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The combination of giving Dayak onion powder (*Eleutherine americana* merr.) and anti-hypertension medicine to decrease sistolic and diastolic blood pressure mother postpartum hypertension

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Abstract
Background: Hypertension is a non-communicable disease which is one of the complications that arise and most often encountered during pregnancy, childbirth and the puerperium. Hypertension in postpartum mothers plays a big role in maternal and perinatal mordibity and mortality. Management of hypertension can be done in two ways, namely pharmacological and non pharmacological therapy. The use of pharmacological drugs needs to be considered given the side effects caused by substances containing chemical compounds. One of the appropriate non pharmacological therapies for people with hypertension is the use of natural ingredients of Dayak onion powder (eleutherine americana merr), which is a typical plant in Central Kalimantan.
Method: The type of research used is True Experiment with a research pre - posttest control group design. This research arranged two groups, namely the intervention group given dayak onion powder (eleutherine americana merr), while the control group was given antihypertensive medication without dayak onion powder (eleutherine americana merr). Technique non probability sampling with method was consecutive sampling used to get 32 respondents who were divided into two groups.
Results: The result statistical test Repeated Measure Anova mean systolic blood pressure values showed p value <0.05 so it can be concluded that dayak onion powder can reduce systolic blood pressure. Conversely, there was no significant difference in diastolic blood pressure with a p value> 0.05, but when viewed from the mean diastolic blood pressure before and after treatment, there was a better decrease in the intervention group compared to the control group.
Conclusion: The results of the research after treatment were given a decrease in the mean systolic and diastolic blood pressure respondents who were given dayak onion powder (Eleutherine americana merr), so that the use of these natural therapies was effectively implemented to postpartum mothers who experienced an increase in systolic and diastolic blood pressure especially post partum mothers with hypertension.

Keywords: Dayak onion powder (*eleutherine americana* merr), antihypertension medication, systolic and diastolic blood pressure, postpartum mothers, hypertension

1. Introduction

Postpartum hypertension or hypertension that occurs in the puerperium is an increase in blood pressure ≥ 140/90 mmHg with or not accompanied by proteinuria or edema during the puerperium [1] Hypertension is a complication that occurs during pregnancy, childbirth and the puerperium, which is around 5-10% [1, 2]. In post partum women who experience hypertension can become normotensive quickly after giving birth, then hypertension can develop within 48 hours postpartum. Women who have hypertension in the postpartum half to two-thirds are diagnosed with preeclampsia, and eclampsia [3]. Hypertension is one of the most common non-communicable diseases (PTM) during pregnancy, childbirth, and postpartum [4, 5].

The puerperium is a critical transition period experienced by mother, baby and her family. The puerperium begins after the birth of the placenta and ends when the uterine uterus returns to how it was before pregnancy. In the postpartum period, the child experiences physiological, psychological, and social adaptations [4, 6]. The exact cause of theoretical hypertension in postpartum mothers is not yet known, hypertension in postpartum mothers is still the subject of many studies to understand the etiology and improve its management [7].

Hypertension in postpartum mothers plays a major role in mordibity and maternal and perinatal mortality [2]. According to WHO (World Health Organization) in 2015 there were 425 per 100,000 births of mothers died due to complications of pregnancy, childbirth, and childbirth worldwide, and 99% occurred in developing countries. The maternal mortality rate in developing countries is caused by hypertension 16%, the rate is higher than bleeding 13%, abortion 8%, and infection 2%.[6]Complications of hypertension in postpartum mothers include brain hemorrhage, stroke, retinal injury, cardiac disorders, pulmonary edema, liver necrosis. Management of maternal complications with postpartum hypertension aims to prevent complications from occurring through pharmacological and non-pharmacological treatment [6].

Maternal Mortality Rate (MMR) is one important indicator in assessing the health status of a country. Based on the 2015 Indonesian Demographic Health Survey (IDHS), MMR in Indonesia was 305 per 100,000 live births. Maternal mortality in Indonesia remains dominated by three

main causes of death, namely bleeding, hypertension and infection. This target is still far from the Millennieum Development Goals (MDGs) program, which is 102 per 100,000 live births. Following the unsuccessful MDGs program, governments around the world have formed a global target program of SDGs (Suitainable Development Goals). One of the goals of the SDGs program is to reduce the Maternal Mortality Rate (MMR) to 70 per 100,000 KH. Referring to the current conditions, the potential to achieve the SDGs target to reduce the MMR is off track, meaning that it takes hard and serious work to achieve it [1].

Based on Indonesia's health profile, Central Java Province is one of the six largest contributing AKI provinces in Indonesia. In 2016 there were 109.65 MMR per 100,000 KH. This figure has decreased in 2017 by 88.05 per 100,000 KH. Although MMR has decreased, this figure has not yet reached the SDGs target of around 70 per 100,000 KH. Hypertension is the second leading cause of death after bleeding, with an incidence of 27.08% of all maternal deaths in the province of Central Java [8]. Results of data obtained from Klaten District obtained AKI as many as 18 cases, there were 12 cases during the puerperium. Bagas Waras Hospital in Klaten Regency in 2018 there were 247 cases with postpartum hypertension. Whereas in January to March there were 73 cases of postpartum hypertension.

The strategy for overcoming the increase in hypertension cases carried out by the government is still not getting satisfactory results. Similarly, government efforts to reduce MMR still experience problems because of the high incidence of hypertension during pregnancy, childbirth can not be controlled properly. New efforts need to be made that combine herbal therapy (non-pharmacological) in addition to medical therapy (pharmacological) with the aim of postpartum hypertension cases can be treated quickly with minimal negative effects so that complications can be prevented.

Pharmacological treatments that have been carried out are by giving antihypertensive chemical drugs such as ace inhibitors, ca blockers, beta blockers, and diuretics [9].

Provision of antihypertensive to postpartum mothers who experience hypertension, namely, nifidipine, hidralazine, and parental labetalol, other alternatives for providing hypertension are nitoglycerin, methyldopa and labetalol [29].

Pharmacologic treatment given by medical personnel at RSUD Bagas Waras Klaten for postpartum hypertensive mothers is nifedipine 10 mg [10]. Taking nifidepine at the right dose can reduce blood pressure but the side effects felt by postpartum mothers are nausea, heartburn, flatulence, constipation, coughing, and headaches [6]. The use of alternative drugs needs to be considered given the side effects caused by nifidepin. The use of natural materials, both as medicines and other purposes tends to increase, with the issue of back to nature. Traditional medicines and medicinal plants are widely used by the middle to lower classes, especially in theefforts prevention, promotive, and rehabilitative [11].

One of the uses of natural ingredients is by using extract of Dayak onion (Eleutherine americana merr.), Which is a typical plant of Central Kalimantan [12]. Dayak onions are also widely found in Indonesian regions. This plant has green leaves with white flowers and red bulbs that resemble the shape of onion bulbs. This plant has been traditionally used by the Dayak community as a medicinal plant. In the bulbs of Dayak onions contained phytochemical compounds namely alkaloids, glycosides, flavonoids, phenolics, steroids and tannins. The mechanism of action of the active compound extracts of dayak onion as a hypotensive agent is found in flavonoid compounds [13].

Various studies on the benefits of dayak onions have been widely carried out but only a few have examined their association with hypertension and there have been no studies on postpartum hypertension, some of these studies include research by Yuliandra (2018) showing that extract of Dayak onions (eleutherine americana merr.) are antihypertensive in rats at a dose of 100 mg / kg body weight [14]. Research conducted by Afrisusnawati Rauf showed that there was an influence of Dayak extract (eleutherine americana merr.) There was a change in blood pressure in male rats at a dose of 200 mg / KgBB [11]. Community service research conducted by Annas Budi (2018) there were changes in systolic and diastolic blood pressure in residents who were given boiled water of Dayak as much as 50 grams [7].

Yurika Sastyna, conducted a toxicity test from dayak extract on 15 mice at a dose of 0.52 mg / kg BW, 2.6 mg / KgBB, and 5.2 mg / KgBB found no animal death (mice) [15]. The results of in vitro research as a potential cancer drug as well as the safety test conducted by Armiin Stefani, have examined the acute toxicity test of Dayak on test animals obtained $LD_{values50}$ onionof 3.6 g / Kg BB means that if the body weight is 60 kg, safe consuming 216 g / day [16].

Dayak onions contain naphthoquinone compounds and their derivatives such as elecanacine, eleutherine, eleutherol, eleuthernone. Naphthoquinone is also known as an antimicrobial, antifungal, antivirial, antiparastic. Compounds ofderivatives naphthalene also have bioactivity as anticancer and antioxidants [17, 18]. The mechanism of action of active compounds from dayak onions as hypotensive agents is found in flavonoid compounds, the content of flavonoids is associated as a protective effect on endothelial function and inhibits platelet aggregation so as to reduce blood pressure in hypertensive patients. Efforts in reducing post partum hypertension are still not as expected. In this case the researchers made an innovation as an alternative to reduce hypertension Combination of Dayak Onion (PowderEleutherine Americana Merr.)and Antihypertensive Medication Against Systolic and Diastolic Blood Pressure Decreased by Mother Hypertension Postpartum. Researchers hope the results of this study can contribute in efforts to improve the quality of midwifery services.

2. Methods

This type of research uses research True Experiment with pre-test - post-test with control group design. Researchers arranged two groups, namely the intervention group given dayak onion powder (eleutherine americana merr), while the control group was given antihypertensive medication without dayak onion powder (eleutherine americana merr). Giving dayak onion powder (eleutherine americana merr) at a dose of 800 mg and antihypertensive drugs both of which were carried out for 14 days. Systolic and diastolic blood pressure measurements using a digital tensimeter instrument that has been calibrated, then recorded on the observation sheet. Systolic and diastolic blood pressure measurements with postpartum hypertensive mothers in the intervention and control groups were performed posttest 3 times namely day 1th, day 7th and day 14th.

The population in this study was postpartum mothers who were diagnosed with hypertension at the General Hospital Bagas Waras District Klaten Regency from January to March 2019. Determination of the minimum sample size using non- probability sampling techniques withmethod consecutive sampling and based on inclusion and exclusion criteria as many as 32 respondents divided into two groups with 16 respondents each in the intervention group and 16 respondents in the control group.

In this study, researchers conducted data collection by observation, identification, interviews and filling out questionnaire sheets. The data collected was analyzed through the IBM SPSS program version 24.0, and continued with a different test, namely the parametric test (Test Repeated Measure Anova). 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.

3. Results

Based on the table above, this study shows that between the intervention group and the control group in terms of age, parity and family history are homogeneous data because p value > 0.05 or no significant difference. Whereas in terms of the type of delivery, history of pregnancy, history of childbirth and past childbirth history are non-homogeneous data because p value <0.05 or there are significant differences.

Table 3.1: Distribution frequencies of respondent based on age, parity, type of childbirth, pregnancy history, childbirth history, past puerperal history, and family history based on demographic data

Categorical	Respondent Group				P Value
	Interventions		Control		
	N	%	N	%	
Age					
≥20 years	1	6, 3	2	12.5	0.758
21-35 years	10	62.5	9	56.3	
> 35 years	5	31.3	5	31.3	
Total	16	100	16	100	
Parity					
Primipara	5	31.3	6	37.5	0.660
Multipara	10	62.5	9	56.3	
Grandemultipara	1	6.3	1	6.3	
Total	16	100	16	100	
Types of childbirth					
Normal	1	6.3	1	6.3	0.000
Sectio Caesaria	15	93.8	15	93.8	
Total	16	100	16	100	
Pregnancy History					
PER	10	62.5	7	43.8	0.001
PEB	4	25	8	50	
Eclampsia	-	-	-	-	
Normal	2	12.5	1	6.3	
Total	16	100	16	100	
Childbirth History					
Complications	11	68.8	11	68.8	0.009
No Complications	5	31.3	5	31.3	
Total	16	100	16	100	
Past puerperal history					
PER	3	18.8	3	18.8	0.012
PEB	3	18.8	4	25	
Eclampsia	-	-	-	-	
Normal	10	62.5	9	56.3	
Total	16	100	16	100	
Family History					
There	8	50	7	43.8	0.629
None	8	50	8	56.3	
Total	16	100	16	100	

*Levene's Test

Table 3.2: Linear Regression Test for systolic blood pressure between types of childbirth, pregnancy history, childbirth history, and past puerperal history in the intervention group and control group

Variable	R Square	F	P Value	Sig.Coef reg	Cofficient
Types of childbirth	0.101	0.755	0.456	-0.149	-0.828
Pregnancy History			0.532	0.124	1.857
Childbirth History			0.229	-0.237	-1.849
Past puerperal history			0.619	0.099	2.357

*Linear regression test

Based on the table above, shows that types of childbirth, pregnancy history, childbirth history, and past puerperal history had no significant effect on systolic blood pressure (p> 0.005). The type of labor, pregnancy history, history of childbirth, and past childbirth only affect 10% of systolic blood pressure, while 90% of systolic blood pressure is influenced by other factors.

Table 3.3: Linear Regression Test for diastolic blood pressure between types of childbirth, pregnancy history, childbirth history, and past puerperal history in the intervention group and control group

Variable	R Square	F	P Value	Sig.Coef reg	Cofficient
Types of childbirth	0.161	0.180	0.761	-0.063	-0.209
Pregnancy History			0.752	-0.065	-0.582
Childbirth History			0.618	-0.101	-0.471
Past puerperal history			0.970	-0.008	-0.112

*Linear regression test

Based on the table above, shows that types of childbirth, pregnancy history, childbirth history, and past puerperal history had no significant effect on diastolic blood pressure (p> 0.005). The type of labor, pregnancy history, history of childbirth, and past childbirth history of 16% affected systolic blood pressure, whereas 84% of systolic blood pressure was influenced by other factors.

Table 3.4: Differences in systolic blood pressure values before and after treatment in the intervention group and control group

	Intervention Group (n=16)					Control Group (n=16)			
Measurement	**Time**	**Mean Difference**	**P***	**P****	**Measurement**	**Time**	**Mean Difference**	**P***	**P****
Pre	H-1	17.375	0.000	0.000	Pre	H-1	22.563	0.000	0.000
	H-7	24.813		0.000		H-7	26.375		0.000
	H-14	33.250		0.000		H-14	23.875		0.000

*Anova Repeated Measures Test (Test of within subject effects)
**Post Hoc Paired Wise Comparison

Based on the table above, it was found that there were differences in systolic blood pressure before and after the intervention group with p value 0.000 (<0.05) and there were differences in systolic blood pressure before and after in the control group with p value 0.000 (<0.05). From the mean systolic blood pressure decreased on day 14 days by 33.250 mmHg with a p value of 0.001 (<0.05), whereas in the control group it only fell by 23.875 mmHg. Between the intervention and control groups the difference in systolic blood pressure reduction was 9.375 mmHg.

Table 3.5: Differences in diastolic blood pressure values before and after treatment in the intervention group and control group

	Intervention Group (n=16)					Control Group (n=16)			
Measurement	**Time**	**Mean Difference**	**P***	**P****	**Measurement**	**Time**	**Mean Difference**	**P***	**P****
Pre	H-1	14.750	0.000	0.000	Pre	H-1	13.375	0.000	0.000
	H-7	17.939		0.000		H-7	18.875		0.000
	H-14	20.625		0.000		H-14	19.938		0.000

*Anova Repeated Measures Test (Test of within subject effects)
**Post Hoc Paired Wise Comparison

Based on the table above, it was found that there were differences in diastolic blood pressure before and after the intervention group with p value 0,000 (<0.05) and there were differences in systolic blood pressure before and after in the control group with p value 0,000 (<0.05). From the mean diastolic blood pressure decreased on the 14th day as much as 20.625 mmHg with a p value of 0.001 (<0.05), whereas in the control group it only dropped as much as 19.938 mmHg. Between the intervention and control groups the difference in systolic blood pressure reduction was 0.687 mmHg.

Table 3.6: Analysis difference in systolic blood pressure values between in the intervention group and control group

Variable	Mean±SD		P value
	Intervention	Control	
Systolic Blood Pressure			
Pre	151.87±7.437	154.06±10.036	0.487
Post 1	134.50±6.957	131.50±7.357	0.245
Post 7	127.06±8.713	127.68±7.040	0.825
Post 14	118.62±8.131	130.183±4.375	0.000

*Repeated Measure Anova

Based on the table above, shows the difference in systolic blood pressure obtained p value >0.05 ie at pre-post, day to day 1th and 7th day which means there is no difference in systolic blood pressure in the treatment and control groups. Whereas after the intervention on day 14th the p value of 0.000 <0.05 was obtained meaning that there was a difference in systolic blood pressure reduction between the intervention group and control group.

Table 3.7: Analysis differences in diastolic blood pressure values between in the intervention group and control group

Variable	Mean±SD		P value
	Intervention	Control	
Diastolic Blood Pressure			
Pre	101,31±6,690	101,37±6,053	0.978
Post 1	86,56±4,530	88,00±4,912	0.396
Post 7	83,37±3,739	82,50±3,651	0.508
Post 14	80,68±4,422	81,43±4,530	0.639

*Repeated Measure Anova

Based on the table above, shows the diastolic blood pressure difference obtained p value > 0.05 ie at pre-post, day 1th, day 7th and day 14th which means there is no difference in diastolic blood pressure in the intervention group and control group.

4. Discussion

4.1 Effect types of childbirth, pregnancy history, child birth history, and past puerperal maternal blood pressure

The F value indicates that the estimated regression model is feasible. The results of linear regression tests for systolic blood pressure between types of labor, pregnancy history, history of childbirth and past childbirth in the intervention group and the control group showed that the type of labor, pregnancy history, history of childbirth and past childbirth history did not significantly influence systolic blood pressure (p>0.05). The type of labor, pregnancy history, history of childbirth and the history of puerperium, which is past 10% affect systolic blood pressure, whereas 90% of systolic blood pressure is influenced by other factors.

Types of childbirth, pregnancy history, childbirth history, and past puerperal history 16% affect diastolic blood pressure, whereas 84% diastolic blood pressure is affected by other factors.

4.2 Effect Dayak onion powder (eleutherine Americana Merr) on systolic and diastolic blood pressure between in the intervention group and control group

Based on the results of data analysis, the value of systolic and diastolic blood pressure in the intervention group decreased from time to time before being treated or pre, and after being treated on day 1th, day 7th and day 14th. On systolic blood pressure there is a significant decrease on day 14, but not on maternal diastolic blood pressure. Meanwhile, the value of sisitolik and diastolic blood pressure in the control group given antihypertensive drugs obtained by 16 respondents who experienced postpartum hypertension all experienced a decrease in systolic and diastolic pressure. Antihypertensive medication is given for 14 days. Based on the results of data analysis of systolic and diastolic blood pressure values in the control group before being given antihypertensive drugs (pre) and after being given antihypertensive drugs on day 1, day 7 and day 14 there was a decrease in blood pressure over time although not significantly.

So it can be concluded that the administration of antihypertensive drugs and onion powder is more effective in reducing systolic blood pressure of postpartum hypertensive mothers compared to only antihypertensive drugs with p = 0.000. Comparison between the intervention group and the control group to find out which group experienced the greatest decrease in blood pressure by looking at each of the measurement results on day 1th, day 7th and day 14th. The results of the data analysis showed that the decline was greater in the intervention group compared to the control group.

Differences in systolic and diastolic blood pressure in the intervention group showed a greater decrease than the control group. It can be concluded that antihypertensive drugs and dayak onion powder (eleutherine americana merr.) Have a higher effect compared to pharmacological therapy in reducing systolic and diastolic blood pressure of postpartum hypertensive mothers.

Dayak onions contain naphthoquinone compounds and their derivatives such as elecanacine, eleutherine, eleutherol, eleuthernone. Naphthoquinone is also known as an antimicrobial, antifungal, antivirial, antiparastic. Compounds ofderivatives naphthalene also have bioactivity as anticancer and antioxidants.[17, 18] The mechanism of action of active compounds from dayak onions as hypotensive agents is found in flavonoid compounds, the content of flavonoids is associated as a protective effect on endothelial function and inhibits platelet aggregation so as to reduce blood pressure in hypertensive patients.

Based on (JNC 8) antihypertensive drugs are divided into several groups consisting of receptor blockers, β blockers, calcium channel blockers, ACE inhibitors and thiazide type diuretics. The administration of atyphy drugs aims to prevent complications in postpartum hypertensive mothers. Various complications that can be caused by hypertension are damage to blood vessels, brain hemorrhage, kidney abnormalities, kidney failure, heart problems, strokes, retinal injuries, eye disorders, and liver necrosis.

In a study conducted by Yuliandra, there was an effect of a decrease in systolic and diastolic blood pressure given Dayak onion extract in mice, phytochemical tests conducted by Yuliandra on Dayak onion extract detected the presence of flavanoids, alkaloids, triterpenoids and steroids. The content of flavonoids can reduce blood pressure in mice [10].

The results of blood pressure analysis obtained are supported by research conducted by Annas that there is a decrease in blood pressure in the administration of Dayak onion tubers 50 grams in the elderly, according to Insanu in his research saying that Dayak onions (eleutherine americana merr.) Contain naphthoquinone compounds and their derivatives such as elecanacine, eleutherine, eleutherol,

eleuthernone. The content of the amount of flavanoid on dayak onion powder conducted at LPPT UGM was 5985.99 µ / g.

After giving birth, the relative volume of maternal blood will increase. This situation will cause a burden on the heart. The body will reabsorb excessive amounts of fluid after labor. In some mothers, this will result in large amounts of urine output, especially on the first day due to increased diuresi. The mechanism of action of active compounds of dayak onion as a hypotensive agent are flavonoid compounds, the content of flavonoids is associated with a protective effect on endothelial function and inhibits platelet aggression, so it can reduce the risk of cardiovascular disease and coronary heart disease. Flavonoids have a hypotensive effect by a mechanism inhibiting the activity of ACE and as a diuretic [19, 20].

Other research also carried out by Gipson is the mechanism of nifedipine including the channel block Ca2 + type L, influenced by the K + channel activated by Ca2 +, a beta adrenergic receptor. Contractions of the uterus are regulated by increasing Ca2 + concentration. Ca2 + binds with calmodulin and activates MLCK, which results in phosphorylation of the serine myosin light chain and initiates cross bridge cycling. Nifedipine works by blockingchannel calcium voltage dependent on myometrial cells, can cause a decrease in the number of intracellular ions [21].

The antihypertensive drug nifedipine in postpartum mothers is recommended according to an oral dose of 10 or 20 mg supported by clinical evidence in adequately managing preterm labor.

5. Conclusion

Based on the results of research and discussion on the effect dayak onion powder (eleutherine americana merr) on systolic and diastolic blood pressure, it can be concluded that:

5.1 There was a decrease in systolic and diastolic blood pressure on the 14th day after being given antihypertensive drugs and dayak onions in different intervention groups. With a mean of 118.62, and a value of p = 0.000.

5.2 There was a decrease in systolic and diastolic blood pressure on day 14 after administration of different antihypertensive drugs in the control group. Mean and 130.18 p value = 0.000.

5.3 There was a decrease in systolic and diastolic blood pressure in the intervention group more effectively than the control group.

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