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The Effect of Acupuncture Therapy at ST 40 (Fenglong), SP 6 (Sanyinjiao) and Avocado Juice on Reducing Total Cholesterol Levels in High Cholesterol Cases in Duwetan Ngunut Jumantono

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ABSTRACT

Introduction: Hypercholesterolemia is a condition where the cholesterol levels in the blood exceed normal levels. One of the non-pharmacological therapeutic treatments for patients with hypercholesterolemia is acupuncture therapy and providing nutritious food intake. This study aims to determine the effect of acupuncture points at ST 40 (Fenglong), SP 6 (Sanyinjiao) and avocado juice on reducing total cholesterol levels in cases of high cholesterol in Duwetan Ngunut Jumantono
Methods: Design of this research was *Quasy experimental* with the two groups pretest-posttest design method. January - August 2023 in Duwetan Ngunut village, Jumantono, Karang Anyar. The sampling technique was Purposive Random Sampling of 38 research subjects. Data collection uses primary data, namely the results of measuring total cholesterol levels. Research analysis consisted of univariate analysis, bivariate analysis with Wilcoxon and Mann-Whitney tests.
Results: There was an effect of acupuncture therapy at points ST 40 (Fenglong), SP 6 (Sanyinjiao) (p=0.0018) and a combination of avocado juice (p=0.0001) on reducing total cholesterol levels. There was a difference in the reduction in total cholesterol levels after being given the intervention (p=0.007) in the acupuncture therapy group (Mean= 219.79; SD= 39.35) and the avocado juice combination acupuncture group (Mean= 181.63 SD= 36.63).
Conclusion: There was a decrease in total cholesterol levels after being given acupuncture therapy at points ST 40 (Fenglong), SP 6 (Sanyinjiao) and a combination of avocado juice in the Duwetan Ngunut Jumantono village community.

Keywords: *Acupuncture, Avocado Juice, Total Cholesterol Levels*

INTRODUCTION

Hypercholesterolemia is a condition where the cholesterol levels in the blood exceed normal levels. Hypercholesterolemia occurs due to disorders of fat metabolism which can cause an increase in blood fat levels caused by deficiencies in lipoprotein enzymes, lipase, LDL receptor deficiencies, genetic disorders, and a decrease in the liver's ability to clean cholesterol in the blood. Hypercholesterolemia over a long period of time can cause the formation of atherosclerosis, resulting in cerebrovascular, cardiovascular and coronary heart disease, pancreatitis (inflammation of the pancreas organ), diabetes mellitus, thyroid disorders, liver disease and kidney disease.[1]

The incidence of heart and blood vessel disease is influenced by many factors, one of which is caused by hypercholesterolemia, which is a condition where cholesterol levels in the blood increase above normal limits.[2] According to WHO (2017) the death rate due to cardiovascular disorders is expected to increase to 25 million people in 2017. 2020, or around 37% of the total estimated deaths and 45% of these deaths were caused by coronary heart disease.[3]

One of the non-pharmacological therapeutic treatments for patients with hypercholesterolemia or dyslipidemia is acupuncture therapy and providing nutritious food intake. The mechanism of acupuncture therapy can stimulate neurotransmitters, namely: the stability of serotonin and noradrenaline levels in the central and peripheral nerves. This stimulation has the effect of facilitating and improving blood circulation. If blood circulation is smooth there will be no atherosclerosis and cholesterol levels will decrease.[4]

Acupuncture management at the ST 40 Fenglong point can affect the plasma lipid profile, also affect the lipid profile in the liver and eliminate foam cells which cause atherosclerosis. [5] At the SP 6 Sanyinjiao point it can reduce cholesterol content in the blood by restraining its synthesis and absorption, accelerating its decomposition and excretion. and changes its distribution in plasma and tissues.[6]

One nutritious food is avocado. Of several fruits that can lower cholesterol levels, researchers chose avocado because it has a total fat content of 15.41 grams/100 grams of fruit.[7]

This study aims to determine the effect of acupuncture points at ST 40 (Fenglong), SP 6 (Sanyinjiao) and avocado juice on reducing total cholesterol levels in cases of high cholesterol in Duwetan Ngunut Jumantono.

METHODS

This research is a quantitative research using a design study. *Quasy experimental* with the two groups pretest-posttest design method. The dependent variable is total cholesterol level. The independent variables were acupuncture treatment at ST 40 (Fenglong), SP 6 (Sanyinjiao) and avocado juice.

The research location is Duwetan Ngunut Village, Jumantono, Karang Anyar. The population in the study was the entire community in the village. The sampling technique was Purposive Random Sampling of 38 research subjects. Data collection uses observation sheets. The research will be carried out in January – August 2023.

This research carried out univariate analysis, bivariate analysis with Wilcoxon and Mann-Whitney tests using the STATA 17 application.

RESULTS

Table 1 Age and Total Cholesterol Levels of Research Subjects

Characteristics	Mean±SD	Min-Max
Age	48.34 ± 3.74	40 – 55
Total Cholesterol Level Pre	244.15 ± 22.99	203 – 300
Post Total Cholesterol Levels	200.71 ± 42.18	125 – 283

Table 1 shows that the research subjects had an average age of 48.34 years. The measurement results of the average total cholesterol level before the intervention were 244.15 mg/dL and the average total cholesterol level after the intervention was 200.71 mg/dL.

Table 2 Characteristics of Research Subjects

Variable	F	%
Gender		
Woman	28	73.68
Man	10	26.32
Work		
IRT	17	44.74
Self-employed	8	21.05
Laborer	10	26.32
Civil servants	1	2.63
Farmer	2	5.26
Total cholesterol levels pre		
Tall	14	36.84
Very high	24	63.16
Post total cholesterol levels		
Normal	19	50.00
Tall	9	23.68
Very high	10	26.32

Table 2 shows data on the characteristics of the research subjects, namely that the majority are female, 28 people (73.68%) and the majority work as housewives, 17 people (44.74%). The results of measuring total cholesterol levels before being given the intervention were in the very high category, 24 people (63.16%), while after being given the action, the majority of total cholesterol levels were in the normal category, 19 people (50%).

Table 3 Tabulation of Total Cholesterol Levels in Research Subjects

Cholesterol Levels	Acupuncture		Acupuncture & Avocado Juice	
	F	%		F
Pre				
High	6	42,86	8	57,14
Very High	13	54,17	11	45,83
Post				
Normal	8	42,11	11	57,89
High	3	33,33	6	66,67
Very High	8	80,00	2	20,00

Table 3 shows that before the intervention was given, the majority of research subjects' cholesterol levels were in the very high category, 13 people (54.17%) in the acupuncture group, and after being given the intervention, the majority of research subjects' cholesterol levels experienced a decrease in total cholesterol levels (normal category), 11 people (57, 89%) in the acupuncture plus avocado juice group.

Table 4 Normality Test Data

Total Cholesterol Levels	n	*Shapiro-Wilk Sign*
Pre-action	38	0.44
Post action	38	0.18
Pre Acupuncture	19	0.93
Post Acupuncture	19	0.04
Pre Acupuncture combination of Avocado Juice	19	0.20
Post Acupuncture combination of Avocado Juice	19	0.67

Table 4 shows the results of the normality test that the Sig value, total cholesterol levels before and after the procedure is >0.05, meaning the data is not normally distributed, so the hypothesis test used is Wilcoxon or Mann-Whitney.

Table 5 Results of Analysis of Average Total Cholesterol Levels in the Acupuncture and Avocado Juice Combination Acupuncture Groups

Total Cholesterol Levels	Acupuncture		Acupuncture & Avocado Juice		*p-value*
	Mean ± SD	**Min - Max**	**Mean ± SD**	**Min - Max**	
Pre	244.58 ± 23.31	203 - 290	243.73 ± 23.30	213 – 300	0.748
Post	219.79 ± 39.35	167 - 283	181.63 ± 36.63	125 - 257	0.007
	p = 0.0018		**p = 0.0001**		

Table 5 shows the results of the Wilcoxon test analysis that there was an influence on total cholesterol levels before and after the intervention in the acupuncture group (p=0.0018; p<0.05) and the avocado juice combination acupuncture group (p=0.0001; p<0, 05).

The results of the Mann-Whitney test between the two acupuncture groups and the avocado juice combination acupuncture group showed no difference in the average total cholesterol levels at the beginning before the intervention was given (p=0.748; p>0.05). This happened because respondents in both groups had the same average total cholesterol levels when examined. There was a difference in total cholesterol levels after being given the intervention between the two groups (p=0.007; p<0.05), after being given the intervention the average levels Total cholesterol in the avocado juice combination acupuncture group decreased more (Mean= 181.63 SD= 36.63) than the single acupuncture group (Mean= 219.79; SD= 39.35).

DISCUSSION

Acupuncture is a traditional Chinese medicine therapy, which has good effects for many diseases in the clinic, one of which can be used as a safe and effective alternative therapy for hyperlipidemia.8

Liu et al, (2015) analyzed the acupuncture points used in 65 research articles by taking the primary database of Chinese and English versions of clinical research literature on acupuncture points for hyperlipidemia treated with acupuncture and moxibustion. The top five acupuncture points were found, namely Fenglong (ST 40), Zusanli (ST 36), Sanyinjiao (SP 6), Neiguan (PC 6) and Tianshu (ST 25).[9]

Pang Jun (2000) explains that the Fenglon point (ST 40) reduces plegma and repairs the meridians; also choose the spleen meridian, namely the Sanyinjiao point (SP 6), which is the meeting point of the three foot yin meridians. It can help strengthen the spleen and kidneys, regulate qi and blood, can also clear heat, facilitate blockages, remove toxins and dispersion and stagnation.[10]

The results of this study showed that there was an influence on total cholesterol levels before and after intervention in the acupuncture group (p=0.0018; p<0.05), in line with previous research by Buranatawonsom (2022) that acupuncture intervention at the Funglong point (ST 40) was significant. reduce cholesterol levels (P = 0.000).[9]

This is supported by the explanation of Xue-Song et al. (2020) and Ling et al. (2014) that the stimulatory effect of electroacupuncture at the ST40 point induces the expression of nNOS and Mt1 enzymes. The NNOS enzyme mediates nitric oxide (NO) signaling and plays an important role in vascular tone, blood pressure, insulin secretion, respiratory tract tone, angiogenesis and peristalsis. intestines. Mt1 plays an important role in protecting cells against oxidative stress in the body, therefore electroacupuncture is effective in lowering cholesterol and triglycerides. The functional theory of the

nervous system when stimulated through certain acupuncture points encourages the brain stem, cerebral cortex, hypothalamus and finally the hypothalamic-pituitary gland to control chemically through neurotrans-mitters and hormones, increasing cell fat metabolism, blood circulation,

Traditional medical theory suggests that acupuncture stimulates the peripheral nerves at acupuncture points, which then affects the central nervous system. It has been proven that the application of electroacupuncture can inhibit gastric hyperactivity caused by increased electrical stimulation of the activity of the lateral hypothalamus (LHA) region, leading to the activation of the satiety center indicating that acupuncture has an anticholinergic function, through which β receptors are activated to inhibit appetite and eliminate hunger.[12]

The results of research in the avocado juice combination acupuncture group showed that there was an effect on reducing total cholesterol levels ($p=0.0001$; $p<0.05$), in line with previous research by Purhadi (2022) that giving avocado juice was effective in reducing cholesterol levels ($p=0.000<0.05$). There was a decrease in cholesterol levels in the intervention group after giving avocado juice twice a day (morning and evening) at a dose of 50 grams/day of avocado flesh plus 140 ml of water which was made into 2 parts, namely in the morning 25 grams of avocado flesh plus 70 ml of water to drink in the morning and in the evening for 7 days. In general, giving avocado juice is effective in reducing cholesterol levels in someone who has high cholesterol (Hypercholesterolemia). [13]

This was added to Nurman's (2019) research that the effectiveness of giving avocado juice in reducing cholesterol levels in people with hypercholesterolemia in the Bangkinang City Health Center work area in 2019 was seen from the average cholesterol level before being given avocado juice, namely 249.2 mg/dl. However, after being given avocado juice for 5 days, the average cholesterol level was 190.9 mg/dl, and the difference in the average cholesterol level before and after drinking avocado juice was 58.3 mg/dl.

A recent study published in the Journal of Clinical Lipidology also stated that consuming one avocado or half regularly per day showed a significant reduction in cholesterol levels. Avocados were chosen because they are a special fruit, containing 20-30 times more fat than other fruits. Avocados have a total fat content of 15.41 grams/100 grams of fruit.[14]

The decrease in LDL cholesterol levels in the group given avocado juice was possibly caused by the compounds contained in avocados, such as omega-9 oleic acid. This condition is thought to be caused by the active ingredients in avocados such as omega-9 oleic acid, panthetin, niacin (vitamin B3), beta setosterone, vitamin C, vitamin E, vitamin A, pantothenic acid, MUFA, folate, acid, selenium, amino acids and fiber.15

The results of this study showed that there was a difference in total cholesterol levels after being given the intervention between the two groups ($p=0.007$; $p<0.05$), after being given the intervention the average total cholesterol level in the avocado juice combination acupuncture group decreased more (Mean= 181 .63 SD= 36.63) than the single acupuncture group (Mean= 219.79; SD= 39.35).

This is supported by research by Kusuma (2020) which explains that there is a significant difference in blood cholesterol levels between the initial condition values before and after acupuncture therapy combined with a low purine diet ($p = 0.000 < 0.05$).

There are several factors that cause cholesterol to increase that cannot be controlled, namely genetics, gender, age and ethnicity. The factors that can be

controlled include diet, body weight, exercise, smoking and certain diseases.[16]

In this case, to emphasize a healthy eating pattern, according to this research, it is by consuming avocado juice. One serving of fresh avocado (50 g or 1/3 of a medium fruit) contains 80 kcal, 3.4 g fiber (11% Daily Value/DV), 44.5 g folate (10% DV), 0.73 mg pantothenic acid (15% DV), 85 g copper (10% DV), 10.5 g vitamin K (10% DV), 254 mg potassium (7.5% DV), and 4 mg sodium (0.2% DV). [17] Carbohydrates avocado consists of 80% dietary fiber, consisting of 70% insoluble and 30% soluble fiber. [18] So a diet that consumes avocado juice is better for the body.

CONCLUSION

This research shows that there is an effect of acupuncture therapy at points ST 40 (Fenglong), SP 6 (Sanyinjiao) (p=0.0018) and a combination of avocado juice (p=0.0001) on reducing total cholesterol levels. There was a difference in the reduction in total cholesterol levels after being given the intervention (p=0.007) in the acupuncture therapy group (Mean= 219.79; SD= 39.35) and the avocado juice combination acupuncture group (Mean= 181.63 SD= 36.63).

This research can be used as a reference or study material for health science literature in the prevention and treatment of diseases caused by high cholesterol levels. Health service agencies can provide health promotion regarding the management of reducing cholesterol levels in preventive and curative services to the community, especially disease prevention. People can be motivated to adopt a healthy diet and combine acupuncture to prevent high cholesterol levels.

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