



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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ABSTRAK

Latar Belakang: *Diabetes Mellitus yang selanjutnya disingkat DM merupakan penyakit kronik dikarakteristikan dengan adanya peningkatan kadar glukosa dalam darah yang disebabkan karena kerusakan insulin yang dapat menyebabkan menurunkan jumlah glukosa yang masuk kedalam sel. Pemberian Rendaman Air Ketan Hitam dapat menurunkan kebutuhan akan obat-obatan kimia karena dengan sumber daya yang minimal dapat meningkatkan cakupan dan jangkauan pelayanan keperawatan tanpa batas geografis.*

Tujuan: *Penelitian ini bertujuan untuk mengetahui pengaruh rendaman air ketan hitam terhadap penurunan kadar gula darah pada penderita DM Tipe 2.*

Metode: *Metode penelitian Quasi eksperimen. Sampel dalam penelitian ini terdiri dari 50 Responden dengan kriteria inklusi pasien DM Tipe 2 yang tidak mempunyai komplikasi gangren dan data dianalisa menggunakan uji wilcoxon.*

Hasil: *Hasil diketahui usia paling tinggi pada pasien diabetes melitus tipe 2 berada antara usia 50-59 tahun (80%). Jenis Kelamin lebih banyak diderita oleh perempuan yaitu sebanyak 35 orang (70%) dibandingkan pria. kadar gula darah penderita diabetes mellitus tipe 2 sebelum pemberian rendaman air ketan hitam adalah 262.72 mg/dl, sampai dengan pada minggu ketiga terjadi perubahan yang signifikan dimana kadar gula darah memiliki rata-rata 132.02 mg/dl. Hasil uji statistik didapatkan antara kadar gula darah sampai dengan minggu ketiga memiliki nilai p-Value < 0.05 yaitu 0,00 yang berarti menunjukkan ada pengaruh pemberian rendaman air ketan hitam terhadap penurunan kadar gula darah pada klien dengan DM Tipe 2.*

Kesimpulan: *Berdasarkan hal tersebut direkomendasikan pemberian beras ketan hitam salah satu rujukan non farmakologis dalam metode pelaksanaan penurunan kadar gula darah pada klien dengan DM Tipe 2.*

KATA KUNCI : *dm tipe 2; rendaman; air ketan hitam; penurunan; kadar gula darah*

ABSTRACT

Background: *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.*

Objectives: *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.*

Methods: *Research methods used quasi experimental. The sample consisted of 50 respondents with the inclusion criteria for type 2 DM patients who do not have gangrene complications and the data were analyzed using the Wilcoxon test.*

Results : 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.

Conclusions : Based on this, it is recommended that the provision of black glutinous rice is one of the non pharmacological references in the implementation method of reducing blood sugar levels in clients with type 2 DM.

KEYWORDS: diabetes mellitus type 2; black glutinous; water soaking; decrease; blood sugar level

Article Info:

Article submitted on February 25, 2021

Article revised on May 06, 2021

Article received on June 09, 2021

DOI: [http://dx.doi.org/10.21927/jnki.2021.9\(2\).134-138](http://dx.doi.org/10.21927/jnki.2021.9(2).134-138)

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 (3). 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 (9). The prevalence of Diabetes Mellitus (DM) in Indonesia, the diagnosis of doctor in the population under 15 years of age increased from 1.5% in 2013 to 2.0% in 2018. The province with the highest prevalence was DKI Jakarta, Yogyakarta special Region which occupy the highest position . Treatment of diabetes either orally or by injection in long consumption, can cause side effects on the stomach (7). 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 (1). 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 (4). The results of data analysis of blood glucose levels showed that the ethanol extract of black glutinous rice had activity in reducing blood glucose levels ($p < 0.05$) in reducing blood glucose levels so it could be concluded that the ethanol extract of black glutinous rice had activity in lowering blood glucose levels (5).

MATERIALS AND METHODS

The design used quantitative, with quasi *research method experiment* pre test and post

test Without Control (8). This research is located in Botania Health Center. This research was conducted in July – August 2020. The research population are all people with Type 2 Diabetes Mellitus. Research sample were 50 Responden with the inclusion criteria for type 2 DM patients who do not have gangrene complications

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 to determine the dose of black glutinous rice water fraction and treatment time which is effective in reducing blood glucose levels. 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 wilcoxon test. Data normality test is used to determine the distribution of data. The test used is *kolmogorov test*.

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 AND DISCUSSIONS

Table 1. Age group & gender

Karakteristik Responden	f	%
Usia		
50-59	40	80
60-69	7	14
69-70	3	6
70-80	0	0
Jenis Kelamin		
Laki-laki	15	30
Perempuan	35	70
Pendidikan		
Tidak Sekolah	10	20
SD	8	16
SMP	10	20
SMA	20	40
PT	2	4

Table 2. The frequency of blood sugar levels in clients with dm type 2 before the implementation of black glutinous rice water soaking

The Frequency of Blood Sugar Before the Implementation	Frequency	%
Hipoglikemia	0	0
Normal	0	0
Hiperglikemia	50	100
Total	50	100

Table 3. The Frequency of blood sugar level criteria after administration of black glutinous rice water

The Frequency of Blood Sugar After the Implementation	Frequency	%
Hipoglikemia	0	0
Normal	45	90
Hiperglikemia	5	10
Total	50	100

Table 4. 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 (3).

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 $p\text{-value} < 0.05$, 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 (6) 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 (1) 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 (4) 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. The results showed that the average difference in the control group without giving black glutinous rice was 8.375 mg/dl and the treatment group giving black glutinous rice soaking water was 62.25 mg/dl obtained a significant ($p < 0.000$) which is smaller than $\alpha = 0.05$ (2). The research took place in the conditions of the covid 19 pandemic which was the limitation of the researcher in carrying out the research, where the researcher had to implement a health program so that the respondents was not anxious during study.

CONCLUSION AND RECOMMENDATION

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 $p\text{-value} < 0.05$, 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 soaking water in 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. this study used one group without any comparison with the control group and this is a suggestion for future researchers to use two group (intervention dan control).

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