

Effect Of Bamboo Shoot Consumption On Decreasing Blood Cholesterol Levels

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Abstract: High levels of cholesterol in the blood is a serious problem because it is one of the risk factors for various non-communicable diseases such as heart disease, stroke and diabetes mellitus. The results of Riskesdas in 2013 the proportion of Indonesian population with higher than normal cholesterol levels is higher in women at 39.6% compared to men at 30%. Some of the factors that influence total cholesterol levels are high-fiber diets, high-fat diets, smoking habits, gender, obesity and physical activity. Bamboo shoots are shoots (young stems) of bamboo plants. The high antioxidant, potassium and srat content in bamboo shoots can help reduce levels of bad cholesterol in the body without reducing the amount of good cholesterol. This study aims to look at the effect of bamboo shoot consumption on reducing blood cholesterol levels. The method used is a quasi experiment. Large samples of 30 people who have cholesterol levels more than the normal range (high). Blood samples are taken at night 10-15 minutes before consuming bamboo shoots and 9-10 hours of fasting after consuming bamboo shoots. Data were then analyzed using paired t tests. The results showed that blood cholesterol levels before shoot consumption showed the mean value \pm standard deviation: 248.11 ± 24.42 . Meanwhile, after consumption, bamboo shoots decreased with mean \pm standard deviation: 214.87 ± 35.47 . Statistical test results with paired sample t test showed that the value of $p = 0.000$ ($p < 0.05$) which means that there are significant changes in blood cholesterol levels before bamboo shoot consumption and after bamboo shoot consumption. From the results it can be concluded that there is an effect of bamboo shoot consumption on blood cholesterol levels.

Index Terms: Bamboo Plants, Bamboo Shoots, Cholesterol Levels, Blood.

1. INTRODUCTION

In Indonesia, Morbidity and Mortality (Non-Communicable Diseases) are increasing. Death data according to the World Health Organization (WHO) shows that of the 57 million deaths in the world in 2008, 36 million were caused by non-communicable diseases. Cardiovascular disease is a non-communicable disease, the biggest cause of death, which is 39%. Deaths from non-communicable diseases will continue to increase throughout the world. The biggest increase will occur in middle and poor countries. 70% of the global population will die of non-communicable diseases such as heart disease, stroke, diabetes mellitus, cancer. One of the risks of various non-communicable diseases which also becomes a serious problem is high cholesterol levels in the blood. The results of Riskesdas in 2013 the proportion of Indonesian population with cholesterol levels above normal is higher in women which is 39.6% when compared to men by 30%. Some of the factors that influence total cholesterol levels are high-fiber diets, high-fat diets, smoking habits, gender, obesity and physical activity. Excess cholesterol levels in the blood will easily be attached to the inner walls of blood vessels. Excessive LDL through the oxidation process will form a clot which if the clot is getting bigger will form a lump that will result in narrowing of the arteries. This process is usually called atherosclerosis. Atherosclerosis is a process of narrowing of blood vessels by fat and atherosclerosis is a clinical manifestation of heart disease. Based on studies that have been carried out the risk of atherosclerosis which is a cause of coronary heart disease will increase if the total cholesterol level in the blood exceeds normal limits. It is predicted that the death rate from coronary heart disease in developing countries in 2020 will increase 137% in men and 120% in women, in developed countries the increase is lower at 48% in men and 29% in women, so that in 2020 it is estimated cardiovascular disease is the number one cause of

death and disability in the world (Martohusodo, 2007). Indonesian flora is very diverse in number and has considerable potential. One of the functional foods made from local people has been used by the community as food and medicine and is expected to be able to inhibit the progression of atherosclerosis is bamboo shoots. In Maluku, especially in the Buru district, young bamboo stems are often used as cooking ingredients in vegetable production. Not only delicious, young bamboo stems also have health benefits. The benefits of young bamboo stems is none other than the content of substances that are in it. High antioxidant, potassium and fiber content in bamboo shoots can help reduce levels of bad cholesterol in the body without reducing the amount of good cholesterol. Bamboo shoots also contain protein, carbohydrates, vitamin A, vitamin B6, vitamin E and 12 kinds of amino acids which are very useful for body health (Rachmadi, 2011).

Antioxidants in shoots such as vitamin E, pholipenol, flavonoids, vitexin and orientin, palmitic acid, curcumene, limonene, toluene, naphthalene, 1,3,5-trimethyl benzene (Kumalasari, 2006; Lu.B, at all, 2010). Other antioxidant compounds in bamboo shoots are vitamin A, thiamine, riboflavin, vitamin C, curcumin (Choudhury.D at all, 2010; Chongtham N, at all, 2011). Although there are many benefits from bamboo shoots, so far only a few people know about the benefits and consume them as well as the lack of scientific information that addresses them. This study aims to determine the effect of bamboo shoot consumption on reducing blood cholesterol levels

2 METHOD

This research is a longitudinal approach using a quasi experimental research design, with a non randomized control group pre-test, post-test design. all cholesterol data needed will be collected in two times, namely: before and after consuming bamboo shoots. This research was conducted in April-May 2019, which began with sample collection until the number of samples was fulfilled. Blood samples will be taken at the Namlea city research location. The population in this study are adult people aged > 30 years who have a history of high cholesterol and live in the city of Namlea. The sample is

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part of the population to be studied or part of the number of characteristics possessed by the population (Hidayat, 2007). The sampling technique is done by using purposive sampling, which is a sampling technique that is based on a particular consideration made by the researchers themselves, based on the characteristics or characteristics of the population that have been known previously (Notoatmodjo, 2012). After the measurement was carried out, the number of samples set as many as 30 people consisted of 12 men and 18 women. The independent variable (X), namely: Consumption of Bamboo Shoots, while the dependent variable (Y), namely: Cholesterol Levels. Data collection of cholesterol levels was carried out 10-15 minutes before bamboo shoot consumption between 22:00-23:00, after which the subject was not allowed to eat or drink (fasting), the subject was not even allowed to do moderate or heavy physical activity (rest) before taking blood next. Blood sampling 9-10 hours after shoot consumption between 07:00-08:00. Blood drawn by using cholesterol sticks in the area of the palm of the hand right at the tip of the finger that has been disinfected with cotton swab alcohol, and then immediately put into a cholesterol check tool. Intake and measurement carried out by experts.

Research procedures

Stage 1

1. Conducting data collection and free interviews to obtain information and the general condition of the respondent, including age, and history of the disease.
2. Gather respondents who meet the criteria.
3. Explain the research procedure to respondents.
4. Asking to sign the consent form to be a respondent.

Stage 2

1. Taking respondent's blood sample 10-15 minutes before consuming bamboo shoot using stick, then put it into cholesterol check tool.
2. Taking the respondent's blood sample 9-10 hours after consumption of bamboo shoots, then input it into a cholesterol check tool.
3. Do a comparison of the results of the analysis of cholesterol levels before and after consuming bamboo shoots.

Data analysis was performed using paired t test to determine the effect of independent variables on the dependent variable, if the data were normally distributed and the Wilcoxon test if the data were not normally distributed with a significance value of $p < 0.05$ using the SPSS 23.0 computer program.

3 RESULT

This research has been carried out in Namlea, from April to May 2019. Subjects were adult individuals aged > 30 years who had a history of high cholesterol. All subjects were cholesterol levels measured before eating bamboo shoots and after eating bamboo shoots. The following are the characteristics of the respondents shown in table 1.

In Table 1. It can be seen the number of subjects in the study were 30 people consisting of 12 men (40%) and 18 women (60%), with an age range of 30-39 as many as 10 people (33.3%), 40-49 as many as 10 people (33.3%), 50-59 as many as 5 people (16.6%), and 60-69 as many as 5 people (16.6%).

Table 1. Characteristics of research respondents (n = 30)

Characteristics Respondent	Amount	%
Gender:		
Men	12	40
Women	18	60
Age:		
30-39	10	33,3
40-49	10	33,3
50-59	5	16,6
60-69	5	16,6

Source: Primary data, 2019

In table 2. Show the results of examination of cholesterol levels after consumption of shoots from 30 subjects who had high cholesterol when consuming bamboo shoots there were 26 people (86.7%) of people whose cholesterol levels had decreased. While 4 (13.3%) experienced an increase in cholesterol levels.

Table 2. Results of examination of cholesterol levels after bamboo shoot consumption

Keterangan	Frekuensi	Persen (%)
Naik	4 Orang	13,3
Turun	26 Orang	86,7

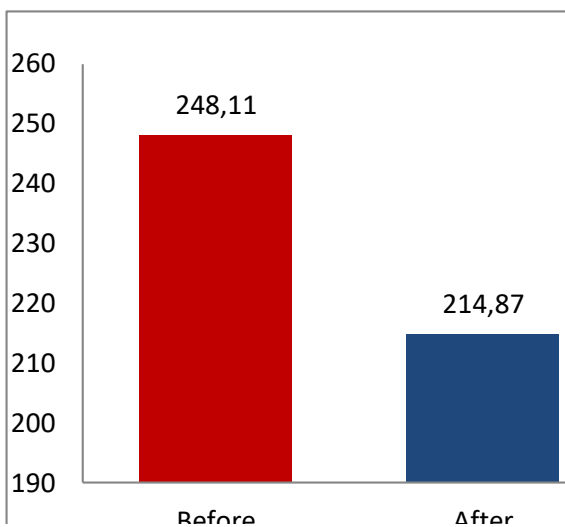
Source: Primary data, 2019

From Table 3. it can be seen that blood cholesterol levels before shoot consumption shows the mean value \pm standard deviation: 248.11 ± 24.42 . Meanwhile, after consumption, bamboo shoots decreased with mean \pm standard deviation: 214.87 ± 35.47 . Statistical test results with paired sample t test showed that the value of $p = 0.000$ ($p < 0.05$) which means that statistically there is a significant influence on blood cholesterol levels before bamboo shoot consumption and after bamboo shoot consumption. This can be seen also from the graph image 1. Which shows changes in cholesterol levels from before the consumption of high shoots (248.11) has decreased (214.87) after consumption of shoots.

Table 3. Changes in blood cholesterol levels before and after bamboo shoot consumption.

Blood Cholesterol levels	Mean (SD)	Difference (SD)	P*
Before	248,11 (24,2)	33,07	0,000
After	214,87 (35,47)	(30,33)	

Source: statistical test paired sample T-test



Graph1. Bar chart of changes in blood cholesterol levels before and after consumption of bamboo shoots.

4 DISCUSSION

This study shows the influence of bamboo shoot consumption on reducing blood cholesterol levels. This is evident from the research data that shows that of 30 subjects who had high cholesterol when consuming bamboo shoots, there were 26 people (86.7%) who had lowered cholesterol levels. While 4 people (13.3%) experienced an increase in cholesterol levels. This is due to the fact that the four subjects at night when fasting subjects had trouble sleeping (insomnia), this is what causes the body can not work properly to absorb food juices at night. Because under normal conditions, circadian rhythm regulates catabolic activity during the day, conversely at night there is an anabolic activity regulation for the proliferation and regeneration of damaged cells so that the body is regulated for rest (Tri W. 2013). Sherwood (2011) also believes that night time is the best time for the body to repair damage. The results of the analysis show the average blood cholesterol level before bamboo shoot consumption (248.11) with a standard deviation (24.42) has decreased after consumption of bamboo shoots (214.87) with a standard deviation (35.47). Statistical test results using paired sample T-test showed that the value of $p = 0.000$ ($p < 0.05$) which means that there is a significant effect of bamboo shoot consumption on the decrease in blood cholesterol levels. This is in accordance with the research of Iskiana Noviwati (2012), who found that the administration of ater bamboo shoots had an effect on reducing the blood cholesterol levels of white rats. The results of Edy Soesanto's research (2017) also prove that the effect of extra-thick babu apus shoots can reduce MDA levels in new-zaeland white hypo-cholesterol cholesterol rabbits. Decreased blood cholesterol levels after bamboo shoot consumption due to the body's response due to the influence of substances contained in bamboo shoots. Bamboo shoots are believed to reduce blood cholesterol levels, jaundice (liver cirrhosis), swollen medicines, cough with phlegm and fever (Edy Soesanto, 2018). This is supported by the results of studies that state that by consuming bamboo shoots every day, levels cholesterol will go down by 23%. The same statement by Park Eun Jin's research that consuming 360 g of bamboo shoots every day will reduce total cholesterol by 3.9 mg / dl and LDL cholesterol 16.1 mg / dl. Bamboo shoots contain high nutrition. Bamboo shoots contain antioxidants, fiber (complex

carbohydrates), fat, protein, vitamin A, thiamine, riboflavin, vitamin C, and other minerals such as calcium, phosphorus, iron, and potassium. Potassium content in bamboo shoots is quite high, which is 533 mg per 100 grams of bamboo shoots. Antioxidant content contained in bamboo shoots included in the type of fikosterol. This type of antioxidant is believed to help reduce levels of bad cholesterol in the body without reducing the amount of good cholesterol. Antioxidants in the bamboo shoots are also able to protect cells from damage. Besides the high potassium and fiber content in bamboo shoots can also reduce blood cholesterol levels (Senior, 2007). bamboo fiber food content is quite high: ie 2.56 percent, higher when compared to other types of tropical vegetables, such as soybean sprouts (1.27 percent), pecay (1.58), cucumbers (0.61), and mustard greens (1.01). Food fiber is a complex form of carbohydrate compounds found in many cell walls of food plants. Food fiber cannot be digested and absorbed by the human digestive tract, but it is important for health maintenance, disease prevention, and as an important component in nutritional therapy (Made Astawan and Tutik Wresdiyati, 2004). Bamboo fiber containing lignin (insoluble fiber), pectin and glucans (soluble fiber) has the effect of binding organic substances such as bile acids and cholesterol so that it can reduce the amount of fatty acids in the digestive tract (Olwin, 2005). Binding of bile by fiber also causes bile acids out of the enterohepatic cycle, because bile acids secreted into the intestine cannot be absorbed but are discharged into the stool. Decreasing the amount of bile acids causing the liver must use cholesterol as an ingredient to form bile acids. This is what causes fiber to reduce cholesterol levels. It is also suspected that the presence of fiber will inhibit the emulsification of fat and cholesterol by bile salts, so that cholesterol will be bound by fibers which will then be excreted through excreta (Hernawati, 2005). Research (Artanti, 2008) states that there is a relationship between fiber intake and triglycerides in the blood. The lower the fiber intake, the higher the total cholesterol level and the higher fiber intake the lower the blood glucose and triglyceride levels this shows there is a relationship of fiber intake with diabetes and cardiovascular disease because of the influence of cholesterol and glucose levels which can trigger an increase in the disease when consumed in excess but fiber intake can help according to cholesterol, triglyceride and blood sugar levels (Kurniasari, 2014). The same research was also carried out by Purdue University which suggested that bamboo shoots' ability to reduce cholesterol was related to the content of beta-glucan fiber which was able to prevent the sticking of cholesterol plaque in blood vessels and then to dispose of it with impurities. Based on the results of the study, it can be concluded that: There is an effect of bamboo shoot consumption on a decrease in blood cholesterol levels. This can be seen from the results of the statistical analysis of paired sample T tests which show the value of $p = 0.000$ ($p < 0.05$), which means that there is a statistically significant effect of bamboo shoot consumption on decreasing blood cholesterol levels. It is recommended that in future studies that wish to continue research on the effect of bamboo shoot consumption on reducing blood cholesterol for longer treatment so that it can be seen again until the healing phase, it is necessary to further research on the effect of bamboo shoots on other bodily functions related to the benefits of the ingredients contained in bamboo shoots .

5 CONCLUSION

Based on the results of the study, it can be concluded that: There is an effect of bamboo shoot consumption on a decrease in blood cholesterol levels. This can be seen from the results of the statistical analysis of paired sample T tests which show the value of $p = 0.000$ ($p < 0.05$), which means that there is a statistically significant effect of bamboo shoot consumption on decreasing blood cholesterol levels. It is recommended that in future studies that wish to continue research on the effect of bamboo shoot consumption on reducing blood cholesterol for longer treatment so that it can be seen again until the healing phase, it is necessary to further research on the effect of bamboo shoots on other bodily functions related to the benefits of the ingredients contained in bamboo shoots .

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