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GIVING RED RICE (*ORIZA NIVARA*) TO CHANGE GLUCOSE LEVELS IN DIABETES MELLITUS PATIENTS IN KENDARI CITY

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Abstract

Background: Diabetes mellitus (DM) is a phenomenon which the body cannot produce insulin supply which is indicated by increasing blood glucose levels. Red Rice (*Oriza nivara*) contains flavonoid compounds which have antidiabetic abilities. It can reduce blood glucose by increasing insulin secretion and preventing insulin resistance. This study aims to determine the effect of giving brown rice (*Oriza nivara*) to change blood glucose levels in people with diabetes mellitus in Kendari City.

Methods: This research method was carried out with a quasi-experimental design with pre-post test design for 1 week with primary and secondary data collection techniques. The respondents were determined by proportional random sampling. Respondents in this study were 33 people with DM.

Result: The results of the study on checking blood glucose levels before and after giving brown rice (oriza nivara) within 1 week obtained P value = 0.000 < alpha 0.05.

Conclusion: there is a significant effect of giving brown rice (*oriza nivara*) on changes in blood glucose level in diabetes mellitus people in Kendari City.

Key words: Brown Rice, Blood Glucose, Levels, Diabetes Mellitus.

INTRODUCTION

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One of health problems faced by the government and society in Indonesia is diabetes mellitus. One type of disease experienced by the community is diabetes mellitus. DM is a disease caused by the body not being able to produce insulin (a hormone that produces blood glucose) or an insufficient supply of insulin. This can lead to an increase in blood glucose(1).

Based on IDF data (2015) the number of DM sufferers was 415million people in 2015 and is expected to increase to 642 million in 2040. In Southeast Sulawesi, according to BPS data (2016), DM is a disease that ranks 4th out of 10 highest diseases, with a total of 7,357 patients. The area in Southeast Sulawesi with the highest DM cases is Kendari City. Kendari City has DM data for the last 3 years, namely in 2016 the cases reached 161 cases, in 2017 there was an increase of 223 cases and in 2018 there were 190 patients(2).

Diabetes mellitus is closely related to blood glucose levels, so it is necessary to check blood glucose at any time. Control of blood glucose levels in DM sufferers is related to excess food intake which results in an increase in blood sugar levels (3). Increased blood glucose (hyperglycemia) can cause damage to insulin-producing β cells of the pancreas. Free radicals such as supraoxide, hydrogen peroxide, nitric oxide and hydroxyl that damage the β cells of the pancreas so that the amount of insulin produced by the body will decrease. This causes glucose unable to enter the cells and accumulate in the blood, causing hyperglycemia. In this case, antioxidants are needed to fight free radicals.

Brown rice (Oriza nivara) contains carbohydrates, fats, protein, fiber and minerals and also contains flavonoid compounds which have the ability to be antidiabetic which lowers blood glucose by increasing insulin secretion and preventing insulin resistance (4). The purpose of this study was to determine the effect of giving red rice (Oriza nivara) to changes in blood glucose levels in diabetes mellitus patients in Kendari City.

METHOD

This type of research is a Quasi Experiment Design with a pre-post test design. The pre-post test design is a research conducted by giving a pretest before being given intervention, after which intervention is given, then a posttest is carried out (5).

This research will be carried out in Kendari City with a population of people with DM disease in Kendari City based on data from the Kendari City Health Office in 2018 totaling 190 people. To determine the number of samples in this study was to use the Slovin formula in order to obtain a total sample of 66 people with diabetes mellitus.

The results of the calculation using this formula are the number of samples given brown rice (Oriza nivara), there are 33 samples of patients with intervention given for 1 week with blood glucose measurements before being given and after being given intervention in DM patients, with information on GDS test on venous plasma ≤ 100 mg / dL means normal or decreased GDS,if ≥ 200 mg / dL means that the GDS is not normal or there is no decrease, while the capillary GDS measurement ≤ 90 mg / dL means that the GDS is normal or decreases, if ≥ 200 mg / dL means that the GDS is not normal or does not occur(6).

RESULT

Table 1 shows that the most age group is at the age of 60-69 years there are 10 patients (30.30%), then in the group and age> 70 years there are 9 people (30.30%), aged 50 - 59 years as many as 8 sufferers (24.24%) while the age group 40-49 years were 6 patients (18.18%).

Table 2 shows that the lowest gender of the respondents is male 27 people (40.91%) and the highest is female, amounting to 39 people (59.09%).

Table 3 shows that the measurement results of respondents with diabetes mellitus in Kendari City before and after giving

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brown rice (oriza nivara) for one week with a frequency of 3 times a day with portions adjusted for their calorie needs. There were 19 people with diabetes mellitus who experienced changes in normal blood glucose levels, and those who did not experience normal changes but entered after being given red rice intervention (Oriza nivara) were 14 people.

Table 4 shows that the data normality test uses the Shapiro-Wilk statistical test with the interpretation that if the P Value> 0.05 then the data is normally distributed, but if the P Value <0.05 then the data is not normally distributed. But if there is one test before giving intervention and after the intervention is not normally distributed, it is assumed that the test results are not normally distributed. Based on the results of the normality test of giving brown rice (oriza nivara) before and after the data was not normally distributed. Therefore, the normality test used is the non-parametric statistical test Wilcoxon Signed Ranks test.

After the Wilcoxon Signed Ranks test statistical test was carried out with a determined significant level of P Value <0.05 on the examination of blood glucose levels before and after giving brown rice (oriza nivara) within 1 week obtained P Value = 0.000 from these data P Value <0.05 (Table 5). This shows that there is an effect of giving brown rice (oriza nivara) on changes in blood glucose in people with diabetes mellitus in Kendari City.

Table 1
Distribution of Respondents by Age Group

No.	Age Group (years)	n	%
1.	40-49	6	18.18
2.	50-59	8	24.24
3.	60-69	10	30.30
4.	≥ 70	9	27.27
amount		33	100

Primary data, 2020

Table 2
Distribution of Respondents by Gender

No.	Gender	n	%
1.	Male	14	42.42
2.	Women	19	57.57
amount		33	100

Primary data, 2020

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Table 3
Measurement of Blood Glucose Levels Before and After Giving Brown Rice (Oriza nivara)

No.	Changes in Blood Glucose		Difference Value	Description Normal ≤ 200 mg / dL
	Pre Test (mg / dL)	Post Test (1 Week) (mg / dl)		
1	485	527	-42	Abnormal
2	561	328	233	Abnormal
3	350	268	82	Abnormal
4	220	109	111	Normal
5	201	319	-118	Abnormal
6	215	137	78	Normal
7	228	149	79	Normal
8	298	334	-36	Abnormal
9	500	328	172	Abnormal
10	450	220	230	Abnormal
11	550	245	305	Abnormal
12	448	248	200	Abnormal
13	240	185	55	Normal
14	550	245	305	Abnormal
15	374	184	190	Normal
16	450	129	321	Normal
17	260	138	122	Normal
18	285	195	90	Normal
19	276	152	124	Normal
20	347	198	149	Normal
21	545	238	307	Abnormal
22	336	185	151	Normal
23	274	128	146	Normal
24	380	192	188	Normal
25	420	200	220	Normal
26	229	138	91	Normal
27	580	258	322	Abnormal
28	420	209	211	Abnormal
29	480	198	282	Normal
30	385	182	203	Normal
31	450	216	234	Abnormal
32	480	200	280	Normal
33	300	165	135	Normal
amount	12567	7147	5420	

Primary data, 2020

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Table 4
Data Normality Test Before and After giving Brown Rice (Oriza nivara) to Changes in Blood Glucose Levels in Patients with Diabetes Mellitus

Examination of Blood Glucose Levels	*P-Value*	α	Conclusion
Pre	0,000	0.78	Abnormal
Post	0,000	0.00	Normal

Primary data, 2020

Table 5
The Wilcoxon Signed Ranks test of the Provision of Brown Rice (Oriza nivara)

Giving of Red Nas (Oriza nivara)	Median	Maximum	Maximum	Statistic test	p value
Measurement of Blood Glucose Levels Pre-Post Test (1 Week)	380,000	201	580	0.00	0,000

Primary data, 2020

DISCUSSION

The Effect of Giving Brown Rice (Oriza nivara) to Changes in Blood Glucose Levels in Diabetes Mellitus Patients in the Working Area of Kendari City

Measurement of blood glucose levels in people with diabetes mellitus, before and after the intervention of brown rice (oriza nivara) with a time span of 1 week frequency 3 times a day with portions adjusted for calorie needs. Thus, 19 patients with blood glucose in the normal range ≤ 200 mg / dl had diabetes mellitus, while 14 patients who did not experience changes in blood glucose levels were still above> 200 mg / dl. The results of the data normality test obtained that the data were not normally distributed so that it was continued with the non-parametric statistical test Wilcoxon Signed Ranks test with a significant level determined was P Value <0.05 on checking blood glucose levels before and after giving brown rice (oriza nivara) in time 1 week obtained P Value = 0.000 from the data P value <0.05.

The results of this study are in line with(7) research, regarding the effectiveness of giving rice diets in reducing blood sugar levels in diabetes mellitus sufferers at Puskesmas Pandemawu Pamekasan, out of 76 diabetes mellitus patients before and after giving brown rice intervention for 1 week, brown rice results are effective. against decreased blood glucose levels in diabetes mellitus patients. On research(8), of the total research sample amounted to 36 samples consisting of the treatment group being given brown rice for 6 days at breakfast and dinner, while the control group did not receive any intervention. The results showed that the initial and final cholesterol levels of the treatment group were 235.69 mg / dL and 198.56 mg / dL, while the initial and final cholesterol levels of the control group were 235.72 mg / dL and 256.50 mg / dL. In this study, giving brown rice was effective in reducing total cholesterol levels in patients with type 2 diabetes mellitus.

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The process of changing blood glucose by giving brown rice (oriza nivara) is due to the high fiber content in brown rice. The benefits of fiber in brown rice can increase the viscosity of the lumen in the intestine so that it can decrease the efficiency of carbohydrate absorption and insulin response. By decreasing the insulin response, the work of the pancreas will be lighter in producing insulin. Brown rice (oriza nivara) can also reduce lipid levels in serum so that it can reduce glucose levels in the blood. In addition, brown rice contains the mineral selenium and anthocyanin pigments (red) which function as antioxidants and act as an inhibitor of various degenerative diseases including diabetes mellitus (9).

Brown rice also contains Gama Amino Butiric Acid (GABA) which can stimulate pancreatic β cells to produce more insulin(10). If insulin production increases, it will suppress the Sensitive Lipase Hormone (HSL) which plays a role in lipolysis so that blood glucose levels will decrease. In addition, brown rice contains essential fatty acids that can reduce blood glucose levels by clearing plasma from chylomicron lipoproteins and reducing the production of triglycerides and β apoloproteins in the liver(11). As for diabetes mellitus sufferers after being given brown rice (oriza nivara) but there is no change in the normal range due to the presence of patients consuming foods that can trigger an increase in blood glucose, drinking coffee, smoking which can cause an increase in blood glucose in people with diabetes mellitus.

External factors that cause no change in blood glucose levels after the intervention of brown rice (oriza nivara) is that patients have various characteristics of age and gender. A person aged 35 years and over is more likely to have postprandial hyperglycemia than someone less than 35 years of age. Likewise for gender, women are more likely to suffer from diabetes mellitus due to the influence of the hormone estrogen which can directly increase insulin and strengthen glucose stimulation to insulin secretion so that pancreatic β cells experience fatigue so that it can trigger diabetes mellitus (12). Women are also more at risk of experiencing postrandial hyperglycemia than men (13).

CONCLUSION

Examination of blood glucose levels before and after giving brown rice (oriza nivara) within 1 week obtained P value = 0.000 from P value <0.05. The conclusion is that there is an effect of giving brown rice (oriza nivara) on changes in blood glucose in diabetes mellitus sufferers in Kendari City

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