

Utilization of Celery Leaf Extract (*Apium Graveolens*) as Alternative for Recovery Blood Pressure of Postpartum Hypertension

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Utilization of celery leaf extract (*Apium Graveolens*) as alternative for recovery blood pressure of postpartum hypertension

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ABSTRACT

Background

Postpartum hypertension is a condition blood pressure $\geq 140 / 90$ mmHg with or not accompanied by proteinuria or edema in postpartum, occurring 5-10% of other cases postpartum pathology. Nifedipine which usually be used has side effects flatulence, constipation, nausea, cough, headache, can be transferred to breast milk and ineffective for patients with severe hypertension. Celery leaves contain potassium and flavonoid which can help lower blood pressure.

Aim

Prove that celery leaf extract as an alternative change blood pressure in postpartum hypertension.

Methods

Quasi experimental with pre and post test control group design through 16 treatment group and 16 control group for postpartum hypertension mothers. Blood pressure were measured everyday for 7 days. Data analysis using *paired t-test, independent t-test, wilcoxon, mann whitney*.

Results

Systolic blood pressure before and after treatment in intervention group 154 ± 11.6 and 129 ± 8.5 with $p=0.000$, the control group 153 ± 10.9 and 141 ± 9.3 with $p=0.000$. Diastolic blood pressure before and after treatment in the intervention group 99 ± 8.2 and 83 ± 5.7 with $p=0.000$, the control group 103 ± 6.1 and 93 ± 5.3 with $p=0.000$. The treatment group significant changes in systolic blood pressure (p-value 0.003) and diastolic blood pressure (p-value 0.049) compared with control group.

Conclusion

Celery leaf extract with dose 213 mg everyday for 7 days effectively reduced blood pressure of postpartum mothers with hypertension.

Keywords: Celery Leaf Extract, Blood Pressure, Postpartum Women, Hypertension.

INTRODUCTION

Postpartum hypertension is an increase in blood pressure $\geq 140 / 90$ mmHg with or not accompanied by proteinuria or edema in postpartum.[1] According to WHO, the maternal mortality rate is 216 per 100,000 live births in 2015 and 18% are caused by hypertension. [2] Puspita's research on 2012, explain that the causes of postpartum maternal mortality are preeclampsia/eclampsia and labor complication, mothers with preeclampsia / eclampsia 37.27 times greater risk of maternal death during puerperal than mothers who have not preeclampsia / eclampsia. [3]

Giving pharmacological drugs that often be used by health workers is nifedipine 10 mg. However nifedipine has side effects including flatulence, constipation, nausea, cough and headache. [4, 5] Futhermore, nifedipine has a concentration in breast milk. Nifedipine doses of 90 mg everyday can be transferred to breast milk by 10ng / ml, although nifedipine has data that supports its safety for use in pregnancy and lactation. [6, 7] Nifedipine be used in mild to moderate hypertension, whereas drug administration in patients with severe hypertension is not effective. [8]

Considering this problem, there is a need complementary therapy for nifedipine which can help lower blood pressure by using celery leaf extract. Celery leaves (*Apium graveolens*) are native Indonesian spices that has not side effects for the human body, very easy to obtain and the price is also affordable for all people. empirically this plant be believed by the community for traditional medicine that has anti-hypertensive effects, mild diuretics and antiseptics in the urinary tract and antirheumatism. [9] Celery leaf contain flavonoid 24,71mg/100 gram which useful as antihypertensive

and antioxidants. [10] Celery is agent hypotensive that function to prevent narrowing of blood vessels and high blood pressure. [11] Celery leaves also contain potassium 260 mg / 100gram which works with 3 roles, they are as diuresis, inhibits the kidneys to secrete renin so that angiotensin II is not formed and as vasodilation. This herb also contains magnesium and vitamin C which play a role in preventing cholesterolemia and amino acid arginine which can help lower blood pressure. [12]

Based on this background, the researchers were interested in conducting a study entitled "utilization of celery leaf extract (*apium graveolens*) as alternative for recovery blood pressure of postpartum hypertension"

MATERIALS AND METHODS

This research used quasi experimental with pre and post test control group design. The population is postpartum women with hypertension who treated in Bhakti Wira Tamtama Hospital Semarang and Ungaran Hospital Semarang. The sample consist of 32 respondents, 16 treatment group and 16 control group for postpartum hypertension mothers. Each group was given the intervention for 7 days. The intervention group was given celery leaf extract (a daily dose of 213mg) plus nifedipine (a daily dose of 10 mg), while the control group was only given nifedipine with a daily dose of 10 mg. Blood pressure were measured everyday from pretest until posttest. Data analysis using paired t-test, independent t-test, wilcoxon, mann whitney. This study identified the effect of giving celery leaf extract to changes in blood pressure in postpartum mothers with hypertension.

RESULTS

Univariate Analysis

Table 1. Distribution of Characteristics of Respondents by Age, Education, Profession, Parity, Type of Labor, History Hypertension in Pregnancy and Family History

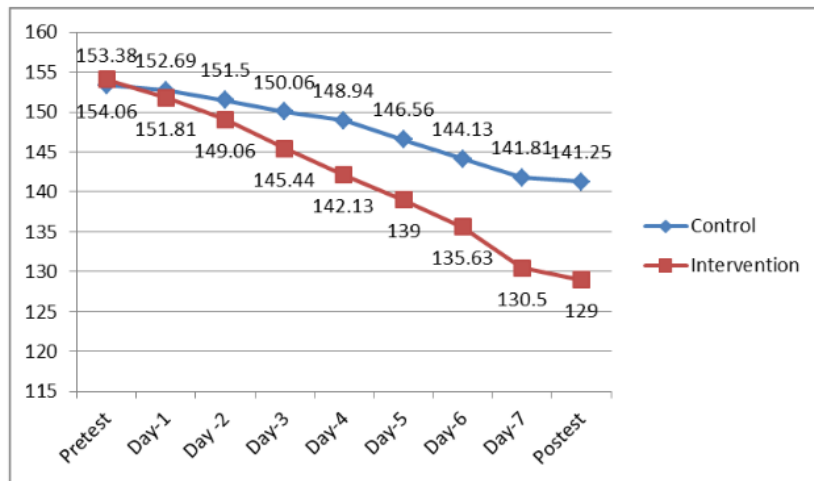
Characteristics	Intervention Group (n=16)		Control Group (n=16)		*p
	N	%	N	%	
Age					1,000
21-35	9	56,3	9	56,3	
>35	7	43,8	7	43,8	

Education					0,334
Primary School	3	18,8	4	25,0	
Junior High School	3	18,8	1	6,3	
Senior High School	9	56,3	7	43,8	
College	1	6,3	4	25,0	
Profession					0,309
Housewife	8	50,0	8	50,0	
Private employees	7	43,8	8	50,0	
Entrepreneur	1	6,3	-	-	
Parity					1,000
Primipara	3	18,8	3	18,8	
Multipara	13	81,3	13	81,3	
Type of Labor					0,510
Normal Birth	6	37,5	7	43,8	
SC	10	62,5	9	56,3	
History in Pregnancy					0,237
There	14	87,5	15	93,8	
Nothing	2	12,5	1	6,3	
Family History					0,629
There	8	50,0	7	43,8	
Nothing	8	50,0	9	56,3	

* Homogeneity

Table 1 show frequency distribution of respondents. The age variable illustrates that the highest age at the age of 21-35 is 9 respondents (56,3%) each group. The education level variable shows that the highest education is senior high school of 9 respondents (56,3%) in intervention group and 7 respondents (43,8%) in control group. The profession level variable shows that the highest profession is housewife of 8 respondents (50%) each group. The parity level variable shows that the highest parity is multipara of 13 respondents (81,3%) each group. The type of labor level variable

shows that the highest type is SC of 10 respondents (62,5%) in intervention group and 9 respondents (56,3%) in control group. The pregnancy history variable shows that the highest respondents have history hypertention of pregnancy namely 14 respondents (87,5%) in intervention group and 15 respondents (93,8%) in control group. The family history level variable shows that the highest respondents haven't hypertension in their family namely 8 respondents (50%) in intervention group and 9 respondents (56,3%) in control group.



Figures 1: Changes in mean systolic blood pressure in the intervention and control groups

Figure 1 above shows that changes in the average systolic blood pressure on the first day to day 7 for the intervention group and the control group both experienced a decrease in the average value of blood pressure. It can be seen also

³ graphically that the decrease in blood pressure in the intervention group was more than the decrease in the average value of blood pressure in the control group.

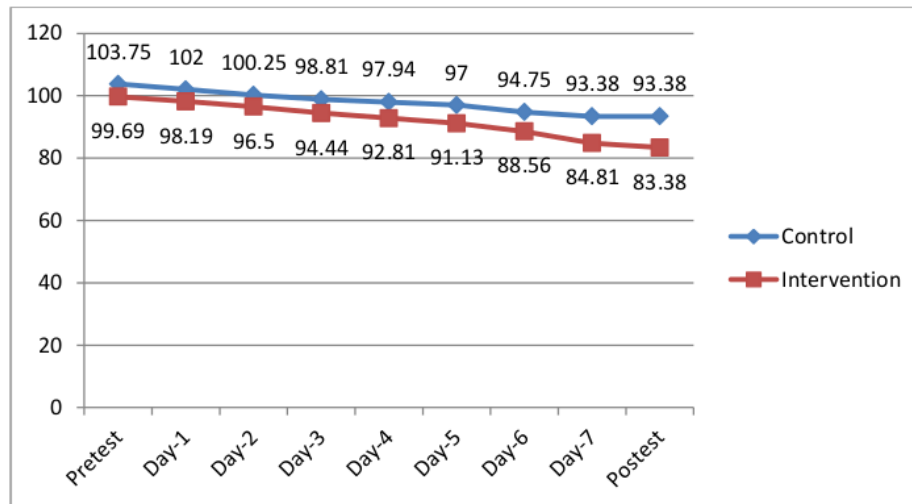


Figure 2 Changes in mean diastolic blood pressure in the intervention and control groups

Figure 2 above shows that the decrease in the average diastolic blood pressure on the first day to day 7 for the intervention group and the control

group both experienced a decrease in the average value of blood pressure.

Bivariate Analysis Systolic

Table 2. Differences in Systolic Blood Pressure Values Between The Intervention and Control Group

Variable	Groups	Mean±SD	p*
Pretest	Intervention	154,06±11,619	0,864
	Control	153,38±10,948	
Day-1	Intervention	151,81±11,280	0,821
	Control	152,69±10,333	
Day-2	Intervention	149,06±11,096	0,516
	Control	151,50±9,866	
Day -3	Intervention	145,44±10,099	0,177
	Control	150,06±8,782	
Day-4	Intervention	142,13±9,584	0,540
	Control	148,94±9,637	
Day-5	Intervention	139,00±9,026	0,022
	Control	146,56±8,648	
Day-6	Intervention	135,63±8,891	0,010
	Control	144,13±8,709	
Day-7	Intervention	130,50±9,209	0,001
	Control	141,81±9,028	
Posttest	Intervention	129,00±8,563	0,001
	Control	141,25±9,342	
Difference Posttest-Pretest	Intervention	-25,06±12,672	0,003
	Control	-12,12±9,273	

*independent t-test

² Based on the results of the Independent t-test in table 2 above, it shows ³ that the value of $p = 0.003 < 0.05$, which means that there is a significant difference of decrease between the systolic blood pressure in the intervention group and the control group. The measurement of systolic blood pressure from pretest to posttest between the intervention group and the control group showed a p-value < 0.05

starting at the ³h day measurement, meaning that on the 5th day there was a significant difference of decrease in systolic blood pressure between the intervention groups and control group. Likewise clinically, the results showed a decrease in systolic blood pressure in the intervention group began effective on day 5 because the systolic blood pressure was at a value of $< 140\text{mmHg}$.

Bivariate Analysis Diastolic

Table 3. Differences In Diastolic Blood Pressure Values Between The Intervention and Control Group

Variable	Groups	Mean±SD	p*
Pretest	Intervention	99,69±8,228	0,061
	Control	103,75±6,191	
Day-1	Intervention	98,19±7,635	0,082
	Control	102,00±5,831	
Day-2	Intervention	96,50±6,947	0,108
	Control	100,25±5,939	
Day -3	Intervention	94,44±6,088	0,049
	Control	98,81±4,806	

Day-4	Intervention	92,94±5,698	0,016
	Control	97,94±5,092	
Day-5	Intervention	91,13±5,464	0,005
	Control	97,00±5,367	
Day-6	Intervention	88,56±5,887	0,003
	Control	94,75±4,344	
Day-7	Intervention	84,81±6,058	0,000
	Control	93,38±4,870	
Postest	Intervention	83,38±5,726	0,000
	Control	93,38±5,353	
Difference Postest-Pretest	Intervention	-16,31±6,650	0,049
	Control	-10,37±6,907	

* *Mann Whitney*

Mann-Whitney analysis in table 3 above shows that the p-value = 0.049 <0.05, which means there is a significant difference between changes in diastolic blood pressure in the intervention group and the control group. The results showed that diastolic measurements from pretest to posttest began to have a p-value <0.05 in the measurement of the third day (p-value = 0.049 <0.05), meaning that there was a significant difference of decrease in diastolic blood pressure between the intervention group and the control group was on day 3, but clinically the diastolic blood pressure in the intervention group was effective on day 6 because blood pressure was starting at <90mmHg.

DISCUSSION

The process of postpartum hypertension is decreased blood flow and uterine perfusion, stimulating excessive renin release will flow with blood to the liver. Renin reacts with angiotensinogen to convert it to angiotensin I. Angiotensin I transforms into angiotensin II in the lungs with thromboxane causing vasospasms to develop, the anterior lumen narrows and increases arterial pressure. Angiotensin II also stimulates the adrenal cortex to secrete nitric oxide causing sodium retention, increasing blood volume and pressure. [13, 14]

Celery leaves have a flavonoid content of 24.71 mg / 100 grams which is useful as an antihypertensive and antioxidant. [10] Celery is a hypotensive agent by flavonoids which serves to prevent narrowing of blood vessels and high blood pressure. 21 Celery leaves also contain potassium 260 mg / 100grams that work with 3 roles, namely

as diuresis, inhibits the kidney from secreting renin so that angiotensin II does not form and as vasodilation. This herb also contains magnesium and vitamin C which play a role in preventing cholesterolemia and amino acid arginine which can help lower blood pressure. [12]

The results of blood pressure analysis obtained were supported by research conducted by Sri Sakinah in 2018 that there were differences in mean values of systolic and diastolic blood pressure before and after intervention in respondents given celery leaf decoction with systolic mean before intervention of 148.68 mmHg and after intervention to 139.33mmHg. This also happened to diastolic blood pressure with a mean before intervention 95.33 mmHg to 90.33 mmHg after intervention. The results of paired t-test analysis showed that the p-value = 0.00 <0.05 in systolic and diastolic pressures meant that there were significant differences in the values of systolic and diastolic blood pressure before and after the intervention of celery leaves decoction.[15]

CONCLUSIONS

The administration of celery leaves (*Apium graveolens*) with a dose of 213 mg and antihypertensive drugs nifedipine 10 mg everyday for 7 days had an effective effect in reducing postpartum maternal systolic and diastolic blood pressure with hypertension. The effect of giving celery leaf extract and nifedipine antihypertensive drugs has a potentiating effect which means that some drugs are given together with different actions, but have a greater effect on the patient if both are given together.

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