

THE EFFECT OF BRISK WALKING EXERCISE ON REDUCING SUGAR LEVELS IN TYPE 2 DIABETES MELLITUS PATIENTS AT EAST KOLAKA DISTRICT HOSPITAL

Dedi Indrawan Saputra¹, Iwan Teba¹, Herna Halim¹, Muh. Imam Subekti¹

¹Master's Study Program Of Public Health, Faculty of Public Health Sciences, Mandala Waluya University, Kendari.

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Corresponding Author:

Dedi Indrawan Saputra

Email:

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ABSTRACT

Diabetes mellitus is a group of metabolic diseases with the characteristics of hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action or both. The purpose of this research is to determine the effect of Brisk walking exercise on reducing blood sugar levels in type 2 diabetes mellitus patients at East Kolaka Regency Hospital. This type of research is quantitative using a pre-experimental design with a one-group pretest-posttest design approach. The research samples were patients diagnosed with diabetes mellitus type 2 at East Kolaka Regency Hospital with a total sample of 14 people. The sampling technique used is 2015purposive sampling. The results of the statistical test obtained the average value of blood sugar levels before the intervention (pretest) was 220.36 mg/dl while the average value of blood sugar levels after the intervention (posttest) was 190.64 mg/dl. The results of the Paired t-test statistical test obtained a p value of 0.000 which means that the p value \leq alpha value of 0.05 which means that H_0 is rejected and H_1 is accepted. Thus, it can be concluded that there is an effect on Brisk walking exercise on blood sugar level values in patients with type 2 diabetes at East Kolaka Regency Hospital.

INTRODUCTION

Degenerative diseases in the world experience an increase in the number of cases every year. One degenerative disease whose prevalence is always increasing is diabetes mellitus. Diabetes Mellitus (DM) according to the American Diabetes Association (2018) is a condition where there is an increase in sugar levels in the blood, often referred to as diabetes because the concentration of sugar or sugar in the blood exceeds normal conditions, diabetes mellitus is a disease that cannot be cured. and carry it for life. DM sufferers are generally unaware of this disease condition and when it is discovered that complications have occurred (1,17)).

In 2021, the International Diabetes Federation (IDF) recorded that 537 million adults (aged 20 - 79 years) or 1 in 10 people live with diabetes worldwide. Diabetes also causes 6.7 million deaths or 1 every 5 seconds. IDF notes that 4 out of 5 people with diabetes (81%) live in low- and middle-income countries. This is also what makes the IDF estimate that there are still 44% of adults with

diabetes who have not been diagnosed. Indonesia is in fifth position with the number of cases of diabetes sufferers of 19.47 million. There was an increase of 81.8 percent compared to the number in 2019, in fact, it is the only one in Southeast Asia that is included in the top 10 countries with the most diabetes cases. With a population of 179.72 million, this means the prevalence of diabetes in Indonesia is 10.6% (6,7).

Based on the 2020 Diabetes Mellitus Data and Information Center, almost all provinces in Indonesia experienced an increase in the prevalence of diabetes mellitus in 2013-2018. The description of the prevalence of diabetes mellitus by province in 2018 also shows that Southeast Sulawesi province has a prevalence of diabetes cases of 1.3% (7,10). Based on the results of the 2018 Southeast Sulawesi Province Riskesdas, the prevalence of diabetes mellitus in East Kolaka Regency based on doctor's diagnosis in residents of all ages was 0.88%.

Based on data obtained at the East Kolaka District Hospital in May 2023, diabetes mellitus was included in the list of the 10 biggest disease cases in the East Kolaka District Hospital. Diabetes mellitus in the last 3 years has continued to increase in the number of cases, where in 2020 there were 14 cases, in 2021 there were 26 cases, and in 2022 it increased by 66 cases, divided into 28 cases of type 1 DM and 38 cases of type 2 DM. The number of diabetes mellitus patients from January to April 2023 is 21 patients.

The phenomenon of increasing prevalence of Diabetes Mellitus Patients from year to year will certainly cause some risks thus prevention and control of Diabetes Mellitus is needed for patients who already have risks are able to control them in order not to suffer from diabetes mellitus, and patients who already suffer from it can control their disease so that complications do not occur(3,4).

Diabetes mellitus is caused by several things including genetics, birth weight, stress, age, diet and lack of physical activity. One of the most common causes of diabetes mellitus, according to Laila & Merryana (2017), is due to lack of physical activity. One example is sitting for a long time in front of the TV and lazing around. Type 2 diabetes mellitus patients who have such activities can be a factor in uncontrolled blood sugar levels (5,10). The management of type 2 DM is called the 4 pillars of type 2 DM management, including nutritional therapy, physical activity, pharmacological therapy and education. One physical activity therapy that can be given to diabetes mellitus sufferers is the brush walking exercise (16,18).

Walking Exercise is a form of simple physical activity that is highly recommended for people with diabetes mellitus. According to the Caribbean Public Health Agency (CPHA) in 2019, walking exercise is a simple physical activity that can be carried out in a structured and planned manner to maintain or improve health by walking and swinging the arms according to the rhythm of the walk, free movement of the whole body as a sign and function of movement. to stimulate various organs and body systems (17,8).

Setiyani (2020) in their research stated that physical exercise is an important non-pharmacological intervention in the management of patients with type 2 diabetes mellitus(13). Among various forms of physical exercise, walking is widely accepted by type 2 diabetes mellitus patients because of its low cost, its security profile and comfort. A randomized controlled trial cross-over shows that the training is progressing Short-term intervals may improve continuous sugar monitoring derived from glycemic control measures in type 2 diabetes patients.

METHODOLOGY

The research design is applied with quantitative using a Pre-experimental design research design with a one group pretest-posttest design approach(2). According to Nursalam (2016) pre-experiment is a research design used to find the effect of research involvement in manipulating

independent variables in the research to be conducted(9,11). Subjects are observed before the intervention is given, by giving a pre-test and then observed to determine the effects of the treatment or intervention that has been given (16).

This research was conducted at the East Kolaka District Hospital. There are 21 patients diagnosed with type 2 diabetes mellitus at the Kolaka Regency Regional Hospital. The sample was 14 people taken using purposive sampling technique. This research aims to determine the effect *Brisk walking exercise* on reducing blood sugar levels in type 2 diabetes mellitus patients at East Kolaka District Hospital.

RESULTS AND DISCUSSION

The results of this research can be seen from the table presented below.

Table 1. Frequency Distribution of Respondent Characteristics Based on Age, Gender, Education and Occupatio

| Characteristics Respondent | Category | | |
|----------------------------|--------------------|----|---------------|
| | | n | Percentage(%) |
| Age | 30-45 | 3 | 21,4 |
| | 46-60 | 8 | 57,1 |
| | >60 | 3 | 21,4 |
| Total | | 14 | 100 |
| Gender | Man | 5 | 35,7 |
| | Woman | 9 | 64,3 |
| Total | | 14 | 100 |
| Educational Background | Primary School | 2 | 14,3 |
| | Middle School | 5 | 35,7 |
| | Senior High School | 5 | 35,7 |
| | College | 2 | 14,3 |
| Total | | 14 | 100 |
| Occupation | Housewife | 7 | 50,0 |
| | Farmer | 3 | 21,4 |
| | Self-Employed | 2 | 14,3 |
| | Civil Servant | 2 | 14,3 |
| Total | | 14 | 100 |
| Religion | Islam | 11 | 78,6 |
| | Hindu | 3 | 21,4 |
| Total | | 14 | 100 |

Based on the table above, it is known that the majority of respondents were 46-60 years old, 57.1%. Regarding gender, the majority of respondents were female, namely 64.3%. Respondent education for elementary school and tertiary education was 14.3% each and for respondents with junior high school and high school education each 35.7%. Most of the respondents work as housewives (housewives) at 50.0%. For religion, the majority of respondents were Muslim, namely 78.6%.

Table 2. Description of Blood Sugar Level (mg/dl) Before doing *Brisk Walking Exercise*

| Variable | n | Average | Df | BSL Minimum & BSL Maximum | Standard Deviation |
|-------------------------------|----|---------|----|---------------------------|--------------------|
| Pre test of Blood Sugar Level | 14 | 220,36 | 13 | 171 mg/dl dan 263 mg/dl | 26,552 |

Based on the table above, it is known that the blood sugar level before doing the Brisk walking exercise, shows that the average blood sugar level (BSL) is 220.36 mg/dl with df 13, the minimum BSL is 171 mg/dl, the maximum BSL is 263 mg/dl.

Table 3. Description of Blood Sugar Levels (mg/dl) After Doing Brisk Walking Exercise

| Variable | n | Average | Df | BSL Minimum & BSL Maximum | Standard Deviation |
|------------------------------|----|---------|----|---------------------------|--------------------|
| Pretest of Blood Sugar Level | 14 | 190,64 | 13 | 152 mg/dl dan 210 mg/dl | 26,552 |

Based on the table above, it is known that the blood sugar level after doing Brisk walking exercise, shows that the average blood sugar level (BSL) is 190.64 mg/dl with df 13, the minimum BSL is 152 mg/dl, the maximum BSL is 210 mg/dl. The result shows that after doing Brisk walking exercise, there is a decrease in the average blood sugar level in Type 2 DM patients.

Table 4. The results of a normality test of BSL respondents' before and after doing Brisk Walking Exercise

| No | Group | Normality Test (P Value) |
|----|---------------|--------------------------|
| 1 | BSL Pre test | 0,200 |
| 2 | BSL Post test | 0,200 |

Based on the table above, it is known that the results of the pre-test BSL value data $p = 0.200$ while the post-test BSL value $p = 0.200$. From these data, it can be concluded that the blood sugar levels before and after doing Brisk walking exercise are normally distributed with a reference value of $p > 0.05$.

Table 5. The effect of Brisk Walking on Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus at East Kolaka District Hospital

| BSL Variance | n | df | t | P Value |
|--------------------------------|----|----|-------|---------|
| BSL pre test dan BSL Post Test | 14 | 13 | 7,173 | 0,000 |

Based on the table above, it is known that the results of the Paired t-test statistical test obtained p value of 0.000, which means that p value = alpha value of 0.05, which means that H_0 is rejected and H_1 is accepted. Thus, it can be concluded that there is an effect of doing Brisk walking exercise on Blood Sugar Levels in Patients with Type 2 Diabetes Mellitus at East Kolaka District Hospital.

Discussion

Characteristics of Respondents Suffering from Type 2 DM at East Kolaka District Hospital

The results of this research shows that most respondents are aged 46-60 years, around 57.1%. Increasing age makes the body get insensitive to insulin or sugar levels. This condition causes insulin in the body not to be used properly, in addition, increasing age also decreases physical activity so that the risk of diabetes increases. Type 2 DM occurs in middle-aged adults, but mostly occur with people who are more than 45 years, this is associated with a decrease in physiological function, metabolism and organs function due to the aging process, so that disease will easily attack. One of the changes is that the body becomes more passive, thus making the body vulnerable to get diabetes.

About gender, most of the respondents are female around 64.3%. Women are more likely to suffer from diabetes than men. It is caused physically, women have more chance of increasing their body mass index. Moreover, women tend to be less active thus they do not use much carbohydrates or

sugar for physical activity that can increase sugar levels in the body. An unbalanced diet and lifestyle can lead to a number of health issues, cause of the high number of women getting diabetes.

Distribution of respondents based on educational background in this research are graduated from primary school and college, around 14.3% for each, while respondents who are graduated from secondary school and senior high school, 35.7% for each. According to researchers, the low level of education of diabetes sufferers will certainly affect their knowledge in managing the disease and the motivation also has relation to the level of it. People with a high level of education usually tend to have better knowledge about the disease they feel, so that sufferers will have a higher awareness in managing the disease they suffer from.

Most of the respondents are housewives around 50%. According to researchers, housewives who stay at home every day, their physical activity is not as much as men who work. Their activities such as sweeping and mopping the floor do not affect the level of stability of blood sugar levels in DM sufferers, doing physical activities to make the body active, such as walking regularly is highly recommended to prevent diabetes for housewives.

Overview of Blood Sugar Level Values Before Being Done *Brisk Walking Exercise*

Blood sugar levels before doing *Brisk walking exercise*, shows that the average blood sugar level (BSL) was 220.36 mg/dl with df 13, minimum BSL was 171 mg/dl, maximum BSL was 263 mg/dl. Referring to these results, it shows that the average blood sugar level of respondents is included in the high category (>200 mg/dl). According to researchers, the high blood sugar levels of diabetes mellitus sufferers are based on their jobs, thus most of the respondents are housewives around 56%. Their activities such as sweeping and mopping the floor do not affect the stability of blood sugar levels of DM sufferers.

This is in line with research conducted by Egi Permana, et al (2021) entitled the effect of walking physical activity on blood sugar levels in diabetes mellitus patients in the region work at the Cianjur City Health Center, it was found that the average blood sugar level of patients before physical activity on foot was 252 mg/dl, the standard deviation was 31.470, the minimum value was 212 and the maximum value was 307 mg/dl. This shows that high blood sugar levels are due to lack of physical activity on foot. Respondents only do physical activity twice a week, respondents mostly do daily activities such as sweeping and mopping the floor. After that the respondent just lay down and sat without doing other activities.

Overview Of Blood Sugar Level Values Once Done *Brisk Walking Exercise*

Blood sugar level after doing *Brisk walking exercise*, shows that the average value of blood sugar levels (BSL) is 190.64 mg/dl with a df of 13, the minimum BSL is 152 mg/dl, the maximum BSL is 210 mg/dl. From the research data, it shows that after doing the *Brisk Walking Exercise* there was a decrease in the average value of blood sugar levels in Type 2 DM sufferers.

According to researchers, there was a decrease in the average blood sugar levels of respondents after it was carried out *Brisk walking exercise* show that *Brisk walking exercise* It has an important role in stabilizing blood sugar levels in diabetes mellitus sufferers which can increase insulin sensitivity. This is in line with research conducted by Yurida and Zaqqyah Huzaifah (2019) entitled the effect of walking on blood sugar levels in patients with type 2 diabetes mellitus. From the results of the study it was found that after carrying out physical activity on foot there was a decrease in the average patient's sugar levels. diabetes mellitus, and the results of statistical tests show that there is an effect of walking on the blood sugar levels of patients with type 2 diabetes mellitus. The effect of doing physical activity on foot is closely related to the sugar burning system in the blood through the action of insulin, which converts sugar into energy.

Influence *Brisk Walking Exercise* on Blood Sugar Levels of Type 2 DM Patients at East Kolaka District Hospital

Based on the research results, it shows that there is a difference in the average of blood sugar levels before and after doing brush walking exercise, the average value before the intervention was 220.36 and the average value after the intervention is 190.64. This shows that once done the brush walking exercise activity of most respondents experienced a decrease in blood sugar levels. This condition illustrates that there is an improvement in blood sugar levels which has an effect on reducing body function disorders due to diabetes mellitus.

According to researchers, by doing physical exercise *Brisk walking exercise* optimally, of course it will have an effect on improving blood sugar levels in diabetes mellitus sufferers which can minimize the occurrence of complications from diabetes itself. *Brisk walking exercise* is a form of simple physical activity that is highly recommended for diabetes mellitus sufferers because it is proven to be easy to do, safe and of course does not cost a lot of money to carry out this activity.

Brisk walking exercise or Walking regularly for 30 minutes a day, 2-3 times per week which uses muscles, especially leg muscles to move from one place to another can stabilize blood sugar levels for people with type 2 DM.

Brisk walking exercise carried out in this study for 30 minutes. The results of data analysis in this study show that the average value of blood sugar levels in type 2 DM sufferers before and after intervention showed a decrease in blood sugar levels and from the results of statistical tests *Paired t - test* value is obtained $p=0,001$ ($p<0,05$) which means H_0 is rejected or H_1 is accepted, then it can be concluded that there is an influence *Brisk walking exercise* on the value of blood sugar levels in type 2 DM sufferers.

CONCLUSION

Overview of blood sugar levels before being done Brisk walking exercise, shows that the average value of blood sugar levels (BSL) 220,36 mg/dl with df 13, minimum BSL is 171 mg/dl, maximum BSL is 263 mg/dl.

Image of the blood sugar level value after being done Brisk walking exercise, shows that the average value of blood sugar levels (BSL) is 190.64 mg/dl with a df of 13, the minimum BSL is 152 mg/dl, the maximum BSL is 210 mg/dl. From the data from this research shows that once done Brisk walking exercise there was a decrease in the average value of blood sugar levels in people with type 2 diabetes mellitus.

There is effect between Brisk walking exercise on the value of blood sugar levels in type 2 DM sufferers at East Kolaka District Hospital in 2023 with a value of $p = 0.000$ ($p < 0.05$) thus it can be concluded that H_1 is accepted.

REFERENCES

1. Abdullah, P. M. (). Living in the world that is fit for habitation : CCI's ecumenical and religious relationships. In Aswaja Pressindo.
2. Fauzi, A., & dkk. (2022). Research methodology. In Suparyanto and Rosad (2015).
3. Febrinasari, R. P., Sholikah, T. A., Pakha, D. N., & Putra, S. E. (2020). Diabetes Mellitus Handbook for Laymen (Print 1, Edition 1). Surakarta: UNS Press, November.
4. Gayatri, R. W., Kistianita, A. N., Virrizqi, V. S., & Sima, A. P. (2019). Diabetes Mellitus in Era 4.0. In Wineka Media.
5. Hati, Y., & Muchsin, R. (2022). The Effect of Brisk Walking on Blood Sugar Levels in Type II Diabetes Mellitus Patients. Effect of Brisk Walking on Blood Sugar Levels in Patients with Type II Diabetes Mellitus. 16(1), 74-79.

6. International Diabetes Federation. (2021). The Fifth Largest Number of Diabetes Sufferers in Indonesia in the World. Article, 1.
7. Indonesian Ministry of Health. (2020). Infodatin remains productive, prevents and treats Diabetes Mellitus 2020. In Indonesian Ministry of Health Data and Information Center (pp. 1-10).
8. Marasabessy, N. B., Nasela, S. J., & Abidin, L. S. (2020). Type 2 Diabetes Mellitus (DM) Prevention Module. In Nasya Expanding Management.
9. Notoatmodjo, S. (2018). Health Research Methodology. Jakarta: Rineka Cipta.
10. Novitasari, D., Cindy, A., Afni, N., & Kartina, I. (2021). The Effect of Brisk Walking Exercise on Current Blood Sugar Levels in Type 2 Diabetes Mellitus Patients in the Working Area of Boyolali Health Center Ii. 001, 1-13.[http://eprints.ukh.ac.id/id/eprint/2629/1/PUBLICATION MANUSCLE_DEWI_NOVITASARI_S17065_S17B.pdf](http://eprints.ukh.ac.id/id/eprint/2629/1/PUBLICATION_MANUSCLE_DEWI_NOVITASARI_S17065_S17B.pdf)
11. Nursalam. (2016). Concept and application of nursing science research methodology. Jakarta: Salemba Medika.
12. Sahir, S. H. (2022). This book was written by a Lecturer at the University of Medan Area. Copyright is protected by law. It has been deposited into the UMA Repository on January 27, 2022.
13. Setiyani, O. S. (2020). Brisk Walking Application Controls Blood Sugar Levels in Type 2 Diabetes Mellitus Wound Sufferers. Muhammadiyah University of Magelang, 1 -56.
14. Simatupang, A. (2019). Monograph. Clinical pharmacology of drugs for Diabetes Mellitus Type 2. In Fk Uki.
15. Soelistijo, S. (2021). Guidelines for the Management and Prevention of Adult Type 2 Diabetes Mellitus in Indonesia 2021. Global Initiative for Asthma, 46. www.ginasthma.org.
16. Tindaon, P. A. I. (2020). The Effect of Walking Physical Exercise on Reducing Blood Sugar Levels in Type II Diabetes Mellitus Sufferers in the Gambir Baru Kisaran Health Center Area in 2020.
17. V.A.R.Barao, R.C.Coata, J.A.Shibli, M.Bertolini, & J.G.S.Souza. (2022). The Influence Of Walking Exercise On Blood Sugar Levels Values In Type 2 Diabetes Mellitus Patients In The Intare Room Of Tugu Jaya Hospital, Ogan Komering Ilir District, 2022. In Braz Dent J. (Vol. 33, Issue 1).
18. Decroli, E. (2019). Diabetes Mellitus Type 2. Padang: Publishing Center for Internal Medicine, Faculty of Medicine, Andalas University, Padang
19. Abdussamad, Z. (2021). Qualitative Research Methods. Makassar: Syakir Media Press