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Effectiveness of giving edamame supplementation (glycine max l. merrill) on improvement lipid profile in women of childbearing age with hypertension

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ABSTRACT

Background

Women of childbearing age who have hypertension can continue or have the potential to experience hypertension in their pregnancy. The prevalence of hypertension in Indonesia tends to increase with age. Alternative treatment of hypertension with giving edamame (Glycine Max L. Merrill) which can improve lipid profile (triglycerides).

Objective

This study aims to determine the effectiveness of giving edamame supplementation (Glycine Max L. Merrill) on improving lipid profile in women of childbearing age with hypertension.

Method

This research is a quasi-experimental with was the draft nonequivalent control group design. Data retrieval involved 40 respondents of women of childbearing age and still menstruating, selected through a technique non probability sampling with a method purposive sampling which was divided into 2 groups: the intervention group was given amlodipine drugs 5 mg / day and edamame extract (Glycine max L. Merrill) dose of 25 grams / day, while the control group was only given amlodipine 5 mg / day.

Results

The results t test showed a significant difference with the mean lipid profile (triglycerides) p value <0.05 that means in the intervention group is better at lowering lipid profile (triglycerides) than the control group seen from the higher difference value.

Conclusion

Giving of edamame supplementation (Glycine Max L. Merrill) 25 grams / day for 30 days is very effective in reducing lipid profile (triglycerides) in women of childbearing age with hypertension.

Keywords: Edamame Supplementation (Glycine Max L. Merrill), Hypertension, Lipid Profile, Triglycerides, Women of childbearing age.

INTRODUCTION

High blood pressure is a state of increased blood pressure, with systolic pressure increasing ≥140 mmHg and diastolic blood pressure increasing ≥90 mmHg, this occurs on two examinations. Measurements are taken when the patient is calm. Various health problems to complications can occur if this condition is not treated or get treatment. Complications and health problems will occur if hypertension is left without treatment. Parts of the brain will cause a stroke. Part of the eye causes retinopathy to blindness. Causes coronary heart disease in the heart. Causing chronic kidney disease and terminal kidney failure. The amount of hypertension continues to increase due to uncontrolled blood pressure [1].

Women of childbearing age who have hypertension can continue or have the potential to experience hypertension in their pregnancy. Women have an important role in the family and in the social environment. As many as 52% of women from all over the world are included in the fertile age category. Fertile age is a time when women become very vulnerable to nutritional problems due to various biological conditions such as menstruation, pregnancy, and breastfeeding [2]. Pregnancy hypertension can be chronic. The pathophysiology of pregnancy itself, the process of cardiovascular changes in pregnant women and other adaptations, can worsen the condition of the mother. Existing hypertension can continue in the state of preeclampsia, eclampsia, to gestational hypertension, where hypertension persists for up to 3 months post-partum [3].

High blood pressure is owned by approximately one billion people in the world. Two-thirds are from developing countries. Estimated in 2025, hypertension occurs in 1.56 adults. Every year around 8 million people worldwide die from hypertension. Southeast Asia region, hypertension occurs approximately 35% of the number of adults. Every year 1.5 million deaths are 9.4% of the total deaths caused by hypertension [4].

The prevalence of hypertension in Indonesia tends to increase with age. The prevalence of hypertension in the range of 18-24 years is 13.2%, ages 25-34 years are 20.1%, 35-44 years are 31.6%, 45-54 years are 45.3%, 65-74 years are 63.2% and the age group >75 years by 69.5%. In men as much as 31.3%, while in women as many as 36.9% [5].

Central Java, non-communicable diseases, especially hypertension in 2014, which occurred as much as 57.89% which is the main period. Likewise with subsequent years, hypertension still remains a major problem of non-communicable diseases [6]. Every year it does not decrease, but it increases. In 2016 hypertension in Central Java increased by 60.00% [7]. An increase of 64.83% for the problem of hypertension in Central Java Province in 2017. The increase in hypertension in Central Java Province every year cannot be said little so that this case needs to be followed up and re-evaluated considering the causes that can occur from various factors [8].

Central Java Province in 2016 20.16% of people at risk of hypertension are people aged >18 years blood pressure checked. As many as 11.55% had hypertension based on this examination. 11.85% of women experience hypertension and 11, 16% for men. Based on these data shows that more women experience hypertension. Jepara and Demak are the highest districts with hypertension 100% of the total blood pressure level [7].

The incidence of hypertension in 2018 in Jepara Regency was 41,082 cases, with the highest region experiencing hypotension, namely the Mlonggo Public Health Center Region with 336 cases of hypertension [9]. The population in the Mlonggo Public Health Center is 4450 residents. Where blood pressure was measured in 100% of the population aged> 18 years with a hypertension rate of 7% in the male population and 7% in the female population. Visit in November 2019, there were 69 special essential hypertension in women of childbearing age at Mlonggo Public Health Center [10].

The existence of free radicals possibly can cause hypertension. Free radicals produced by our body cause cell damage in the body. Damage to body cells that occur can result in cancer, diabetes and heart disease. These antioxidants function to repair damaged cells and remove free radicals in the body [11].

Antioxidants are found in foods, and those that contain the most antioxidants are fruits and vegetables. One food that contains antioxidants is soy. Evidenced by Handayani's research which showed a decrease in blood pressure in patients who have hypertension by giving soy milk where each portion contains 25.5 g of soy powder [12]. The results of Francine K. Welty's research show lowering LDL levels and systolic and diastolic blood

pressure in women who are hypertensive by giving soy for 8 weeks by 25 gram [13]. The study of Maryam Sadat Miraghajani said that 240 cc of soy milk was given within 4 weeks of decreased systolic blood pressure compared to cow's milk [14].

Soybeans contain a lot of isoflavones. One type of soybean is edamame (Glycine max L. Merrill). One study contained 80.7 - 213.6 mg / 100 gram of is flavones. Research says that higher adamame consumption can reduce the risk of death from gastric, colorectal, and lung cancer and ischemic cardiovascular disease. The group given edamame consumption, with its isoflavone content, had a 10% lower risk of causing death compared to those in the low category of edema intake [15].

Hypertension can also be treated with essential antihypertensive drugs that have been widely circulating in the market. Antihypertensive drugs can not only reduce blood pressure but have side effects. Side effects of antihypertensive drugs are influenced by the body's tolerance for drugs and compliance in taking them. Antihypertensive drugs can cause other problems for the user's body. The study concluded that the side effects of enalapril type hypertension drugs experienced dry cough in most patients (66.7%) and dry cough and dizziness experienced by one patient (6.7%). In the use of atenolol the side effects experienced, namely bradycardia, dizziness, and insomnia experienced by patients (14.3%). Then the use of amlodipine, side effects experienced were peripheral edema (23%), flushing (2.6%), dyspnea (2.6%), headache (5.1%), dizziness (2.6%), palpitations (2.6%) and insomnia (2.6%) [16].

With this in mind, a study is needed to determine whether the administration of edamame supplementation (Glycine max L. Merrill) can provide changes in lipid profile (triglycerides) in women of childbearing age.

METHODS

This type of research uses quasi experimental with the draft nonequivalent control group design. Researchers arranged two groups: the intervention group was given amlodipine 5 mg / day and edamame extract (Glycine max L. Merrill) dose of 25 grams / day, while the control group was only given amlodipine 5 mg / day without edamame extract (Glycine max L. Merrill). Therapy Edamame supplementation (Glycine Max L. Merrill) is given for 30 days. The lipid profile examination was carried out with a chemistry analyzer at the Mlonggo Public Health Center Laboratory. Measurement lipid profile of respondents who have hypertension that is before (pre-test) and after the action of the therapy (post-test).

The population in this research was all women of childbearing age and still menstruating hypertension at the Mlonggo Public Health Center in Jepara Regency. Determination of the minimum number of samples using techniques non probability sampling with the method of purposive sampling and based on inclusion and exclusion criteria as many as 40 respondents divided into two groups with 20 respondents each in the intervention group (amlodipine drug 5 mg therapy with edamame extract (Glycine max L. Merrill) and 20 respondents in the control group (therapy drug amlodipine 5 mg without edamame extract (Glycine max L. Merrill).

In this research, researchers conducted data collection by means of observation, identification, interviews and filling in the observation sheets. The data collected was analyzed through the IBM SPSS program version 21.0, and continued with different tests, namely parametric and non-parametric tests (Paired t test, Wilcoxon Test and Mann Witney). The processed data is used as a basis for discussing statement matters, which are then presented in tabular form so that conclusions can be drawn.

RESULTS

Table 1 Frequency distribution of respondents from education and employment based on demographic data

Characteristics	Intervention (n=20)		Control (n=20)		P
	N	%	N	%	
Employment					
Work	5	25	7	35	0.187
Does not work	15	75	13	65	
Education					

Elementary school	7	35	3	15	0.688
Middle School	8	40	8	40	
High school	5	25	8	40	
College	0	0	1	5	
Total	20	100	20	100	

**Homogeneous test*

Based on the above table, it is obtained that education and employment in the treatment and control groups have the same significant value p value >0.05 means same or homogeneous.

Table 2 Differences in mean triglycerides levels before and after treatment in the intervention group and control group

Group	Pre Mean ± SD	Post Mean ± SD	Mean difference	P-value
Intervention	142.55±84.359	113.00±55.018	29.55	0.014**
Control	161.10±59.611	152.60±49.721	8.5	0.395*

**Paired t test*

***Wilcoxon test*

The above table shows that there are differences in triglycerides levels before and after the treatment given to the intervention group or the control group. However, the difference in triglycerides reduction in the intervention group was greater than in the control group.

Table 3 Analysis of mean difference in triglycerides levels between the intervention and control group

Group	Mean	SD	Mean difference	P value
Intervention	113.00	55.018	-39.6	0.022*
Control	152.60	49.721		

**Independent t test*

Based on the table above shows that there are differences a significant decrease in triglycerides levels between the intervention group and the control group with a p value of 0.022 (<0.05), in conclusion the intervention group was better at reducing triglycerides levels than the control group.

DISCUSSION

The intervention group triglyceride levels, there were significant differences (p=0.014), whereas in the control group there were no significant differences (p=0.395), then the hypothesis was accepted. The average difference in the triglyceride levels of the intervention group was 29.55 mg/dl, whereas in the control group it was 8.5 mg/dl so that the improvement of the triglyceride levels in the intervention group was 21.5 greater than the control group. This is in line with research that 80 g snack bar interventions a day were carried out for 4 weeks. The results reduced 32.89% of triglyceride levels in adult hyper-triglyceridemic women [17].

Soybean seed extract contains isoflavones in the form of glycine and arginine which can bind triglycerides originating from food that enters the body so that the absorption of triglycerides by the intestine is reduced. This was stated in a study that provided 5000 mg/kg BW soybean extract, curcuma rhizome extract 500 mg/kg BW, delja combination 12500:250 mg/kg BW and delja combination 25000: given 500 mg/kg BW or allies for 30 days. The result was that triglyceride levels were reduced by around 40%, 50%, 60% and 60% compared to the control group (p<0.05) [18].

The results of the unpaired different test analysis of triglyceride levels contained significant differences (p=0.022), then the hypothesis was accepted. The average triglyceride level of the intervention group was 113.00 mg/dl and in the control group were 152.60, so that the improvement of triglyceride levels in the control group was greater than 39.6 mg / dl than in the intervention group. This is in line with research that provides black soybean juice at a dose of 250 ml per day for

21 days. The results were the intervention of triglyceride levels of black soybean juice before 205.65 mg/dl and after 181.75 mg / dl with an average difference of 23.90 mg/dl. Statistical test results p=0.002 (p<0.05) which means that there is an effect of black soybean extract on triglyceride reduction [19].

Other studies also say that Isoflavones can influence lipid metabolism due to activation of Peroxisome Proliferator-activated Receptor α (PPARα). PPARα activation can reduce fatty acids in the liver and triglyceride biosynthesis. This can prevent the occurrence of many triglyceride levels in the liver [20].

This is also in line with other studies that have shown average results of triglyceride levels before consumption of teak leaf extracts of 229.17 mg/dl. The average of triglycerides after consumption of teak leaves extract in the Netherlands is 188.03 mg/dl. Wilcoxon test results on triglyceride levels before and after administration of ditch teak leaf extract obtained p value <0.05, which means that Dutch teak leaf extract has an effect of reducing triglyceride levels in dyslipidemia individuals [21].

CONCLUSION

Based on data processing and analysis of edamame supplementation therapy (Glycine Max L. Merrill), it can be concluded that the average decrease in triglycerides levels in the intervention group with a difference of 29.55 mmHg more than the average decrease in triglycerides levels in control group with a difference of 8.5 mmHg with a p value of 0.022 (<0.05). Conclusion the intervention group was better at reducing triglycerides levels than the control group.

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