PROCEEDING

1st Banten International Conference on Health Advancement & Research
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The Effect of Decorated Spiced Drink on Total Cholesterol and Blood Glucose Levels in Patients with Hypercholesterolemia

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ABSTRACT

Hypercholesterolemia is one of the main risk factors for cardiovascular diseases that can be influenced by lifestyle and dietary patterns, including the consumption of herbs or spices. This study aims to determine the effect of administering herbal drink decoctions on total cholesterol levels and random blood glucose in patients with hypercholesterolemia. This study uses a Quasi-Experiment method with control and treatment groups design. The research subjects were divided into two groups: one group received the herbal drink decoction and the control group received no treatment. The parameters measured were total cholesterol levels and random blood glucose through laboratory tests before and after the treatment. The results of this study showed that the average cholesterol level in the treatment group before the intervention was 220 mg/dL, and after the intervention to 210 mg/dL. The results of total cholesterol levels in the control group before the intervention amounted to 173 mg/dL, for after the intervention to 185 mg/dL. The results for blood glucose levels in the treatment group before the intervention were 92 mg/dL and after the intervention to 97 mg/dL. Then for the results of temporary blood glucose levels in the control group before the intervention amounted to 88 mg/dL and after the intervention amounted to 90 mg/dL).The results of the statistical tests showed that H0 was accepted, which means there was no significant effect of administering herbal drink decoctions on total cholesterol levels and random blood glucose. Thus, the herbal drink infusion was not proven effective in lowering both parameters in patients with hypercholesterolemia. This study was conducted in the Pondok Kacang Barat area.

Keywords: Noncommunicable diseases; Hypercholesterolemia; herbal drinks

INTRODUCTION

Non-communicable diseases (NCDs) are chronic illnesses that cannot be transmitted from one person to another (Masitha et al., 2021). One example of a non-communicable disease is heart disease, which is caused by high cholesterol levels. According to data from the 2023 Indonesian Health Survey (SKI), the prevalence of heart disease in the Banten region was 0.78%. Furthermore, the survey results showed that 69.8% of the Banten population had never had their total cholesterol levels checked. High cholesterol levels are common in women, predominantly among those aged 45-74. High cholesterol levels can also occur in the productive age group; according to the 2023 Indonesian Ministry of Health, the prevalence in the productive age group is 15-64 years.

Changes in lifestyle among the community can lead to complications, one of which is hypercholesterolemia. This disease is caused by uncontrolled fat consumption. Factors that can influence high cholesterol levels include gender, age, obesity, and smoking habits (Noviana and Nurul, 2023). Hypercholesterolemia can be treated with pharmacological and non-pharmacological therapies. One example of pharmacological therapy is medication, while non-pharmacological therapy includes diet, reducing animal fat intake and increasing fruit and vegetable consumption. This therapy can also be supported by consuming herbal remedies derived from plants or spices high in fiber and antioxidants. Examples of spices that can be used include turmeric, galangal, lime, and brown sugar (Pertiwi, 2021). Turmeric contains curcumin, which

inhibits the activity of the HMG-CoA reductase enzyme, and essential oils act as antidiabetics, helping control blood sugar (Febriawan, 2020). Galangal contains flavonoids, which inhibit fatty acid synthesis, thereby lowering blood cholesterol and triglyceride levels (Nastiti, 2020). Limes contain hesperidin, a compound that can lower LDL cholesterol and increase HDL cholesterol.

Research (Pertiwi, 2021) concluded that consuming a functional drink made from red ginger and lime for 7 consecutive days can reduce total cholesterol levels by 25–76 mg/dL. Research (I Gusti et al., 2022) indicated that turmeric can lower cholesterol levels. Research conducted by Fadhil et al. (2024) found that the Duampanua community uses a combination of ginger, white turmeric, lemongrass, galangal, lime, and honey as a traditional therapy. The study found that all the spices used have good antioxidant properties, indicating that the community still uses traditional ingredients for traditional therapy. Entering the COVID-19 era, the Ministry of Health (Kemenkes) released several natural ingredients used for health maintenance, disease prevention, and health care. Several findings have involved ingredients such as ginger, lemongrass, galangal, lime, Javanese ginger, and galangal (KEMENKES, 2019). This researched aims to determine the effect of boiled spiced drinks on total cholesterol and blood glucose levels in people with hypercholesterolemia.

MATERIALS AND METHODS

The materials that used in this researched such as apparatus glass laboratory, photometer, POCT, cholesterol sticks, micropippette, balance analytical, syringe, vacutainer, and etc. The method that conduct was quasy experiment with one group pre and post test. All respondents are community that lived in Pondok Kacang Barat and for sampling using purposive technique with inclusion criteria are willing as respondents for 7 days treatment, not consumed alcohol drinks or drugs that related to cholesterols, and adults age (16-64 years old). The total samples that used are 15 respondents as control group and 15 respondents as treatment group. For the spiced drinks material that used are ginger, turmeric, lime, galangal, and brown sugar (Kemenkes, 2019). Each respondents were given for each day by 250 mL of spiced drinks. For baseline the respondents were measure cholesterol and blood glucose parameters using photometer, while for examine effect of spiced drink using POCT methods.

RESULTS AND DISCUSSION

The reasearched collected some data such as descriptive of respondents that willing to help this researched, average of blood glucose and total cholesterols for 7 days treatment in control (1st group) and treatment group (2nd group). All treatments in this researched was test for ethical clearance by number 070/KEPK/UNPRI/VI/2025 that approved from Universitas Prima Indonesia. The first data was about characteristics of respondents in table 1 below.

Table 1. Respondenst Characteristics

Gender	Frequency (n)	Percentage (%)
Male	10	33
Female	20	67
Age (years old)		
20-25	2	7
26-35	3	10
36-45	9	30
46-55	9	30
56-65	6	20
>65	1	3

The table above showing that in this researched mostly dominated by female and for the age in range between 36-55 years old. The more mature someone can related to the risk of hypercholesterolemia. This could happened if someone not regulary exercise, maintain healthy life, consume healthy food, and etc. With age, the liver's ability to excrete cholesterol-containing lipoproteins also decreases (Arif et al., 2025). Insulin sensitivity also tends to decrease with age, and the risk of diabetes complications can increase. By this data we can assumed mostly for hypercholeterolemia patients dominated by female and increasing in age. As baseline in control and treatment group were presented in graph at figure 1 below.

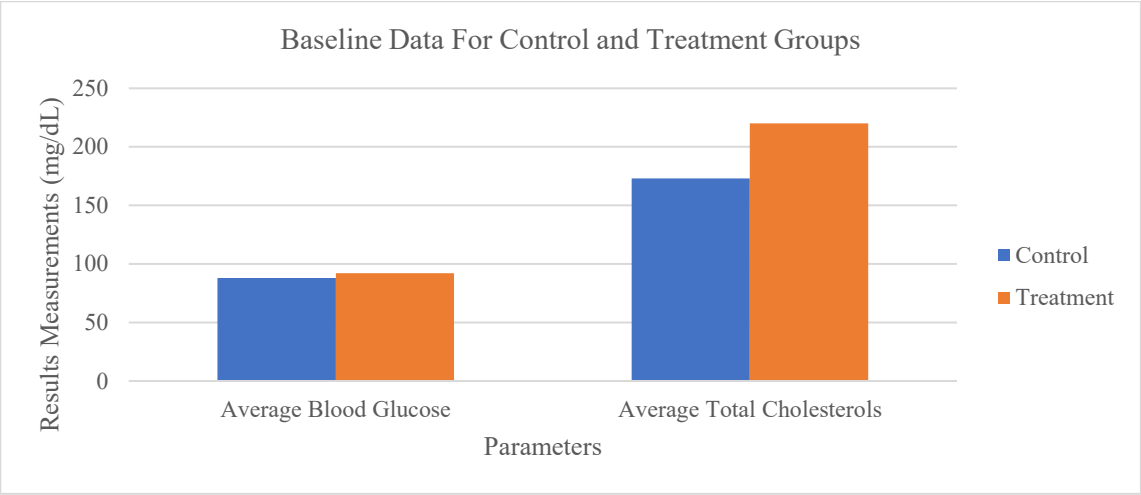


Figure 1. Baseline Blood Glucose and Total Cholesterols for Group and Treatment Groups

As figure 1 above showing that as baseline data before the treatment for giving spiced drinks in treatment group was all respondents in treatment group (2nd group) had blood glucose and total cholesterols higher than control group. The blood glucose for control and treatment group as 1st day respectively are 88 mg/dL, 92 mg/dL. While for total cholesterols respectively are 173 mg/dL and 220 mg/dL.

For seven days cosencutively the 2nd group were given spiced drinks and after consumed, the reasearcher was measure the value of it by POCT method. Average of blood glucose and total cholesterol for each control and treatment groups showing at table 2 below.

Table 2. Average Blood Glucose and Total Cholesterols in Control and Treatment Group

Parameters	**Average (Day 2 to Day 6) in Treatment Group**	**Average (Day 2 to Day 6) in Control Group**
Blood Glucose	102 mg/dL	94 mg/dL
Total Cholesterols	215 mg/dL	186 mg/dL

The table 2 indicate that in control group the value of blood glucose and total cholesterols were lower than treatment group. Eventhough the effect of spiced drink will evaluate on the last day of treatment (7th day) for treatment group. Figure 2 showing effect of spiced drink for treatment group before and after treatment.

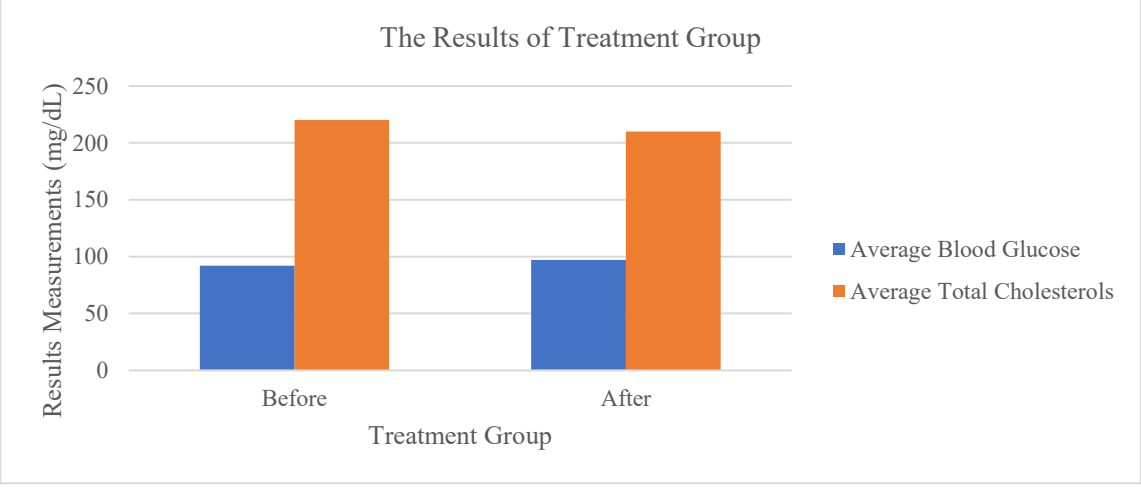


Figure 2. The Results of Treatment Group of Blood Glucose and Total Cholesterols

From figure 2 aboved showing that for total cholesterols before and after treatment given results decreased after the treatment. While for blood glucose given results increasing eventhough not so much as to give a rise in numbers. The effect of spiced drink in hypercholesterolmia patients for 7 days consecutively given improvement of reduce total cholesterol in blood. Each ingredients by previous researched showing potential substances to reduce total cholesterols by Ngurah et al, 2022 about tumeric as substances as anticholesterols agents. Galangal (Alpinia galanga) contains flavonoids such as galangin, camphorol, and

quercetin. These three flavonoid compounds have antioxidant effects and are used to inhibit fatty acid synthesis, thereby lowering blood cholesterol and triglyceride levels and helping protect cells from free radical damage, which contributes to blood sugar control. Phenolic compounds are used as a treatment for diseases such as diabetes, cancer, and brain dysfunction because they function as soluble fiber (Nastiti, 2020). Limes contain vitamin C, an antioxidant that works by reducing oxidative stress, stopping the digestion of carbohydrates, and preventing fat from passing through the small intestine wall, which results in lower blood cholesterol levels. Furthermore, hesperidin functions as a lipid-lowering agent by inhibiting the activity of the enzyme HMG-CoA reductase, which is involved in cholesterol synthesis. By reducing the activity of this enzyme, hesperidin helps lower LDL cholesterol and triglyceride levels in the blood (Pertiwi, 2021).

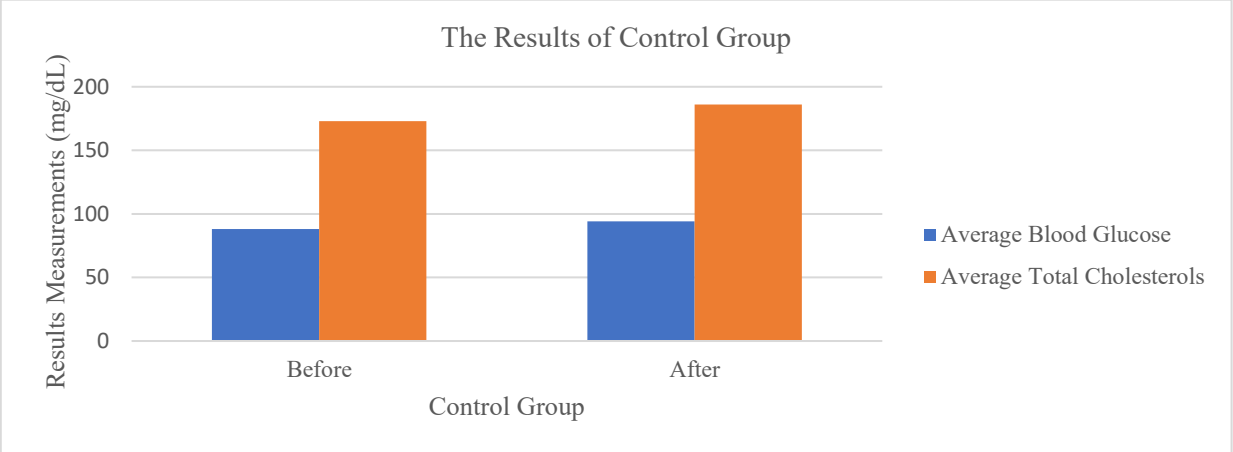


Figure 3. The Results of Control Group of Blood Glucose and Total Cholesterols

From figure 3 below of control group showing that before and after for 7days following the research is increasing value for blood glucose from 88 mg/dL to 94 mg/dL, while for total cholesterols from 173 mg/dL to 186 mg/dL. Its indicate that eventhough control group didn't given spiced drinks but if not implementing healthy lifestyle nor healthy food and also exercise regulary, it could increasing of blood glucose or total cholesterols levels in blood.

CONCLUSION

The conlusion of this researched are the effect of spiced drinks that given to treatment group that consist of 15 respondenst than willing to following the researched is quite effective to reduce the level of total cholesterols in blood. The average total cholesterol level before the intervention in the treatment group was 220 mg/dL and after the intervention it was 210 mg/dL. There was a decrease of 10 mg/dL. Meanwhile, in the control group, the pre-intervention reading was 173 mg/dL and after the intervention it was 185 mg/dL, an increase of 12 mg/dL. The average random blood glucose level in the treatment group was 92 mg/dL before the intervention and 97 mg/dL after the intervention, an increase of 5 mg/dL. Meanwhile, in the control group, the pre-intervention reading was 88 mg/dL and after the intervention it was 90 mg/dL, an increase of 2 mg/dL.

ACKNOWLEDGEMENTS

The researchers would like to thank all partner who have assisted in the research, especially the Pondok Kacang Barat community who were willing to be research respondents and the Pondok Kacang Timur Community Health Center who assisted in the laboratory examination process in this research. Last but not least to Poltekkes Kemenkes Banten who supported this researched.

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