

# The LapiSe Juice as an Alternative Drink to Reduce Blood Pressure of Pregnant Women with Pre-eclampsia

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**Keywords:** LaPiSe Juice, Blood Pressure, Pregnant Women, Pre Eclampsia.

**Abstract:** Objective: to determine the difference of blood pressure in pre-eclampsia pregnant women who were given LaPiSe juice and who were not given LaPiSe juice. Method: This study used Quasi experimental with pre and post-test design, held in Tanjungpinang, between 12 June 2017 and 20 August 2017. Samples were 76 pre-eclampsia pregnant women selected with using purposive sampling method who received Pre-Eclampsia treatment, that divided into 2 groups of treatment and control group (38 respondents in each group). Treatment group were given pre-eclampsia treatment and also LaPiSe Juice for 10 days then the blood pressure measurement was carried out before and after being given LaPiSe juice. The control group was given pre-eclampsia treatment only. Researcher and enumerator team visited pregnant woman's home and gave LaPiSe Juice every day, once a day for 10 days then recorded it on the observation sheet. They also measured blood pressure on 10<sup>th</sup> day. The data was analyzed with wilcoxon. Result: There was a significant difference in pregnant women blood pressure which was given LaPise juice (systole's mean 128,42 ± 12,597 diastole's mean 82,89 ± 6,939) and not given LaPiSe juice (systole's mean 134,0 ± 7,97, diastole's mean 84,74 ± 7,618) with p value 0.000. Conclusion: LaPiSe juice could be used as an alternative healthy drink to lower blood pressure.

## 1 INTRODUCTION

Hypertension in pregnancy is estimated to be the cause of death of around 7.1 million people worldwide, and it is the top three cause of death for pregnant women in Tanjungpinang City. Preeclampsia is a systemic disease that affects the function and health of multiple organs and leads to pathophysiology during pregnancy that affects both the mother and baby. While there is no cure for PE, except for early delivery of the feto-placental unit.(Harmon *et al.*, 2017). Because of it, special treatment is needed. Fruit and vegetables tend to rich in natural antioksidants and increased consumption at these dietary component has been proposed as an alternative strategy for health improvement for pregnant women with pre eklamsia.

The use of medicinal plants and herbal formulations is a consideration to reduce toxic effects and have minimal side effects compared to synthetic drugs (Mulyani, Rosa and Huriah, 2015). Herbal treatments for hypertension are fruits, vegetables, leaves and roots. However, herbal

treatments take from fruits and vegetables which can lower blood pressure are not available yet. Processing and converting fruits and vegetables into different product are needed in order to make pregnant women able to consume fruits and vegetables. So, it's important to provide herbal treatment to lower blood pressure from fruits and vegetables such as chayote, banana and watermelon.

Chayote or namely *Sechium edule* Sw contain of the tannin which are antimicrobial, and alkaloid which is able to facilitate blood circulation so as to prevent disease and open clogged blood vessels. The results of phytochemical screening and gastric layer chromatography analysis The chemical components of chayote (*Sechium edule*) found alkaloids, saponins, kardenolines or bufadienols and flavonoids (Marliana and Suryanti, 2005). One of the active compounds in chayote (*Sechium edule*) is flavonoids. Flavonoids have antihypertensive potential by damaging ACE and as a diuretic. Therefore, the last extract of chayote (*Sechium edule*) as an antihypertensive.(Nadila, 2014).Watermelon contain of flavonoid named

Rutin. One of Flavonoid named Rutin is a flavanol glycoside and in vitro and in vivo studies showed the antioxidant and anti-inflammatory properties of rutin and its role in the metabolism of glucose and lipids (Abu-hamed, 2017). The high antioxidant activity of watermelon can be ascribed either to presence of high phenols or flavonoids or lycopene or other reducing agents which may also reduce the oxidized state of antioxidant compounds (Choudhary, 2015). Similar observation has been recorded in watermelon (Choo and Sin, 2012; Nagal, Kaur and Singh, 2012). Five flavonoids were detected in both banana varieties at all fruit developmental stages (Dong *et al.*, 2016). These fruits contain anti-oxidants which allow it to help lowering blood pressure and suitable for pregnant woman, easy to find, cheap and easy to serve. We can combine these three ingredients into a juice to lower blood pressure because they have antioxidant content.

Based on preliminary studies conducted by researchers at the Tanjungpinang City in 2015 there were 113 cases with Pre Eclampsia, there were 11 cases of pregnant women with Pre-eclampsia, and one person died because of it. In 2016 there were 94 cases pre-eclampsia and 4 cases with eclampsia, there were no mortality rates for pregnant women with eclampsia. Based on the results of interviews with 30 pre-eclampsia pregnant women in Tanjungpinang City, it was found that there was no herbal treatment as a support for medical treatment while undergoing pre-eclampsia treatment. So we need for juice made from herbal ingredients that can reduce blood pressure in pregnant women with pre eclampsia. This juice can be mixture of chayotes, bananas and watermelon namely LaPiSe Juice. The aim of the study was to determine the differences of blood pressure of pre-eclampsia pregnant women who were given LaPiSe juice and who were not given LaPiSe juice.

## 2 METHOD

The study held in Tanjungpinang Tanjungpinang, between 12 June 2017 and 20 August 2017. LaPiSe Juice contain of each 200 mg of chayotes, bananas and watermelons. Prepare watermelons, bananas and chayote each 200 grams of Chayote, 200 grams of banana and 200 grams of watermelon. Put the fruits to the blender and mix it with 250 ml of water. Blend it for 1 minute. After that, put the Lapise juice into a glass and it ready to serve. The methods used in this study was Quasi experimental with pre

and posttest design. The sample was pre-eclampsia pregnant women (blood pressure of a pregnant woman reaches  $\geq 140/90$  mmhg) who receive Pre-Eclampsia treatment receive antihypertensive drugs. Seventy-six (76) pregnant woman with pre eclampsia (38 treatment group and 38 control group) were selected with using purposive sampling method. The treatment group was given pre-eclampsia treatment and also LaPiSe Juice for 10 days, a glass every morning (250 ml), then the blood pressure measured with Digital Omron HEM 7130 Automatic Blood Pressure Monitor From Japan that was carried out before and after the respondent drink LaPiSe juice. The control group was given pre-eclampsia treatment only. Researcher and enumerator team visited pregnant woman's home and gave LaPiSe Juice everyday, and then recorded it on the observation sheet. The team also measured blood pressure in the last day of research. The blood pressure examination is carried out in a sitting position with the elbows bent on the table and the palms facing up. Cufflinks approximately 3 cm from the elbow, turn on the blood pressure meter and the measurement results could be seen. Data was analysed with Wilcoxon. This study has received ethical approval from Jakarta Three health ministry polytechnic ethics committee.

## 3 RESULTS

Table 1: Characteristics of respondent.

Indicator	Group				p value
	Lapise		Control		
	F	Percentage (%)	F	Percentage (%)	
Gestational age:					0.806*
≤ 24 week	16	42	20	41	
≥ 25 week	22	58	18	59	
Mother's Age:					0.584*
≤ 20 years	0	0	0	0	
21 – 35 years	21	55	34	89	
> 35 years	17	45	4	11	
Parity:					
Primigravida	1	4	5	14	0.709*
Multygravida	37	96	33	86	

\*One way Annova

From table 1, it was found that the gestational age in the Lapise group and the control group were mostly at gestational age more than 25 weeks. The age of the mother in the Lapise group and control group

was mostly aged 21 to 35 years. Respondent in both group were mostly in multigravida status.

Table 2 shown that there were very significant differences in systole before and after the treatment of LaPiSe in LaPiSe group with a value of  $p < 0.05$  (0,000), as well as the control group with a value of  $p < 0.05$  (0,000). Further data showed that the mean decreased in the LaPiSe group was higher then the control group (15.71 > 7.95).

Table 3 shown that there were very significant differences in diastole before and after the treatment of LaPiSe in LaPiSe group with a  $p$  value  $< 0.05$  (0,000), and there was no significant difference in the diastole of the control group before and after the  $p$  value  $> 0, 05$  (0.087). The next data showed that there was a decreased in the mean in the treatment group (6,27) was higher than the control group (0,42).

Table 2: The Differences of systole value in pre and post test between the intervention group and control group

Sistole	Group	
	Lapise (n= 38)	Control (n=38)
Pre Test:		
Mean (SD)	144,53(11,825)	142,95(8,091)
Median	140,0	140,0
Range	130,0-170,0	140,0-170,0
Post Test:		
Mean (SD)	128,42(12,597)	134,0(7,97)
Median	120,0	140,0
Range	120,0-170,0	120,0-150,00
Decrease in Mean	15,71	7,95
P value	0,000*	0,000*

\* Wilcoxon

Table 3: The Differences of diastole value in pre and post test between the intervention group and control group.

Diastole	Group	
	Lapise (n= 38)	Control (n=38)
Pre Test:		
Mean (SD)	89,16(8,397)	85,16(7,758)
Median	90,0	90,0
Range	70,00-100,00	70,0-100,0
Post Test:		
Mean (SD)	82,89(6,939)	84,74(7,618)
Median	80,0	90,0
Range	70,00-100,00	70,00-100,00
Decrease in Mean	6,27	0,42
P value	0,000*	0,087*

\* Wilcoxon

## 4 DISCUSSION

Lapise juice given to pregnant women with pre

eclampsia has lowered the blood pressure of sitole and diastole better than pregnant women who are not given lapise juice. LaPiSe Juice contain of 200 mg chayotes, bananas and watermelons. This Juice contain of flavonoid. Based on laboratorium test in 2017, the flavonoid content in 200 grams of LaPiSe juice was 0.14. This flavonoid could reduce pregnant woman's blood pressure.

The chemical components of chayote (*Sechium edule*) in ethanol extract showed that the squash ethanol extract found flavonoids (Marliana and Suryanti, 2005). One of the active compounds in chayote (*Sechium edule*) is flavonoids. Flavonoids have antihypertensive potential by damaging ACE and as a diuretic. Therefore, extract of chayote (*Sechium edule*) as an antihypertensive (Nadila, 2014).

Watermelon contain of flavonoid named Rutin.

Antioxidants commonly One of Flavonoid named Rutin is a flavonol glycoside and in vitro and in vivo studies showed the antioxidant and anti-inflammatory properties of rutin and its role in the metabolism of glucose and lipids (Abu-hiamed, 2017). The high antioxidant activity of watermelon can be ascribed either to presence of high phenols or flavonoids or lycopene or other reducing agents which may also reduce the oxidized state of antioxidant compounds (Choudhary, 2015) Similar observation has been recorded by Nagal et al. (2012) and Choo and Sin (2012) in watermelon. (Choo and Sin, 2012; Nagal, Kaur and Singh, 2012). Five flavonoids were detected in both banana varieties at all fruit developmental stages. (Dong *et al.*, 2016)

Plant compounds such as flavonoids have been reported to exert beneficial effects in cardiovascular disease, including hypertension. Information on the effects of isolated individual flavonoids for management of high blood pressure. Flavonoids, as isolated outside of the food matrix, from the 5 main subgroups consumed in the Western diet (flavones, flavonols, flavanones, flavan-3-ols, and anthocyanins), along with their effects on hypertension, including the potential mechanisms for regulating blood pressure (Clark, Zahradka and Taylor, 2015)

Flavonoids from all 5 subgroups have been shown to attenuate a rise in or to reduce blood pressure during several pathological conditions (hypertension, metabolic syndrome, and diabetes mellitus). Flavones, flavonols, flavanones, and flavanols were able to modulate blood pressure by restoring endothelial function, either directly, by affecting nitric oxide levels, or indirectly, through other pathways. Quercetin had the most consistent

blood pressure-lowering effect in animal and human studies, irrespective of dose, duration, or disease status (Clark, Zahradka and Taylor, 2015).

Flavonoids are scavengers of free radicals such as superoxide anions and lipid proxy radicals and by preventing oxidation of LDL-C, because oxidized LDL is believed to be atherogenic. Therefore, flavonoids may decrease the formation of atherosclerotic plaques and reduce arterial stiffness, arteries more responsive to the endogenous stimuli of vasodilation. Studies have shown that consumption of fruit, vegetable and tea (black and green) containing high amount of flavonoid may lead to lower blood pressure and may provide protection against coronary heart disease and stroke. It is possible that their antioxidant effect is responsible (Kooshki and Hoseini, 2014).

Oxidative stress contributes to increase blood pressure by acting on eNOS uncoupling and decrease bioavailability of nitric oxide. The result is a predominant on factors vasoconstrictors and low action of vasodilators in vascular bed (Mink *et al.*, 2007). In the cardiovascular system, the reactive oxygen species (ROS) are produced in vascular cells by a number of oxidases, including NADPH oxidase, xanthine oxidase, lipoxygenase, and cytochrome P450 (Mink *et al.*, 2007; Kizhakekuttu and Windlasky, 2010) Furthermore, clinical data have suggested that there is increased endogenous antioxidant, introducing exogenous antioxidants present in food. In fact, the reduction of oxidative stress has been accompanied by decreasing cardiovascular risk and blood pressure in humans used include vitamins A, C, and E, L-arginine, flavonoids, coenzyme Q10, and alpha-lipoic acid (Cherubini, 2008). Of these, flavonoids have gained attention for their higher antioxidant power than the others. In fact, the selected studies that used supplements based on flavonoids, all demonstrated significant reductions in blood pressure in hypertensive, and hypercholesterolemic individuals. The reductions were more pronounced for systolic blood pressure, with a reduction of around 3 mmHg. For diastolic blood pressure, only the study by Ward *et al.* (Ward *et al.*, 2005) identified a significant reduction (3 mmHg). Although these reductions are relatively discreet, these are clinically significant, so that hypotension afforded by the flavonoid is equivalent to the use of a class of antihypertensive medication (Baster, 2014).

These are some of the changes that can occur during pregnancy, especially in pre eclampsia. Oxidative stress seems to play an important role in preeclampsia. Increased levels of reactive oxygen

species (ROS) might be the result of ischemia-reperfusion injury from deficient conversion of the medial segment of the spiral arteries. Increased ROS exposure leads to protein, lipid and DNA oxidation all of which have been found in placentas from patients with preeclampsia. Other mechanisms involved in preeclampsia include enhanced sensitivity to angiotensin II (Mustafa *et al.*, 2012). A subset of women with pre-eclampsia have detectable autoantibodies against type-1 angiotensin II receptor (AT1) in the serum, which can activate AT1 in endothelial cells, vascular smooth muscle cells, and mesangial cells from the kidney glomerulus. AT1 autoantibodies have been shown to induce hypertension, proteinuria, glomerulus capillary endotheliosis, increased production of sVEGFR-1 (soluble Vascular Endothelial Growth Factor Receptor) and to stimulate the synthesis of NADPH oxidase (Wallukat *et al.*, 1999; Peres, Mariana and Cairrão, 2018). So it is suitable to use LaPiSe juice that contain of flavonoid to help pregnant women that suffering pre eclampsia. Limitation of this study was the absence of another component measurement of LaPiSe juice that might be can help reduced blood pressure.

## 5 CONCLUSION

There was a significant difference in pregnant women blood pressure which was given LaPiSe juice and not given LaPiSe juice. LaPiSe juice can be used as an alternative healthy drink to lower blood pressure.

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