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Giving cucumber (cucumis sativus l) and green grass jelly (cyclea barbata myers) to blood pressure of pregnant women with hypertension

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ABSTRACT

Background

Hypertension is a disease that often occurs during pregnancy. The cause of hypertension or preeclampsia in patofisologis unclear. Many factors influence the occurrence of hypertension, one of which is oxidative stress and diet. Oxidative stress is caused by an imbalance prooxidant and antioxidant. So it takes an antioxidant that can reduce oxidative stress in pregnant women with hypertension. Potassium contained in the cucumber has a working system affect the renin angiotensinogen to angiotensin I to angiotensin II later changed because of a block in the system of blood vessels occurs vasodilation resulting in decreased blood pressure ..

Aim

Proving the provision of cucumber and green grass jelly effect on blood pressure in pregnant women with hypertension.

Method

Quasy experiment with pretest and posttest control design. Samples were 45 divided into 3 groups. The first group with the intervention of cucumber 400 grams, the second group with green grass jelly intervention as much as 150 grams and the third group a combination of cucumber and green grass jelly 550 gr, given the intervention for 14 days.

Results

Differences in mean systolic before and after the intervention of cucumbers 9.04 mmHg, 9.3 mmHg green grass jelly, and a combination of cucumber and green grass jelly 10.7 mmHg. Diastolic mean difference before and after the intervention of 6.9 mmHg cucumber, green grass jelly 4.37 mmHg, and a combination of cucumber and green grass jelly 8.6 mmHg. There are significant differences in each group interventions for blood pressure pre and post-systolic with p-value <0.05 and diastolic with p-value <0.05.

Conclusion

Giving the most effective intervention and a significant decrease in blood pressure in pregnant women with mild hypertension is a combination of cucumber and green grass jelly.

Keywords: Blood pressure, Maternal hypertension

PRELIMINARY

Hypertension is a disease that often occurs during pregnancy.(Sarker Shamima Ahmed, Nazma Sultana Begum Most Luthy, Lobaba Sultana Lima and Hosen 2017) Women will experience pregnancy, resulting in pregnancy are prone to hypertension chronic, gestational hypertension, and preeclampsia / eclampsia.(Kattah and Garovic 2014) This will impact the morbidity and mortality for mothers and their babies around the world.(Paarul Prinja Catherine Nelson-Piercy 2018) According to data from the Directorate of Health, Ministry of Health of the Republic of Indonesia (MoH RI), hypertension and pre-eclampsia / eclampsia is still one of the highest causes of maternal death in Indonesia with a percentage of 27.1%. (Indonesia 2018) The cause of hypertension or preeclampsia in patofisologis unclear. Many factors influence the occurrence of hypertension. (El-Sayed 2017) [1-5]

The placenta is believed to play a role as mediator in the center of each hypertension.(Sohlberg et al. 2014) The placenta also plays a role in the development of hypertension in which there is an interruption in the placenta, the invasion of the bad, and abnormal angiogenesis which is the main pathological manifestations.(Yoshida et al. 2018) These events are the result of oxidative stress were found in the placenta hypertension Oxidative stress plays an important role in the pathogenesis of hypertension in pregnancy and can be a path that can lead to tissue damage.(Dsouza et al. 2016) Oxidative stress may stimulate the release of cytokines, antiangiogenic, microparticles and other important molecules in hypertension.(Schoots et al. 2018)Oxidative stress is caused by an imbalance prooxidant and antioxidant. So dibutuh antioxidants that can reduce oxidative stress in pregnant women with hypertension.(Gathiram and Moodley 2016)Green grass jelly contains alkaloids and flavonoids. Where flavonoids can act as an antioxidant and anti-inflammatory.(Santi, the Son, and Wahyuni 2017) [6-10]

Flavonoids are antioxidants that play an active role for anti-hepatotoxic, anti-HIV-1, anti-tumor, anti-inflammatory and can provide maximal vasodilation in blood vessels that help protect the heart. Flavonoids can reduce arterial stiffness makes Reactive Oxygen Species (ROS) decreased thus decreasing fat peroxide, followed by decreasing oxidative stress, the endothelial function is increased and occurs vasodilation.(Sundar Fitriana, Amalia Leily 2014) [11-15]

Potassium contained in the cucumber has a working system affect the renin angiotensinogen to angiotensin I to angiotensin II later changed because of a block in the system of blood vessels occurs resulting in vasodilatation of blood pressure is lowered.(Ismalia et al. 2016)

Alternatives used in lowering hypertension in pregnant women one of which is the provision of cucumber (Cucumis sativus) and green grass jelly (cylea barbata Miers). (Trejo-Moreno et al. 2018) Cucumber contains potassium and magnesium at 149 mg and 13 mg.(Agatemor, Fred, and Nwodo 2015) Levels of antioxidant flavonoids in green grass jelly is 1867 ug / ml.(Rizki, Jayanti, and Widyaningsih 2015) Potassium and antioxidants such as flavonoids, polyphenols, vitamin C, vitamin A and lutein, which will help to reduce blood pressure and lower (normalize) the heartbeat.(Rani et al. 2014) [16-20]

METHOD

This study uses quasy experiment with pretest and posttest control design. In this group used three intervention groups the first group of pregnant women with hypertension were given a cucumber with a dose of 400 grams for 14 days, the second group of pregnant women with hypertension were given grass jelly green with a dose of 150 grams for 14 days, and a group of three, namely pregnant women with hypertension were given a combination of cucumber and green grass jelly with a dose of 550 grams for 14 days. From this design look average effect of an intervention on the dependent variable by looking at the average reduction in blood pressure in each group were given inervensi cucumber, green grass jelly and a combination of cucumber and green grass jelly. [21-25]

The population in this research were 260 pregnant women who were taken from three health centers, which consisted of 110 pregnant women in the Puskesmas Borobudur, 95 Mungkid pregnant women at health centers, and 55 pregnant women at health centers Muntilan I. The sampling technique in this research is purposive sampling where to take samples based on specified criteria. This study was

taken based on inclusion and exclusion criteria. [26-30]

RESULT

This study has been listed in Health Research Ethics Committee, Faculty of Medicine UnSoed with Ethica number Approval Ref: 1643 / KEPK / IV / 2019. The research was conducted on April 10 to May 21, 2019 at 3 Puskesmas namely Borobudur health center, health center and health centers Muntilan I Mungkid.

Data collection was conducted by researchers assisted with 5 enumerator that midwives. Total population in 3 health centers which 260 pregnant women, who comprised 110 pregnant women at health centers Borobudur, 95 pregnant women in Mungkid health centers, and 55 pregnant women at health centers I. Muntilan required number of respondents in this study is 45 people, of which 20 obtained Borobudur from health centers, 15 in Puskemas Mungkid, and 10 obtained in Puskesmas Muntilan I. Data collection begins with determining the subject of research based on inclusion criteria obtained 45 pregnant women who met inclusion criteria and provided informed consent.

Table 3.1 characteristics of the respondents

Characteristics	**Intervention**						**Homogeneous test p-value**
	cucumber		green grass jelly		Combination		
Work	N	%	N	%	N	%	0.087
IRT	9	60	7	46.7	10	66.7	
employee	4	27.7	3	20	3	20	
PNS	1	6.7	1	6.7	2	13.3	
labor	-	-	4	26.7	-	-	
farmer	1	6.7	-	-	-	-	
The stress level							0.185
Normal	12	80	12	80	13	86.7	
Light	-	-	2	13.3	1	6.7	
moderate	3	20	1	6.7	1	6.7	
Weight	-	-	-	-	-	-	
Very heavy	-	-	-	-	-	-	
Activity							.202
Light	8	53.3	8	53.3	9	60	
moderate	4	26.7	2	13.3	4	26.7	
Weight	3	20	5	33.3	2	13.3	

Based on Table 3.1 characteristics of respondents based on employment, stress and activity levels have homogeneity test p-value> 0.05, which means that the characteristics of respondents worth homogeneous or similar nature

Table 3.2 systolic and diastolic blood pressure by intervening cucumber

Cucumber group systolic	**mean**	**value min**	**max value**	**SD**
Day 1	140.4	134	144	2,640
Day 2	138.53	130	144	2.875
Day 3	138.67	130	144	2.895
Day 4	138.4	128	144	3.312
Day 5	138.13	126	144	3.739
Day 6	138.13	126	144	3.739
Day 7	138.13	126	144	3,739

Day 8	137.73	130	140	2,712
Day 9	137.6	130	140	2,849
Day 10	134.67	130	138	2.992
Day 11	133.53	128	139	3.907
Day 12	131.33	126	138	3,177
Day 13	129.73	124	138	3,105
Day 14	130	122	134	3,024
The average difference	**10.4**			
diastolic				
Day 1	90.8	88	94	1,821
Day 2	89.73	86	94	1,981
Day 3	89.87	86	94	2,066
Day 4	89.73	86	94	1,981
Day 5	89.73	86	94	1,981
Day 6	89.73	86	94	1,981
Day 7	89.73	86	94	1,981
Day 8	88.4	80	92	3.043
Day 9	89.07	86	94	2,374
Day 10	89.07	86	90	1,486
Day 11	88.8	86	92	1,821
Day 12	88.67	86	90	1.633
Day 13	87.73	84	90	2,120
Day 14	85.6	80	88	1,882
The average difference	**5.2**			

From table 3.2 above explains that of all the measurements of systolic and diastolic blood pressure in the intervention group showed a decrease cucumbers. For the average differences in systolic blood pressure decreased by 10.4 mmHg and for diastolic decreased by 5.2 mmHg.

Table 3.3 systolic and diastolic blood pressure by green grass jelly intervention

Cucumber group	mean	value min	max value	SD
systolic				
Day 1	140.67	134	144	2.582
Day 2	140.67	134	144	2.582
Day 3	139.87	132	144	2,560
Day 4	139.07	134	144	2,251
Day 5	139.07	134	144	2,251
Day 6	139.07	134	144	2,251
Day 7	138.8	132	144	3.448
Day 8	138.73	130	144	3.788
Day 9	137.93	130	142	3.595
Day 10	133.73	130	140	3,990
Day 11	132.67	130	140	3,177
Day 12	132.67	130	140	3,177
Day 13	131.33	124	138	3,177
Day 14	129.47	122	134	3,519
The average difference	**11.2**			
diastolic				
Day 1				
Day 2	91.2	90	94	1.656

Day 3	90.53	88	94	1,767
Day 4	90.53	88	94	1,767
Day 5	90.13	88	94	1,598
Day 6	90.13	84	94	2,446
Day 7	90	86	94	1,852
Day 8	90.53	88	94	1,767
Day 9	90.27	88	94	1,831
Day 10	90.27	88	94	1,668
Day 11	90.27	88	94	1,668
Day 12	90	88	94	1.512
Day 13	89.87	88	94	1,598
Day 14	89.6	86	92	1,549
The average difference	88.93	84	92	1,981
	2,27			

From table 3.3 above explains that of all the measurements of systolic and diastolic blood pressure in the intervention group showed a decrease of green grass jelly. For the average differences in systolic blood pressure decreased by 11.2 mmHg and for diastolic decreased by 2.27 mm Hg.

Table 3.4 systolic and diastolic blood pressure by intervening combination

Cucumber group	**mean**	**value min**	**max value**	**SD**
systolic				
Day 1	140.13	138	142	1,187
Day 2	138	130	140	3,464
Day 3	138	130	140	4.033
Day 4	137.87	128	142	4.033
Day 5	137.83	128	142	3.595
Day 6	137.93	130	142	3,266
Day 7	137.93	130	140	3,266
Day 8	135.47	130	138	2,774
Day 9	134	130	138	3,207
Day 10	132.27	128	138	3.195
Day 11	129.73	126	134	2,120
Day 12	129.2	126	134	2,366
Day 13	127.6	124	134	3.312
Day 14	122.93	120	128	2,712
The average difference	**17.07**			
diastolic				
Day 1				
Day 2	90.67	90	94	1,447
Day 3	90.4	90	94	1,121
Day 4	90.27	88	94	1,280
Day 5	89.87	88	92	0.915
Day 6	90	88	94	1.309
Day 7	89.33	86	90	1,234
Day 8	89.07	84	94	2,374
Day 9	88.53	82	94	2.973
Day 10	88	82	94	3.546
Day 11	87.73	80	94	3,990

Day 12	86.4	78	92	5,138
Day 13	85.6	78	92	4,733
Day 14	85.6	80	88	1,882
The average difference	80.4	70	90	5.193
	10.27			

From table 3.4 above explains that of all the measurements of systolic and diastolic blood pressure in group intervention combined with cucumber and green grass jelly showed a decrease. For the average differences in systolic blood pressure decreased by 17.2 mmHg and for diastolic decreased by 10.27 mmHg.

Table 3.5 Differences in mean systolic blood pressure values every day in each intervention group

systolic	**cucumber group**			**Group of green grass jelly**			**Cucumber groups and grass jelly**		
	mean difference	***P** **	***P***	**mean difference**	***P** **	***P***	**mean difference**	***P** **	***P***
Day 1	11.47	0,00	1,000	11.47	0,00	1,000	12.00	0,00	1,000
Day 2	9.87		.090	11.47		1,000	10.70		0.068
Day 3	10,13		0.087	11.07		0.063	10.70		0.068
Day 4	9.57		0.065	8.83		0.055	10.33		0.065
Day 5	9.07		0.057	8.83		0.055	10.33		0.065
Day 6	9.07		0.057	8.83		0.055	10.17		0,032
Day 7	9.07		0.057	8,77		0,071	9.70		0,011
Day 8	9.53		0,049	8.67		0.083	7.70		0,001
Day 9	9.47		0,042	7.73		0,036	6.73		0,001
Day 10	5.43		0,002	4.87		0,001	5.80		0,001
Day 11	4.63		0,002	4.53		0,001	3.97		0,001
Day 12	2.70		0,001	4.53		0,001	3.27		0,001
Day 13	2.57		0,001	3.23		0,001	2.30		0,001
Day 14	2.43		0,001	2.17		0,001	1.30		0,001
Δ	9.04			9.3			10.7		

Δ = The difference from the mean pre-post differences between each intervention group

P * = Test Friedman

P ** = Post Hoc Test Wilcoxon

Table 3.6 The difference in the value of systolic and diastolic blood pressure before and after the intervention in each group

Group	**Before and after the systolic blood pressure (p-value)**	**Before and after the diastolic blood pressure (p-value)**
Mentiimun	0,001	0,001
green grass jelly	0,001	0.007
Cucumber and green grass jelly	0,001	0,001

In table 3.6 above using the Wilcoxon test to determine differences in the average value of systolic and diastolic blood pressure in each group. The results showed that p-value <0.05, then there is a difference between before and after the respective groups both systolic and diastolic pressures were no significant changes.

Table 3.7 The difference in the value of systolic and diastolic blood pressure between pretest and posttest intervention group

Group	systolic				diastolic			
	mean pretest	P *	mean posttest	P *	mean pretest	P *	mean posttest	P *
cucumber	23.37	0,862	30.30	0,000	22.03	0.537	21.80	0,000
green grass jelly	22.33		28.93		25,50		34.97	
Cucumber and green grass jelly	22.39		9.77		21.47		12.23	

From table 3.7 above the known value of Sig> 0.05 at pretest to all intervention groups both systolic and diastolic blood pressure means there is no real influence among interventions for pretest done before the administration of any intervention. At posttest value Sig <0.05 for all intervention groups both systolic and diastolic blood pressure means there is a real effect between interventions.

DISCUSSION

Changes in Systolic and Diastolic Blood Pressure Pregnant Women with Mild Hypertension Intervention Provided Cucumber

Systolic blood pressure showed a decrease from the first day mean value of 140.40 mmHg intervention into the category of mild hypertension, experienced a mean decrease in systolic blood pressure each day until the last day of the intervention the mean value of 130 mmHg. In line with diastolic blood pressure also showed a decrease from the first day mean value of 90.80 mmHg interventions included in mild hypertension, experienced a mean decrease in diastolic blood pressure each day until the last day of the intervention the mean value of 85.60 mmHg were categorized as normal.

The results of the analysis of the difference of systolic and diastolic blood pressure before and after the intervention in the intervention group cucumber using non-parametric test friedman for systolic blood pressure with a p-value 0.000 <0.05. As for diastolic blood pressure with a p-value 0.000 <0.05. Based on these data revealed that no significant difference value of systolic and diastolic blood pressure before and after the intervention in the intervention group cucumber with a mean decrease of 9.04 mmHg in systolic and diastolic by 6.9 mmHg. In further tests are post hoc Wilcoxon value <0.05 on day 8 to drop in systolic blood pressure, while there is a decrease in diastolic blood pressure values <0.05 at day 8.

The results of the data analysis for each intervention group using the Wilcoxon test was no difference in systolic blood pressure values and cucumber diastolik.Pada intervention group that is to pretest and posttest systolic value of 0.001 <0.05. As for the pretest and posttest diastolic value of 0.001 <0.05. Both showed no differences between the mean before and after the intervention both systolic and diastolic blood pressure.

Hypertension in pregnancy is a situation where an increase in systolic blood pressure of> 140 mmHg and diastolic> 30 mmHg which took place at the time of pregnancy or gestation> 20 weeks. From a normative blood pressure will rise at 30 mmHg systolic and diastolic blood pressure by 15 mmHg above normal blood pressure.(Brown et al. 2018)Cucumber inside the functions contained potassium lowers blood pressure by reducing sodium in the urine and water by means of a diuretic. Potassium inhibits renin release thereby increasing the excretion of sodium and water. Renin operates in the blood in a way to catalyze the decomposition of angiotensin be angiotensinI. AngiotensinI change shape ie angiotensin II with the help of Angiotensin Converting Enzyme (ACE). Retention of sodium and water to be lower in the presence of potassium, making the decrease in plasma volume, cardiac output, peripheral pressure and blood pressure.(Widiasari 2018)·(Maya 2013)

The results of the analysis of blood pressure obtained is supported by research conducted by Aisyiyah and Enny Probosari 2014 that there are differences between the mean blood pressure values sisitolik and diastolic before and after the intervention of respondents who awarded cucumber

juice with a mean systolic before the intervention amounted to 161 mmHg and decreased by 16 mmHg so that after the intervention to 145. It is equally the case in diastolic blood pressure by a mean 92.67 mm Hg before the intervention had decreased by 6.67 mm Hg to 86 mm Hg to become. The results of the analysis Paired t-test systolic values obtained for p-value 0.000 <0.05 and diastolic blood pressure 0.002 p-value <0.05 means there is a significant difference value of systolic and diastolic blood pressure before and after the intervention of cucumber juice.(Aisyiyah 2014)

Changes in Systolic and Diastolic Blood Pressure Pregnant Women with Mild Hypertension Intervention Given Green Cincau

Systolic blood pressure showed a decrease from the first day mean value of 140.47 mmHg intervention into the category of mild hypertension, experienced a mean decrease in systolic blood pressure each day until the last day mean value of 129.47 mmHg interventions that fall into the normal category. In line with diastolic blood pressure also showed a decrease from the first day mean value of 91.20 mmHg interventions included in mild hypertension, experienced a mean decrease in diastolic blood pressure each day until the last day of the intervention the mean value of 88.93 mmHg were categorized as normal.

The results of the analysis of the difference of systolic and diastolic blood pressure before and after the intervention in the intervention group green grass jelly using non-parametric test friedman for systolic blood pressure with a p-value 0.000 <0.05. As for diastolic blood pressure with a p-value 0.000 <0.05. Based on these data revealed that no significant difference value of systolic and diastolic blood pressure before and after the intervention in the intervention group green grass jelly with a mean decrease of 9.3 mm Hg systolic and 4.37 mmHg diastolic.

The results of the data analysis for each intervention group using the Wilcoxon test was no difference in the value of systolic and diastolic blood pressure. In the intervention group, namely green grass jelly for pretest and posttest systolic value of 0.001 <0.05. As for the pretest and posttest diastolic value of 0.007 <0.05. Both showed no differences between the mean on green grass jelly group before and after intervention both systolic and diastolic blood pressure.

The main chemical constituents in leaves of green grass jelly is a protein, fat, fiber, carbohydrates, chlorophyll.(Santoso 2017) Meanwhile, the active compounds contained are saponins, polyphenols, glycosides, flavonoids, triternoid, vitamin A and vitamin B.(Kusmardiyani, Insanu, and Asyhar 2014) Flavonoids are antioxidants that has the potential to prevent the formation of free radicals.(Widiasari 2018)Free radicals are naturally in the body of pregnant women with hypertension. The emergence of free radicals in the body's defense mechanisms offset by an endogenous system that produces substances that effect as anti-free radicals are called antioxidants. Mechanism of action of flavonoids antioksdian on the establishment of a defense mechanism Reactive oxygen species (ROS), both inhibition of enzymes or binding trace element associated with the formation of free radicals, detect Reactive Oxygen Species (ROS) as well as increase the antioxidant defenses of regulation or protection. However, at the level of Reactive Oxygen Species (ROS) increased in the body exceeds the antioxidant defense system naturally produced in the body, it will happen oxidative stress. Oxidative stress cause increased fat peroxide then occurs lipid peroxidation.(Bhale and Mahat 2013)

In this study, according to the results of Sundari Fitriany et all in 2014. They conduct research to be divided into five groups: one control group and four treatment groups. Formula A diintervensikan to P1 (frequency of consumption of each day) and P2 (frequency of consumption of two days). Formula B diintervensikan as Formula A to the group P3 and P4. The results showed that the P1 significantly decreased systolic blood pressure by an average decrease of 20-25 mm Hg (p <0.05). P1 and P3 group proved significantly decreased diastolic blood pressure by an average decrease of 14-15 mm Hg after two weeks of treatment (p <0.05).(Sundar Fitriana, Amalia Leily 2014)

Changes in Systolic and Diastolic Blood Pressure Pregnant Women with Mild Hypertension Intervention Provided combination Cincau Cucumber and Green

Systolic blood pressure showed a decrease from the first day mean value of 140.13 mmHg intervention into the category of mild hypertension, experienced a mean decrease in systolic blood pressure each day until the last day mean value of

122.92 mmHg interventions that fall into the normal category. In line with diastolic blood pressure also showed a decrease from the first day mean value of 90.67 mmHg interventions included in mild hypertension, experienced a mean decrease in diastolic blood pressure each day until the last day of the intervention the mean value of 80.40 mmHg were categorized as normal.

The results of the analysis of the difference of systolic and diastolic blood pressure before and after the intervention in the intervention group a combination of cucumber and green grass jelly using non-parametric test friedman for systolic blood pressure with a p-value 0.000 <0.05. As for diastolic blood pressure with a p-value 0.000 <0.05. Based on these data revealed that no significant difference value of systolic and diastolic blood pressure before and after the intervention in the intervention group a combination of cucumber and green grass jelly with a mean reduction of 10.3 mm Hg systolic and diastolic by 8.6 mmHg. In further tests are post hoc Wilcoxon value <0.05 on day 6 for a decrease in systolic blood pressure, while there is a decrease in diastolic blood pressure values <0.05 on day 6.

The results of the data analysis for each intervention group using the Wilcoxon test was no difference in the value of systolic and diastolic blood pressure. In the intervention group a combination of cucumber and green grass jelly is to pretest and posttest systolic value of 0.001 <0.05. As for the pretest and posttest diastolic value of 0.001 <0.05. Both showed no differences between the mean in the group a combination of cucumber and green grass jelly before and after the intervention both systolic and diastolic blood pressure.

Decreased blood pressure in group intervention combined with cucumber and green grass jelly is due to the synergy of content of potassium found in cucumbers as well as the active compounds of flavonoids from green grass jelly are consumed every day during the intervening time given.(Sundar Fitriana, Amalia Leily 2014)Mechanical action of flavonoids as antioxidants can be directly or indirectly. Flavonoids as antioxidants indirectly by increasing the excretion of endogenous antioxidant genes through several mechanisms. Flavonoids may act as an antioxidant by capturing free radicals, so it is very important in maintaining the balance between oxidants with antioxidants in the body.(Martin Lajous, Emilie Rossignol, Guy Fagherazzi, Florence Perquier, Augustin Scalbert, Françoise Clavel-Chapelon 2016)

Flavonoids are able to improve placental vascular endothelial function, can reduce the sensitivity of Low Density Lipoprotein (LDL) against the effects of free radicals and can be hypolipidemic, anti-inflammatory as well as antioxidant.(Behradmanesh and Nasri 2012)Placental endothelial damage due to the presence of free radicals is a source of high blood pressure during pregnancy. so it takes antioxidants one source of antioxidants are flavonoids contained in green grass jelly and cucumbers.

Cucumber inside the functions contained potassium lowers blood pressure by reducing sodium in the urine and water by means of a diuretic. Potassium inhibits renin release thereby increasing the excretion of sodium and water. Renin operates in the blood in a way to catalyze the decomposition of angiotensin be angiotensinI. AngiotensinI change shape ie angiotensin II with the help of Angiotensin Converting Enzyme (ACE). Retention of sodium and water to be lower in the presence of potassium, making the decrease in plasma volume, cardiac output, peripheral pressure and blood pressure.(Widiasari 2018)·(Maya 2013)

These findings are consistent with studies conducted Arjawa I Made Adi Yuda et al in 2018 that there was an average reduction in blood pressure is 17 mmHg respondents after 7 days of administration of the intervention. While in general the average decrease in diastolic blood pressure was 5 mmHg respondents after 7 days of administration of a given intervention in the respondents mix cucumber juice, melon and watermelon.(Arjawa I Made Adi Yuda, Ansharullah 2018)

Difference Analysis Values Systolic and Diastolic Blood Pressure Intervention Interagency Group

Analysis of the difference of systolic and diastolic blood pressure between the intervention group from 4:12 table known value of Sig> 0.05 in pretest between treatment groups both systolic and diastolic blood pressure means there is no real influence among interventions for pretest done before the administration of any intervention. At posttest value Sig <0.05 among the treatment

groups both systolic and diastolic blood pressure means there is a real effect between interventions.

The results of the above study stated that all interventions of three intervention groups are all significant. But the average decrease in blood pressure in both pretest and posttest systolic and diastolic show a combination of cucumber and green grass jelly menagalami decline the most. In this study, the combination of the provision of cucumber and green grass jelly acts as potentiation simultaneously when given together than given separately.

The cause of hypertension in pregnancy is not known with certainty. In the green grass jelly contains flavonoids that are useful as antihypertensive and antioxidant. Placental ischemia and hypoxia will produce oxidants (free radicals). Oxidants or free radicals are compounds that have a molecular receiver unpaired electrons. One important oxidants produced by placental ischemia is highly toxic hydroxyl radicals, particularly against vascular endothelial cell membranes. Oxidant production in humans is a very natural process, because oxidants are necessary for the body immunology.(Cindrova-Davies, 2009)Oxidative stress is considered to have an important role in endothelial dysfunction one to disturb the balance between thromboxane and prostacyclin through increased lipid peroxidation and antioxidant protection deterioration. Okaidatif Stress can stimulate the release of cytokines, anti-angiogenic, microparticles and other important molecules in hypertension. Anti-angiogenic vascular role in the early development of the placenta.(Chen et al. 2013)Previous research suggests that oxidative stress induces a concentration of sFlt-1. Increase slft-1 causes placental growth factor (PIGF) and vascular endothelial growth (VEG).

The role of intake of foods containing potassium, calcium and magnesium affect the blood pressure reduction. In the cucumbers are potassium, calcium and magnesium. Potassium intake affect blood vessels which is potassium will reduce peripheral vascular resistance that can directly dilate the arteries, increased expenditure of water and sodium from the body, suppression of angiotensin renin secretion, and stimulation of sodium and potassium pump activity. Potassium has a natriuretic effect by inhibiting the release of renin-angiotensin, which can increase the excretion of sodium and water. This, lead to a decrease in plasma volume, cardiac output, and peripheral pressure so that the blood pressure will go down.(Nguyen et al. 2013),

CONCLUSION

Giving each group interventions are equally effective influence on systolic and diastolic blood pressure in pregnant women with mild hypertension. The provision of a combination of cucumber and green grass jelly can lower mean systolic and diastolic blood pressure were the most effective.

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