

Original Article

The Effect of a Combination of Brisk Walking Exercise and Bay Leaf Decoction on Changes in Blood Sugar Levels in Diabetes Mellitus Patients

Siti Badriah^{1,2*}, Ridwan Chandra Permana¹, Syaukia Adini¹, Ridwan Kustiawan¹, Iwan Somantri¹

¹ Poltekkes Kemenkes Tasikmalaya, Tasikmalaya, West Java, Indonesia

² Center of Excellence Health and Disaster Emergency (HADE) Center, Poltekkes Kemenkes Tasikmalaya, West Java, Indonesia

(Correspondence author email, siti.badriah@dosen.poltekkestasikmalaya.ac.id)

ABSTRACT

Diabetes mellitus is a clinical condition of metabolic disease characterized by an increase in blood sugar levels or called hyperglycemia due to failure of insulin secretion, insulin performance or both. Management of diabetes mellitus can be helped non-pharmacologically in the form of brisk walking exercises and boiled bay leaves. This research aims to determine the effect of a combination of brisk walking exercise and boiled bay leaves on reducing blood sugar levels in people with type 2 diabetes mellitus. This type of research is quasi-experimental with pretest - posttest with control group. The instruments used were an observation sheet and a glucometer set. Sampling used probability sampling with purposive sampling consisting of 38 respondents for the intervention group and 38 respondents for the control group. The data analysis used was the Wilcoxon test and the Mann-Whitney test. The results showed a significant reduction in blood sugar levels in the intervention and control groups. However, there was a significant reduction in blood sugar levels in the intervention group with a p-value of 0.000. This study concluded that there was an effect of the combination of brisk walking exercise and boiled bay leaves on reducing blood sugar levels in people with type 2 diabetes mellitus.

Keywords: Brisk Walking Exercise, Salam Leaf Decoction, Blood Sugars Levels, Diabetes Mellitus

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INTRODUCTION

Diabetes mellitus (DM) is a clinical condition of metabolic disease characterized by increased blood sugar levels or hyperglycemia caused by failure of insulin secretion, insulin performance or both. Diabetes mellitus is divided into 2 types, namely type 1 and type 2 diabetes mellitus. In type 2 diabetes mellitus, the insulin produced by the pancreas does not function properly, and type 2 diabetes mellitus sufferers are known as Non-Insulin Dependent Diabetes Mellitus (NIDDM) namely the

condition of cells not depending on insulin from outside the body ¹. Type 2 diabetes mellitus can cause death and acute even chronic complications such as coronary heart disease, microvascular disease down to small blood cells, macrovascular disease, sensory nerve neuropathy and can even affect the extremities ¹.

According to the World Health Organization (WHO) in 2018, the incidence of diabetes mellitus sufferers worldwide was 422 million people, in that year there was an increase in sufferers of the disease with a

percentage of 8.5% with the proportion of type 2 diabetes mellitus being 93%. , with a majority adult population and estimates that deaths from diabetes mellitus will be around 2.2 million people, which will even continue to increase until around 600 million people in 2035. Based on this data, Indonesia is ranked 4th after China, India and the United States. The World Health Organization estimates that diabetes mellitus sufferers in Indonesia will increase by 2030 by 21.3 million people ². Of the sufferers of type 2 diabetes mellitus, the majority are women compared to men⁷. Diabetes mellitus is spreading in various regions of Indonesia, one of which is West Java province with 73,285 people. Tasikmalaya is one of the cities in West Java Province, the number of diabetes mellitus sufferers in Tasikmalaya City in 2022 will be 7,438 people, in the working area of the Kersanagara Community Health Center, Cibereum District there are 422 people with it ranking 5th in Tasikmalaya City ³. Apart from that, there are an increase in the number of cases of elderly diabetes mellitus sufferers from 313 people in 2013 to 570 in 2014 at RSUD dr. Soekardjo, Tasikmalaya City ⁴.

Based on preliminary studies conducted by researchers and several studies, one of the factors that supports the increase in diabetes mellitus sufferers is economic factors. In line with research conducted by (Musdalifah, 2020) in his research, economic level can be protective against diabetes mellitus⁵.

Based on this phenomenon, with the increase in diabetes mellitus sufferers, efforts are needed to control and control blood sugar by implementing the 4 pillars of diabetes mellitus management, one of which is physical activity⁶. Physical activity is one of the efforts that is easier for society in general, because physical activity does not require financial expenditure, which is one of the factors in the increase in diabetes mellitus sufferers.

By practicing physical activity, blood sugar will more easily enter the cells and cause the HbA1c concentration to decrease, this can anticipate and reduce the risk of complications. Physical activity training is said to be good if it meets the requirements, namely continuous, rhythm, interval, progressive, endurance (CRIPE). One physical activity that meets these requirements is the Brisk Walking Exercise, this physical activity is walking with an increased speed compared to normal walking and there is the same rhythm in each step⁷.

Regarding exercise, physical activity or exercise is very important in increasing muscle sensitivity to insulin so that it can reduce the occurrence of insulin resistance⁸.

Brisk Walking Exercise can reduce blood sugar levels in people with type 2 diabetes mellitus by walking for 1 week 3 times with a duration of 25 - 20 minutes in each exercise, this physical activity was given to 21 people who had blood sugar levels > 200 mg /dl and after doing these activities there was a decrease in 14 people with blood sugar < 200 mg/dl and 7 people > 200 mg/dl⁷.

Another appropriate study, namely by (Amrullah, 2017), showed a decrease in blood sugar levels after walking exercise intervention for 2 weeks in the treatment group with an average of 201.17 compared to the control group⁹. To control and control blood sugar levels, apart from physical activity, you can also consume boiled bay leaves. Someone who drinks boiled bay leaves with 5 bay leaves and 300 cc of water can lower blood sugar levels. The bay leaf decoction was given to 18 people and after being given the bay leaf decoction there was a decline in 12 people¹.

The results of a preliminary study in the Working Area of the Kersanagara Community Health Center, Cibereum District, Tasikmalaya City, the therapy given to type 2 diabetes mellitus sufferers was by participating in prolanis activities only with education, checking blood sugar levels, diabetes exercises and pharmacological therapy, but the results of these checks were still many sufferers. diabetes mellitus with high blood sugar levels, and the results of interviews with several people who participated in the prolanis program showed that the cause of the high blood sugar levels was that they rarely did physical activity.

Based on the above phenomenon, the author took the study title "The Effect of the Combination of Brisk Walking Exercise and Boiled Bay Leaves on Reducing Blood Sugar Levels in Type 2 Diabetes Mellitus Sufferers" with the research formulation whether there is an effect of the combination of Brisk Walking Exercise and Boiled Bay Leaves on reducing blood sugar levels. in people with type 2 diabetes mellitus? The aim of the research is to analyze the effect of the combination of Brisk Walking Exercise and Bay Leaf Boil on reducing blood sugar levels in people with type 2 diabetes mellitus.

METHOD

This type of research is quasi experimental by conducting a pretest - posttest with a control group. The research was conducted in the Kersanagara Community Health Center Working Area, Cibereum District, Tasikmalaya City and the research period was 2 weeks starting from 9 – 24 May 2023. The population in this study was 422 people suffering from type 2 diabetes mellitus. The sample was determined using the Lemeshow formula and the results obtained were 34 respondents for each group. In anticipation of dropout, 10% was added so that the number of respondents in this study was 38 in the intervention group and 38 in the control group, with a total of 76 respondents.

The sampling technique used in this study was Probability Sampling with the Purposive Sampling method based on predetermined inclusion criteria, namely people who suffer from type 2 diabetes mellitus and are adults (25 – 59 years old), people who have blood sugar levels above the normal limit (140 mg/dl)¹⁰. The data collection technique used by the author in this research is observation techniques and using a glucometer set. During the preliminary study, observation and interview techniques were used, the pre-test used an observation sheet and a glucometer set, during the intervention, a measuring cup, bay leaves were used, and during the post-test, an observation sheet and a glucometer set were used. Data analysis uses univariate and bivariate. In univariate analysis uses the Wilcoxon test and bivariate uses the Mann – Whitney test.

This study has obtained a letter of ethical test from the ethics committee of the Tasikmalaya Poltekkes with no. DP.04.03/16/95/2023. Ethical implementation has been carried out during the study by giving respondents the freedom to be involved or not in this study by providing an informed consent sheet. The researcher also guarantees the confidentiality of the respondent's identity and the data collection results and that the actions taken in this study are not harmful to respondents.

RESULTS

Table 1. Characteristics of Respondents Based on Age, Gender, Education, Economic Status and Length of Suffering from Type 2 Diabetes Mellitus.

Variable	Intervention Group (n=38)	Control Group (n=38)
Age	26–30 Year	-
	31–35 Year	3
	36–40 Year	1
	41–45 Year	6
	46–50 Year	8
	51–55 Year	8
	56–60 Year	12
Gender	Male	9
	Female	29
Education	Elementary School	15
	Junior High School	11
	Senior High School	12
Economic status	Low	19
	Middle	18
	Upper	1
Duration of DM	< 1 Year	19
	1 – 2 Year	7
	> 3 Year	12

Based on the table above, in both groups the majority of respondents were aged 56 – 60 years and the majority were female with elementary school education, and had a monthly income or low economic status (<Rp. 1,500,000) and the majority had a history of diabetes mellitus. type 2 less than 1 year. A person with low income or economic income can influence their lifestyle in controlling blood sugar in terms of the food consumed, because a higher income can be a protection against diabetes mellitus.

Table 2. Comparison of reduction in blood sugar levels in the control group and intervention group

	Blood Sugar Value Min.	Blood Sugar Value Max.	Mean	Std. Dev.
Intervention Group				
Pre Test	168	482	256.32	70.627
Post Test	133	359	219.89	70.627
Control Group				
Pre Test	101	168	142.68	17.757
Post Test	109	175	138.03	16.182

Based on table 2 above, it appears that there was a decrease in blood sugar levels in both the intervention and control groups, however there was a significant decrease in the intervention group with an average decrease of 36.43 mg/dl.

Table 3. Analysis of the Effect of Applying a Combination of Brisk Wlaking Exercise and Bay Leaf Boil in the Intervention Group

Variable	<i>p.value</i>	Conclusion
Pretest – Posttest Intervention Group	0.000	There is an Influence

**Wilcoxon*

The Wilcoxon test results show a p-value of 0.000, which shows that there is a significant effect of the combination of brisk walking exercise and boiled bay leaves on reducing blood sugar levels.

Table 4. Analysis of Decrease in Posttest Blood Sugar Levels for Control Group and Intervention Group with the Application of a Combination of Brisk Wlaking Exercise and Bay Leaf Boil

Variable	<i>p.value</i>	Conclusion
Posttest of Control Group and Intervention Group	0.000	There was a Significant Decrease in the Intervention Group

**Mann-Whitney*

The table above regarding the analysis of the reduction in posttest blood sugar levels in the control group and intervention group using the Mann-Whitney test, obtained a p-value of 0.000. in the Mann-Whitney test, if the p-value is <0.005, then the hypothesis is accepted or there is a significant decrease between the intervention group and the control group.

DISCUSSION

1. Characteristics of Respondents Based on Age, Gender, Education, Economic Status and Length of Suffering from Type 2 Diabetes Mellitus

In this study, the majority of respondents were elderly. A person who has reached adulthood or is more than 40 years old will experience several diseases with age risk factors, one of which is diabetes mellitus. Because at that age the body will begin to be

susceptible to diseases known as degenerative, degenerative in diabetes mellitus, namely a decrease in the function of beta cells in the pancreas which produce insulin and reduced performance of insulin in the body¹¹. In line with several studies that have been carried out regarding "reducing sugar levels blood in type 2 diabetes mellitus patients with physical activity", in his research showed that most of the respondents were early elderly (53 - 65 years), according to him, at that age they had entered a degenerative stage which could affect body function, these changes were related to a decrease in the value of mass muscle, vascular changes, and reduced activity¹². In the elderly it is also a factor in health problems, one of which is diabetes mellitus¹³. This research is in line with research conducted by Gunawan in 2019 that those over 45 years old have an 8 times risk are more affected by diabetes mellitus than people aged less than 45 years¹⁴.

The majority of respondents in this study were female. Gender is one of the factors that causes a person to experience diabetes mellitus. According to him, women are more at risk of developing diabetes mellitus because women are prone to weight gain, rarely do physical activity, and women experience a period of monthly cycle syndrome, after a woman experiences menopause which can cause the distribution of fat in the body to accumulate, so that they can be at risk of developing diabetes mellitus¹⁵. This research is in accordance with what was conducted by A-Hadi in 2020, that the prevalence of diabetes mellitus sufferers is women compared to men with a ratio of 58 people and 23 people¹⁶.

Regarding the education that the respondents in this study had completed, it was elementary school. Experts say that diabetes mellitus sufferers have low levels of education, this could be due to a lack of broad and specific knowledge about health, so that people cannot maintain their health well. This research is in line with research conducted by Silalahi et al., (2019), education is an important factor in living life, both health and other aspects. Someone who is highly educated will have more extensive knowledge. Based on this education, it can raise awareness of healthy behavior and be more aware of the risk factors for various diseases, one of which is diabetes mellitus¹⁷.

Regarding the economic status of the respondents, the majority had low economic

status. In line with research conducted by Ramadhani et al., (2019) regarding "the influence of Self-Care on reducing blood sugar levels in type 2 diabetes mellitus patients", in their research it was found that respondents with low economic status were 41.7% of people with low economic status. Low levels can cause a person to have uncontrolled blood sugar. This can happen due to the inability to buy healthy and nutritious food, apart from that, someone with a low economic status can cause someone stress which can lead to weight gain and so on. Thus causing the impact of diabetes mellitus¹⁸. This is in line with research by Musdalifah in 2019 that people with low economic status can be a risk factor for developing diabetes mellitus⁵. This is in accordance with research that has been carried out previously and suggests that low economic status will influence lifestyle that increases the risk of developing diabetes mellitus¹⁹.

The history of diabetes mellitus in most of the respondents in this study was less than 1 year, this occurred due to uncontrolled health by not paying attention to lifestyle and diet. This is in line with research conducted by Hati et al., (2021), in his research the majority were less than 5 years old and revealed that someone who had just experienced and been diagnosed with diabetes mellitus was due to a lack of knowledge regarding controlling and reducing blood sugar levels²⁰.

2. Comparison of the reduction in blood sugar levels in the control group and the intervention group

The results of the research carried out by the author, in the control group and intervention group, there was a decrease in blood sugar levels, in the intervention group the average decrease was 36.43 mg/dl, while in the control group the average decrease was 4.65 mg/dl. In line with research conducted by Irmawati et al., (2022), in their research they used a control group and an intervention group with the application of boiled bay leaves. In the intervention group, more respondents experienced a decrease in blood sugar levels compared to the number of respondents who experienced a decrease in the control group¹.

3. Analysis of the Effect of Applying a Combination of Brisk Walking Exercise and Bay Leaf Boil in the Intervention Group

In the intervention group there was a

significant reduction because they had been given a combination of Brisk Walking Exercise which was carried out for 2 weeks, every week the exercise was carried out 3 times and boiled bay leaves for 14 consecutive days with 5 bay leaves boiled in 900 cc to 300 cc of water. , drink 1 time in 1 day.

This is in line with research conducted by Irmawati et al., (2022). Revealed that consuming 5 bay leaf decoctions totaling 300 cc could reduce blood sugar levels which was carried out on 36 people, 18 people in each group. In the pretest, 9 people found high blood sugar values in the intervention group and 12 people in the control group. After being given bay leaf decoction in the intervention group, there was a decrease in blood sugar levels in 17 people. From these results, it was concluded that the intervention group experienced a decrease in blood sugar levels, while in the control group there were still high blood sugar levels as many as 14 people¹.

From the results of this research, in accordance with research conducted by Hayati (2021), her research revealed that doing physical activity in the form of walking or known as Brisk Walking Exercise can reduce blood sugar levels in people with type 2 diabetes mellitus. In her research, activity This physical exercise was carried out for 2 weeks with 3 exercises each week with a duration of 15 – 20 minutes carried out on 21 people. The value of blood sugar levels before the intervention was given was blood sugar levels above 200 mg/dl and after the intervention there was a decrease in blood sugar levels in 14 people (66.7%) with blood sugar levels < 200 mg/dl, and 7 people (33.3%) still have blood sugar levels > 200 mg/dl⁷.

4. Analysis of the decrease in posttest blood sugar levels in the control group and intervention group using a combination of brisk walking exercise and bay leaf decoction

In the intervention group, apart from a decrease in blood sugar levels, there was a change in the signs and symptoms of diabetes mellitus, namely polyuria. Several respondents from the intervention group said that apart from feeling fitter, there was a reduction in the intensity of urination at night, which was usually 4-6 times, reduced to 3-4 times.

CONCLUSION

The majority of respondents in this study were aged 56 - 60 years, and most were female. The education attained by the majority of respondents was elementary school, most of them had low economic status, the duration of suffering for the majority of respondents was less than 1 year. There was a decrease in blood sugar levels in the control group and intervention group by applying a combination of Brisk Walking Exercise and boiled bay leaves. And there was a significant reduction in the intervention group with the application of the combination of Brisk Walking Exercise and boiled bay leaves compared to the reduction in the control group in sufferers of type 2 diabetes mellitus.

Physical activity training in the form of the Brisk Walking Exercise and boiled bay leaves can be used as additional recommendations in the management of type 2 diabetes mellitus, and used as reading reference material to increase knowledge.

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