THE EFFECT OF GIVING SOY MILK ON BLOOD PRESSURE OF HYPERTENSION PATIENTS AT REJOSARI PUBLIC HEALTH CENTER PEKANBARU CITY

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Abstract

High blood pressure is generally caused by poor diet, lack of physical activity, smoking, excessive salt intake, and obesity. These problems can lead to hypertension. The purpose of this study was to determine the effect of soy milk consumption in lowering blood pressure in hypertensive patients at the Rejosari Community Health Center in Pekanbaru City. The number of respondents in this study was 17 respondents. This type of research is a quantitative study using a quasi-experimental method with a pre-post approach without a control group. The sampling technique in this study used a non-probability sampling technique (random sampling). The instruments used in this study were the SOP for providing soy milk, a digital sphygmomanometer (Sinohart), and an observation sheet. This study was conducted from December 30, 2024 - January 11, 2025. The intervention was carried out for 3 consecutive days by providing 250 ml of soy milk in the morning and evening. This study used a paired T-Test analysis. The average value of systolic blood pressure in the pre-test was 156.41 and post-test 128.24 while the diastolic pre-test was 98.18 and post-test 86.12. Based on the results of statistical tests, it was found that the systolic p value was 0.000 (<0.05) and the diastolic p value was 0.000 (<0.05), so there was an effect of giving soy milk on the blood pressure of hypertension sufferers at the Rejosari Community Health Center in Pekanbaru City. The results of this study can be used as a treatment recommendation as a complementary therapy to medical therapy by giving soy milk in lowering blood pressure in hypertension sufferers.

Keyword: Hypertension 1; Soy milk 2; Blood pressure 3;

INTRODUCTION

Hypertension is one of the most dangerous health problems worldwide, as it is a major risk factor for cardiovascular diseases such as heart attacks, heart failure, stroke, and kidney disease (Widiasari, 2022). Hypertension is nicknamed "The Silent Killer" because it often occurs without any symptoms, so sufferers are usually unaware or unable to identify that they have this disease and only find out after complications develop (Markang et al., 2023). Hypertension is defined as systolic blood pressure >140 mmHg and diastolic blood pressure >90 mmHg based on two or more measurements (Sari et al., 2024).

Uncontrolled hypertension can cause complications such as myocardial infarction, coronary heart disease, congestive heart failure, stroke, hypertensive encephalopathy, chronic kidney failure, and hypertensive retinopathy (Siswanto, 2020).

Hypertension can be controlled with pharmacological and non-pharmacological treatments. Pharmacological treatment can involve administering chemical compounds, including antihypertensive medications such as diuretics, beta-blockers, vasodilators, and angiotensin-converting enzyme inhibitors. Non-pharmacological or alternative treatments can include acupressure, reflexology, massage, and traditional medicine (Alam & Jama, 2020).

Functional foods play a role in improving health and preventing disease. One such functional food is soybeans. Soybeans (Glycine Max) are a type of functional food containing nutrients such as isoflavones, which are thought to reduce the risk of cardiovascular disease. Soy protein supplementation can be used as an alternative therapy to treat individuals at risk of coronary heart disease and may have hypotensive effects with long-term administration. An effective soy intake is 25 g/day to improve body fat profiles (Kusuma et al., 2024). Soybeans contain antioxidants that lower blood pressure and improve blood vessel health. The benefits of soy milk include isoflavones that can increase metabolism, improve digestion, strengthen the immune system, strengthen the matrix structure, stabilize blood pressure, lower blood cholesterol, and stabilize blood sugar levels (Yulianto et al., 2021). Soybeans also contain potassium. The mechanism of action of potassium in lowering blood pressure is that potassium causes vasodilation, thereby reducing peripheral resistance and increasing cardiac output. Potassium functions as a diuretic, so that sodium and fluid excretion increases, inhibits the release of renin thereby changing the activity of the renin-angiotensin system and can regulate peripheral and central nerves that affect blood pressure (Widiasari, 2022).

The results of the research conducted (Ervina, 2020) stated that giving soy milk was given as much as 2 x 250cc per day, namely before breakfast and at night before bed for 3 days. The results of the paired samples test showed that the p-value was 0.000, which was smaller than 0.05 (p-value <0.05). These results indicate that there is an effect of soy milk consumption on changes in blood pressure in the elderly with hypertension in the work area of the Sibela Surakarta Health Center.

A preliminary study was conducted on October 3, 2023. Researchers conducted brief interviews with 10 people with high blood pressure at the Rejosari Community Health Center in Pekanbaru City. Researchers found that 7 people with hypertension (70%) who suffered from high blood pressure said they were bored with the habit of taking their medication, and 3 people with hypertension (30%) said they were not bored taking their medication because they were used to taking their medication regularly and did not want to worsen their condition. During the interviews, they also said they rarely consumed soy milk and other herbal remedies because they were not aware that soy milk could help lower blood pressure. Therefore, researchers wanted to conduct research using non-pharmacological treatments and determine the effect of giving soy milk on the blood pressure of people with hypertension.

RESEARCH METHODS

This type of research is a quantitative study with a quasi-experimental design with a pre- and post-test design without a control group. The population of this study were hypertension sufferers at the Rejosari Community Health Center in Pekanbaru City with 154 cases of hypertension sufferers. In this study, the data collection tool used was an observation sheet containing respondent data including initials, age, gender, last education, occupation, duration of suffering, medication consumption, soy milk allergy, pre- and post-administration of soy milk. The instrument used in this study was regarding the effect of soy milk in lowering blood pressure in hypertension sufferers to respondents.

Prior to the study, respondents were asked to sign an informed consent form. They were then interviewed to collect data from the observation sheet. Afterward, the researchers conducted a pre-test blood pressure check and explained the research procedure, which involved consuming 500 ml of soy milk (250 ml in the morning and 250 ml at night) for three consecutive days.

The researchers then conducted a post-test blood pressure check on the third day after consuming soy milk, within 10-15 minutes. After completing the data collection process, the researchers analyzed the data using statistical tests appropriate to the parametric data. They then conducted normality tests on the pre- and post-tests. If the data were normally distributed, the paired t-test was used; if the data were not normally distributed, the Wilcoxon test was used.

RESEARCH RESULTS

Table 1. Respondent Frequency Distribution

Frequency	Variable (AND)	Percentage (%)
Gender		
Woman	12	70,6%
Man	5	29,4%
Total	**17**	**100%**
Age		
Late Adolescence 17-25	1	5,9%
Early Adulthood 26-35	0	0%
Late Adulthood 36-45	3	17,6%
Early Elderly 46-55	9	52,9%
Late Elderly 56-65	4	23,5%
Total	**17**	**100%**
Education		
Elementary School	2	11,8%
Middle School	8	47,1%
High School	5	29,4%
Bachelor's Degree	2	11,8%
Total	**17**	**100%**
Work		
Housewife	6	35,3%
Self-Employed	6	35,3%
Entrepreneur	3	17,6%
Students	1	5,9%
Civil Servants	1	5,9%
Total	**17**	**100%**
Long Suffering		
1-5 Year	13	76,5%
>10 Year	4	23,5%
Total	**17**	**100%**

Source: Primary Data Analysis 2025

Table 1 shows that of the 17 respondents with hypertension, more than half were female (12 respondents (70.6%). Meanwhile, the age range was mostly in the early elderly range of 46-55 with a total of 9 respondents (52.9%). The majority of respondents had junior high school education, with 8 respondents (47.1%). The majority of respondents were housewives and self-

employed, with 6 respondents (35.3%). Meanwhile, the longest duration of hypertension was in the range of 1-5 years with 13 respondents (76.5%).

Table 2. Blood Pressure Frequency Distribution Before and After Soy Milk Intervention in Hypertension Patients at the Rejosari Community Health Center in Pekanbaru City

Variable	N	Mean	SD	SE	Min	Max
Pre systolic	17	156.41	10.834	2.628	143	176
Post systolic	17	128.24	6.109	1.482	120	137
Pre diastolic	17	98.18	4.405	1.068	90	110
Post diastolic	17	86.12	3.935	.954	80	94

(Source: Primary Data Analysis, 2025)

Based on Table 4.2, the results of the study obtained an average blood pressure value before the intervention was given on systolic 156.41 with a standard deviation of 10,834, a standard error of 2,628, the lowest blood pressure value was 143 while the highest blood pressure was 176. After being given an intervention on systolic 128.24 with a standard deviation of 6,109 systolic, a standard error of 1,482, the lowest blood pressure value was 120 and the highest blood pressure on systolic 137. Meanwhile, the average blood pressure results before being given an intervention on diastolic was 98.18 with a standard deviation of 4,405, a standard error of 1,068, the lowest blood pressure value was 90, the highest blood pressure was 110. The average blood pressure after being given an intervention on diastolic was 86.12, a standard deviation of 3,935, a standard error of .954 with a lowest blood pressure value of 80 and the highest blood pressure value 94.

Table 3. Mean Blood Pressure Values in Hypertension Patients, Pretest and Posttest, Given Soy Milk Intervention at Rejosari Community Health Center, Pekanbaru City

Blood Pressure	N	Mean	SD	Δ	SE		P Value
					Lower	Upper	
Pre systolic	17	156.41	10.834	28,17	23.570	32.783	0.000
Post systolic		128.24	6.109				
Pre diastolic	17	98.18	4.405	12,06	10.192	13.926	0.000
Post diastolic		86.12	3.935				

(Source: Primary Data Analysis, 2025)

The results of the study in table 4.3 can be seen the average value of the systolic pre-test 156.41 and post-test 128.24 with a standard deviation of the systolic pre-test 10,834 and post-test 6,109. In diastolic obtained an average value of pre-test 98.18 and post-test 86.12 with a standard deviation of pre-test 4,405 and post-test 3,935. It was found that the difference in the average value of blood pressure in hypertension sufferers before and after being given soy

milk intervention in systolic 28.17 and in diastolic 12.06 and obtained values before and after being given intervention in systolic p value = 0.000 and in diastolic p value = 0.000 then <α = 0.05 which means H0 is rejected which means there is an effect of giving soy milk on blood pressure of hypertension sufferers at the Rejosari Health Center, Pekanbaru City.

DISCUSSION

A. Univariate Analysis

1. Gender
   The results of the study showed that of the 17 respondents with hypertension, more than half were female (12 respondents (70.6%), while 5 respondents (29.4%) were male.
2. Age
   The results of the study showed that of the 17 respondents, the majority were in the early elderly age group 46-55 with a total of 9 respondents (52.9%).
3. Education
   The results of the study showed that of the 17 respondents
4. Work
   The results of the study showed that of the 17 respondents, the majority of respondents worked as housewives and 6 people (35.3%) were self-employed.
5. Long Suffering
   The results of the study showed that of the 17 respondents who had suffered from hypertension for a long time, the majority were in the 1-5 year range with 13 respondents (76.5%).

B. Bivariate Analysis

This study is in line with research conducted by Ernawati et al., (2023) there is a significant effect of soy milk intervention on changes in systolic blood pressure with a p value of 0.000 and diastolic blood pressure p value of 0.000. Soy milk based on the results of the study has an effect on lowering blood pressure in hypertensive patients. Soy milk is very good for hypertensive patients because it contains isoflavones that facilitate metabolism, facilitate digestion, increase immunity, strengthen the immune structure, strengthen the matrix structure, stabilize blood pressure, lower blood cholesterol levels, and stabilize blood sugar.

Soybeans are a legume. They are a superior source of vegetable fat. The protein in soybeans is thought to improve blood pressure because it is rich in arginine and potassium. Potassium is the main ion in intracellular fluid, while sodium is the main ion in extracellular fluid. High potassium consumption will increase the concentration in intracellular fluid, thereby tending to lower blood pressure. Potassium is the most important intracellular electrolyte; in fact, 98% of the body's potassium is found inside cells, with the remaining 2% outside cells functioning as neuromuscular transporters. Potassium influences the activity of skeletal muscles, especially the heart muscle (Supardi, 2023).

Soy milk is a soybean-based product that can be consumed to lower blood pressure. Soybeans contain various bioactive substances, including protein (the amino acids arginine and tryptophan), potassium, which acts as an antihypertensive, and isoflavones, which are beneficial antioxidants. Regular consumption of soy milk acts as an ACE inhibitor, preventing high blood pressure. ACE inhibitors inhibit the production of the hormone angiotensin II, which plays a role in constricting blood vessels and lowering blood pressure (Widyastuti et al., 2022).

From the results of this study, it can be concluded that consuming 2x250ml of soy milk per day, namely before breakfast and at night before bed for 3 days can lower blood pressure.

CONCLUSION

The results of the study from 17 respondents with hypertension, more than half were female, amounting to 12 respondents (70.6%). While based on the age range, most were in the early elderly range of 46-55 with a total of 9 respondents (52.9%). Based on the occupation of the respondents, most were housewives and self-employed, amounting to 6 people (35.3%). While the duration of suffering from hypertension was mostly in the range of 1-5 years with 13 respondents (76.5%). From the results of statistical tests, it was found that the effect of consuming soy milk in lowering blood pressure was obtained before and after the intervention on systolic p value = 0.000 and on diastolic p value = 0.000, then $<\alpha = 0.05$ which means H0 is rejected which means there is an effect of giving soy milk on blood pressure of hypertension sufferers at the Rejosari Community Health Center, Pekanbaru City.

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