

# The Effect of Soymilk Consumption Toward Reduction Levels of Total Cholesterol and LDL Cholesterol on Menopause Women

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**Abstract—Objectives:** The increasing of blood cholesterol levels is one factor of atherosclerosis risk. Estrogen hormone secretion decreases in postmenopausal women as a result of atrophy of the ovaries so that tends to increase in total cholesterol levels, LDL (Low Density Lipoprotein) cholesterol, triglycerides and decreased HDL (High Density Lipoprotein) cholesterol. Soy milk can decrease cholesterol, protein, lecithin and isoflavones which functions to dissolve cholesterol in the blood so that there is no narrowing and blockage of blood vessels, and acts as an antioxidant. The purpose of the study is to determine the effect of soymilk consumption towards reducing levels of total cholesterol and LDL cholesterol in menopausal women. The research uses an experimental method by collecting purposive sampling techniques. The results of a study on 14 postmenopausal female respondents in Singaparna compassionate nursing homes were obtained which reduced total cholesterol levels after consuming soy milk by 35.7% and which increased of 64.3%. While those decreased in LDL cholesterol levels by 71.4% and those increased of 28.6%. Based on the results of the Paired T-Test, a significance is obtained 0.476 ( $P > 0.05$ ) so that it can be concluded that it is not significant to decrease total cholesterol levels, whereas LDL cholesterol significance is obtained 0.022 ( $P < 0.05$ ) so that it can be concluded that the result is significant to decrease LDL cholesterol levels.

**Keywords:** total cholesterol, LDL cholesterol, soy milk, menopause women

## I. INTRODUCTION

The estrogen hormone secretion decreases as a result of atrophy of the ovaries in menopausal women. After menopause, total cholesterol, LDL cholesterol, triglycerides tend to increase and a decrease in HDL cholesterol [6]. Total cholesterol is a composition of many substances, including triglycerides, LDL cholesterol, and HDL cholesterol. Excess amount of cholesterol in the blood vessels will cause cholesterol buildup, namely atherosclerosis; is a major risk factor for coronary heart disease and stroke [3]. An increase or decrease in blood cholesterol levels is influenced by food intake. Foods that contain antioxidants, fiber and protein  $\beta$ -conglycinin and glycinin can reduce cholesterol levels in the blood. One food ingredient that contains these nutrients is soy. Soybean is then processed into soy milk to make it easier to be used, especially to overcome cholesterol [1]

Soy milk contains lecithin and isoflavones. Lecithin functions to emulsify or dissolve cholesterol in the blood so that there is no narrowing and blockage of blood vessels. Other ingredients, namely isoflavones also act as antioxidants and can increase HDL cholesterol. Isoflavones also function as antiatherosclerosis and have estrogenic properties, resulting in a decrease in total cholesterol, LDL cholesterol, triglycerides and an increase in HDL cholesterol in the blood [4]

**II. MATERIAL AND METHOD**

**A. Procedure**

This research is experimental, by using pre-post-test design. The subjects of the study were 14 menopausal women with a purposive sampling method. After the respondent agreed to comply with the exclusion inclusion criteria and signed the informed consent, the treatment was given to respondents in the form of "X" soybean milk to be consumed as much as 200 ml every morning at 06.00-08.00 WIB and every night at 20.00-21.00 WIB for 14 days. During the treatment, the respondent was observed. After that, fasting blood samples were measured to determine the total cholesterol levels by the CHOD-PAP method and LDL cholesterol by the enzymatic assay method twice; one day before treatment and one day after treatment (on the 15th day).

**B. Data Analysis**

The data obtained in this study were total cholesterol and LDL cholesterol before and after the treatment of "X" soybean milk, and processed by using the Paired T-Test.

**RESULTS**

Descriptive statistical data related to total cholesterol and LDL cholesterol before and after treatment. Total cholesterol levels before treatment (M = 238.07; Min = 147; Max = 323; SD = 57.887), total cholesterol levels after treatment (M = 248.36; Min = 171; Max = 336; SD = 45.770), LDL cholesterol levels before treatment (M = 168.7; Min = 70.7 Max = 261.7; SD = 66.8) and LDL cholesterol after treatment (M = 126.6; Min = 68; Max = 176.6 ; SD = 36.0). Data can be seen in table 1 as follows:

**TABLE 1: DESCRIPTIVE DATA STATISTICS OF TOTAL CHOLESTEROL AND LDL CHOLESTEROL LEVELS BEFORE AND AFTER TREATMENT**

Variabel	Mean (mg/dL)	Min	Max	Std. Deviation
Total cholesterol levels before treatment	238,07	147	323	57,872
Total cholesterol levels after treatment	248,36	171	336	45,770
LDL cholesterol levels before treatment	168,7	70,7	261,7	66,8
LDL cholesterol levels after treatment	126,6	68	176,6	36,0

Data on the average percentage reduction in total cholesterol levels after treatment was 35,7%, while the average percentage increase after treatment was 64.3%, and the average percentage reduction in LDL cholesterol levels after treatment was 71.4%, while the percentage an average increase after treatment of 28.6%. The data can be seen in table 2 as follows:

**TABLE 2 : A PERCENTAGE OF AVERAGE REDUCTION AND INCREASE OF TOTAL CHOLESTEROL LEVELS AND LDL CHOLESTEROLS**

Variable	Decrease Percentage (%)	Increase Percentage (%)
Total cholesterol levels	35,7	64,3
LDL cholesterol levels	71,4	28,6

Paired Sample T-Test statistical data obtained significance values for total cholesterol of 0.476 and LDL cholesterol of 0.022. Data can be seen in table 3 as follows:

**TABLE 3 : STATISTICAL DATA PAIRED T-TEST TOTAL**

Variable	P	Explanation
Total cholesterol levels before - after treatment	0,476	Not Significant
LDL cholesterol levels before - after treatment	0,022	Significant

**III. DISCUSSION**

In this study, respondents were given a menu according to the rules in a nursing home. Some respondents experienced an increase or decrease in total cholesterol and LDL cholesterol. The increase was due to several factors such as irregularity in consuming soy milk every day, besides the lack of physical activity such as exercise (gymnastics). While the decrease in cholesterol is caused by regular consumption of soy milk every day during the research treatment, physical activities carried out such as following routine exercise every morning, which causes the body to burn more calories so that it has a good effect on reducing cholesterol levels in the blood.

Soy milk consumed can reduce cholesterol levels because it contains lecithin and isoflavones which function to dissolve cholesterol in the blood so that blood vessel constriction and blockage does not occur, acts as an antioxidant and can increase HDL cholesterol. Besides that it also functions as an anti-atherosclerosis and has estrogenic properties, resulting in a decrease in total cholesterol, LDL cholesterol, triglycerides and an increase in HDL cholesterol.

The protein in soy milk can also reduce cholesterol levels because soy protein contains essential amino acids such as glycine and arginine which have a tendency to reduce blood insulin resistance followed by a decrease in cholesterol synthesis. In addition to its amino acid content, soy protein contains  $\beta$ -conglycinin (7S globulin) and glycinin (11S globulin) which are the main peptides in soy. The mechanism of reducing cholesterol by  $\beta$ -conglycinin (7S globulin) and glycinin (11S globulin) is by increasing the secretion of bile acids and inhibiting the absorption of cholesterol that comes from food.

#### IV. CONCLUSION

The study concludes that based on the Paired T-Test, a significance value was obtained 0.476 ( $P > 0.05$ ), so that it did not significantly influence the reduction in total cholesterol levels, whereas in LDL cholesterol a significance value was 0.022 ( $P < 0.05$ ), it means significantly affected decrease in LDL cholesterol levels.

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