sex, education, and duration of suffering from type 2 diabetes mellitus which are considered to have an influence on blood sugar control of type 2 diabetes mellitus patients. This study shows that aerobic exercise has a significant effect on patients. type 2 diabetes mellitus at the USU Hospital out of 38 participants in the aerobic exercise intervention group where aerobic exercise can improve the work and function of the heart, lungs and blood vessels characterized by decreased resting pulse, reduced lactic acid buildup, increased HDL cholesterol, and reduce atherosclerosis. From the results, the average reduction in blood sugar levels while in the exposed group 2, 3 times greater than in the group that did not do physical activity (31.5 mg / dL compared to 13.5 mg / dL). In line with research conducted by Astuti (2016) also found with aerobic activity done on a regular basis will be able to lower or control blood sugar levels in patients with type 2 diabetes mellitus⁵.

In line with research conducted by Dewi, et al (2019), Kristianingsih (2012) suggests that a person's glucose levels can be controlled by the willingness of each individual to change their lifestyle to be more regular. In the study also mentioned the factors that cause an increase in blood glucose levels because respondents are unable to control / lower their blood glucose levels to remain stable, lack of physical activity, an increase in life expectancy, unhealthy food intake, obesity, and a healthy lifestyle. Modern^{5,25}.

Discussion

According Mirnawati (2018) in a study of quasi experimental design with one group pre-post test design with a sample of 8 respondents were given the aerobic exercise intervention for 2 weeks showed that aerobic exercise is not effective in reducing blood sugar levels in people with diabetes mellitus type According Imanuel (2018) in his research using repeated treatment (One group pretest-posttest design) that the increase in blood sugar is caused by consuming foods that contain excess sugar. However, in this study it was found that the average result of fasting blood sugar levels before being given the intervention was 106.56 and the average result of fasting blood sugar levels after being given the intervention was 107.44 which concluded that there was no difference before and after aerobic exercise. . The triggering factor of the ineffectiveness of aerobic exercise on blood glucose levels in the research of Mirnawati (2018) and Imanuel (2018) is inseparable from a lifestyle, one of which is due to a lack of activity. In addition, there is still a lack of community knowledge and / or lack of motivation to do physical exercise^{10,11}.

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In Puji's study (2017) using pre-experimental research methods without a comparison group, it was suggested that the presence of aerobic exercise had an effect on reducing blood sugar levels in people with type 2 diabetes mellitus ($p = 0.0001$) with an average decrease of 30.14 . In line with this, Febriyanto (2016) in his research using the same method with a sample of 15

respondents obtained an average value of 99.93 and obtained a p-value of 0.000 (0.05).

According to Berawi (2016) in a study conducted on 32 people with inclusion criteria aged ≥ 20 years and diagnosed with type 2 diabetes mellitus with symptoms of hyperglycemia and plasma glucose ≥ 200 mg / dl, there was a significant difference ($p < 0.05$) between Fasting blood glucose levels before and after aerobic exercise with the mean fasting blood glucose levels before exercise was 81.66 ± 13.14 mg / dl, while the mean fasting blood glucose levels after exercise was 67.81 ± 4.49 mg / dl. In line with research conducted by Hokon (2016) to find out differences in blood glucose before and after aerobic exercise in the elderly with a total of 21 respondents, it was also found that pre-diabetes before exercise with a value of 138.52 mg / dl, while after being given aerobic exercise treatment (Low Impact) for 2 weeks, the average blood sugar level of the respondents was 120.62 mg / dl³.

Based on this, it can be seen that the effect of activities with regular aerobic exercise and lifestyle modification by controlling the intake of foods containing high sugar levels is one way to control glucose in the blood, besides this is also influenced by the willingness of each individual to realize the importance of having a healthy lifestyle in controlling blood glucose.

According to Berawi (2016) about the effect of aerobic exercise on fasting blood glucose levels in aerobic exercise participants at the Sonia fitness center in Bandar Lampung. Aim to determine the effect of aerobic exercise on fasting blood glucose levels in aerobic exercise participants. Research design using pretest and posttest design, while the Respondent Her 32 people with the inclusion criteria of age ≥ 20 years old and was diagnosed with type 2 diabetes mellitus with symptoms of

hyperglycemia and plasma glucose ≥ 200 mg / dl. Demographic data were collected based on age, gender, occupation, BMI, and duration of suffering from diabetes . The results showed that there was a significant difference ($p < 0.05$) between the fasting blood glucose levels of the respondents before and after participating in aerobic exercise. The average fasting blood glucose level before exercise was 81.66 ± 13.14 mg / dl, while the average fasting blood glucose level after exercise was 67.81 ± 4.49 mg / dl. The conclusion in this study is that aerobic exercise can cause a decrease in fasting blood glucose levels.

Then according to Toni Tonamal (2015) about the effect of 1 hour aerobic exercise on blood glucose reduction in members of the Central Left Kampar Gymnastics Gymnastics Center, which aims to determine the effect of aerobic exercise "Low intensity" for 1 (one) hour on the reduction of glucose in the body. blood. The research design was an experimental method with 15 respondents with inclusion criteria aged ≥ 20 years and diagnosed with type 2 diabetes mellitus with symptoms of hyperglycemia and plasma glucose ≥ 200 mg / dl. The demographic data were collected on age, sex, occupation, BMI, duration of diabetes mellitus . Based on the calculation results, the two test data were normally distributed. the results of calculations using the t test obtained the t value of 2.55. After obtaining the calculated t value, the next step is to find the t table value. The value of t table at $n = 15$ or $df = 14$ with an error rate of 5% is 2.14. The results of the comparison between the t value and the t table value, it is found that $t_{\text{arithmetic}} > t_{\text{table}}$ or $2,55 > 2.14^{22}$.

Conclusion

Based on the results of a literature study that has been conducted, it is

concluded that 8 of the 10 journal articles obtained are 75% which are effective in the implementation of aerobic exercise on blood glucose levels in type 2 diabetes mellitus patients. And 25% have increased blood glucose levels after exercising. In other words, aerobic exercise is found to be ineffective on blood glucose levels in patients with type 2 diabetes mellitus. The trigger factor cannot be separated from lifestyle, one of which is due to lack of activity, lack of knowledge, and motivation and physical activity of the community such as aerobic exercise.

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