The Effect of Black Glutinous Rice Soaking on Decreasing Blood Sugar Levels in Patients’ with Type 2 Diabetes Mellitus in Batam

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ABSTRACT

Diabetes Mellitus, as abbreviated as DM, is a chronic disease characterized by an increase in glucose levels in the blood due to insulin damage, which can reduce the amount of glucose that enters into cells. Administration of black glutinous water soaking can reduce the need for chemical drugs, because with minimal resources it can increase the coverage and extend of nursing services without geographic boundaries. This research aimed to determine the effect of black glutinous water soaking on the decrease in blood sugar levels in patient with type 2 diabetes. Research methods used quasi experimental. The sample consisted of 50 respondents and the data were analyzed using the Wilcoxon test. The results showed that the most age in patients with type 2 diabetes mellitus is between the ages of 50-59 years (80%). Gender is most women than men, as many as 35 participants (70%. The blood sugar level of type 2 diabetes mellitus patients’ before giving black glutinous water soaking was 262.72 mg / dl, until the third week there was a significant change, where the blood sugar level had an average of 132.02 mg/dl. The statistical test results obtained between blood sugar levels up to the third week had a p-value <0.05, which is 0.00, it showed that there was an effect of giving black glutinous water soaking to a decrease in blood sugar levels in patients’ with type 2 diabetes.

Keywords: diabetes mellitus type 2, black glutinous water soaking, decrease blood sugar level

**Introduction**

Diabetes mellitus (DM) is a chronic disease characterized by an increase in glucose levels in the blood, that caused by insulin impairment, that lead to reduction the amount of glucose entering the cells, with typical symptoms of polydipsi, polyphagy and polyuri (Black & Hawks, 2014; Lewis, 2014; Ignatavicius & Workman, 2010). The main causes of this, are due to interference in the process of insulin secretion, the action of insulin (insulin resistance), and/or a combination of these two things. Diabetes Mellitus is commonly referred to as the silent killer because the disease can affect all organs of the body and cause varieties of complaints.

Based on data from Riskesdas in 2013 the prevalence of DM is 2.1 percent higher than in 2007 1.1%, estimated in 2030 reached 21.3 million people. People with DM more in urban areas (2.5%) rural areas (1.7%) (Balitbangkes, 2013), with the highest age group is 45-64 years, followed by the age group 65 years and the age group 25-44 years (Ministry of Health, 2012). Treatment of diabetes either orally or by injection in long consumption, can cause side effects on the stomach (Neal, 2002). Non-pharmacological therapy can be used as a complement to obtain the effects of pharmacological treatment (anti-diabetes drugs). Non-pharmacological therapy is proven to stabilize blood sugar levels in people with type 2 diabetes.

One of the non-pharmacological therapy to lower blood sugar levels is to use Indonesian traditional plants, namely black glutinous rice. Black glutinous rice contains secondary metabolite compounds such as: alkaloids, flavonoids, tannins and steroids (Agus, 2016). Black glutinous rice has beneficial effects for the body such as protection against cardiovascular disease, diabetes mellitus, anti-inflammatory, anti-cancer and antioxidants. Flavonoids in black glutinous rice can be used to lower blood glucose levels, namely by inhibiting the work of α-glucokinase enzymes found in the small intestine (Brahmachari, 2011).

**RESEARCH METHODS**

Types of Research

The design used quantitative, with quasi *research method experiment* pre test and post test Without *Control.*

Research Location and Time

This research is located in Botania Health Center. This research was conducted in July – August 2020.

Population and Sample

The research population are all people with Type 2 Diabetes Mellitus. Research sample were 50 Respondents.

**Data Collection**

Selected respondents took measurements of blood sugar levels before being given black glutinous rice soaking drink, 3 spoons of black glutinous rice into 250 cc of warm water, soaked for 1.5 hours. After that respondents consumed black glutinous rice soaking water 2 times a day for a week. After one week, the blood sugar levels was measured for 4 weeks. The study used the Cochran Q test. Data normality test is used to determine the distribution of data. The test used is *kolmogorov test.*

Data Processing and Data Analysis

Grouping was done with the total score of each component determined the mean value. The next data in the analysis of frequency distribution and logistic regression.

**Results**

Table 1. Age Group & Gender

Table 2. The Frequency of Blood Sugar Levels In Clients with *DM*  *TYPE 2* Before The Implementation of Black Glutinous Rice Water Soaking

Table 3. The Frequency of Blood Sugar Level Criteria After Administration of Black Glutinous Rice Water

Table 4. Average Value Of Decreased Blood Sugar Levels Before and After Soaking Black Glutinous Rice Water

Table 5. Statistical Test of Decreased Blood Sugar Levels Before and After Black Glutinous Rice Water Soaking

|  | N | Min | Max | Median | Mean | *p-value* |
| --- | --- | --- | --- | --- | --- | --- |
| Pre Test | 20 | 113 | 243 | 37.451 | 202.40 | 0.000 |
| Post Test | 20 | 72 | 211 | 39.156 | 154.45 |

Discussion

Based on table 1 above it was known that the highest percentage of age in patients with type 2 diabetes mellitus was between the ages of 50-59 years (80%). Based on gender, it was shown that the percentage of people with type 2 diabetes mellitus is more experienced by women, as many as 35 people (70%) compared to men.

Diabetes Mellitus, here in after abbreviated as DM, is a chronic disease characterized by an increase in glucose levels in the blood caused by insulin impairment, that can cause decreasing the amount of glucose entering the cells, with typical symptoms of polydipsi, polyphagy and polyuri (Black & Hawks, 2014; Lewis, 2014; Ignatavicius & Workman, 2010).

According to table 2 and 3, the results analyzes showed that the respondents experienced *DM type 2* at Botania health center, before given implementation of soaking glutinous black rice, 50 respondents had the level of blood glucose on hyperglycemia category, or 100%. After the implementation of giving soaking glutinous black rice, 45 respondents were on normal blood sugar level category (90%) 5 respondents on hyperglycemia, or 10%. The results in table 4, the average blood sugar level of patients with diabetes mellitus type 2, before giving marinade glutinous black rice was 262.72 mg/dl. After given marinade air glutinous black on week first, there was decline to 214.66 mg/dl. On the second week was 191.1 mg/dl, while on the third week there was significant effect, the blood sugar levels have average on 132.02 mg/dL. The test results statistics obtained to the third week, have value *p-value* < 0.05 , that 0.00 showed the effect of the blood sugar level before dan after given marinade glutinous black rice water.

According to the study by Iryani (2017) stated that the fraction of black glutinous rice water resulted from the extraction of 1 Kg of black glutinous rice, obtained as much as 2.1594 grams that were used as anti-diabetes test material with glucose tolerance test method. To find out the dose of black glutinous rice water fraction and the time of effective treatment in lowering blood glucose levels, the measurement data was analyzed by determining the percentage of decreased blood glucose levels. The result of data analysis obtained a percentage decrease in blood glucose levels that in the control group, the percentage decreased blood glucose levels at the 90th minute (PG1) by 36.43%. Then there was a larger decrease in the 150th minute (PG2) of 54.99%. According to research by Agus (2016), said that black glutinous rice is one type of rice containing secondary metabolite compounds such as: alkaloids, flavonoids, tannins, and steroids. Black glutinous rice has beneficial effects for the body such as protection against cardiovascular disease, diabetes mellitus, anti-inflammatory, anti-cancer and antioxidants.

From the data of the research that has been done by Brahmachari (2011) it was appeared that black glutinous rice was able to lower blood glucose levels. The watery extract of black glutinous rice is estimated to contain the active substance flavonoids, where flavonoids can be used to lower blood glucose levels, by the work of α-glucokinase enzymes found in the small intestine. Enzyme α–glucokinase serves to hydrolyze oligosaccharides into monosaccharides present in the walls of the small intestine. Inhibition of the work of this enzyme can effectively reduce the digestion of carbohydrates in the form of large molecules such as polysaccharides and oligosaccharides into simpler molecules such as glucose, so that glucose absorption can be reduced (Ratimanjari, 2011).

**CONCLUSIONS AND SUGGESTIONS**

Based on the research results the conclusion were, the average of patients with diabetes mellitus type 2 before giving marinade air glutinous black was 262.72 mg/dl, after given the soaking glutinous black rice water on the first week declined to 214.66 mg/dl. On the second week, the average was 191.1 mg/dl, while on the third week, the average was significantly decreased to 132.02 mg/dl. The test results statistics showed *p-value* < 0.05, for 0.00 means there was effect between blood sugar level before dan after given marinade glutinous black sticky rice water.

From the results of the study, the recommendation for the health workers, especially nurses, to implement reducing blood sugar levels through the administration of black glutinous rice soakingwaterin patients with DM Type 2*, for the discharge planning program* in DM *Type 2 patients.* The Implementation of black glutinous rice soaking as one of the efforts to reduce the increase in blood sugar levels in patients with type *2* DM.

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