



Control Blood Sugar Levels by Brisk Walking Method



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Abstract

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Diabetes mellitus (DM) is a chronic disease, and specific treatments are needed in order to control blood glucose. In addition to pharmacological therapy, non-pharmacology therapy also takes an important role to control blood glucose levels and should be done regularly. Brisk walking is one example of physical activity which included in non-pharmacology therapy and can improve body expenditure. This activity can help DM patient to control their blood glucose level within the normal range. The physical activity of Brisk Walking, which is one type of exercise that can maintain blood sugar levels within the normal range, especially in people with Diabetes Mellitus. This study aimed to determine the effect of Brisk Walking on the blood glucose level of DM patients at Tamalenrea Health Center Makassar City. This study adopted a quasy experiment and a one-group pre-post test design. A total of 16 respondents were selected purposively based on the determined criteria. Data analysis of the difference of blood sugar level between the treatment and control was carried out by using the Spearman correlation test with SPSS version of 21. The difference was significant with the value of $p < 0.05$. The results showed that the physical activity of Brisk Walking could control blood sugar levels. Statistical analysis showed that the average blood sugar content was significantly lower in patients practicing Brisk Walking (blood sugar level < 200 mg/dl) (176.06%) than the control (blood sugar level > 200 mg/dl) (218.81%). So it can be concluded that by doing physical activity Brisk Walking can control blood glucose levels.

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INTRODUCTION

Diabetes mellitus (DM) includes in the ten non-communicable diseases that occupy the top rank of most cases and are the diseases with the largest financing burden in Indonesia (Wahyuningrum et al 2020). According to the World Health Organization (WHO) in 2015, 415 million adults suffer from diabetes, a 4-fold increase from 108 million in 2015. 1980s. By 2040 it is estimated that the number will be 642 million. Nearly 80% of people with diabetes live in low- and middle-income countries and are the 6th leading cause of death by 2030 (World Health Organization 2016). WHO predicts an increase in the number of people with diabetes mellitus in Indonesia from 8.4 million in 2000 to around 21.3 million in 2030, this shows an increase in the number of people with diabetes mellitus by 2-3 times in 2034. Diabetes mellitus (DM) is a metabolic disease characterized by high blood sugar levels (hyperglycemia) that occurs due to insulin disorders and insulin work disorders or a combination of both. (Azitha, Aprilia, & Ilhami, 2018). Diabetes is a chronic disease where blood therapy is needed to be able to check glucose levels properly, in addition to pharmacological therapy that is needed in addition to therapy to control glucose. Type 2 diabetes (DMT2) is the most common form of diabetes. T2DM treatment therapy consists of five main components, namely diet regulation, exercise, monitoring of metabolic status, pharmacological therapy, and pharmacological therapy (Ali, 2011, Rudianto et al 2011). Most DMT2 patients have difficulty in self-management regarding physical activity, eating health, drug use, blood glucose monitoring, and stress management (Aghili et al 2016). According to the doctor's perspective, most of the patients who receiving insulin therapy failed to achieve therapy targets caused by lifestyle factors, non-compliance, and about medical expenses not covered by insurance (out-of-pocket costs). Among the components of DM therapy, the adoption and maintenance of physical activity is an important focus for blood glucose management and overall health in individuals with diabetes and prediabetes. Recommendations and precautions vary depending on individual characteristics and health status. Physical activity includes all movements that increase energy use, whereas exercise is planned, structured physical activity. Exercise improves blood glucose control in type 2 diabetes, reduces cardiovascular risk factors, contributes to weight loss, and improves well-

being (Chen et al 2015). Regular exercise can prevent or delay the development of type 2 diabetes (Schellenberg et al 2013). Regular exercise also has considerable health benefits for people with type 1 diabetes (eg, improved cardiovascular fitness, muscle strength, insulin sensitivity, etc.) (Yardley et al 2014). The challenges associated with blood glucose management vary with the type of diabetes, the type of activity, and the presence of diabetes-related complications (Colberg et al 2010). Therefore, recommendations for physical activity and exercise must be tailored to meet the specific needs of each individual. Physical activity is defined as any body movement produced by skeletal muscles that requires energy expenditure (Chen et al 2015).

Physical activity is body movement that is produced by muscles and produces energy. Physical activity that is done repeatedly can maintain physical and mental health, as well as the quality of life to stay healthy (Sakung, et.al 2018). Lack of physical activity is a big enough factor for a person to be overweight and weaken the work of vital organs such as the heart, liver, kidneys, and pancreas. Lack of physical activity can also cause diabetes. (Rahmatul Fitriani, 2016). Physical exercise or exercise in people with diabetes has a very important role. The type of physical exercise recommended for people with diabetes mellitus is brisk walking, which is a type of aerobic exercise that aims to improve health and fitness, especially to improve the function and efficiency of the body's metabolism so that it will help control blood sugar levels. Aerobic exercise involves repeated and continuous movement of large muscle groups (Physical Activity Guidelines Advisory Committee, 2009). Activities such as walking, cycling, jogging, and swimming rely primarily on aerobic energy-producing systems. Brisk walking or brisk walking is a type of exercise that can keep blood sugar levels within normal limits. Light exercise that can be done is walking for 30 minutes and brisk walking for 20 minutes (Suyono et al 2011). According to Houmard (2003) brisk walking is one of the sports that is done with a duration of 30-60 minutes, a frequency of 3-5 times a week and if done regularly will increase insulin work, stimulate glycogen synthesis through increased insulin action and stimulate glucose transport by glucose transporters. GLUT4 (Fenny Rosa Indah, 2013). Brisk walking is a sport that is very easy to do, because it can be done anywhere, especially outside the home and does not cost any-

thing (Listyarini & Fadilah, 2017). Based on data from the Tamalanrea Community Health Center Makassar City, it shows that the number of visits by people with diabetes mellitus in 2016 was 859 (8.59%) people, increased in 2017 to 897 people, increased again in 2018 to 977 (10%). people, while in January to June 2019 there were 246 people. The results of interviews with implementing nurses at the time of initial data collection showed that most people with diabetes mellitus only gave pharmacological drugs to patients. Based on the explanation of the background above, the researcher is interested in conducting a study with the title “The Effect of Brisk Walking of Diabetes Mellitus Patients on Control of Blood Sugar Levels in the Working Area of the Tamalanrea Health Center Makassar City”.

METHOD

This study adopted a quantitative research using the Quasy Experiment method with one group pre-post test design. The effectiveness of the treatment was assessed by comparing the pre-test and post-test scores. The sampling technique in this study used accidental sampling. The sample in this study was 20 people. This study was conducted at the Puskesmas Tamalanrea Makassar City from October 8th to November 8th, 2019.

a. Inclusion Criteria

- 1) Patients with diabetes mellitus who seek treatment at the Puskesmas Tamalanrea Makassar City
- 2) Patients aged 30-65 years
- 3) The patient is conscious
- 4) Patients who are willing to be respondents
- 5) Does not depend on insulin injections
- 6) Patients who are willing to follow the brisk walking 3 times a week within 30 minutes as far as 2 miles

b. Exclusion Criteria

- 1) Patients who do not regularly follow a schedule
- 2) Patients whose body condition does not allow for physical activity
- 3) People with gestational diabetes

Data analysis of the difference between the treatment and control was carried out by using the Spearman correlation test with SPSS version of 21. The difference is significant if the value of $p < 0.05$.

RESULT

1. Univariate analysis

Table 1 Frequency distribution based on demographic characteristics (n = 16)

| Characteristics | | (n) | (%) |
|-----------------|-------------|-----|------|
| Age | 45-55 years | 3 | 18.8 |
| | 56-65 years | 13 | 81.3 |
| Sex | Man | 6 | 37.5 |
| | Women | 10 | 62.5 |
| Education | High school | 6 | 37.5 |
| | D3 | 2 | 12.5 |
| | S1 | 7 | 43.8 |
| | Retired | 1 | 6.3 |
| Married Status | Married | 16 | 100 |
| Long Suffering | 1-5 Years | 8 | 50.0 |
| | 6-10 Years | 6 | 37.5 |
| | 11-15 Years | 1 | 6.3 |
| | 16-20 Years | 1 | 6.3 |

The results of Table 1 show that of the 16 respondents, 13 respondents (81.3%) have an age of 56-65 years. A total of 10 respondents (62.5%) were female. A total of 7 respondents (43.8%) who have a bachelor's level education. as many as 16 respondents (100%) married status. A total of 8 respondents (50.0%) have had diabetes mellitus for a long time.

Table 2 Characteristics of The Distribution of Blood Sugar Respondents During the Pre-test and Post-test Physical Activity of Brisk Walking

| When blood sugar | Mean | Min-Max |
|---|--------|---------|
| Brisk Walking Physical Activity Pre Test | 218.81 | 101-314 |
| Brisk Walking Post Test Physical Activity | 176.06 | 124-251 |

In Table 2, the blood sugar during the pre-test, physical activity of Brisk walking, has an average value of 218.81 mg / dl, a minimum blood sugar level of 101 mg / dl is a maximum of 314 mg / dl and a post-test blood sugar level of physical activity of Brisk walking has an average value of 176.06 mg. / dl minimum 124 mg / dl and maximal 251 mg / dl.

2. Bivariate Analysis

Table 3 The effect of physical activity of Brisk Walking with diabetes mellitus on controlling blood sugar levels

| Statistical test between variables | Mean | Std.Deviation | T | Score ρ |
|--|--------|---------------|-------|--------------|
| Brisk walking pre test of physical activity - Post test of physical activity of brisk walking | 42,750 | 67,589 | 2,530 | 0,023 |

Based on Table 3, the difference in the mean \pm Std.Deviation in Brisk walking physical activity is 42.740 ± 67.589 . The results of the Paired T Test obtained a t value of 2.530 and a p value = $0.023 < \alpha = 0.05$, so the alternative hypothesis (H_a) is accepted and the null hypothesis (H_0) is rejected. Interpretation is the effect of physical activity of Brisk Walking with diabetes mellitus sufferers on controlling blood sugar levels while in the working area of Puskesmas Tamalanrea, Makassar City.

DISCUSSION

The results of the study conducted on 16 respondents obtained 11 respondents who have a good activity pattern, because 11 respondents routinely do physical activity brisk walking for 20-30 minutes, and it is carried out 3-5 times a week with a time of 20-30 minutes and a distance of 2. mill. In this study there were 11 respondents with good physical activity with brisk walking and controlled blood sugar levels, where before the respondents did physical activity brisk walking there were 11 respondents whose blood sugar levels were > 200 mg / dl, and there were 5 respondents whose blood sugar levels < 200 mg / dl. However, when respondents do physical activity brisk walking 3-5 times a week with a time of 30 minutes and a distance of 2 miles is good and routine, their blood sugar levels fall below 200 mg/dl.

When exercising, the body requires extra energy which causes the muscles in the body to absorb glucose which helps lower blood sugar levels in the body. It is known that age is closely related to an increase in blood sugar levels because insulin production begins to decrease, this is an increase in fat levels in the muscles so that it is more difficult for glucose to be used as energy for activities, but when someone does activities regularly and correctly it will help muscle movement. so that it can accelerate blood circulation and by doing activities can reduce blood sugar levels.

In this study, there were 5 respondents who had uncontrolled blood sugar levels, did not experience a significant change between before and after physical activity brisk walking with a time of 30 minutes and a distance of 2 miles.

By doing good physical activities can reduce the amount of fat and increase tissue metabolism, such as increasing muscle strength, nerves and bones. Physical activity brisk walking can also reduce blood pressure and bad cholesterol and increase good cholesterol.

Meanwhile, there were 4 respondents who had a bad activity pattern where the respondents did not do physical activity properly and correctly with the specified time and distance because the respondent said they did not have enough time to do physical activity brisk walking. Thus these 4 respondents were excluded from the study results because they did not match the inclusion criteria.

This study is in accordance with the research conducted by (Listyarini & Fadilah, 2017). From the results of the research conducted, the following conclusions were obtained (1) There was an effect of brisk walking on reducing blood glucose levels in diabetes mellitus sufferers. (2) There is a difference in the results of the study between the intervention and non-intervention groups. From the results of this study, it showed that the average value after doing the brisk walking, the blood sugar levels of diabetes mellitus sufferers were able to decrease on average to 184.79 mg / dl, there was a decrease in blood sugar levels by an average of 19.26 mg / dl. although most of them experienced a decrease, there were also those who experienced an increase in blood sugar levels, this was because this was due to the lack of dietary supervision on the respondents. So the conclusion of the study is that there is an effect of brisk walking on reducing blood glucose levels in people with diabetes mellitus.

Research result (Rehmaita, Mudatsir, 2018) showed a significant effect on reducing blood sugar levels in patients with type 2 diabetes melli-

tus and walking. By doing good and proper physical activity, regularly can stabilize blood sugar levels. Physical exercise has an important role in controlling blood sugar levels.

Likewise with the research results (Yitno & Riawan Wahyu, 2017) stated that after doing a light walk for 30 minutes from 24 respondents. The results of this study indicate the effect of 30 minutes of walking exercise on reducing blood sugar levels in people with diabetes mellitus. This is proven by walking for 30 minutes can reduce blood sugar levels in people with diabetes mellitus.

Research conducted Fahrnunisa, E, R Setyowati (2019) shows that during the pre-test and post-test the average blood sugar level before a leisurely walk was 194.17 mg / dl. while the mean of blood glucose after a leisurely walk was 182.7 mg / dl. This is because during physical activity, brisk walking can cause glucose in the body to be used through the work of the insulin hormone due to the increased sensitivity of insulin receptors in muscles during exercise to produce energy. Regular exercise can reduce insulin resistance so that insulin can be used better by the body's cells and can lower blood sugar levels.

Likewise with (Fauzi, 2013) states that research conducted on moderate walking and high walking shows a decrease in blood sugar levels in diabetes mellitus patients (blood sugar when <250 mg / dl). It can be concluded that there is an effect of moderate and high intensity walking on reducing blood sugar levels in diabetes mellitus patients. Exercise, in this case walking with moderate intensity, is more recommended for people with diabetes mellitus. This can lower blood glucose because it can increase muscle glucose compared to the release of hepatic glucose.

By doing walking, it is possible to prevent increased insulin resistance, glucose intolerance and obesity.

This study is also supported by the research conducted (Nurayati & Adriani, 2017) which states that there is a relationship between physical activity and fasting blood sugar levels in diabetics. 62.9% of respondents have low activity and as many as 58.0% of respondents have fasting blood sugar levels in the high category. The results of this study show that there is a relationship between physical activity and fasting blood sugar levels in diabetes mellitus sufferers, it is better if diabetes mellitus sufferers can apply physical activity. good and routine

such as cycling or walking 3-4 days a week with 20 minutes every day and reducing sitting activity so that fasting blood sugar levels are controlled

CONCLUSION

There is an effect of physical activity of brisk walking with diabetes mellitus on controlling blood sugar levels in the working area of the Puskesmas Tamalanrea Makassar City with a statistical test, the value of $p = 0.023 < Q 0.05$

SUGGESTION

For respondents as information: the importance of proper and correct physical activity. For further researchers: subsequent researchers can continue further in-depth research using different methods and a larger number of samples so that better results are obtained for the advancement of science in the future. The results of this study are also expected to be used as a comparison in conducting research that is in line.

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