The Effect of Soy Milk and Boiled Peas to Waist Circumference in Postmenopausal Women

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Abstract

Background: A woman's life period after 12 months from the last menstruation is called the postmenopause period. Estrogen affects the accumulation of gluteo-femoral fat. Decreased estrogen levels cause abnormal redistribution of fat and increase central fat. Postmenopausal women are at greater risk of central fat accumulation. This can be detected by measurement of waist circumference. Soybeans (*Glycine max*) has antioxidant and hypolipidemic effects also reduce waist circumference and waist-hip circumference ratio. Peas (*Pisum sativum*) contain soluble fiber which can reduce blood lipid levels. The aim of this study was to analyze the effect of soy milk (*Glicyne max*) and boiled peas (*Pisum sativum*) on waist circumference in postmenopausal women. **Method:** This study is an experimental research with pre-post test and control group design. The population of study is were postmenopausal women patients in Magelang, Central of Java. The sample of study amounted to 39 postmenopausal women divided into three subject groups, one control group, the second group given treatment 240 ml soymilk per day 4 weeks, and the third group was given the intervention of 100 g boiled peas per days 4 weeks. Data is presented as mean (*mean*) and standard deviation (SD). The mean values of the three study groups were statistically tested with the ANOVA test. **Results:** The findings of the study is consumption 240 ml of soymilk per days 4 weeks in postmenopausal women decrease waist circumference but not statistically significant. Consumption 100 g of boiled peas per days 4 weeks in postmenopausal women decrease waist circumference statistically significant (-0,19 ± 0,38 cm, *p* = 0,096). **Conclusion:** Consumption 100 g of boiled peas per days 4 weeks in postmenopausal women decrease waist circumference statistically significant (-0,19 ± 0,38 cm, *p* = 0,096).

Keywords: Soy milk, boiled peas, waist circumference, postmenopause women, estrogen

Introduction

A woman's life period after 12 months from the last menstruation is called the postmenopause period[1]. Decreased estrogen during and after menopause causes changes in physiological and biochemical structures that will affect general health status[2]. Estrogen affects the accumulation of gluteo-femoral fat. Decreased estrogen levels cause abnormal redistribution of fat and increase central fat[3]. Postmenopausal women are at greater risk of central fat accumulation. This can be detected by measurement of waist circumference[4].

Dietary planning mainly containing plant protein, fiber, phytosterols and nuts can overcome hyperlipidemia. Soybeans (*Glycine max*) contain high quality protein (40%), polyunsaturated fatty acids (18%), carbohydrates (8%) and fiber (17%)[5]. Lunasin as a peptide in soybeans has antioxidant and hypolipidemic effects[6]. Soy lecithin and saponin play a role in regulating blood lipids. Phytosterols and linoleic acid cause hypolipidemia effects[5]. Soy milk combined with green bean porridge per day for 4 weeks can reduce waist circumference and waist-hip circumference ratio[7,8]. Peas (*Pisum sativum*) contain soluble fiber which can reduce blood lipid levels[9,10,11]. The aim of this study was to analyze the

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effect of soy milk (*Glicyn max*) and boiled peas (*Pisum sativum*) on waist circumference in postmenopausal women.

Method

This study is an experimental research with pre-post test and control group design. The population of study is were postmenopausal women patients in Magelang, Central of Java. The sample of study amounted to 39 postmenopausal women. Inclusion criteria in this study are the women aged 50-70 years old and have stopped menstruating for more than 12 months. While the exclusion criteria in this study are weight loss diet, consume alcohol, have been diagnosed coronary heart disease, heart failure, severe kidney failure, stroke and cancer from history and medical records, allergic to soybeans and peas, immobility and smoking. Immobility found as one of the risk factors for obesity[15]. Severe diseases such as stroke, heart disease, kidney failure and cancer due to security the subject when going on a diet and sport suit suggestion.

The sample was divided into three subject groups, namely one control group and two treatment groups. All groups were given nutrition education and a healthy lifestyle. The control group was only given education without continued treatment. The second group was not only given education but also given treatment in the form of giving soy milk, and the third group after being given education was given the intervention of boiled peas.

Treatment group 1 was given 1x240 ml soy milk per day for 4 weeks. Soymilk is delivered directly by the medical team to the homes of study subjects and confirmed to be drunk by each study subject. Treatment group 2 was given 1x100 g boiled peas for 4 weeks. The peas were delivered directly by medical team to the study subject's house and confirmed to be eaten all by the study subjects.

To prepare the soymilk, 800 g soybeans (for a portion of 20 people) that have been rinsed and washed first, soaked for 8 hours in a water ratio of 1: 2 (800 g of soybeans in 1600 ml water), then cleaned by removing the soybean husk. Steah, boiling for 15 minutes. Boiled soybeans are blended with a ratio of soy and water 1:

3.5. Furthermore, soybeans that have become soybean porridge are taken and boiled until boiling, stirring, then cooled and then added 0.5g (1 kcal) low-calorie sweet sweetener brand of Tropicana slim sweetener for every 240 ml. Giving was carried out for 4 weeks in treatment group 1. Making boiled peas is the 1,300 g peas which have been rinsed and washed first, are soaked for 24 hours with a water ratio of 1: 2 (1,300 g of peas soaked in 2,600 ml of water). In the morning, it is cleaned and cooked until it boils. The boiled peas are then drained and weighed 100 g and given for 4 weeks in treatment group 2.

The waist circumference in each group was measured two times, that is before (pretest), and after (posttest) intervention.

Data is presented as mean (*mean*) and standard deviation (SD). Then to find out whether there is a meaningful difference in the mean data before and after intervention in one group, in groups with normal distribution paired t tests were performed, in groups that were not normally distributed Wilcoxon was tested. The mean values of the three study groups were statistically tested with the ANOVA test.

Results and Discussion

The subjects who participated in this study were 39 people. The research sujects were divided into three groups, each group consist of 13 participants, and no dropout. Characteristics research subjects are measured, consists of nutritional status, education level, employment, average age, average index mass body (BMI), and score of Global Physical Activity Questionnaire (GPAQ).

According to table 1, participants who overweight and preobese were most common in the soy milk group and boiled peas group. The soy milk and boiled peas treatment group also had a lower level of education compared to the control group. The work in the three groups is mostly housewives. Based on the table, it can be concluded that there is no significant difference in nutritional status and occupation. Education level data from the three groups have different proportions between education.

Table 1. Characteristics of Subjects

Characteristic	Control (n=13) %	Soymilk (n=13) %	Boiled peas (n=13) %	P
Nutritional status				0,197
Normal	8 (61,54%)	5 (38,46%)	5 (30,77%)	
Overweight	1 (7,69%)	2 (15,38%)	5 (30,77%)	
Preobese	4 (30,77%)	6 (46,15%)	3 (23,08%)	
Obese	0 (0%)	0 (0%)	0 (0%)	
Education level				0,018
Elementary school	2 (15,38%)	7 (53,85%)	7 (53,85%)	
Junior High School	6 (46,15%)	0 (0%)	0 (0%)	
Senior High School	4 (30,77%)	5 (30,77%)	5 (30,77%)	
Graduate	1 (7,69%)	1 (7,69%)	1 (7,69%)	
Employment				0,517
Housewife	9 (69,23%)	7 (53,85%)	8(61,54%)	
Private	3 (23,08%)	5 (30,77%)	5 (30,77%)	
Teacher	1 (7,69%)	0 (0%)	0 (0%)	

Table 2. *Mean* **with One Way ANOVA**

Characteristic	Control (n=13) %	Soymilk (n=13) %	Boiled peas (n=13) %	P
Status nutrition				0,197
Normal	8 (61,54%)	5 (38,46%)	5 (30,77%)	
Overweight	1 (7,69%)	2 (15,38%)	5 (30,77%)	
Preobese	4 (30,77%)	6 (46,15%)	3 (23,08%)	
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Employment				0,517
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Table 3. T-test

Group	n	Waist Circumference (Mean ± SD) pretest (cm)	Waist Circumferences (Mean ± SD) posttest (cm)	Δ Mean	P
Control	13	87,69 ± 6,96	87,50 ± 7,11	-0,19 ± 0,38	0,096
Soymilk	13	93,15 ± 6,11	92,92 ± 6,19	-0,23 ± 1,09	0,461
Boiled peas	13	93,85 ± 8,68	93,34 ± 8,45	-0,50 ± 0,76	0,036

From table 2 show that mean of waist circumference in the control group did not change after research. Mean of waist circumference in the soybean milk group decreased after being treated. In the boiled peas group after being treated there was also a decrease in the mean waist circumference.

Table 3 informed that the mean of waist circumference decrease statistically significant in group of boiled peas (-0,50 ± 0,76 cm, p = 0,036).

In this study, it was found that consumption 100 g boiled peas for 4 weeks in postmenopausal woman can reduced waist circumference significantly. Postmenopausal period results decline in the hormone estrogen level. Estrogen afects the accumulation of gluteo-femoral fat, and decreased estrogen levels are associated with an increase in central fat. Postmenopausal woman have high risk of increased waist circumference because increasing age, lack of activity, consumption more carbohydrate and fat. Soybean contain isoflavones around 99-159 mg/ 100 g. Peas have a hypolipidemic effect similar to soybean. Isoflavones in peas and soybean have an antiobesity effect by inhibiting lipogenesis, increasing the oxidation of fatty acid and reducing the supply of fat in the body. Isoflavones have an important role to reduce waist circumference. Both of peas and soybeans also have a linolenat acid. It decreases machrofag infiltration to help reducing *gluteo-femoral* fat[12]. Every 100 g of boiled peas contains 8 g of protein, and 8 g of fiber. Consumption of 100 g of boiled peas can meet about 33% of fiber needs per day. Based on the Institute of Medicine's recommendation, the fiber requirement for women aged 19-50 years is 25 g/ day and women over 50 years is 21 g/ day. Peas contain a lot of soluble fiber which is very important in reducing lipid levels blood[13].

The education about nutrition once a week during the study. Fiber can reduce lipid and waist circumference[9]. The fiber content in peas is mostly soluble fiber which decreases blood lipid levels[14]. Soluble fibers are non-cellulose polysaccharides or oligosaccharides such as gum, pectin, β-glucans. Soluble fiber can reduce serum triglyceride levels and waist circumference. Soluble fiber contains almost no calories, increases satiety by regulating satiety hormones such as cholecystokinin, glucagon-like peptide-1, and Y peptide[10,11].

This study had different result with the previous studies. The consmption of 240 ml of soy milk every day for 5 weeks with a randomized controlled trial cross over design with a washout period of 2 weeks in 24 nonmenopausal women showed a significant decrease in waist circumference[7]. Giving soybeans to older women and as much as 40 g of soy protein can reduce waist circumference but not lose weight[15]. Research in postmenopausal women with consumption of 240 ml of soy milk per day for 4 weeks can reduce waist circumference by -2.40 cm and also decrease the waist-hip circumference ratio by -0.02 cm[8].

Conclusion

The conclusion of this study shows that consumption 100 g of boiled peas per days 4 weeks in postmenopausal women decrease waist circumference statistically significant (-0,19 ± 0,38 cm, p= 0,096).

Conflict of Interest; The author states there is no conflict of interests.

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