# The Effect of Non Pharmalogical (Chayote, Aerobic Exercise, and Rosella Tea) on Blood Pressure of Menopause Women Who Have Hypertension

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***Abstract*—Hypertension rarely didn't show signs and symptoms, so that it was known as 'the silent killer'. It could continue for many years till the sufferer fell down into emergency condition and it exposed to heart disease, stroke, or kidney damage and lead to death. Hypertension often happened toward almost women after in the age of 55 or who experienced menopause. Hypertension could be controlled by pharmacology and nonpharmacology (complementary) treatment. Many patients chose a safer way than taking medicine. Those ways included doing exercise in regularly, a balanced diet, reducing salt intake, losing weight, avoiding smoking or using traditional medicine or herbs. Herbal therapy is a process of healing by using various medicinal herbs medicine. The purpose of this research was to know the effect of chayote, rosella tea, and aerobic exercise toward blood pressure of menopause women and experiencing hypertension. This research useda quasy experiment with 45 subjects. Inclusion criteria were menopause and hypertensivewomen with a purposive sampling method. The data were analyzed to give result that there was significant effect of giving chayote juice and rosella tea to the decrease of systolic and diastolic blood pressure. However aerobic exercise had no significant effect.**

***Keywords*—chayote, exercise, hypertension,rosella tea, women**

## I. INTRODUCTION

Cardiovascular disease could not be separated from hypertension. Hypertension is an increase in systolic blood pressure greater than 140mmHg and /or diastolic greater than 90 mmHg in two measurements with an interval of 5 minutes in a rest / quiet state. Hypertension is one of the non-communicable diseases that is a health problem worldwide because of its high prevalence as well as its association with the incidence of cardiovascular disease. Based on the Third National Health and Nutrition Examination Survey (NHANES III) study, hypertension can increase coronary heart disease by 12% and increase the risk of stroke by 24%. Indonesia, as one of the developing country in the world, according to WHO in 2002, mortality from cardiovascular disease of 361 per 100.000 population for age-standardize mortality rate category [1]

Hypertension sometimes does not show signs and symptoms of disease manifestation, so it is known as The Silent Killer [2]. It can last for years until the patient falls into an emergency and has heart disease, stroke, or kidney damage, which eventually leads to death. Hypertension is common in most women after the age of 55 years or who have a menopouse [3].

This hypertension disease can be controlled by pharmacology and non-pharmacology treatment, in pharmacologically which is with blood pressure lowering drugs. These drugs include diuretic type drugs, adrenergic inhibitors, ACE-inhibitors, ARBs, calcium antagonists, and so on [4]. In non-pharmacology that is exercising regularly, balanced diet, reducing salt intake, losing weight, not smoking and using traditional medicine / herbal. Herbal therapy is a process of healing by using various medicinal herbs medicine. Currently this kind of therapy is popular among people because it is considered as a treatment that has few side effects, cheap and easily available [5]. Therefore, consuming fruits and vegetables containing potassium, postasium and calcium is the right way to lower high blood pressure [6].

Maintaining the balance of body blood pressure cannot be separated from the role of mineral and potassium. Therefore, the intake of sodium and potassium must be balanced so that our body remains healthy. Most problems occur because the intake of sodium is too high from potassium so it leads to hypertension or high blood pressure. It happens because we often meet sodium a lot in the most preferred foods such as meat, milk, preserved foods,bread (containing baking soda) and even daily food. While potassium is mostly found in vegetables and fruits. Among others are contained in chayote and rosella tea.

Chayote is one solution that can be used to increase potassium intake in order to get balanced sodium levels so that our blood pressure is maintained. Rosella is rich in phytochemicals which is for lowering blood pressure. The phytochemicals are anthocyanin, arginine, cyanidin, gossepin, hibiscin, hebiscetin, delphindin-3, sambubioside, and sabdaretin [7]. The anthocyanin and proantocyanidin compounds, which are commonly found in the sediment of Hibiscus sabdariffa (HS) dried flower petals, become bioactive compounds that are responsible for lowering blood pressure [8].

Another factor that causes hypertension is lack of physical activity [9]. Less physical activity increases a person's risk of developing hypertension. People who are inactive tend to have higher heartbeat frequency so that heart muscle must work harder during contraction [10]. Someone who is not physically active has a 30-50% greater risk of developing hypertension [11]. Based on the most of cases, it indicates that hypertension is one of the major health problems and requiring proper handling and good prevention as well because nowadays people tend to use alternative medicine which can be found with many choices.

## II. METHODS

*1) Research Ethics*

In conducting this research, researchers emphasize ethical issues include: informed consent, anonymity, confidentiality.

*2) Research Design*

The research was conducted in Sumberngepoh for 3 months, July to September 2016.This research used Quasi Experimental research design in three groups.The first group was group that received the treatment of chayote consumption, the second group got aerobic exercise and group three got the treatment of rosella tea. The subject of groups were observed prior to intervention, then observed after intervention, and seeing the difference of the three treatments. The population in the research was menopause/ adult women with mild high blood pressure, in a month approximately as many as 60 people. The amount of sample was 45 people [12, 17] with sample inclusion criteria was menopause with mild hypertension, while the sample exclusion was uncooperative, suffered from chronic/ chronic disease/ weak condition. The sampling technique used in this research is purposive sampling

*3) Data Collection*

Data collection was done by measuring blood pressure. Instruments used in this research is the Checklist / check list, the tool: Tension meter was to measure blood pressure before and after intervention. Data were collecting bygiven variables:

- Chayote (X1): Provision of chayote (*Sechium edule*) juice given during the day as a distraction of 50-75 cc every day for 4 weeks, every 3 days if the tension improves to stop a day and then drink again the next 3 days.
- Aerobic exercise (X2): Giving aerobic exercise by gymnastics instructor in the afternoon for 20-60 minutes of practice, done 2 times per week for 4 weeks.
- Rosella tea (X3): dried rosella flower 1.5 brewed with hot water, given 50-75 cc every day, every 3 days if tension improves to stop one day and drink again in the next 3 days, for 4 weeks.

Blood pressure (y) as chronic medical conditions with blood pressure in the arteries are increased by involving two measurements, systolic and diastolic. Data were collecting by criteria as follows:

- Normal: <130 / <85
- Normal height: 130-139 / 85-89
- Hypertension stage 1: 140-159 / 90-99
- Hypertension stage 2: 160-179 / 100-109
- Hypertension Stage 3: 180-209 / 110-119
- Hypertension Stage 4> 210 /> 120

For each statement, the respondent will be scored according to the value of the category of answer given. Scores of respondents on each statement then summed which is the score of respondents on the attitude scale.

*4) Data Analysis*

The data obtained are then processed and the results are presented in the form of data collection. While knowing the influence between variables used Paired Sample Test with significance value $p \leq 0.05$. Furthermore, to see the effect difference between the three interventions using One Way Anova test followed by Tukey test.

## III. RESULT

*1) The results of measurement and monitoring of blood pressure of respondents who got chayote*

This studyshows that difference between pre and post treatment of chayote to respondents between systolic have mean difference of 10.9 mmHg and diastolic average difference of 7.5mmHg.

**TABLE 1 :** THE RESULT OF SYSTOLIC BLOOD PRESSURE MEASUREMENT ON PRE TEST AND POST TEST

| Category | Freq | Systolic Pre test | Freq | Systolic Post test |
|---|---|---|---|---|
| Normal | - | - | - | - |
| High Normal | - | - | 5 | 33.3% |
| Hypertension of stage 1 | 8 | 53.3% | 7 | 46.7% |
| Hypertension of stage 2 | 5 | 33.3% | 2 | 13.3% |
| Hypertension of stage 3 | 2 | 13.4% | 1 | 6.7% |
| Hypertension of stage 4 | - | - | - | - |
| Total | 15 | 100% | 15 | 100% |

**TABLE 2 :** THE RESULT OF DIASTOLIC BLOOD PRESSURE MEASUREMENT ON PRE TEST AND POST TEST

| Category | Freq | Diastolic Pre test | Freq | Diastolic Post test |
|---|---|---|---|---|
| Normal | 8 | 53.4% | 12 | 80% |
| High Normal | 5 | 33.4% | 3 | 20% |
| Hypertension of stage 1 | 1 | 6.6% | - | - |

| | | | | |
|---|---|---|---|---|
| Hypertension of stage 2 | 1 | 6.6% | - | - |
| Hypertension of stage 3 | - | - | - | - |
| Hypertension of stage 4 | - | - | - | - |
| Total | 15 | 100% | 15 | 100% |

From the data we know that systolic blood pressure pre-test and post test in hypertension adult women that there is a significant difference, after the chayote juice 50-75 ml every day for 4 mg, every 3 days if the tension improved to stop a day then drink again. The next 3 days were given a chayote so that there was a change of frequency of category hypertension stage 1,2,3 changed to high normal category, stage 1,2,3.

Based on table 2 above shows that diastolic blood pressure pre-test and post test in adult women with hypertension, there is a significant difference, ie there is a change in frequency of normal stage of hypertension categories, normal height, hypertension stage 1,2,3 turns into normal and high- normal category.

**TABLE 3 :** Paired Samples Test

| **Paired** Differences 95% Confidence Interval of the Difference Upper | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|
| **Pair 1** Systolic pretest ofchayote- systolicposttest of chayote | 13.61 | 10.46 | 14 | .000 |
| **Pair 2** Diastolic pretest of chayote – diastolic posttest of chayote | 9.79 | 4.10 | 14 | .001 |

*2) The results of measurement and monitoring of blood pressure of respondents who got Rosella tea*

The result shows that systolic blood pressure on pre-test and post-test of menopause women, there is a significant difference after getting rosella tea. Pre-test found that there is still a category of hypertension on stage 3, on post-test, there is no hypertension stage 3. Paired test also showed that there is difference in systolic and diastolic between before and after drinking rosella tea (table 6).

**TABLE 4 :** THE RESULT OF SYSTOLIC BLOOD PRESSURE MEASUREMENT ON PRE TEST AND POST TEST

| Category | Freq | Systolic Pre test | Freq | Systolic Post test |
|---|---|---|---|---|
| Normal | - | - | 2 | 13.4% |
| High Normal | - | - | 5 | 33.3% |
| Hypertension of stage 1 | 10 | 66.7% | 7 | 46.7% |
| Hypertension of stage 2 | 4 | 26.7% | 1 | 6.6% |
| Hypertension of stage 3 | 1 | 6.6% | - | - |
| Hypertension of stage 4 | - | - | - | - |
| Total | 15 | 100% | 15 | 100% |

**TABLE 5 :** THE RESULT OF DIASTOLIC BLOOD PRESSURE MEASUREMENT ON PRE TEST AND POST TEST

| Category | Freq | Diastolic Pre test | Freq | Diastolic Post test |
|---|---|---|---|---|
| Normal | 3 | 19.9% | 9 | 59.9% |
| High Normal | 4 | 26.7% | 3 | 20.1% |
| Hypertension of stage 1 | 5 | 33.4% | 2 | 13.4% |
| Hypertension of stage 2 | 2 | 13.4% | 1 | 6.6% |
| Hypertension of stage 3 | 1 | 6.6% | - | |
| Hypertension of stage 4 | - | - | - | |
| Total | 15 | 100% | 15 | 100% |

**TABLE 6 :** Paired Samples Test

| **Paired** Differences 95% Confidence Interval of the Difference Upper | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|
| **Pair 1** Systolic pretest ofchayote- systolicposttest of chayote | 14.84 | 7.37 | 14 | .000 |
| **Pair 2** Diastolic pretest of chayote – diastolic posttest of chayote | 9.51 | 5.02 | 14 | .000 |

*3) The effect of aerobic exercise toward hypertension of adult women*

The result on observing blood pressure of respondents which got aerobics exercise in Sumber Ngepoh Village, its known that there is difference between pre and post of aerobic exercise treatment on the respondents between systolic (average difference of 9.25 mmHg) and diastolic (average difference of 4.02 mmHg).

**TABLE 7:** THE RESULT OF SYSTOLIC BLOOD PRESSURE MEASUREMENT ON PRE TEST AND POST TEST

| Category | Freq | Systolic Pre test | Freq | Systolic Post test |
|---|---|---|---|---|
| Normal | 6 | 40% | 8 | 53.4% |
| High Normal | 3 | 20% | 3 | 20% |
| Hypertension of stage 1 | 5 | 33.4% | 3 | 20% |
| Hypertension of stage 2 | 1 | 6.6% | 1 | 6.6% |
| Hypertension of stage 3 | - | - | - | - |
| Hypertension of stage 4 | - | - | - | - |
| Total | 15 | 100% | 15 | 100% |

**TABLE 8 :** THE RESULT OF DIASTOLIC BLOOD PRESSURE MEASUREMENT ON PRE TEST AND POST TEST

| Category | Freq | Diastolic Pre test | Freq | Diastolic Post test |
|---|---|---|---|---|
| Normal | - | - | 4 | 26.7% |
| High Normal | 7 | 46.7% | 3 | 20% |

| | | | | |
|---|---|---|---|---|
| Hypertension of stage 1 | 7 | 46.7% | 7 | 46.7% |
| Hypertension of stage 2 | 1 | 6.6% | 1 | 6.6% |
| Hypertension of stage 3 | - | - | - | - |
| Hypertension of stage 4 | - | - | - | - |
| Total | 15 | 100% | 15 | 100% |

Based on the table above, it shows that systolic blood pressure in pre-test and post test of menopause women there are differences, after doing aerobic exercise. Both systole and diastole examinations still have hypertension stage 2 which only decrease in number in stage 1.

**TABLE 9 :** Paired Samples Test

| **Paired** Differences 95% Confidence Interval of the Difference Upper | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|
| **Pair 1** Systolic pretest ofchayote- systolicposttest of chayote | 4.92 | .798 | 14 | .44 |
| **Pair 2** Diastolic pretest of chayote – diastolic posttest of chayote | 2.03 | .000 | 14 | 1.00 |

From the result on pair t test we knew that there is no difference between systolic and diastolic as well as before and after aerobic exercise.

*4) The effect of chayote juice,rosella tea,aerobic exercise through hypertension of women*

Systolic blood pressure on pre and post-test for third treatment can be seen on the figure 1.

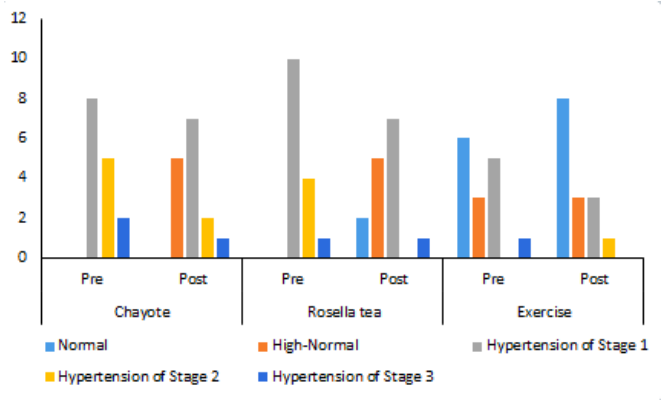


Figure 1.Systolic blood pressure on pre and post-test for third treatment

Based on the diagram above, it could be seen that the treatment by using chayote for pre-test mostly got by hypertension category stage 1 as many eight people while for post-test is mostly got hypertension category stage 1 as many as seven people. The treatment by using rosella tea for pre-test is mostly gained hypertension stage 1 is 10 people while for post-test as many as gained hypertension category stage 1 is 7 people. The treatment by using aerobic exercise for pre- test is mostly gained normal category is 6 people while for post-test is mostly also gained normal is 8 people.

Diastolic blood pressure on pre and post-test for third treatment can be seen on the figure 2.

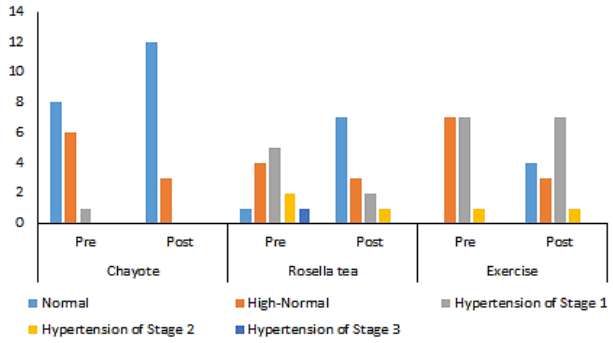


Figure 2.Diastolic blood pressure on pre and post-test for third treatment

Based on the table above, it could be known that the treatment by using the chayote for pre-test mostly obtained the normal category of 8 people, while for post-test mostly also get the normal category of 12 people.The treatment by using rosella tea for pre-test mostly obtained category of stage 1 hypertension for 5 people while for post-test mostly got the normal category of 7 people.The treatment using aerobic exercise for pre-test mostly obtained high normal category and stage 1 hypertension for 7 people while for post-test mostly got category of stage 1 hypertension for 7 people.

Data normality test is done to test the response of each treatment used, where the method used is Shapiro-wilk. Basic decision-making is if the value of significance (α) is greater than 5% , all treatment data has a significance value greater than 5% alpha on both systolic and diastolic data. Therefore it can be concluded that the observed data is normally distributed and the data normality assumption is fulfilled.

Based on result of analysis with ANOVA method to the systolic data of the respondent, it is gained F value 15.88 and significance equal to 0.0. The significance value (0.00) is smaller than α, so that indicates that there is a marked difference between treatments. To find out which treatments producing different responses is real, then for the further test is done using Tukey test.The follow-up test using the Tukey test, found that the treatment of rosella tea has the average value of pre-test difference with the largest post-systolic test of -11.50 but not significantly different with the treatment of chayote that has a pre-test difference with post-test of -11.30.While aerobic treatment has the average value of pre-test difference with the smallest systolic test post which is -1.33 and it is significantly different from the treatment of rosella tea and chayote.

Assesment on the diastolic data of the respondent is also followed by ANOVA method, and it shows a F value8.39 and significance equal to 0.001, smaller than the

value of α, which indicates that there is a marked difference between treatments.Based on the results of Tukey test, it was found that the treatment of rosella tea has the average value of pre-test difference with the largest systolic post-test is -6.67 but not significantly different with the treatment of chayote that has the difference of pre-test with post-test of -6.43 . While aerobic treatment has the average value of pre-test difference with the smallest systolic test post 0 and it is significantly different from the treatment of rosella tea and chayote.

## IV. DISCUSSION

Menopause is a condition that is often a frightening thing for women. Where at the time, women feel no longer young, the ability of organs decreased because the hormoneestrogen has decreased in number. Flexibility in the vagina, bladder and ovarian ability has been lost. This period for some women will make her feel diminished existence as a woman. Moreover, the bone density also decreases along with the decrease in estrogen produced.WHO mentions that the age of women start menopause in general ranges from 45 to 55 years. And classify the age in the middle age (45-60 years).

Even at the age of 30 yearly there is already a menopause. In general, the age of menopause a person will not be much different from the age of his mother's menopause. For example his mother menopause age is 53 years then the child will menopause around the age of 50 to 55 years [13]. The average age of menopausal women in the USA is around 52 years, while for Indonesia the average is 48-52.2 years [14]. The frequency distribution of respondents in this study was 45-55 years old 71%, 56 years-60 years of 29%.This is in line with the theory that age over 55 years, hypertension suffered [4]. Menopausal women have a higher risk of hypertension. This is related to decreased estrogen hormone in women with atherosclerosis as one of the factors causing hypertension [15].The more age the higher the risk of hypertension is. The risk of hypertension is caused by the aging process in the cardiovascular system [16]. The aging process of the cardiovascular system causes arterial blood vessels to become stiff and not straight, in addition to thickening and formation of a bulge in the heart valve that can cause hypertension [18].

*1) The effect of chayote on blood pressure in menopause women*

Research conducted by giving juice of chayote (table 1 and 2) to 15 respondents got average systolic blood pressure before treatment was 158 mmHg and mean systolic blood pressure after treatment was 146.9 mmHg. The results of these measurements show that the average decrease in systolic blood pressure, which is 10.9 mmHg. While average diastolic blood pressure before treatment 84.5 mmHg and average diastolic blood pressure after treatment of 78 mmHg. The mean results of these measurements show that the average diastolic pressure is 7.5 mmHg.

Chayote can lower blood pressure due to the potato gourd has potassium content. Potassium is a good mineral for lowering or controlling the tension. Potassium is a strong diuretic that helps maintain the balance of urine, helps dissolve stones in the urinary tract, bladder and kidneys. Potassium is also very important in converting blood sugar into muscle sugar [17].

*2) The effect of rosella tea on blood pressure in menopause women*

Based on research done by giving rosella tea to 15 respondents got average systolic blood pressure before treatment was 293 mmHg and mean systolic blood pressure after treatment was 271.4 mmHg. The results of these measurements showed that the average decreased in systolic blood pressure, which amounted to 22.3 mmHg. While average diastolic blood pressure before treatment 176 mmhg and average diastolic blood pressure after treatment 163.5 mmhg. The mean results of these measurements showed that the average diastolic pressure is 12.5 mmHg (table 4 and 5).

Rosella tea broth were known for the richness in phytochemicals which are efficacious for lowering blood pressure. The phytochemicals are anthocyanin, arginine, cyanidin, gossepin, hibiscin, hebiscetin, delphindin-3, sambubioside, and sabdaretin [7,18]. Administration of rosella petal extract containing 9.6 milligrams of anthocyanin daily for 4 weeks, it was able to reduce hypertension or high blood pressure similar to captopril 50 mg/day [7,19]. The anthocyanin and proantocyanidin compounds, which are commonly found in the sediment of *Hibiscus sabdariffa* dried flower petals, become bioactive compounds that are responsible for lowering blood pressure [8].

*3) The effect of aerobic exercise on blood pressure in menopause women*

Research conducted by giving aerobic exercise to 15 respondents got average systolic blood pressure before treatment was 115 mmHg and mean systolic blood pressure after treatment was 257 mmHg. The results of these measurements show that the average decrease in systolic blood pressure, which is equal to 9.25 mmHg. While average diastolic blood pressure before treatment 168 mmHg and average diastolic blood pressure after treatment 168.3 mmHg. The mean results of these measurements show that the average diastolic pressure is 4.02 mmHg.

Gymnastics in this research is using aerobic gymnastics in accordance with the age of respondents. Gymnastics can affect blood pressure. It is proven to lower blood pressure although the results obtained are very small difference between the decline before and after treatment.There is a fixed or unchanged blood pressure, many factors that affect blood pressure even though given the treatment of gymnastics but the respondents still consume foods high in salt, especially if the respondent also has a descent of hypertension or even the respondent has a stressor

that can affect blood pressure. The hormone cortisol plays an important role in managing stress, cortisol also makes an important contribution in regulating blood sugar levels with insulin, maintaining the immune system and keeping blood pressure constant.

From difference of influence of three intervention therefore researcher used ANOVA test continued with Tukey test. Based on the results of tukey test, it was found that the treatment of rosella tea has the average value of pre-test difference with the largest post-systolic test of - 11.50 but it is not significantly different with the treatment of chayote that has a pre-test difference with pos-test of -11.30. While the treatment of chayote has the average value of pre-test difference with the smallest systolic test post is -1.33 and is significantly different from the treatment of rosella tea and chayote.

Aerobic exercise is only one therapy that can be an influence on blood pressure in people with hypertension in the village Sumberngepoh, Lawang District. This can happen because in doing aerobic exercise properly can reach the peak of relaxation on the body, throw the negative bio electricity load, so that oxygen can flow smoothly throughout the body, it increased endurance so that the body will feel healthy and fit. This can be a reference that gymnastics does affect the blood pressure of hypertensive patients[16]. With a relaxed body condition, and no stress, blood vessels will undergo vasodilation without any resistance. This can maximize oxygen supply and promote blood circulation throughout the body. Especially when done regularly, while maintaining a healthy lifestyle to get results maximum in controlling blood pressure to stay within normal limits. Unlike when gymnastics performed not with maximal / less correct movement.So that it can be seen from the results of research that the influence of aerobic exercise against hypertension is smaller than the squash or rosella tea.

## V. CONCLUSION

There is influence by promission ofchayote, rosella tea, and exercise to systolic blood pressure and diastolic in hypertension women, it is found that the influence of treatment of rosella and chayote both in systolic blood pressure and diastolic results obtained greater than aerobic exercise.

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