



The analysis of reducing blood glucose levels of diabetics with diabetes mellitus by giving a secang wood stew (*Caesalpinia sappan* L.) to menopausal women in Makassar City[☆]



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Abstract

Objective: Being the basis for the creation of products from sappan wood (*Caesalpinia sappan* L.) to reduce and control blood glucose levels and to find out the effectiveness of secang boiled water on the decrease in blood glucose levels of patients with diabetes mellitus at menopause. **Methods:** This research used *quasi-experimental* research method with pre-test and post-test design in one treatment group. It was obtained the result of diabetic's blood glucose level before and after giving treatment (*decoction of sappan wood*) by using this method. The number of samples was 30 respondents (menopausal women). Data collection utilized observation sheets and blood glucose check-up.

Results: The test results showed that there were significant differences between blood glucose levels before and after treatment. It was obtained that $t\text{-count} (10,939) > t\text{-tab} (1,714)$ with a sig value. < 0.05 . There is the Effect of Giving Mixed Secang Wood Decoction (*Caesalpinia sappan* L.), and Aloe Vera Leaves on Blood Glucose in Mice (*Mus musculus*).

Conclusion: Result of paired sample *t*-test was obtained $p = 0.005 < \alpha = 0.05$. It meant that H_0 was rejected or there is the affectivity decoction of sappan wood toward reducing blood glucose level to menopause women with diabetes mellitus in 2018 of Makassar city.

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Introduction

Diabetes mellitus (DM) is a type of degenerative disease that has increased every year in countries throughout the world. According to the International of Diabetic Federation the global prevalence rate of people with DM in 2014 was 8.3% of the total population in the world and experienced an increase in 2014 to 387 million cases. Indonesia is ranked 7th country of diabetes Mellitus as many as 8.5 million sufferers after China, India and the United States, Brazil, Russia, Mexico.¹

Diabetes mellitus is a public health problem, not only in Indonesia but also in the world. This case can be seen by increasing numbers of DM cases in Indonesia, which ranks 4th after India, China, and the United States with 8.4 million sufferers and is expected to increase to 21.3 million people in 2030. In general, almost 80% of the prevalence of diabetes is type 2 diabetes. Diabetes mellitus is known as diabetes in Indonesia. This disease is characterized by increased blood glucose levels (hyperglycemia) that occur due to the body's deficiency of both absolute and relative insulin hormones. High glucose levels can cause blindness, heart disease, and kidney problems.² Good regulation of blood glucose levels in people with DM can delay or even prevent these abnormalities.

DM treatment often done is insulin therapy and antidiabetic oral drugs, but these treatments can have negative effects, such as severe hypoglycemia, nausea, abdominal discomfort, anorexia, and the occurrence of long-term complications that can harm the brain and require expensive costs. So many patients who try to control their blood glucose levels with traditional medicine.³

Menopause is a medical term that states a woman experiences menstrual cessation, which is not having her period again in 12 consecutive months. Menopause is a natural process experienced by every woman who is around 48–54 years old. Menstrual disorders are a result of decreased levels of the hormone estrogen.⁴ There is not the production of estrogen hormone that will cause many health vulnerabilities. The loss of female hormones also causes easy appear degenerative diseases, such as heart disease, hypertension, diabetes, cancer, stroke, osteoporosis.⁵ The hormones estrogen and progesterone also influence the response of body cells to insulin. After menopause, changing body hormone levels can trigger fluctuations in blood sugar levels. This causes blood sugar levels more difficult to be predicted than before menopause. If blood sugar levels are not controlled, it will have a higher risk of diabetes complications).

People who got Diabetes Mellitus achieved 25,145 and became one of 10 diseases that often occur in 2016 of Makassar. It is seen that the number of people with diabetes mellitus increased in two research place so that the authors are interested in examining the effectiveness of secang wood decoction in Diabetes Mellitus especially in menopausal women. The purpose of this study was to obtain the effectiveness of secang wood (*Caesalpinia sappan L.*) boiled water in reducing blood glucose levels in patients with diabetes mellitus, especially menopausal women. Specifically, the objectives of this study include 1. Being the basis for the creation of products from sappan wood (*Caesalpinia sappan L.*) to reduce and control blood glucose levels. 2.

Table 1 Frequency distribution of blood glucose in menopausal women with diabetics mellitus before being treated with secang wood decoction water of Makassar in 2018.

Blood glucose (<i>pre-test</i>)	Frequency	Percentage (%)
<120	1	3.3
121–160	11	36.7
161–200	9	30.0
>200	9	30.0
Total	30	100

Table 2 Frequency distribution of blood glucose in menopausal women with diabetics mellitus after being treated with secang wood decoction water in Makassar 2018.

Blood glucose (<i>post test</i>)	Frequency	Percentage (%)
<120	2	6.7
121–160	12	40.0
161–200	11	36.7
>200	5	16.7
Total	30	100

To find out the effectiveness of secang boiled water on the decrease in blood glucose levels of patients with diabetes mellitus at menopause.

Method

This research was conducted in Makassar, namely at two research places in Antang Public Health Center. The study was conducted in March–June 2018. The research design used by the author in this study was the Quasy-Experiment with one group pretest-posttest design approach. The measurement of blood glucose levels was distributed before giving secang wood decoction and measurements after treatment. Sample of research was 30 patients with diabetes mellitus with menopausal women in the working area of Antang Public Health Center. Furthermore, the bivariate was analyzed to look at the effectiveness of giving sappan wood decoction on blood glucose levels before and after treatment using paired sample t-test

Result

This research was conducted in Makassar in which data collection was conducted from March to September 2018. The result of research was obtained from 30 samples which consisted of 1 treatment group pre and post-test design. Furthermore, the data obtained are presented in tabular form (Table 1) as follows.

Based on Table 1 showed that there was 1 respondent (3.3%) with blood glucose levels < 120 before being treated, 11 respondents (36.7%) with blood glucose levels 121–160, 9 respondents (30.0%) with blood glucose levels 161–200, and 9 respondents (30.0%) with blood glucose levels > 200.

Based on Table 2, it showed that there were 2 respondents (6.7%) with blood glucose levels < 120 before being given treatment, 12 respondents (40.0%) with

Table 3 Results of analysis of blood glucose levels reduction before and after treatment of secang wood decoction in menopausal women with diabetics mellitus in Makassar 2018.

Variable	Group	N	Mean	SD	Value Asymp.sig (2-tailed)
Blood glucose	Before	30	181.47	45.841	$p = 0.005$
	After	30	169.67	38.531	

blood glucose levels 121–160, 11 respondents (36.7%) with blood glucose levels 161–200, and 5 respondents (16.7%) with blood glucose levels >200. This research aimed to determine the effect of Effectiveness before and after being given the treatment after being given a treatment of wood water secang.

Based on Table 3, it described that the mean score of blood glucose level before being given decoction of secang wood is 181.47 with a standard deviation of 45,841. Meanwhile, after being given a secang decoction, mean score was 169.67 with a standard deviation of 38,531. T-test analysis was obtained p -value of $0.005 < \alpha = 0.05$, then H_0 was rejected, which meant that decoction of secang effectively reduced blood glucose levels in patients with Diabetes Mellitus in menopausal women.

Discussion

A woman entering menopause will have a higher risk of experiencing degenerative diseases due to hormonal instability in the body. During menopause, there are usually several metabolic disorders in the body. This metabolic disorder will have an impact in the form of impaired organ function and can trigger various degenerative diseases. A degenerative disease that is often experienced by menopausal women is Diabetes Mellitus.

Unstable hormones in menopausal women's bodies can cause changing of blood glucose levels. The imbalance of estrogen and progesterone hormones in the body can affect the performance of body cells in responding to insulin. If blood glucose levels cannot be controlled, it will increase the risk of sufferers experiencing complications of Diabetes Mellitus. Giving secang boiled water can be one way to reduce blood glucose levels in the body. In the secang wood, the plant contains Brazilin compound which has the function as an antidiabetic. Provision of boiled secang water boiled continuously can be effective way to reduce blood glucose levels in patients with Diabetes Mellitus.⁶

The results of research indicated that there was 1 respondent (3.3%) with blood glucose levels < 120 before being given a treatment (Pre-Test), 11 respondents (36.7%) with blood glucose levels 121–160, 9 respondents (30,0%) with blood glucose levels 161–200, and 9 respondents (30.0%) with blood glucose levels >200. In the post-test after being treatment (given secang wood boiled water) for 7 days continuously, it showed there were 2 respondents (6.7%) with blood glucose levels < 120 that after being treated, 12 respondents (40.0%) with blood glucose levels 121–160, 11 respondents (36.7%) with blood glucose levels 161–200, and 5 respondents (16.7%) with blood glucose levels > 200.

From the univariate analysis, there were still eight respondents who did not experience reducing blood glucose levels after being treated with secang wood boiled water. It was caused that there were three respondents experiencing sleep disorder during treatment. This caused respondents being stress so that blood glucose level in body is not controlled. While 5 respondents have a slow metabolism so that the absorption process in the body was also slow. In the analysis of t-test (paired-sample t-test), the value of $p = 0.005$ was obtained. It was smaller than the value of $\alpha = 0.05$. It meant that H_0 was rejected or the wood boiled water was effective against reducing blood glucose levels in menopausal women with Diabetes Mellitus in Makassar 2018.

The Effect of Giving Secang Wood Decoction Liquid (*Caesalpinia sappan L.*) and Aloe Vera Leaves on Blood Glucose Levels of Mice (*Mus Musculus*).⁷ This research used formula t-test with a test level < 0.05. The test results showed that there were significant differences between blood glucose levels before and after treatment. It was obtained that t-count (10,939) > t-tab (1,714) with a sig. value < 0.05. These results indicated that the null hypothesis was rejected, and the Alternative Hypothesis was accepted. There is the Effect of Giving Mixed Secang Wood Decoction (*Caesalpinia sappan L.*), and Aloe Vera Leaves on Blood Glucose in Mice (*Mus musculus*). Based on the result of research that has been done, researchers assume that there is effectiveness between before and after the provision of secang wood boiled water to patients with Diabetes Mellitus through the Pre-Test and Post Test. This shows that the provision of secang wood boiled water can help reduce blood glucose levels if consumed regularly and maintain a healthy lifestyle.

One of the components in secang extract that has been studied has antihyperglycemic effects, namely brazilin and tannins. The antihyperglycemic effect of brazilin is caused by an increase in peripheral glucose metabolism including glucose transport, glycogen synthesis and binding of insulin in adipose, liver and muscles. The substance brazilin can increase glycolysis and suppress gluconeogenesis in the liver by increasing fructose-2,6-bisphosphate production by increasing levels of fructose-6-phosphate and hexose-6-phosphate in cells. Where fructose-2,6-bisphosphate plays an important role in the regulation of gluconeogenesis and glycolysis in the liver where fructose-2,6-bisphosphate acts as an intracellular signal.²

In addition to suppressing production, brazilin can increase glucose transport in the body by stimulating the translocation of glucose transport from intracellular to the plasma membrane in adipocyte cells. The tannin content in secang extract has inhibitory activity against the α -glucosidase and α -amylase enzymes. Tannins can form complexes with enzyme proteins thereby reducing the

ability of the enzymes α -glucosidase and α -amylase as catalysts in carbohydrate digestion.^{8,9}

Conclusion

Based on the result of research conducted by researchers, it can be concluded that the provision of secang wood boiled water can reduce blood glucose levels in menopausal women who suffer from Diabetes Mellitus. In the paired-sample t-test analysis, It is obtained the value of $p=0.005$. This was smaller than the value of $\alpha=0.05$, It means that H_0 is refused or the Secang Wood Decoction Water is effective against Reducing Blood Glucose Levels in Diabetes Mellitus Patients in Menopausal Women of Makassar in 2018.

Suggestion

Based on conclusion above, it can be given some advice for the people to be expected to maintain diet and rest patterns to maintain metabolic stability in the body. In addition, it can cultivate secang wood plants as herbal plants which can be consumed every day and as an alternative medicine to reduce blood glucose levels in patients with Diabetes Mellitus. Health Workers are expected can socialize information about the use of secang boiled water as an alternative choice to reduce blood glucose levels in people with diabetes mellitus, so they will not depend on expensive medicines.

Conflict of interest

The authors declare no conflict of interest.

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