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Effect Consumption of Papaya and Jicama Juice to Total Cholesterol Levels in Hypercholesterolemia Patients

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ABSTRACT

Hypercholesterolemia is a metabolic disorder of lipoproteins which is characterized by high total cholesterol levels. Papaya and Jicama juice contains vitamin C. This is benefit to regulate the concentration of lipid plasma by inhibits the micelles forming, binding of bile through feces and produces short chain fatty acid that can reduce cholesterol synthesis. This study aimed to determined the effect of Papaya and Jicama Juice to decreased total cholesterol level of hypercholesterolemia patient at dr. M.Suherman Clinic Jember. This study was Quasy Experimental pretest-posttest with control group design. Total subjects were 24 taken by purposive sampling and divided into 2 group, namely control group (24) and treatment group (24) who consumed 180 ml of papaya and jicama juice, containing 65,45mg vitamin C for 7 days, once a day. The criteria of subjects was aged 30-60 years who had total cholesterol levels 200-240 mg/dl. Measurement of total cholesterol used GCU-meter Easy Touch. Data were analyzed used Independent t-test and paired t-tes. The results was total cholesterol level in treatment group before consumed juice was 226.17 mg/dl decreased 176.25 mg/dl after the juice was given. However, papaya and jicama juice had no significant effect (p=0.0103) on the decrease of total cholesterol levels.

KEYWORDS: jicama, juice, papaya, vitamin C, total cholesterol.

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INTRODUCTION

Hypercholesterolemia has become a public health problem that needs to be resolved. Based on National Basic Health Research (2013), there are 35.9% of Indonesia's population aged over 15 years who have total cholesterol levels above normal. Increased cholesterol levels were more common in women (39.6%) than men (30%). Dr. M. Suherman Jember Inpatient Clinic has treated 317 patients with hypercholesterolemia.

Hypercholesterolemia is a lipoprotein metabolism disorder characterized by high total blood cholesterol (Grundy, 2006). Normal total cholesterol blood level is less than 200 mg/dl (Guyton, 2007). Hypercholesterolemia can be caused by high intake of food sources of fat. High fat consumption of 100 mg/day can increase the amount of cholesterol in the body by 2-3 mg/dl (Yani, 2015). Other causes of hypercholesterolemia are genetic factors, weight gain, the aging process, lifestyle changes and eating patterns high in calories, saturated fat and cholesterol (Otunola, 2010).

Hypercholesterolemia can be treated pharmacologically and non-pharmacologically. Non-pharmacological therapy is carried out with nutritional therapy by consuming foods high in vitamin C. Vitamin C is one of the nutrients included in antioxidants. Antioxidants function to reduce free radicals by repairing blood lipids (Aysun, 2011). The role of vitamin C in reducing the risk of hypercholesterolemia is by regulating the concentration of lipids in the blood, which inhibits the formation of micelles and binding of bile through the feces, and produces short-chain fatty acid compounds that can reduce cholesterol synthesis (Mette, 2012). One of the treatments for hypercholesterolemia is by consuming fruit juices that contain high levels of vitamin C, such us papaya fruit and jicama.

Papaya fruit (Carica papaya) is a fruit that can be obtained at any time because its growth does not know the season so that

the fruit can be harvested at any time, and has a relatively cheap price. All parts of the papaya fruit, from the roots to the leaves, can be processed and have various health benefits. Papaya fruit flesh has health benefits, because it contains vitamin C which can lower total cholesterol levels in the blood. Ripe papaya flesh contains vitamin C of 61.8 mg/100 g (Wall, 2006).

Jicama is a type of tubers that are commonly consumed by the community. Jicama is easy to obtain because the harvest of Jicama does not depend on the season and the price of Jicama is affordable. Jicama juice is a processed product of Jicama which is obtained by grinding Jicama using a squeezer. Bengkoang contains 20 mg/100g of vitamin C (Astawan, 2009).

Papaya and jicama have higher vitamin C content when compared to other types of fruit and tubers such as apples, starfruit, mangoes and taro. By combining papaya juice with jicama juice, the amount of vitamin C contained in it increases, so it can be more effective in lowering total cholesterol levels in the blood.

Previous research on hypercholesterol Sprague Dawley rats that were given papaya fruit as much as 12 mg/dl for 4 weeks showed a decrease in total cholesterol levels in Sprague Dawley rats with hypercholesterolemia (Dewi, 2012). Other studies have shown that consuming 20 mg/dl of jicama extract can significantly reduce cholesterol levels in a group of women with hypercholesterolemia (Hanisa, 2014).

Based on previous research, there are various types of fruit and tubers that can reduce total cholesterol levels. However, there has been no similar research that combines fruit and tubers into functional drinks. Thus, it is necessary to investigate the effect of giving papaya and jicama juice on total cholesterol levels in hypercholesterolemia sufferers at the Dr. M. Suherman Inpatient Clinic Jember

METHOD

This research is a Quasi-Experimental Research with Pretest-Posttest Control Group Design. The research was carried out at the Inpatient Clinic dr.M.Suherman Jember. The subjects in this study were outpatients with hypercholesterolemia at the Dr.M.Suherman Inpatient Clinic Jember which were divided into two groups, namely the treatment group and the control group, with inclusion and exclusion criteria. The inclusion criteria were outpatients who were diagnosed with hypercholesterolemia by a doctor, aged 30-60 years, had total cholesterol levels of 200-240 mg/dl, were taking the anti-hypercholesterol drug simvastatin and were willing to follow the research procedure until it was completed.

The research subjects were selected randomly using purposive sampling and obtained 24 people, divided into 12 people in the control group and 12 people in the treatment group. The treatment group was given 180 ml of papaya and jicama juice once a day for 7 days with a total vitamin C content of 65.45 mg while the control group was only given mineral water. Papaya and jicama juice made with a formulation of 137.7 grams of papaya and 68.85 grams of jicama have a vitamin C content of 65.45 mg/100g. Furthermore, cholesterol levels were measured using the GCU Meter Easy Touch before and after the intervention of papaya and jicama juice.

Data Analysis

Bivariate analysis was conducted to analyze the effect of consuming papaya juice with jicama juice on total cholesterol levels in hypercholesterolemic patients. The normality of pretest and posttest total cholesterol level data was tested using the Shapiro-Wilk test to determine whether the data were normally distributed or not. To analyze the difference in total cholesterol levels between the treatment group and the control group, the Independent sample t-test was used. Meanwhile, to analyze the difference in total cholesterol levels before and after treatment in each group, paired t test was used.

RESULTS AND DISCUSSION

The subjects involved in this study were 24 people who were divided into 2 groups, namely 12 people as the control group and 12 people as the treatment group. The criteria for research subjects can be seen in table 1

Table 1. Characteristic of Subject

	Control Group (n)	Treatment Group(n)	Total (n)
Gender			
Male	4	4	8
Female	8	8	16
Age (years)			
19-29	1	0	1
30-49	4	2	6
50-64	7	10	17

Most of the hypercholesterolemic subjects in this study were aged 50-64 years. Based on statistical analysis using the Chi Square test, it is known that the value of $p = 0.313$ ($p > 0.05$) means that there is no significant age difference between the control group and the treatment group.

Based on gender, the number of male subjects was less (33.33%) than female (66.66%). At the age of 20, men tend to have higher cholesterol levels than women. While women have a higher tendency after menopause. The results of the study found that 63.3% of hypercholesterolemic sufferers

were women while 36.7% were men (Ujani, 2016). Other studies state that there is no significant difference between gender and total cholesterol levels (p=0.503) (Mulyani, 2018).

Reducing the hormone estrogen during menopause can cause the distribution of body fat which results in increased total cholesterol. The increase in total cholesterol levels in women during menopause is 5-19%. Women of childbearing age have the hormone estrogen which functions well in preventing arterial deposits by increasing HDL levels and reducing LDL levels which can affect total cholesterol levels. Women in the pre-menopausal to menopausal period experience a decrease in the function of the hormone estrogen, which can cause an increase in total cholesterol levels in the blood (Hanisa, 2014; Ganong, 2009).

The food intake of the research subjects was also observed using the direct interview method using a 24-hour food recall. Statistical analysis was carried out to determine whether there were differences in food intake between the two groups which could also affect cholesterol levels.

Table 2. Intake of protein, fat, carbohydrates, fiber and vitamin C

Food Intake	Control Group (n = 12)	Treatment Group (n = 12)	*p
Protein (gram)	57,75	56,85	0,686
Fat (gram)	54,50	56,05	0,436
Carbohydrates (gram)	251,20	268,10	0,298
Fiber (gram)	8,55	9,55	0,046*
Vitamin C (mg)	74,25	95,00	0,001*

*) Mann-Whitney test, Significance p < α (α = 0.05)

There were differences in fiber and vitamin C intake in the control group and the treatment group (p=0.046, p<0.05). The treatment group's fiber intake was higher than the control group. Even though there were differences in the control group and the treatment group, daily fiber intake was still lacking. The recommended fiber consumption is ± 25 gr/day (Almatsier, 2009). Intake of fiber and vitamin C was higher in the treatment group compared to the control group, because the treatment group consumed papaya juice with yam juice which affected fiber and vitamin C intake.

Table 3. Total cholesterol levels pre test between groups

	Mean	Min	Max	p-value
Control	225.67	202	272	0,952
Treatment	226.17	205	273	

*) Independent sample t-test Significance p <α (α = 0.05)

Table 4. Total cholesterol levels post test between groups

	Mean	Min	Max	p-value
Control	190.42	169	211	0.056
Treatment	176.25	135	220	

*) Independent sample t-test Significance p <α (α = 0.05)

Table 5. Total cholesterol levels pre and post intervention in each group

	Kadar Kolesterol Total (mg/dl)		*p
Group	Pre-test	Post-Test	
Control	225.67	190.42	0.00
Treatment	226.17	176.25	0.00

*) Paired sample test Significance p <α (α = 0.05)

The results of statistical analysis in the control and treatment groups showed that there was a significant difference between total cholesterol levels before and after the intervention with a p = 0.000 (p<0.05).

This shows that both the control group and the treatment group decreased total cholesterol levels. However, total cholesterol levels after the intervention were lower in the treatment group than in the control group. This was because the subjects in the treatment group consumed Papaya and jicama juice which contained fiber and vitamin C in addition to taking anti-hypercholesterol drugs, while those in the control group only took anti-hypercholesterol drugs.

Papaya and jicama juice contains 65.45 mg of vitamin C and 1.39% of fiber. Vitamin C is a type of antioxidant that helps in the process of cholesterol oxidation. Vitamin C can help hydroxylation reactions and the formation of bile acids so that it can increase cholesterol excretion in the body. Jicama contains water-soluble fiber which can reduce fat absorption in the intestine. Fiber can increase the secretion of bile, which is later fermented by bacteria to produce acetic

acid propionate and butyrate which function to inhibit cholesterol synthesis, and is excreted with feces (Gropper et al, 2009).

CONCLUSION

The average pre-test cholesterol level in the control group was 225.67 mg/dl, while the treatment group was 226.17 mg/dl. The average post-test cholesterol level in the control group was 190.42 mg/dl, while the treatment group was 176.25 mg/dl. There was a significant difference (p=0.000 <0.05) in total cholesterol levels of hypercholesterolemic patients before and after consuming papaya and jicama juice in both groups, the control and treatment groups. The average reduction in cholesterol levels in the treatment group (49.92 mg/dl) was more than the control group (35.25 mg/dl). Papaya and jicama juice can be recommended as a supporting therapy for pharmacological treatment in hypercholesterolemia patients.

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