

## RESEARCH ARTICLES

### **Giving Yali Pear Juice (*Pyrus Brettschneider*) Is Influential Against Total Cholesterol Levels in the Blood in Patients with Hypercholesterolemia**

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**Abstract:** Hypercholesterolemia is one of the abnormalities that occur in the body's metabolism, which is shown to cause an increase in total cholesterol levels exceeding the normal limit, which is 200 mg/dL. Metabolic disorders can increase blood fat levels due to enzyme deficiencies, LDL receptor abnormalities, and genetic factors that trigger excess cholesterol production or decrease cholesterol clearance by the liver. Natural ingredients of fruit can help reduce body fat levels. Yali pears contain compounds such as carotenoids, chlorophyll, triterpenoids, polyphenols, fibre, and vitamin C that can help improve blood lipid profiles. This study looked at the effect of giving Yali pear juice on total cholesterol levels in the blood, so that it can be one of the natural additional treatments for hypercholesterolemia patients. This study uses a *non-equivalent control group design*, namely research conducted with a *pre-* and *posttest*, which is divided into two groups, namely the treatment group given Yali pear juice and the control group given a placebo. Yali pear juice and a placebo were given for 10 days. Checking total cholesterol levels in the blood using *GCU easy touch* tools before and after the study. Data analysis using the T-test parametric test. Analysis of *pre-test* data with *the post-test* of the treatment group obtained a result of  $p < 0.05$ , which means that there is an effect of Yali pear juice on total cholesterol levels in the blood. In the *pre-test* with *the post-test*, the control group had  $p > 0.05$ , which means there was no placebo effect on total cholesterol levels in the blood. Giving Yali pear juice for 10 days has an effect on reducing total cholesterol levels in the blood.

**Keywords:** Hypercholesterolemia, influences, yali pear

## INTRODUCTION

Hypercholesterolemia is one of the abnormalities that occur in metabolism in the body, which is shown to cause an increase in total cholesterol levels beyond the normal limit, which is more than 200 mg/dL.<sup>1,2</sup> The American Heart Association (AHA) states that total blood and LDL levels that exceed the high limit of normal are called hypercholesterolemia and are risk factors for several diseases and disorders.<sup>3</sup>

Atherosclerosis or disorders related to atherosclerosis, such as peripheral vascular disease, ischemic cerebrovascular disease, and coronary heart disease, are the main causes, one of which is due to high cholesterol levels in the blood.<sup>1,2</sup> Several factors, such as gender, age, food intake that enters the body, smoking, and daily activities, can have an impact on total cholesterol levels in the blood.<sup>1,2</sup>

Hypercholesterolemia is still very common to this day. More than 45% of people worldwide suffer from hypercholesterolemia. The cases that occurred in Southeast Asia amounted to 30% while in Indonesia amounted to 35%.<sup>2,4</sup> Therefore, high cholesterol is still a health problem.

According to a 2008 WHO estimate, 39% of people worldwide over the age of 25 suffer from hypercholesterolemia.<sup>2,4</sup> Southeast Asia has the lowest frequency of hypercholesterolemia at 30.3%, followed by the Americas at 47.7% and Europe at 53.7%.<sup>2,4</sup> Based on statistics from the 2018 Basic Health Statistics Research (Riskesdas), abnormal cholesterol levels of 21.2% were

found in people aged 15 years and above in Indonesia. The proportion of women is higher than that of men (18.3% compared to 24.0% for men).<sup>5</sup> This figure shows that the management of hypercholesterolemia is not good enough.<sup>2,4</sup>

Management and control of lipid levels in the body, especially LDL cholesterol and triglycerides, is an option for the treatment of hypercholesterolemia. In addition to controlling food intake, the natural ingredients of the fruit can help lower body fat levels. Consuming foods rich in antioxidants reduces the risk of developing diseases.<sup>6,7</sup> Fruits are an excellent source of substances with antioxidant and pro-health properties.<sup>7</sup> These bioactive ingredients, characterised by the content of polyphenol compounds and high antioxidant capacity, include pears.<sup>6,7</sup>

Yali pears contain compounds such as carotenoids, chlorophyll, triterpenoids, polyphenols, fibre, and vitamin C that can help improve blood lipid profiles.<sup>7,8</sup> Nevertheless, little research has been done on how the Yali pear can help people with hypercholesterolemia to reduce total cholesterol levels in the blood.<sup>9</sup>

In 2018, a study was conducted that tested rabbits with the administration of pure Yali pear juice could lower total cholesterol levels in the blood.<sup>9</sup> In this regard, researchers wanted to examine the effects of giving Yali pear juice to people who experienced an increase in total cholesterol in the blood.

## METHOD

This study uses a *quasi-experimental design research* type that is quantitative. The research design used in this study is a *non-equivalent control group* design, which is a research method that involves before-and-after measurements of the treatment group and control group.

The time for this research is scheduled to take place from August to December 2024 at the Jamkrindo Syariah Branch Office and IDX Branch Office located in Lhong Raya Village, Banda Raya District, Banda Aceh City.

The population in this study includes all employees working at the Jamkrindo Syariah Branch Office and IDX Branch Office in Banda Aceh City. The number of employees suffering from hypercholesterolemia was obtained as many as 45 people from the total employee population of 100 people.

The minimum number of samples required for each study group was 15 hypercholesterolemia. In order to avoid the potential for *dropout*, the number of samples is increased by 10% for each group.

Therefore, the number of samples in this study was 34 people, with each group of 17 people. From the total sample obtained, respondents will be randomly grouped into two groups. This random group division is expected to minimise bias and increase the validity of the research results.

Sampling in this study uses *purposive sampling*, which is a sample selection method based on certain criteria (inclusion criteria and exclusion criteria).

Inclusion Criteria: Age 25–50 years, patients with hypercholesterolemia whose total cholesterol level is more than 200 mg/dL, patients who have been checked for total cholesterol levels in the blood after fasting for 8-12 hours using *the Easy Touch tool*, and are willing to be used as study respondents and have signed the *informed consent* that has been provided.

Exclusion Criteria: Patients who are allergic to Yali pears, patients who are taking anti-hypercholesterolemia drugs, patients who are taking other alternative medicines, patients who are pregnant, patients with complications, or have other comorbidities such as kidney and heart disorders.

This study collected data using the observation method. The data collected was obtained from the results of research conducted directly. In this study, the data used is primary data.

The various instruments used in this study are a test tool for total cholesterol levels in the blood with Easy Touch brand strips, Yali pears, and observation sheets for data recording.

The treatment group will receive Yali pear juice, and the control group will receive a placebo. Both the treatment group and the control group received treatment for 10 days. Each group will have a total cholesterol level checked before and after the administration of Yali pear juice and a placebo.

The making of Yali pear juice is done by preparing Yali pears and measuring cups. The process begins with peeling, washing, and cutting the fruit into small pieces before

blending it into juice. A total of 200 ml of pure Yali pear juice is given to hypercholesterolemia patients with a cholesterol level of >200 mg/dl, consumed every morning after breakfast at 10.00 WIB and drunk immediately after making to avoid discolouration of the juice. Meanwhile, a placebo was made by mixing pear flavour into 200 ml of boiled water, then stirring until dissolved. Placebo was administered by the same method as Yali pear juice to ensure uniformity of treatment in the study.

As the first step in data analysis, a test of the assumption of data distribution is carried out to see whether the data is normally distributed or not. If the results of the normality test data show that the data is normally distributed ( $p > 0.05$ ), then the T-Test is used. The normality test used in this study is the Shapiro-Wilk test. The nonparametric Wilcoxon test should be used for data analysis if the results of the normality test indicate that the data are not normally distributed.

**RESULT**

**Table 1. Demographic Data by Gender**

Gender	N	%
Treatment Groups		
Man	10	58,8
Woman	7	41,2
<b>Total</b>	<b>17</b>	<b>100,0</b>
Control Group		
Man	8	47,1
Woman	9	52,9
<b>Total</b>	<b>17</b>	<b>100,0</b>

Based on Table 1, the results of the study showed that the results of the study on samples at the Jamkrindo Syariah Branch Office and the IDX Branch Office in Banda Aceh City were found that in the male treatment group, there were 10 people (58.8%) and women there were 7 people (41.2%). In the control group, there were 8 people (47.1%) and 9 women (52.9%).

**Table 2. Age Demographic Data**

Age	N	%
Treatment Groups		
25 – 32	12	70,6
33 – 41	2	11,8
42 – 50	3	17,6
<b>Total</b>	<b>17</b>	<b>100,0</b>
Control Group		
25 – 32	6	35,3
33 – 41	8	47,1
42 – 50	3	17,6
<b>Total</b>	<b>17</b>	<b>100,0</b>

Based on Table 2, the results of research data on samples at the Jamkrindo Syariah Branch Office and IDX Branch Office in Banda Aceh City based on age, there was an increase in total cholesterol levels with the highest age in the treatment group, namely 25-32 years with 12 people (70.6%) and in the control group with 8 people (47.1%).

The increase in total cholesterol levels with the least amount based on age occurred in the treatment group, namely 33-41 years old, amounting to 2 people (11.8%), and in the control group, namely 42-50 years old, amounting to 3 people (17.6%).

**Table 3. Results of Cholesterol Values**

Group	Mean (mg/dl)	Standar Deviasi
Treatment Groups		
Pre-Test	224,24	15,68
Post Test	188,18	27,57
Control Group		
Pre-Test	222,88	15,13
Post Test	222,82	20,05

Based on Table 3, the data showed the mean *pre-test* value of the treatment group of 224.24 mg/dl and the standard deviation of 15.68. The mean *post-test* value of the treatment group was 188.18 mg/dl, and the standard deviation was 27.57.

The mean *pre-test* value of the control group was 222.88 mg/dl, and the standard deviation was 15.13. The mean *post-test* value of the control group was 222.82 mg/dl, and the standard deviation was 20.05.

**Table 4. Normality Test**

Group	P value
Pre-Test Treatment Group	0,301
Post-Test Treatment Group	0,188
Pre-Test Control Group	0,316
Post Test Control Group	0,285

Based on Table 4, the results of the normality test in the treatment and control groups showed a *p-value* of > 0.05. This indicates that the data in this study is normally distributed, so that the analysis can be continued with the T-Test.

**Table 5. Dependent T-Test Test**

Group	P value
Post Test Treatment Group – Post Control Group Test	<0.001

Based on Table 5, the results of data analysis in the pre-test and post-test treatment groups showed a value of  $p < 0.001$  ( $p < 0.05$ ), which means that statistically, there was a significant difference between the *pre-test* and *post-test* in the group given Yali pear juice. This indicates that the administration of Yali pear juice has an effect on the total cholesterol level in the blood.

In the *pre-test* and *post-test* control groups, a value of  $p = 0.984$  ( $p > 0.05$ ) was obtained, which means that statistically, there was no statistically significant difference between the *pre-test* and *post-test* in the placebo-given group.

**Table 6. Independent T-Test**

Group	P value
Pre-Test Treatment Group – Post Test Treatment Group	<0.001
Pre-Test Control Group – Post Test Control Group	0,984

Based on Table 6, the results of data analysis in the *post-test* of the treatment group and the *post-test* of the control group showed a value of  $p < 0.001$ , which means that statistically, there was a significant difference between the results of the *post-test* of the treatment group and the *post-test* of the control group.

## DISCUSSION

This study, which examined total cholesterol levels in the blood using the *Easy Touch GCU* tool, showed that the increase in total cholesterol levels in the blood occurred most in the treatment group, with the male sex of 10 men (58.8%), while in the control group, it was more experienced by 9 women (52.9%).<sup>10,11,12</sup>

This study, which examined total cholesterol levels in the blood using the *Easy Touch GCU* tool, showed that the increase in total cholesterol levels in the blood in the treatment group occurred most in the age range of 25–32 years, which was 12 people (70.6%) while the most in the control group was found at the age of 33–41 years of 8 people (47.1%).<sup>13,14,15</sup>

This study was conducted on respondents aged 25–50 years who consumed 200 ml of pure Yali pear juice daily for 10 days. The results showed a decrease in total cholesterol levels in the blood.<sup>16,17</sup>

Based on data from the Basic Health Research (RISKESDAS) in 2018, the proportion of total cholesterol levels in the population aged  $\geq 15$  years shows that high total cholesterol levels occur more in women, with a percentage of up to twice that of men.<sup>5,18,19</sup>

In another study conducted in Lampung in 2020 involving 200 respondents aged 10–65 years, it was found that the increase in total cholesterol levels occurred most in the male sex, with 52 people, while with the female sex, with 33 people.<sup>20,21,22,34</sup>

In another study conducted in Semarang in 2022 using the *Easy Touch GCU* tool and involving 139 respondents, it was found that the increase in total cholesterol levels occurred most in women, namely 51 people, while in men, it was 22 people.<sup>24,25,26,35</sup>

Based on data from Basic Health Research (RISKESDAS) in 2018, the proportion of total cholesterol levels to the population aged  $\geq 15$  years shows that the highest increase in total cholesterol levels occurs in the age group of 55–64 years.<sup>5,27,28,29</sup>

In another study in 2020 in Lampung with 200 respondents divided into three age categories, namely, adolescent age (10–24 years), adult age (25–44 years), and old age (45–65 years) showed that there was the largest increase in total cholesterol levels in adults (25–44 years) as many as 33 people.<sup>30,31,32,34</sup>

In another study in 2023 regarding the effect of giving dragon fruit as yoghurt and low-fat milk on total cholesterol levels was studied using the *Easy Touch GCU* tool with a total sample of 60 people. The sample was divided into two groups, namely the treatment and comparator groups, each consisting of 30 people. The age categories used in this study are 20–40 years old and 41–60 years old. The results obtained from the study showed that the increase in total cholesterol levels was most common in the treatment group with the age of 41–60 years of 19 people (63.3%) while in the comparison group it was found that the highest increase in total cholesterol levels was also found at the age of 41–60 years with a total of 22 people (73.3%).<sup>33,34,35,36</sup>

In contrast, another study conducted in 2013 with the consumption of 166 grams of fresh pears daily for 12 weeks in respondents aged 45-65 years showed no significant decrease in total cholesterol levels.<sup>37</sup> In contrast, another study conducted in 2013 with the consumption of 166 grams of fresh pears daily for 12 weeks in respondents aged 45-65 years showed no significant decrease in total cholesterol levels

Research that has been conducted in 2018 on rabbit test animals that were given pure Yali pear juice can reduce total cholesterol levels.<sup>9</sup> It is the same with this study, given to humans whose doses have been converted from rabbit doses to human doses.

In a 2020 study that reviewed several research journals on various compounds contained in pears. Bioactive compounds such as arbutin, kaempferol, quercetin, tannins, flavonoids, polyphenols, sterols, and ursolic acid contribute to a wide range of health benefits. Based on various studies, pears have pharmacological activity that includes antioxidant, antimicrobial, anticancer, cholesterol-lowering, antidiabetic, skin whitening, wound healing, hepatoprotective, antipsychotic, and weight loss effects.<sup>38</sup>

In a 2023 study that examined several research journals about the compounds contained in pear juice. Pears contain a variety of bioactive components, such as fructose, sucrose, flavonoids, polyphenols, and ascorbic acid, that have significant health benefits. Pears have potential as an anti-

diabetic, anti-hyperlipidemia, and anti-inflammatory agent.<sup>39</sup>

In vitro 2024 research shows that Yali pear polyphenol extract has a high capacity to bind cholesterol. In vitro 2024 research shows that Yali pear polyphenol extract has a high capacity to bind cholesterol.<sup>40</sup>

## CONCLUSION

Before consuming Yali pear juice, the average total blood cholesterol level of the experimental group was 224.24 mg/dl; after consuming Yali pear juice, the average total blood cholesterol level dropped to 188.18 mg/dL, a difference was 36.06 mg/dL.

The average total cholesterol levels before and after consuming Yali pear juice differed with a p value of <0.01 (p<0.05). These findings suggest that the administration of Yali pear juice lowers total blood cholesterol levels. In contrast, the average total cholesterol level of the control group was 222.88 mg/dl before receiving a placebo and 222.82 mg/dl afterwards, with a difference of 0.059 mg/dl.

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