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Effects of Konjac Glucomannan on Blood Profile in Schizophrenia with Hyperglycemia: Pra Eksperimental Study

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Abstract--Background and Objectives: Konjac glucomannan has the effect of maintaining Blood Glukosa Fasting (BGF) in the general population, but there is no research on schizophrenic patients who are susceptible to hyperglycemia. Our study aims to evaluate the effects of konjac glucomannan on blood glucose levels in schizophrenia in patients with hyperglycemia. Methods and Study Design: eight people with schizophrenia were enrolled in a 30-day pra experimental study. The subjects in the experimental group were given a capsule containing konjac glucomannan 30 minutes before each meal Results: The plasma glucose was measured at baseline and at the first of 0-day treatment end of 31-day treatment. Eight subjects completed the study. There was a substantial decrease in plasma glucose in the experimental group. Conclusions: We concluded that a diet supplemented with konjac glucomannan may prevent the deterioration of hyperglycemia in people with schizophrenia, demonstrating its potential value in the treatment of metabolic disorders in schizophrenia as a new therapeutic method herb.

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Introduction

Hyperlipidemia as part of the metabolic syndrome in addition to hyperglycemia is a major risk factor for atherosclerosis and coronary heart disease. Recent recommendations, lifestyle changes that should be the main action for the treatment of metabolic syndrome, including regulating diet, limiting calorie intake, and increasing physical activity (Eckel et al., 2014). Water-soluble high-fibre foods such as pectin, psyllium, cereal bran, fruit gums, and glucomannan (Porang) can lower blood lipid levels. Porang plants are currently widely cultivated in Ponorogo. However, until now research on the use of soluble fibre in the treatment of hyperglycemia in patients with severe mental disorders is still rarely done.

The incidence of hyperlipidemia is higher in patients with severe mental disorders than in the general population (Zhang et al., 2020). As many as 40% of patients with severe mental disorders have changes in lipid profiles (Mitchell et al., 2013). Observations for three years in patients with severe mental disorders who underwent pharmacological treatment showed as many as 16.9% of patients with severe mental disorders had dyslipidemia (Bernardo et al., 2021). Unfortunately, dyslipidemia is often overlooked in schizophrenic patients (Baller et al., 2015). As many as 88% of cases of dyslipidemia in patients with severe mental disorders are not treated (Kelly et al., 2021). If this situation continues, the quality of life for people with mental disorders will decrease.

Glucomannan, which is derived from *Amorphophallus muelleri* (a type of porang cultivated in Ponorogo), is a straight-chain polymer with several branches and a sugar component β -(1 \rightarrow 4) D-mannose and D-glucose with a ratio of 1.6:1 (Julibert et al., 2019). The mechanism of action of glucomannan in the treatment of hyperlipidemia is due to the inhibition of the absorption of cholesterol and bile acids in the intestine and the reduction of the release of hydro-3-methyl-glutaric-1 (HMG) CoA reductase (Castro-Barquero et al., 2020; Julibert et al., 2019). The study by Palmer (2017), in patients with mental disorders who were given a ketogenic diet for 3 weeks and 4 weeks gave a significant improvement in the condition and weight loss. Giving a ketogenic diet with a ratio of 3: 1 for 6 weeks showed that after 15 days there was an improvement in mental disorders (Gilbert-Jaramillo et al., 2018). Regular administration of the ketogenic diet has a positive impact on people with mental disorders (Palmer et al., 2019). In the study by Zang et al. (2020). The 59 respondents who completed the research protocol with dietary glucomannan showed that biomedical measurements in the treatment group resulted in an increase in lipoprotein levels and a decrease in cholesterol.

The purpose of this study was to determine the potential of konjac glucomannan as a new therapeutic herb in stabilizing blood glucose in patients with severe mental disorders in patients with severe mental disorders with hyperglycemia need to be done. Giving a dietary supplement of 1 glucomannan tablet before

eating is expected to improve the condition of people with severe mental disorders in Ponorogo.

Materials and Methods

This study uses an experimental study, as many as 8 people with mental disorders will be involved in this study with the following inclusion and exclusion criteria. Inclusion criteria: 1) Patients with severe mental disorders aged 19 – 65 years; 2) Outpatients of Ponorogo Mental Health Center; 3) Serum total cholesterol (TC) 6.22 mmol/L or serum triglycerides (TG) 2.26 mmol/L (McGuire, 2015). Exclusion criteria: 1) Patients taking drugs other than antipsychotics that can affect lipid metabolism; 2) Have hypothyroidism or kidney disease.

Material

This research is planned to be carried out on outpatients at the Paringan Ponorogo Mental Health Center. This study was given to adult subjects who have low activity, the subject's dietary standards refer to the standards of adult men or women with light physical activity recommended in the Dietary Guidelines for the Indonesian Population. Researchers considered the sex, age and activity of the subjects, but without their body size and dietary history. Energy intake per day is 1800 kcal for women and 2,200 kcal for men, with approximately 25% of total calories from fat, 15% from protein, and 60% from carbohydrates. A clinical nutritionist creates prescriptions using a standardized Nutrition Therapy System. Research subjects were not allowed to eat snacks, especially high-fat foods, such as white bread, instant noodles, and french fries.

Intervention

The treatment group was given konjac glucomannan capsules at a dose of 1 capsule a day for 30 days. Konjac glucomannan capsules provided by researchers contain 96% glucomannan. To maintain compliance, the duty nurse is responsible for monitoring and recording information about the subject's diet and drink intake, with a focus on recording whether the patient has abnormal eating behaviours, such as food refusal and overeating, or refusing to take drinks. The research design used was Quasy Experimental. 8 respondents were given 1 tablet of glucomannan (KGM 96%).

Data collection and data analysis

Research variables consist of general variables and special variables. General variables, demographic data describe the respondent's condition based on gender, duration of treatment, marital status, number of siblings and the type of antipsychotic consumed. While the special variables measure glucose levels. SPSS 22.0 software was used for data analysis. Continuous variables were reported as mean \pm standard deviation (SD) and Kolmogorov Smirnov test was applied to explore the normality of the data. Paired t-test was applied to perform statistical analysis on the variable improvement in the condition of severe mental disorders. A two-tailed p-value < 0.05 was considered statistically significant.

Results and Discussions

Table 1

The results of the study on the effect of konjac glucomannan on blood glucose in patients with schizophrenia

	Pre-test-Post test	Paired Sample T-test
Mean	45,75	
CI Max 99%	82,6	
CI MIN 99%	8,9	p=0.003
SD	29,8	
SE	10,5	
n	8	

The results showed that the value of the Paired T-Test was $p=0.03$, which means that konjac glucomannan can control blood glucose levels in patients with severe mental disorders. A total of 8 people with mental disorders who were given 1 tablet per day of konjac glucomannan for 30 days showed improvement in blood glucose lab values.

Multiple general mechanisms have been proposed to explain the current study's inverse relationship between fibre intake and insulin resistance. First, fibre, particularly soluble fibre, gels in the stomach after ingestion. This slows carbohydrate digestion and absorption, which moderates glucose release and results in a lower insulin response (Anderson et al., 2009; Jenkins et al., 2000). Furthermore, dietary fibre is only found in plant foods. As a result, it's possible that other plant components besides fibre are to blame for the positive relationship between fibre consumption and insulin sensitivity. Magnesium, for example, could act as a moderator (Anderson et al., 2009). Finally, as discovered in the current study, differences in abdominal obesity appear to account for a significant portion of the fibre-HOMA association. Fibre-rich foods significantly raise feelings of fullness and aid in the reduction of energy intake, which helps to reduce weight gain and obesity over time (Tucker & Thomas, 2009).

Sharing interventions are expected to be effective in overcoming the problems of people with severe mental disorders. Model of nursing intervention is needed to prevent the occurrence of a community-based (Mashudi et al., 2019). The health status of families with severe mental disorders will help stabilize people with severe mental disorders (Mashudi, 2019; Mashudi & Yusuf, 2021). However, researchers often encounter the behaviour of people with mental disorders who are not healthy, such as excessive smoking. Excessive smoking behaviour has been shown to reduce oocyte quality (Dwirahayu & Mashudi, 2016). Interventions with the provision of porang extract are still rarely applied to patients with severe mental disorders. The content of porang, konjac glucomannan can be a cheap and effective alternative therapy (Mashudi, 2020; Mashudi & Mashudi, 2021). The nutrigenomic approach and the ketogenic diet using konjac glucomannan can be a therapeutic trend for people with severe mental disorders in the future. (Mashudi, 2017, 2020).

Several previous studies have been carried out to measure the effectiveness of konjac glucomannan in the treatment of metabolic syndrome (Zhang et al., 2020). Metabolic syndrome is a state of obesity, hyperinsulinemia, dyslipidemia, and hypertension. Metabolic syndrome can be corrected with Konjac glucomannan (McRae, 2020). Konjac Glucomannan in addition to stabilizing blood sugar levels also improves the value of total cholesterol, LDL cholesterol, triglycerides, body weight (Sood et al., 2008). Konjac glucomannan diet has been shown to improve insulin resistance (Vuksan et al., 2000). Konjac glucomannan as a high fiber supplement, adults with high fibre consumption have less insulin resistance (Tucker, 2018).

Giving capsules with a dose of 1 tablet/day to people with mental disorders will be able to stabilize blood sugar levels so that it will improve the quality of life of people with mental disorders. The use of konjac glucomannan will be a future trend in overcoming the problems of people with severe mental disorders so that the quality of life of people with severe mental disorders increases.

Conclusion

Administration of konjac glucomannan with a dose of 1 tablet a day before meals for 30 days has been shown to be able to control blood sugar levels in patients with severe mental disorders. It is necessary to study the effect of konjac glucomannan on blood pressure improvement.

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