Journal of World Future Medicine, Health and Nursing, 2(1) - Feb 2024 179-190

The Effect of Green Tea (Camellia sinensis) on Reducing Cholesterol Levels in Hypercholesterolemic Patients at the Working Area of Pangkajene Sidrap South Sulawesi Community Health Centre

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Article Information:
Received February 10, 2024
Revised February 19, 2024
Accepted February 26, 2024

ABSTRACT

Cholesterol is a component of fatty acids found in the blood. This substance is needed by the body for certain processes for survival. Among other things to form hormones, cells and maintain nerve cells. The purpose of this study was to determine the effect of giving green tea on reducing cholesterol levels in hypercholesterolemia patients in the Pangkajene Health Center work area. The design of this study was a pre-experiment pretest-posttest one group design. The population in this study were all hypercholesterolemia patients in the Pangkajene Health Center work area with sampling techniques using purposive sampling techniques totaling 15 respondents. This research was conducted on April 15-30, 2023. The results showed that before being given the intervention of giving green tea, most of the respondents' cholesterol levels were in the high category as many as 9 respondents (60%), and the normal category was 7 respondents (46.6%), the conclusion of the study was that there was an effect of giving green tea on reducing cholesterol levels in hypercholesterolemia patients with a p-value = 0.000. Suggestions are expected for people who experience hypercholesterolemia to use green tea as an alternative treatment to lower cholesterol levels.

Keywords: *Cholesterol Levels, Green Tea, Hypercholesterolemic Patients*

Journal Homepage https://journal.ypidathu.or.id/index.php/jnhl

How to cite: Hasliani, Hasliani. (2024). The Effect of Green Tea (Camellia sinensis) on Reducing Cholesterol Levels in Hypercholesterolemic Patients at the Working Area of Pangkajene Sidrap South Sulawesi Community Health Centre. *Journal of World Future Medicine, Health and Nursing*, 2(1), 179-190. https://doi.org/10.70177/health.v2i1.728
Published by: Yayasan Pendidikan Islam Daarut Thufulah

INTRODUCTION

Non-communicable diseases (NCDs) are health conditions that cannot be transmitted from one individual to another (Basílio dkk., 2022). Non-communicable diseases arise from a combination of non-modifiable risk factors and modifiable factors (Filho dkk., 2021). Risk factors that can be modified by individuals are age, gender, and

genetics (Gu dkk., 2019). Meanwhile, modifiable risk factors are factors that can be changed through individual awareness and social intervention (Sun dkk., 2019). Along with changing lifestyles in the current era of globalization, most people like practical food (Ference dkk., 2019). Fast food with high saturated fat content, lazy exercising and liking salty ones are one of the causes of hypertension and high cholesterol.

Cholesterol is a component of fatty acids found in the blood. This substance is needed by the body for certain processes for survival. Among them are to form hormones, cells and maintain nerve cells (Kim dkk., 2020). Hypercholesterolemia usually does not show typical symptoms, often someone just finds out about hypercholesterolemia when they do a health check to health services or other complaints.

Patients with hypercholesterolemia symptoms that are often encountered are often complaining of dizziness in the back of the head, the nape and shoulders feel sore, tingling in the hands and feet and some even complain that the left chest feels stabbing pain (Liu dkk., 2022). If hypercholesterolemia is left unchecked, it will increase the risk of coronary heart disease and stroke.

Cholesterol produced by the body consists of 2 types, namely HDL cholesterol (High Density Lipoprotein) which can be called good cholesterol and LDL cholesterol (Low Density Lipoprotein) called bad cholesterol (Huhn dkk., 2019). LDL cholesterol will accumulate on the walls of the coronary arteries causing blockages, therefore LDL is referred to as bad cholesterol.

In hypercholesterolemia, there is an increase in LDL, triglyceride and total cholesterol levels. Normal LDL levels are less than 100 mg/dl, normal triglyceride levels are less than 150 mg/dl, normal total cholesterol levels are less than 200 mg/dl. Elevated cholesterol has been shown to alter the structure of blood vessels resulting in impaired endothelial function leading to lesions, plaques, occlusions, and emboli.

High cholesterol levels in the blood have an important role in the process of atherosclerosis which will further cause cardiovascular disorders. basically bad cholesterol in the body that can be lowered and prevented before it turns into bad cholesterol in the body that can cause disease (Costa dkk., 2019). The impact of increased cholesterol in the body can trigger complications such as hypertension, diabetes mellitus, heart disease and stroke.

According to the Word Health Organization or WHO in 2018, the global prevalence of hypercholesterolemia in adults is 37% for men and 40% for women (Dal Canto dkk., 2019). The prevalence of elevated total cholesterol is highest in the Western European region at around 54% for both sexes, followed by the American region at 48% for both sexes and 30% for both sexes in the Southeast Asian region (Goodman-Bacon, 2021). The prevalence of hypercholesterolemia in Indonesia in 2018 was highest among those aged ≥25 years (36%) and women (38.2%).

The prevalence of heart disease in Aceh based on physician diagnosis in the population of all ages is estimated to continue to increase (Chomsy dkk., 2022). Based on the clinical chemistry parameters examined in Riskesdas 2018, including the

examination of total cholesterol, HDL, LDL, and triglyceride levels, in the population of all ages was 1.6% or as many as 20,244 people.

Hypercholesterolemia treatment is divided into two, namely, pharmacological and non-pharmacological therapy (Tauber dkk., 2020). Pharmacological treatment of hypercholesterolemia can be done by consuming drugs such as statins, fibric acid, prubocal and niacin (Huang dkk., 2019). Non-pharmacological treatment can be done with herbal medicine or what is known as herbal medicine, which is treatment using herbal medicines (natural ingredients, such as medicinal plants including green tea).

Currently, Asian communities including Indonesia believe that green tea contains substances that are useful for the prevention and cure of various types of diseases, including as anticarcinogenic, antimetastatic, antioxidative, antihypertensive, antihypercholesterolemia, dental anticaries, antibacterial, and immunomodulatory or antiallergic.

Green tea is a natural tea because it does not undergo a fermentation process so that the substances contained in green tea have not undergone a process of change. In addition, tea is also very easy to find and commonly used as a daily drink (Pervin dkk., 2019). The most important content of green tea is epigallocatechin-3-gallate (EGCG) which is a bioactive ingredient that suppresses the pathogenesis of several chronic diseases, especially cardiovascular diseases (Chawanpaiboon dkk., 2019). Green tea also has pharmacological effects including weight loss, lower cholesterol, triglycerides, and blood glucose.

The benefits of green tea on lowering cholesterol levels can be seen in several studies that have been conducted (Luo dkk., 2020). The administration of green tea can reduce cholesterol levels (Ahmad dkk., 2019). Giving medicinal supplements that contain extra green tea can also reduce total cholesterol levels and the concentration of low density lipoprotein (LDL), 2021) Based on research conducted by Luthfi with the title the effect of giving green tea on lowering cholesterol levels in elderly people with hypertension in the area of the new added health center in the village of added new mekar, the average value before treatment (Pretest) was 256. 94 mg/dl and after being given treatment (Posttest) is 20081 mg/dl with a difference in the average before and after 56.125 mg/dl and after the statistical test is obtained asyimp sig (p) = 0.000 < α = 0.05 mka significance value < 0.05 Ha accepted can be concluded that there is an effect of giving green tea on lowering cholesterol levels in elderly people with hypertension in the area of the new tamban health center in the village of tamban baru mekar.

From the recapitulation data of the Pangkajene Health Center report in 2021, there were 129 people with cholesterol (Qu dkk., 2021). And the highest village with hypercholesterolemia patients was in November with 15 people with hypercholesterolemia.

Based on interviews with 5 hypercholesterolemia patients who suffer from cholesterol, 2 patients do not follow the doctor's recommendations to avoid foods that cause high cholesterol levels so that when cholesterol levels are high, patients look for drugs to pharmacies to lower cholesterol levels, while 3 more patients follow the

doctor's recommendations by keeping foods that cause high cholesterol levels, 2 patients also look for traditional medicine in the form of habbatussauda herbal medicine which can reduce hypertension and overcome high cholesterol. But so far the patient has never tried green tea.

Based on the background, the researcher is interested in examining the effect of giving green tea on lowering cholesterol levels in hypercholesterolemia patients in the Pangkajene Health Center working area.

RESEARCH METHODOLOGY

This research design uses a quasi experiment with a pretest-posttest control group design (Bharti & Singh, 2020). This design involves one group that is given a pre-test (O), given treatment (X) and given a post-test. The success of treatment with the comparison of pre-test and post-test values (Xie dkk., 2020). The population in this study were all hypercholesterolemia patients in the Pangkajene Health Center working area as many as 129 people from January - November 2022 (Veisi dkk., 2020). The purposive sampling technique was 15 respondents (Rolim dkk., 2019). The research was conducted on April 15 to 30, 2023. Data analysis using descriptive test and Paired Test T test.

RESULT AND DISCUSSION

Table 1. Respondent Demographic Data

No	Age	Frequency	Percentage
Age (Ministry of Health)			
a.	20-44 years old	0	0
b.	5-54 years old	11	73,3
c.	5-60 years old	4	26,7
	Total	**15**	**100**
1.	Gender:		
a.	Girl	5	33,3
b.	Man	10	66,7
	Total	**15**	**100**
2.	Work:		
a.	PNS	3	20
b.	IRT	4	26,7
c.	Swasta	8	53,3

	Total	**15**	**100**	
3.	Cholesterol history:			
a.	1 years old	5	33,3	
b.	> 1 years old	10	77,7	
	Jumlah	**15**	**100**	
a.	Complaints of HypercholesterolemiaKebas			1
	6,7			
b.	Leg pain and numbness	11	73,3	
c.	Joint pain and swelling	2	13,3	
d.	Sakit	1	6,7	
	Total	**15**	**100**	
4.	Food Type			
a.	High in protein	2	13,3	
b.	Fried food	5	33,3	
c.	Fatty foods	4	26,7	
d.	Tumisan	4	26,7	
	Total	**15**	**100**	

Source: Primary data (processed in 2023)

Based on Table 1 above shows that of the 15 respondents studied, most respondents were 45-54 years old as many as 11 respondents (73.3%), most respondents were male as many as 10 respondents (66.7%), most respondents worked privately as many as 8 respondents (53.3%), most respondents had a history of hypercholesterolemia as many as 10 respondents (77.7%), most respondents had hypercholesterolemia complaints, namely leg pain and numbness as many as 11 respondents (73.3%) and most respondents liked to consume fried foods as many as 5 respondents (33.3%).

1. Cholesterol Levels Before Giving Green Tea to Hypercholesterolemia Patients

The results of the study in table 4.2 show that before the intervention of giving green tea, most of the respondents' cholesterol levels were in the high category as many as 9 respondents (60%) and in the high limit category as many as 6 respondents (40%).

Hypercholesterolemia usually does not show typical symptoms, often someone just found out about hypercholesterolemia (Kakutani dkk., 2019). When doing health checks to health services or because of other complaints. It's just that the symptoms that are often encountered are frequent dizziness in the back of the head, the stalk and shoulders feel sore, often aching, tingling in the hands and feet and some even complain that the left chest feels pain like being stabbed.

Hypercholesterolemia is increasing due to the behavior of people who tend to consume low-fiber and high-fat foods (Ushiroda dkk., 2019). Generally, a person only realizes that his cholesterol level is increasing after a health check (Y. Chang dkk., 2020). The cause can be caused by genetic or congenital disorders, as well as due to

changes in habits and ways of life such as lack of physical activity, increased stress and changes in diet.

The main causes of increasing cholesterol include too much and frequent consumption of foods with high fat content is one of the main causes of hypercholesterolemia (Lopez dkk., 2023). In addition to fat, excess carbohydrate intake can also increase cholesterol in the body (Black & Richmond, 2019). Therefore, eating foods that contain high calories such as rice, cakes, snacks, noodles, and bread should also be limited.

The results of research conducted by Widiyono, all respondents had a history of high cholesterol, as many as 23 respondents (79.3%) were female, as many as 26 respondents (89.7%) had a saturated fat diet, as many as 29 respondents (100%) did physical activity exercise and as many as 3 respondents (10.3%) had smoking habits.

Researchers assume that high cholesterol is mostly experienced by female respondents as many as 10 people (66.7%) and aged> 50 and as many as 10 respondents have experienced hypercholesterolemia for> 1 year and have private jobs (53.3%), where at that age the respondents have entered menopause which triggers high cholesterol (Pamukkale Universitesi, Tip Fakultesi, Fizyoloji Anabilim Dali, Denizli, Turkiye dkk., 2022). This relates to the theory put forward by Ersi, that with increasing age, a person's physical activity tends to decrease and the metabolic rate will naturally run slower.

This is related to the weakening of the body's organs (Orringer dkk., 2021). Since a person reaches the age of 20, the cholesterol level in his body will begin to increase naturally (Andes dkk., 2020). In men, this increase in cholesterol will generally continue until it stops at the age of 50, while in women, cholesterol in the body will generally remain low until menopause (Wang dkk., 2019). After reaching menopause, cholesterol levels in the female body will increase and stop at the age of 50 as well.

2. Cholesterol Levels After Giving Green Tea to Hypercholesterolemia Patients

The results of the study in table 4.3 show that after the intervention of giving green tea, most of the respondents' cholesterol levels were in the nomal limit category as many as 7 respondents (46.6%), in the high limit category as many as 4 respondents (26.7%) and in the high category as many as 4 respondents (26.7%). Hypercholesterolemia is a condition where cholesterol in the blood increases beyond the normal threshold, characterized by increased levels of LDL cholesterol and total cholesterol (Dumont dkk., 2019). The classification of primary hypercholesterolemia can be divided into two types, namely hypercholesterolemia with increased levels of Low Density Lipoprotein (LDL) and total cholesterol (Jiang dkk., 2020). Cholesterol is insoluble in water, so it is transported in the blood as lipoproteins. Disorders of cholesterol metabolism, especially LDL and total cholesterol levels, can increase the risk of atherosclerosis and ultimately lead to coronary heart disease.

Hypercholesterolemia management can be done with non-pharmacological therapy, one of which is green tea, green tea effectively reduces bad cholesterol in the blood and increases the ratio of good cholesterol (Lv dkk., 2023). Research on the

effects of consuming green tea on cholesterol levels shows that green tea reduces the level of low density lipoprotein (LDL) cholesterol, the bad cholesterol.

The results of research conducted by Ni Made Shinta with the title "The effect of giving green tea on lowering cholesterol levels in the early elderly (46-55) years in Ngudirejo Hamlet, Ngudirejo Village, Diwek District, Jombang Regency" (Chen dkk., 2021). The results showed that of the 10 respondents, most had sufficient cholesterol levels (200-239 mg/dL) as many as 6 people (60%) and a value of p=0.002 <0.05, indicating that there was an effect of giving green tea on cholesterol levels in the early elderly (K. Chang dkk., 2019). there is an effect of giving green tea on reducing cholesterol levels in the early elderly (46-55) years.

Researchers assume that after being given green tea there is a decrease in cholesterol in respondents, this is because currently respondents are being intervened by routinely consuming tea twice a day, namely morning and evening for 7 days according to the dose (500 ml), the result is that the polyphenol content contained in tea is a beneficial substance as anti-inflammatory, anti-cancer and able to affect body fat deposits and cholesterol levels, so as to reduce cholesterol levels in the body.

3. Differences Before and After Giving Green Tea to Reduce Cholesterol Levels in Hypercholesterolemia Patients

Based on that the knowledge of respondents before giving green tea was mostly in the high category as many as 9 respondents (60%), while after giving green tea most of them were in the category of normal limits as many as 7 respondents (46.7%), high limits as many as 4 respondents (26.7%) and high as many as 4 respondents (26.7%). The results of statistical analysis using the paired sample T test obtained a p-value of 0.000 <0.05, it can be concluded that there is a significant difference between cholesterol levels in hypercholesterolemia patients before and after giving green tea.

Green tea (camellia sinesis L kuntze) has various benefits, including reducing the risk of cancer (stomach cancer, breast cancer, gynecological cancer, prostate cancer, oral cancer), lowering blood cholesterol levels, preventing high blood pressure, killing bacteria, killing influenza virus viruses, reducing stress, losing weight, improving learning ability, lowering blood sugar levels, preventing tooth loss, antioxidants and preventing premature aging, overcoming coronary heart disease, reducing the risk of cardiovascular disease, increasing immunity, preventing kidney disease, preventing parkinson's disease, preventing unpleasant appetite, and antiosteoporosis. (Rattus, 2009)

The results of this study are in accordance with research conducted by Vivi Maydawati with the title "The potential of green tea in reducing cholesterol levels in hypercholesterolemic progestin contraceptive acceptors at Sapta Jaya Aceh Tamiang Health Center" showing the average cholesterol level before giving green tea 231.3 mg/dl and the average cholesterol level after giving green tea to179.6 mg/dl (p <0.05). So it can be concluded that giving green tea can reduce cholesterol levels caused by the use of DMPA in hypercholesterolemic DMPA birth control acceptors.

Researchers argue that there is a difference between before and after giving green tea to reduce cholesterol levels, where before giving green tea during the day with a

frequency of 2 times a day, namely morning and afternoon, most respondents have high cholesterol levels (66.7%) (Mello Rodrigues dkk., 2019), this is because most respondents are> 50 and have experienced hypercholesterolemia for> 1 year back (66.7%), while after giving this tea the cholesterol levels experienced by respondents decreased. this is because respondents control their diet which is high in protein, fat and fried respondents also consume green tea which has the benefits of controlling cholesterol, this is seen by a decrease in cholesterol levels experienced by respondents from the high to normal category as much as 66.7%, This is because respondents control their diet which is high in protein, fatty and fried, respondents also consume green tea which has the benefits of controlling cholesterol, this can be seen by a decrease in cholesterol levels experienced by respondents from the high to normal category by 46.6% and from the high category to normal limits by 26.7%, this can reduce the negative impact of uncontrolled cholesterol increase. However, there are still respondents who have cholesterol levels in the high category, this is because respondents do not want to control their diet which triggers an increase in cholesterol levels so that even though respondents consume green tea for 7 days with a frequency of 2 times a day, namely morning and evening, it cannot reduce the cholesterol levels they experience.

CONCLUSION

Based on research conducted on the effect of giving green tea on lowering cholesterol levels in hypercholesterolemia patients in the Krueng Barona Jaya Health Center work area on March 25 to 31, 2022, with a total of 15 respondents, it can be concluded as follows:

a. Cholesterol levels before giving green tea to hypercholesterolemia patients, it was found that most were in the high category 60%.
b. Cholesterol levels after giving green tea to hypercholesterolemia patients, it was found that most were in the normal category 46.6%.
c. There is an effect of giving green tea on reducing cholesterol levels in hypercholesterolemia patients with a p-value = 0.000.

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