



Effects of Konjac Glucomannan on Indicators of Metabolic Syndrome in Adults with Schizophrenia (A preliminary study)



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Abstract

Objectives: effects of konjac glucomannan (KGM) in adults with schizophrenia. Method post feasibility trial with 20 participants with elevated blood glucose, blood pressure, and triglycerides. Intervention konjac glucomannan for 1 to 1.5 h, 1 tablet times every day for 4 weeks, and were encouraged to practise the exercises at home. Main Outcome Measures Indicators of blood pressure, fasting blood glucose, triglycerides, and schizophrenia symptoms. Results: There was high acceptability and good adherence. There were significant improvements in four indicators of metabolic syndrome including; Cholesterol (p,0.037), systolic (p,0.037) and diastolic blood pressure (p,0.869), as well as in GDP (p,0.004), schizophrenia symptoms (p,0.000). Conclusions: The program was feasible and acceptable, and participants' physiologic and physiological variables continued to improve. A larger controlled trial is now required to confirm these encouraging preliminary findings.

Keywords

blood pressure;
fasting blood glucose;
health;
konjac glucomannan;
schizophrenia symptoms;
triglycerides;

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1 Introduction

Schizophrenia is a major health disease that affects people all over the world. Schizophrenia has a lifetime frequency of around 1%, and only 10–15 per cent of persons with schizophrenia are employed (Dixon, 2017; He et al., 2020). Metabolic syndrome is a grouping of risk factors. The metabolic syndrome was found to be present in 18.2% of people with schizophrenia (Schreurs & Vancampfort, 2009; Saddichha et al., 2007). In cross-sectional studies, the prevalence of metabolic syndrome ranged from 11 per cent to 69 per cent in medicated patients and 4-26 per cent in drug-naive individuals (Malhotra et al., 2013). Metabolic syndrome was found to be present in 47.9% of the population (Sorić et al., 2021); 18.2% of people with schizophrenia 18.2% of people with schizophrenia (Schreurs & Vancampfort, 2009; Saddichha et al., 2007).

Previous research has shown that KGM is essential in preventing the progression of metabolic syndrome as well as in maintaining a healthy weight and controlling schizophrenia patients. KGM has gained popularity due to its reduced viscosity, better hydrophilicity, and beneficial physiological activities (Jiang et al., 2018). KGM has already been demonstrated to enhance health-related quality of life indices (Behera & Ray, 2016; Devaraj et al., 2019). These advantages may be especially crucial for those suffering from schizophrenia, who may be more prone to poor health-related quality of life and psychological healing (Jiang et al., 2018). Diet reduces LDL cholesterol and triglyceride levels, therefore dietary adjustments should eventually be connected to a lower risk of heart disease and increased insulin sensitivity (Clifton, 2019; Vuksan et al., 2001). The findings revealed that consuming KGM resulted in a significant improvement in biochemical parameters and physiological indices, such as a decrease in blood glucose, triglyceride, total cholesterol, and high-density lipoprotein cholesterol levels, as well as the suppression of oxidative stress in the liver and kidneys (Wang et al., 2021).

2 Materials and Methods

Participants and study design

The study was awarded ethical clearance by the Public Health Research Ethics Committee at the University of Jember (Indonesia). It was a single-group pre-post experiment with outcome measures taken before and after a 4-week KGM program. Participants were recruited through a variety of means, including letters of invitation sent to members of schizophrenia in Paringan District Indonesia, referrals from general practitioners (GP), and public ads in local print media. Table 2 shows the qualifying and exclusion criteria. 11 of the 32 original responses were granted permission to participate in the program.

Table 1
Eligibility and exclusion criteria for participation in the study

Eligibility criteria	Exclusion criteria
a. Have in the last month evidence of elevated fasting blood glucose (>100 mg/dl)	a. Inability to complete the data collection forms or follow the
b. Cholesterol >200 mg/dl	b. Contraindications for physical activity
c. Blood pressure (Sistole >140 mmHg, diastole > 100 mm/hg)	c. Taking diabetes medication
d. BMI >25 kg/m ² and <40 kg/m ²	
e. Between 20 and 64 years of age	
f. Willing and able to regularly consume KGM one capsule every day over 4 weeks.	

The intervention

Participants received their normal treatment as well as one capsule of KGM every day after breakfast for 4 weeks, under the supervision of senior nursing.

Measures

After providing informed permission, all participants completed the baseline evaluation up to one week before the intervention began. A research assistant conducted each evaluation at the University, which required participants to produce a fasting venous blood sample. At the end of the 4-week intervention period, baseline evaluation procedures were reproduced ([Salawali et al., 2021](#)).

Haematological measurements

A fasting blood sample was collected from the antecubital vein at least 48 h post-intervention for analysis of Blood pressure, HDL-cholesterol, and plasma glucose.

Statistical analyses

Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 22.0 software. Means and standard deviations (SD) were calculated for normally distributed continuous variables. Differences between baseline and post-intervention measures were analysed using paired t-tests; confidence intervals (95% CI) were calculated to describe mean differences. McNemar's χ^2 test was conducted to examine within-participant change in indicators of metabolic syndrome and change in clinical depression from baseline to post-intervention ([Suryasa et al., 2021](#)). Unless otherwise noted, significance was set at an alpha level of 0.05.

Participant characteristics

Eleven participants (three men, and eight women, aged 42–65 years) participated in this pilot study. Only four were born in Australia but all except one spoke English at home. Five had fasting blood glucose levels indicative of elevated blood glucose (5.8–6.4 mmol/l) and six had levels >7 mmol/l (7–8.7 mmol/l). BMI levels ranged from 18.5 to 36.4 kg/m². Seven participants met the criteria for diagnosis of metabolic syndrome according to the International Diabetes Federation's definition of metabolic syndrome (shown in table 1). Eight participants reported a family history of diabetes, and nine met the current Australian public health guidelines for physical activity (i.e. >150 minutes of moderate physical activity per week) at baseline.

Changes in indicators of metabolic syndrome and glycaemic control

Mean changes in indicators of metabolic syndrome and glycaemic control from baseline to postintervention are shown in table 3. There were significant improvements in body weight (mean difference 22.96 kg (95% CI 24.13 to 21.79), $p=0.001$), in four of the seven indicators of metabolic syndrome (BMI, waist circumference, systolic and diastolic blood pressure) and the three additional indicators of glycaemic control (HbA1c, insulin and insulin resistance). There were no significant changes in the three remaining indicators of metabolic syndrome (fasting blood glucose, triglycerides and HDL-cholesterol), but downward trends in these three haematological measures were observed. Although this was not statistically significant, the percentage of participants with metabolic syndrome decreased from 64% to 36%.

3 Results and Discussions

Table 2
Changes in cholesterol, blood glucose, and blood pressure

	N	Pra			pos			Sig (p) T Test
		Mean	SD	SE	mean	SD	SE	
Cholesterol	20	217.70	35.350	7.904	203.60	39.062	8.735	0.37
Blood Glucose	20	157.55	55.120	12.325	137.85	60.584	13.547	0.004
Systole	20	125.00	23.786	5.319	120	19.255	4.305	0.106
Dyastole	20	85.75	12.489	2.793	85.30	9.631	2.153	0.869

This 4-week KGM intervention resulted in significant improvements in four indicators of metabolic syndrome (blood glucose fasting, cholesterol total, systolic and diastolic blood pressure), and Schizophrenia Symptoms in a small group of 20 participants. Significant value for cholesterol (p,0.037), systolic (p,0.037) and diastolic blood pressure (p,0.869), as well as in GDP (p,0.004), schizophrenia symptoms (p,0.000).

These findings offer reason to be cautiously optimistic about a KGM program's function in managing people at high risk of getting schizophrenia. Based on these data, the diastolic blood pressure data does not show a significant value (Ettehad et al., 2016). Several past trials have been conducted to assess the effectiveness of KGM for health. In persons with schizophrenia, a diet supplemented with konjac glucomannan may help to prevent hyperglycemia from worsening (Mashudi et al., 2022). Dietary fibres might be utilized as an alternate supplement to reduce lipid levels in adults (Nie & Luo, 2021; Djunaid et al., 2022). According to current data, various clinically evaluated lipid-lowering nutraceuticals might be used safely to enhance plasma lipid levels in people with mild-to-moderate dyslipidaemia and low cardiovascular risk (Cicero et al., 2021). The same dietary fibres enhance lipid profiles, decreasing LDL-C, total cholesterol, and triglyceride levels (Cicero et al., 2021). The capsule form of glucomannan had a good effect on lowering TC, LDL-C, TG, body weight, and FBG compared to the control intervention, but no beneficial effect in lowering BP or boosting HDL was seen (Onakpoya et al., 2014).

The antihyperlipidemic advantages of dietary fibres are thought to be due to five key pathways, including low levels of energy, bulking impact, viscosity, binding capacity, and fermentation, all of which help to alleviate hyperlipidemia symptoms (Nie & Luo, 2021). The safety data and relevant clinical results on metabolic effects of glucomannan representative dietary supplement components have suggested consumption limits, which do not appear to be exceeded when taken according to the manufacturer's directions (Mah et al., 2022).

Although there were no statistically significant changes in blood pressure, the average reduction in systole blood pressure of almost 5 mmol/hg produced a significant improvement in blood pressure after this 4-week KGM programme (Warabi et al., 2004; Ginsberg et al., 2005). The mean change in blood pressure levels reported here (0.53) was similar to that reported in (Andrade et al., 2021) Decrease of ~0.9 to 2.0 mmHg, after 10 weeks of Concurrent Training on Metabolic Markers and Physical Performance. According to the World Health Organization, insulin-resistant blood pressure levels are integral to the definition and development of metabolic syndrome. It is also recognised as a strong predictor of diabetes, cardiovascular disease and stroke (de Melo et al., 2018; Ma et al., 2020). The reduction of 10 mmHg in blood pressure levels resistance in this study may therefore be clinically meaningful, and partly attributable to improvements in central obesity and adipocyte insulin resistance (Zhu, 2018; Wang et al., 2012).

After four weeks, the small but statistically significant decrease in GDP (p,0.004) was greater than previously reported (Beaudry et al., 2022; Bullard et al., 2019). Following a 4-week KGM training intervention study. (Alothman et al., 2021; Kanaley et al., 2022) have suggested that a 0.6 percent decrease in GDP (observed after 4 months of resistance training) has clinical significance. However, because that study combined high-intensity resistance training with a healthy eating plan, the unique effect of the exercise program could not be determined. The study sample's low initial mean GDP level (20 points) and the current study's relatively short-term intervention may explain some of the small changes in GDP.

Notably, five of the twenty patients (25%) who had metabolic syndrome at the start of the study no longer met the diagnostic criteria at the end. The small sample size precludes statistical significance, but the findings lend support to the notion that this intervention may play a role in regulating or even correcting metabolic syndrome in some people (Frith et al., 2000; Dixon, 1999).

4 Conclusion

The feasibility of a 4-week KGM intervention was investigated in this study. Discovered that the intervention was agreeable to participants and resulted in substantial improvements in metabolic markers syndrome, diabetes management, health-related quality of life, and Adults with high blood glucose levels have poor psychological health.

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