



Giving green grass jelly for mda (*malondialdehyde*) level in pregnant women with hypertension

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ABSTRAK

Latar belakang: Hipertensi merupakan penyakit yang sering terjadi selama kehamilan. Banyak faktor yang mempengaruhi terjadinya hipertensi, salah satunya yaitu stres oksidatif. Stres oksidatif mempunyai peranan penting pada patogenesis hipertensi dalam kehamilan dan bisa menjadi jalur yang bisa mengarah ke kerusakan jaringan. Stres oksidatif dapat menstimulasi pelepasan sitokin, antiangiogenik, mikropartikel dan molekul penting lainnya pada hipertensi. Stres oksidatif disebabkan oleh ketidakseimbangan prooksidan dan antioksidan. Sehingga dibutuhkan antioksidan yang bisa menekan stres oksidatif pada ibu hamil dengan hipertensi. Cincau hijau mengandung zat alkaloid dan flavonoid. Dimana flavonoid dapat berperan sebagai antioksidan dan anti inflamasi. Flavonoid dapat mengurangi kekakuan arteri menjadikan Reactive Oxygen Species (ROS) menurun sehingga peroksida lemak menurun dan diikuti dengan stres oksidatif menurun, maka fungsi endotel akan meningkat dan terjadi vasodilatasi. Malondialdehyde (MDA) merupakan aldehyd senyawa penanda yang penting untuk melihat peroksidasi lipid dan kerusakan oksidatif yang disebabkan Reaktif Oxygen Spesies (ROS).

Tujuan: Membuktikan pemberian cincau hijau berpengaruh terhadap penurunan stres oksidatif pada ibu hamil.

Metode: Penelitian ini menggunakan Quasy eksperimen dengan rancangan pretest dan posttest control design. Sampel berjumlah 30 dibagi menjadi 2 kelompok. Kelompok dengan intervensi cincau hijau sebanyak 15 orang dengan diberikan cincau hijau sebanyak 150 gr per hari selama 14 hari. Kelompok kedua sebanyak 15 orang sebagai kelompok kontrol.

Hasil: Kelompok intervensi cincau hijau terdapat perbedaan signifikan dengan p-value < 0,05. Untuk hasil malondialdehyde pada kelompok kontrol tidak ada perubahan p-value > 0,05. Adapun rerata penurunan kadar malondialdehyde pada kelompok kontrol 0,0560 nmol/ml sedangkan penurunan rata-rata malondialdehyde pada kelompok intervensi yaitu 1,3133 nmol/ml.

Kesimpulan: Cincau hijau efektif dan signifikan untuk penurunan kadar malondialdehyde pada ibu hamil hipertensi ringan.

KATA KUNCI: cincau hijau; mda (*malondialdehyde*); hamil hipertensi

ABSTRACT

Background: Hypertension is a disease that often occurs during pregnancy. Many factors influence the occurrence of hypertension, one of which is oxidative stress. Oxidative stress has an important role in the pathogenesis of hypertension in pregnancy and

may be a pathway that can lead to tissue damage. Oxidative stress can stimulate the release of cytokines, antiangiogenic, microparticles and other important molecules in hypertension. Oxidative stress is caused by an imbalance of prooxidants and antioxidants. So we need antioxidants that can suppress oxidative stress in pregnant women with hypertension. Green grass jelly contains alkaloids and flavonoids. Where flavonoids can act as antioxidants and anti-inflammatory. Flavonoids can reduce arterial stiffness making Reactive Oxygen Species (ROS) decrease so that fat peroxide decreases and is followed by decreased oxidative stress, then endothelial function will increase and vasodilation occurs. Malondialdehyde (MDA) is an aldehyde marker compound that is important to see lipid peroxidation and oxidative damage caused by Reactive Oxygen Species (ROS). **Objectives:** To prove that giving green grass jelly has an effect on reducing oxidative stress in pregnant women.

Methods: This study used a quasy experiment with a pretest and posttest control design. A sample of 30 was divided into 2 groups. The group with green grass jelly intervention was 15 people who were given green grass jelly as much as 150 grams per day for 14 days. The second group as many as 15 people as the control group.

Results: The green grass jelly intervention group had a significant difference with p-value <0.05. For malondialdehyde results in the control group there was no change in p-value > 0.05. The mean decrease in malondialdehyde levels in the control group was 0.0560 nmol/ml while the average decrease in malondialdehyde in the intervention group was 1.3133 nmol/ml.

Conclusions: Green grass jelly is effective and significant for reducing malondialdehyde levels in pregnant women with mild hypertension.

KEYWORD: green grass jelly; MDA (malondialdehyde); pregnant hypertension

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INTRODUCTION

Hypertension is a disease that often occurs during pregnancy (1). Women will experience pregnancy so that during pregnancy they are susceptible to chronic hypertension, gestational hypertension, and preeclampsia/eclampsia. This will have an impact on maternal and infant morbidity and mortality worldwide (2). According to data from the Directorate of Health of the Ministry of Health of the Republic of Indonesia (Kemenkes RI), hypertension and preeclampsia/eclampsia are still the highest causes of maternal mortality in Indonesia with a percentage of 27.1%. In 2018, cases of maternal death due to hypertension and preeclampsia/eclampsia in Central Java reached 32.97% or 157 cases (3). In Magelang Regency, preeclampsia/eclampsia

was the highest cause of maternal mortality in 2016 at 40% (4). According to the Magelang District Health Office, in 2018 the Borobudur Health Center there were 9 cases of pregnant women with hypertension, 17 cases of the Muntilan I Health Center, and 17 cases of the Mungkid Health Center. The pathophysiological causes of hypertension and preeclampsia are unclear. Many factors influence the occurrence of hypertension (5).

The placenta is believed to play a central role in every mediator of hypertension (6). The placenta also plays a role in the development of hypertension in which there is disruption of the placenta, poor invasion, and abnormal angiogenesis which are the main pathological manifestations (7). These events are the result of

oxidative stress found in hypertensive placentas (8). Oxidative stress has an important role in the pathogenesis of hypertension in pregnancy and may be a pathway that can cause tissue damage (9). Oxidative stress can stimulate the release of cytokines, antiangiogenics, microparticles and other important molecules in hypertension (10). Oxidative stress is caused by an imbalance of pro-oxidants and antioxidants. So we need antioxidants that can suppress oxidative stress in pregnant women with hypertension (11).

In hypertension, therapy given to pregnant women such as methyl dopa, α -blockers, β blockers and diuretics (12). However, the use of nifedipine as an inhibitor in some countries such as the UK is contraindicated. In pregnancy it can cause side effects of headache, tachycardia, hypoperfusion in mother and fetus, possible delay in fetal growth, peripheral edema, and even increase the risk of pulmonary edema (13).

One alternative used to reduce hypertension in pregnant women is green grass jelly which contains alkaloids and flavonoids (14). Where flavonoids can act as antioxidants and anti-inflammatory (15). The antioxidant content of flavonoids in green grass jelly is 1867 g/ml (16). Flavonoids are antioxidants that play an active role as antihepatotoxic, anti-HIV-1, anti-tumor, and anti-inflammatory and can provide maximum vasodilating effects on blood vessels that help protect the heart. Flavonoids can reduce arterial stiffness, causing a decrease in Reactive Oxygen Species (ROS) so that lipid peroxide decreases and is followed by a decrease in oxidative stress, so that endothelial function will increase and vasodilation occurs. Malondialdehyde (MDA) is an important aldehyde marker compound to see lipid peroxidation and oxidative damage caused by Reactive Oxygen Species (ROS) (17). Inflammatory effects and oxidative stress caused by angiotensin II and endothelial cell damage in the placenta are factors that can cause hypertension (18).

Several studies, including the research of Sundari et al (2014) that giving green grass jelly has an effect on reducing blood pressure with 14 days of intervention. At 172 mmHg systolic blood pressure to 146.8 mmHg decreased by 25.2 mmHg while diastolic blood pressure from 94 mmHg to 79 mmHg decreased by 15 mmHg. Various studies on the benefits of green grass jelly have been carried out in hypertensive patients, but few have investigated the relationship between hypertension and the aldehyde produced from oxidative stress, namely malondialdehyde. So that researchers are interested in conducting research on giving green grass jelly to MDA (malondialdehyde) levels of pregnant women with hypertension.

MATERIALS AND METHODS

This research was conducted in the Work Area of the Magelang District Health Office, namely Borobudur Health Center, Mungkid Health Center and Muntilan I Health Center in April – June 2019. This study used a quasi experiment with a pretest and posttest control design. Testing in groups using the Paired t-test. The sampling technique in this study was purposive sampling with a total of 30 respondents. In this study, 2 groups were used, the first group was 15 pregnant women with hypertension who were given green grass jelly at a dose of 150 grams for 14 days, and the control group was 15 pregnant women with mild hypertension. This design looks at the average effect of an intervention on the dependent variable by looking at the average reduction in blood pressure and malondialdehyde (MDA) levels in the intervention group and the control group. Collecting data in this study by direct measurement of malondialdehyde (MDA) levels and blood pressure in pregnant women with mild hypertension. Data were taken before and after intervention. Sources of data in this study were pregnant women with mild hypertension in each intervention group.

RESULTS AND DISCUSSION

RESULT

Based on **Table 1**, malondialdehyde levels decreased in the intervention group. In the green grass jelly group before the intervention the average was 6.742 nmol/ml and after the intervention the average was 5.428 nmol/ml. In the control group before the intervention the average was 6.779 nmol/ml and after the intervention the average was 6.723 nmol/ml.

Table 1. Malondialdehyde levels in the green grass jelly group and the control group

Malondialdehyde levels	Green grass jelly group (n=15)	Control group (n=15)
	Mean ± SD	Mean ± SD
Before treatment	6,742 ± 1,773	6,779 ± 2,025
After treatment	5,428 ± 2,015	6,723 ± 2,030

Based on **Table 2**, it shows that the control group has a p-value of 0.145, meaning that there is no significant difference between the malondialdehyde examination before and after the intervention in the control group. In the control group, the mean measurement of malondialdehyde levels from pretest to posttest decreased by 0.0560 nmol/ml. In the green grass jelly intervention group, the mean measurement of malondialdehyde levels from pretest to posttest decreased by 1.3133 nmol/ml or 19.4%.

DISCUSSION

The results of processing data on the value of malondialdehyde levels in the green grass jelly intervention group for 14 days obtained 15 respondents who were pregnant women with mild hypertension experienced a decrease in malondialdehyde levels before

and after treatment. The results of descriptive analysis of malondialdehyde content data can be seen in table 2 which shows that the pretest malondialdehyde level is 6.7420 ± 2.0225 and the post-test malondialdehyde level is 5.429 ± 2.0159 .

Tests in the treatment group and control group showed that in the green grass jelly intervention group the p-value was $0.000 < 0.05$, which means that there was a significant difference between the pretest and posttest malondialdehyde levels. So it can be concluded that there is a significant difference in malondialdehyde levels before and after the green grass jelly intervention. The mean decrease in malondialdehyde levels after the intervention was 1.3133 nmol/ml.

In accordance with the theory that placental ischemia and hypoxia will produce oxidants (free radicals) (9). Oxidants or free radicals are compounds that accept molecules that have unpaired electrons. One of the important oxidants produced by placental ischemia is hydroxyl radicals which are highly toxic, especially to vascular endothelial cell membranes. The production of oxidants in humans is a very natural process, because oxidants are needed for the body's immunology (19). In hypertensive patients, the oxidant will decrease enzymatically in the cells, followed by an increase in lipid peroxide due to the free radical malondialdehyde (MDA) (20). The content of flavonoids in green grass jelly has antioxidant activity by binding to free radicals thereby reducing the concentration of lipid peroxide so that malondialdehyde is not formed. In cases of gestational hypertension malondialdehyde (MDA) is present in plasma, small vessels and decidua basalis (21).

Table 2. Analysis of differences in malondialdehyde levels in the intervention group and control group

Group	MDA Level (nmol/ml)		Δ	Δ %	p-value
	Before	After			
	Mean ± SD	Mean ± SD			
Control group	6,7793 ± 2,0255	6,7233 ± 2,0302	0,0560	0,82%	0,145
Intervention group	6,7420 ± 1,7735	5,429 ± 2,0159	1,3133	19,47%	0,000

The results of the analysis are in accordance with research conducted by Yeni et al (2017), research proves that curcumin which contains antioxidants is able to reduce the level of malondialdehyde (MDA) in cells induced by preeclampsia (22). Another study conducted by Martin all (2016) stated that in a prospective cohort of elderly women with a greater intake of flavonoid polymers were less likely to develop hypertension (23).

CONCLUSION AND RECOMMENDATION

The results of this study prove that offering green grass jelly has a potential effect on reducing MDA levels in pregnant women with mild hypertension. The decrease in MDA causes a decrease in blood pressure of pregnant women with mild hypertension. So that this intervention can be one of the interventions in the SOP for midwifery care for pregnant women. Furthermore, it can be developed or distributed to pregnant women who are not in the research group to use natural ingredients such as green grass jelly for complementary therapy.

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