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The Effect of Provision Decoged Leaves of Moringa, Red Ginger, Turmeric, Red Meniran, Cinnamon, and Sambiloto Towards Reduction of Blood Pressure in The Region Long Kali District, Paser Regency

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Abstract

Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto have compounds with antihypertensive activity. The study was to describe the characteristics and effect of decoction 6 plant compositions for reducing the systolic and diastolic blood pressure of respondents in Long Kali District. The method used is quasi-experimental for 7 days. The results show characteristics data respondents for hypertensive patients in Long Kali District occurred the highest in late adulthood (36-45 years) with a percentage of 65%, female sex with a percentage of 75%, family history (hypertension) with a percentage of 65%, other diseases (more than 1 disease) with a percentage of 30%, and BMI obesity I (23.0 – 29.9) 50%. Data on the effect of giving decoction 6 plant compositions had a significant effect for decreased systolic and diastolic blood pressure of pre-test and post-test which was able to reduce the average systolic blood pressure on the third day by 11.7 mmHg (p=0.000) and diastolic blood pressure of 7.2 mmHg (p=0.005) and on the seventh day was also able to reduce the average systolic blood pressure of 9.4 mmHg (p= 0.012) and diastolic blood pressure of 4.9 mmHg (p= 0.030).

Keywords: Jamu; Hypertension; Systolic and Diastolic Blood Pressure

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1 Introduction

Hypertension is an important public health issue that rarely causes symptoms in the functional health of patients but is often a frightening thing because patients can experience high levels of severity and even death so hypertension is dubbed the "silent killer" disease. Hypertension is also a major risk factor for coronary heart disease, heart failure, and stroke. Hypertension is classified into two, namely Primary (Essential) Hypertension and Secondary Hypertension which is distinguished based on the cause [1].

Hypertension cases according to WHO data in 2015 showed that around 1.13 billion people in the world have hypertension, which means that 1 in 3 people in the world is diagnosed with hypertension, and only 36.8% are drug users. Every year 9.4 million people die from high blood pressure and its compilation [2]. Health problems are one of the greatest global challenges faced in the 21st century. In 2015, around 56 million deaths worldwide were caused by Non-communicable Diseases (NCDs), one of which is hypertension. [3].

According to Riskesdas data in 2018, hypertension sufferers tend to increase at the age of 55-64 years, which is around 55 years to 65-74 years, around 63.2%. In addition, women also tend to have higher rates of hypertension with a figure of around 36.9% compared to men at 31.3%. From the hypertension prevalence rate of 34.1%, it is known that 8.8% are diagnosed with hypertension and 13.3% are not treated and 32.3% are not routinely using drugs. This suggests that most people with high blood pressure are unaware that they have the disease and therefore do not receive treatment. 59.8% of the reasons people with high blood pressure don't take medication is because they feel well, and about 4.5% can't tolerate the side effects of taking medication [4].

One of the traditional medicines in Indonesia is Jamu which contains various kinds of herbal plants that are beneficial for health, one of which is hypertension therapy to maintain blood pressure balance. Indonesia is rich in medicinal plants that can be used for the prevention, treatment, and cure of a disease, one of which is hypertension. The advantages of using herbal plants are that they are safer to consume, effectively cure diseases without harmful side effects, and are affordable prices because they can be found all around us. Plus its use has been empirically proven to be used for generations by previous ancestors. One of the plants that have anti-hypertensive activity are Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto [5].

Moringa leaves contain beta carotene, thiamin (B1), riboflavin (B2), niacin (B3), calcium, iron, phosphorus, magnesium, zinc, and Vitamin C which have many benefits [6]. It turns out that Moringa leaves also have antihypertensive activity because Moringa leaves are rich in antioxidants consisting of alkaloids, saponins, phytosterols, tannins, phenolics, polyphenols, and flavonoids [7], [8].

Red ginger is reported to have various biological and pharmacological activities. In traditional medicine, it is widely used to treat other diseases [9]. The antihypertensive activity of red ginger can also be seen from the results of research conducted by Hutabarat (2020) and Fickri (2021) showing that antihypertensive drug therapy and red ginger extract have a higher potential in lowering systolic and diastolic blood pressure compared to antihypertensive-drug-therapy-and-placebo. This happens because ginger has the benefit of lowering blood pressure through the blockade that depends on calcium channels. Ginger can also block calcium which causes the contraction of smooth muscle tissue in organs and artery walls. [9], [10], [11]

According to research by Rafieian (2014), Curcumin in turmeric can ward off oxygen free radicals, its antioxidant activity is comparable to vitamins C and E, able to protect lipids or hemoglobin from oxidation. The antihypertensive effect of turmeric can be attributed to the active compounds that turmeric has, each of which has a different mechanism of action. Several mechanisms that may be involved in reducing blood pressure include antioxidant, anti-inflammatory, Ca2+ concentration disturbances, stimulation of a2-adrenergic receptors, and inhibition of the renin-angiotensin system so that turmeric has antihypertensive activity[12], [13].

Red meniran has a lot of pharmacological activities equivalent to its chemical content. Red meniran leaves have a lot of chemical content that is beneficial to health, one of which is Geraniin. In a study conducted by Xu (2007), and Wu (2012) geraniin compounds isolated from red meniran leaves were given orally in Lin's (2008) study, which then showed an antihypertensive effect that could last up to 24 hours. Although the highest blood pressure lowering effect was lower than that of captopril, the duration of the blood pressure lowering effect of geraniin was better than that of captopril in the reports of several of these studies [14], [15], [16], [17].

The polyphenolic polymers found in cinnamon have antioxidant activity and can

improve oxidative stress markers including plasma malondialdehyde (MDA) levels, superoxide dismutase (Cu-Zn SOD), and glutathione peroxidase (GPx). Most importantly, the polyphenols in cinnamon can improve insulin sensitivity, which is associated with lower blood pressure. In addition, cinnamon selectively stimulates the expression of proliferating activated gamma receptors (PPARγ). PPARγ activation may reduce renal fibrosis and blood pressure. The mechanism is proven by the research of Shirzad (2021) if cinnamon can reduce blood pressure indirectly by this mechanism [18], [19], [20].

Sambiloto especially the leaves have many health benefits, one of which is antihypertensive activity. Bitter leaf has a vasodilating effect, namely andrographolide which is associated with its alpha-1 adrenergic receptor blockade blocking adrenergic receptors and weakening arterial pressure by dilating blood vessels both resistance and capacitance. [21], [22], [23].

In this study, six combinations of these plants were used, namely Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto which will be given to hypertensive patients in the Long Kali District Area in the form of a decoction, which will later measure the effect of giving the stew on blood pressure of hypertensive patients.

2 Methods

2.1 Tools and Materials

The tools used were a pot, stove, 200 mL plastic bottle, 1000 mL measuring cup, clock, Microtoise (GEA), tea strainer, spoon, digital sphygmomanometer (Yuwell YE 660 F), and digital weight scale (GEA EB1622). Then the ingredients used are mineral water, sugar (Tropicana slim classic), packaging labels, and jamu cemplung containing Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto.

2.2 Population and Sample

The population in this study were all residents in the Long Kali District, Paser Regency who suffered from hypertension. The research samples were taken from as many as 20 people who were selected based on the purposive sampling data collection technique consisting of men and women with details of 20 people consisting of only 1 group, namely the treatment group, with pre-test data as data. control and data after treatment (post-test) as treatment data. The selection of respondents was based on the inclusion criteria made, namely respondents with hypertension aged 25-60 years, willing to be research respondents, able to communicate verbally and clearly, and had no serious disease complications if given treatment during the study. Patients who meet the inclusion criteria will be declared as research respondents.

2.3 Research Design

The research method used is quasi-experimental. The method with this research design is used to determine the effect that arises as a causal relationship from the existence of a certain treatment. While the research design used is a one-group pretest–post-test design. The research design used only one group where the results of the pretest became the control group and the results of the post-test as the treatment group as a comparison for before and after treatment. The design of this study was carried out twice, namely pre-test and post-test. Where, the intervention was given in the form of giving a decoction of Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto in the form of jamu cemplung preparations which were used as a decoction once a day as much as 200 mL regularly for 1 week.

The initial and final blood pressure checks are the same, namely for the initial blood pressure (pre-test) at 08.00 am on the first day before being given treatment and the final blood pressure (post-test) at 11.00 am on the third day and seventh day 2 hours after the administration of treatment. After the data was collected, statistical analysis was carried out using SPSS on the initial examination data (pre-test) and data after treatment (post-test). The statistical test method was chosen based on the results of the normality test which if the data were normally distributed, a further test would be chosen, namely the parametric test or if the data were not normally distributed, a further test would be carried out in the form of a non-

parametric test. Where the conclusions from the results obtained indicate the value of changes that occur before and after the treatment and whether there is a real difference from the treatment given.

3 Results and Discussions

Table 1. Respondent Characteristic Data

No.	Characteristic	Amount (n=20)	Percentage
1.	Age		
	36 – 45 years	2	10%
	46 – 55 years	13	65%
	56 – 65 years	5	25%
2.	Gender		
	Male	5	25%
	Female	15	75%
3.	Family History (Hypertension)		
	Yes	13	65%
	No	7	35%
4.	Comorbidity		
	No	5	25%
	Maag / stomach disease	4	20%
	Chronic cough	1	5%
	Gout	3	15%
	Asthma	1	5%
	More than one comorbidity + (hypercholesterolemia and diabetes mellitus)	6	30%
5.	Body Massa Index (BMI)		
	Normal (18,5 – 22,9)	8	40%
	Overweight – Obesity I (23 – 29,9)	10	50%
	Obesity II (>30)	2	10%

Table 1 shows the percentage of respondents' characteristic data from giving Decoged Leaves of Moringa, Red Ginger, Turmeric, Red Meniran, Cinnamon, and Sambiloto given to the hypertensive respondent to decrease blood pressure in the research period Juli-August 2022. The respondent's characteristic data obtained include age, gender, family history, comorbidity, and body mass index (BMI).

Based on the above characteristic data related to age, the explanation is that age itself is a non-modifiable hypertension factor [24]. Generally, hypertension occurs in people over the age of 40 years. Individuals over the age of 40 years will lose elasticity in the walls of blood vessels. Which will cause an increase in blood pressure because the blood continues to pump in the absence of vasodilation of blood vessels. Changes in blood pressure with age will cause the opportunity for hypertension because the walls of blood vessels will thicken and harden with age [25]. It can be concluded from the explanation above that age in hypertensive patients is indeed one of the risk factors and the results of the study show things related to the theory that as age increases, the risk of developing hypertension also increases.

Based on the data on sex characteristics obtained from this study, the explanation is that men and women initially have the same prevalence of hypertension (when women have not entered menopause), but after entering menopause and age the levels of the hormone estrogen (increasing HDL) decrease. it causes women at pre-menopausal age (45-55 years) the hormone estrogen as a protective factor from the process of arteriosclerosis will continue to decrease so that it can increase risk factors for suffering from hypertension due to decreased protection of blood vessels. The incidence of hypertension is associated with hormonal and biochemical factors during menopause that can increase androgen levels, resulting in the activation of the Renin-Angiotensin System (RAS), increasing renin levels, plasma endothelin, salt sensitivity, insulin resistance, sympathetic activity, and unstable body weight. be a cause of hypertension [26]. Based on this explanation, the research results that have been obtained are data on gender characteristics, by the existing theory that the incidence or prevalence of hypertension is indeed higher in women than men, especially women aged over 40 years who enter the pre-menopausal phase until menopause.

Then, based on the data on the characteristics of a family history of hypertension, an explanation was also obtained regarding this matter, namely, the genetic factor that plays a role in the incidence of hypertension is high blood pressure which is influenced by many genes (polygenic hypertension). Polygenic hypertension is triggered by major and minor genes. Many genes are included, namely systems that play a role in the mechanism of hypertension, namely the Renin-Angiotensin-Aldosterone System (RAAS), G protein signaling / G signaling pathway system, non-androgenic systems, ion channels, adductors, the immune system, and

inflammation. [27]. Adolescents with a family history of hypertension have a higher risk of suffering from hypertension than adolescents with families without hypertension. In a study by [28], about 30-60% of the variation in blood pressure in various individuals is due to the effects of genetic factors. Children who have a hereditary history of hypertension in both parents have a 40-60% risk of hypertension when they grow up [29]. Based on the explanation of the results of other studies related to the relationship of genetic history with the incidence of hypertension, the results of this study are by the theory that respondents or individuals who have a family of hypertension, chances of experiencing hypertension will also increase.

For respondents' characteristic data about comorbidities, there is an explanation, namely for ulcer disease and GERD, they have similarities in the increase in gastric acid but have differences in severity and effects and symptoms. Research conducted by [30] shows the relationship between GERD and ulcers This study suggests that part of the reflux episode may be associated with increased blood pressure. Antiacid therapy restores esophageal and gastric pH to normal and significantly decreased BP elevation, which suggests that GERD treatment is useful for normalizing blood pressure in hypertensive patients. Meanwhile, chronic cough has the potential to be associated with an increased risk of hypertension. This may be the result of the cardiovascular consequences of repeated coughing attacks, or it may be autonomic dysfunction. These new findings have implications for cardiovascular health [31]. Then the relationship between gout is in serum uric acid (SUA) levels and uric acid (UA) levels or uric acid itself Several cross-sectional studies have shown that hyperuricemia or excess uric acid is present in 25-60% of individuals with essential hypertension who do not have hypertension. treated, and SUA levels were associated with prehypertension. Longitudinal studies have confirmed the prognostic value of UA hypertension, suggesting that higher levels of SUA are associated with an increased relative risk for hypertension. [32]. Then for asthma, there is a relationship with hypertension due to inflammation caused by asthma, which contributes to left ventricular hypertrophy and possibly right ventricular hypertrophy. Inflammation that occurs in asthmatic patients can contribute to hypertension [33]. Next is hypercholesterolemia, the relationship is that the walls of the arterial canal with arteriosclerosis (plaque due to cholesterol buildup) will become thick, and stiff, then the arterial channel will experience a process of narrowing, hardening, losing flexibility, and becoming stiff. So that elasticity will disappear and decrease in regulating blood pressure so that various diseases will occur, one of which is hypertension [34]. And the last disease suffered by the respondents of this study is Diabetes Mellitus, the relationship occurs because K-ATP will stick to the cell wall to open and close the canal in response to blood glucose levels. If blood glucose levels rise (high), the canal closes and pancreatic cells will release insulin into the bloodstream as an effort to control blood glucose levels significantly associated with the incidence of hypertension.[35]. Based on the explanation of the results of other studies above related to the relationship of other diseases owned by respondents with the incidence of hypertension, the results of this study can be said to be by the theory that respondents or individuals who have other diseases, their chances of experiencing hypertension will also increase.

Then the characteristic data related to Body Mass Index (BMI) has an explanation that the risk of suffering from hypertension can be influenced by Body Mass Index (BMI). The greater the weight, the greater the BMI results. When you gain weight, your blood volume will increase, so the workload to ensure blood also increases. The heavier the heart's burden to monitor blood throughout the body can cause peripheral pressure and cardiac output to increase it can cause hypertension. Individuals who have a body mass index value more than normal are 4.8 times more likely to suffer from hypertension than individuals who have a normal body mass index value. [36]. Based on this explanation, the results of research related to BMI characteristic data on respondents are by the theory that people who have a BMI mass that exceeds the normal limit will have a higher chance of developing hypertension than those with normal weight.

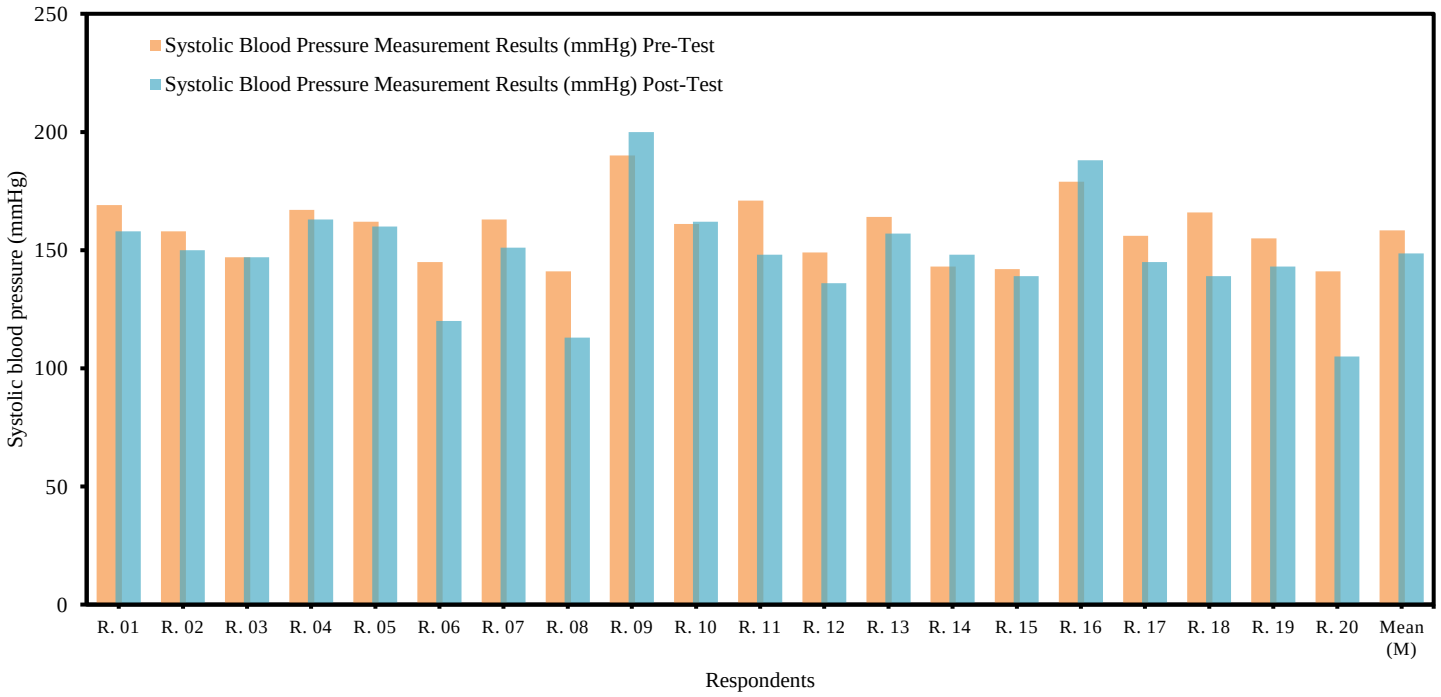

Figure 1. Bar Graph of Systolic Blood Pressure Measurement Results Day 3

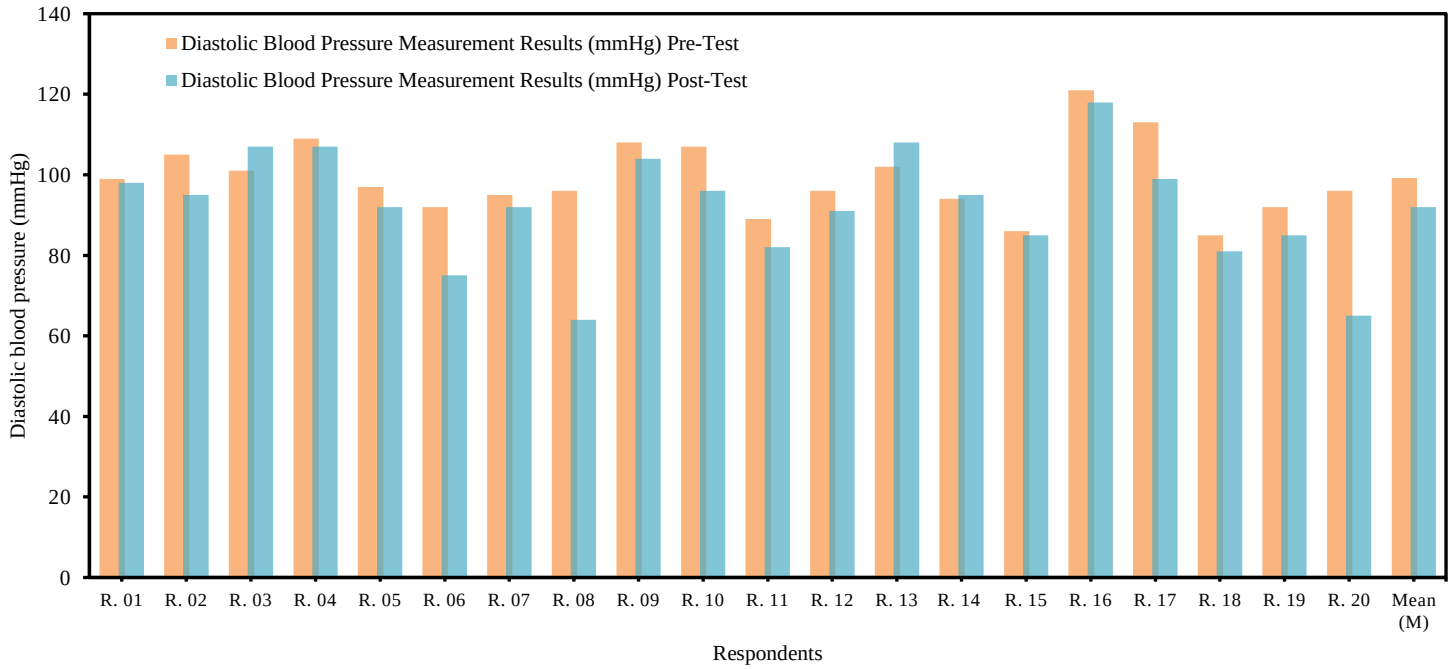

Figure 2. Bar Graph of Diastolic Blood Pressure Measurement Results Day 3

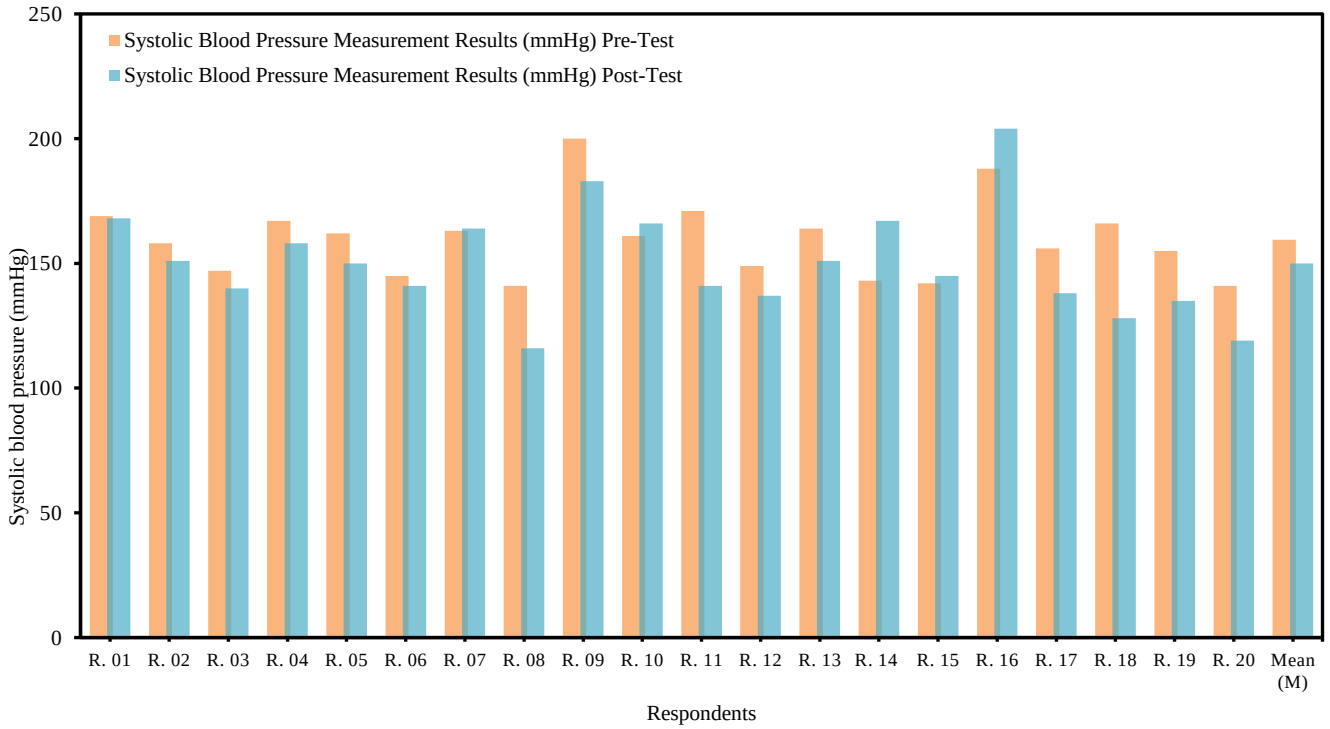

Figure 3. Bar Graph of Systolic Blood Pressure Measurement Results Day 7

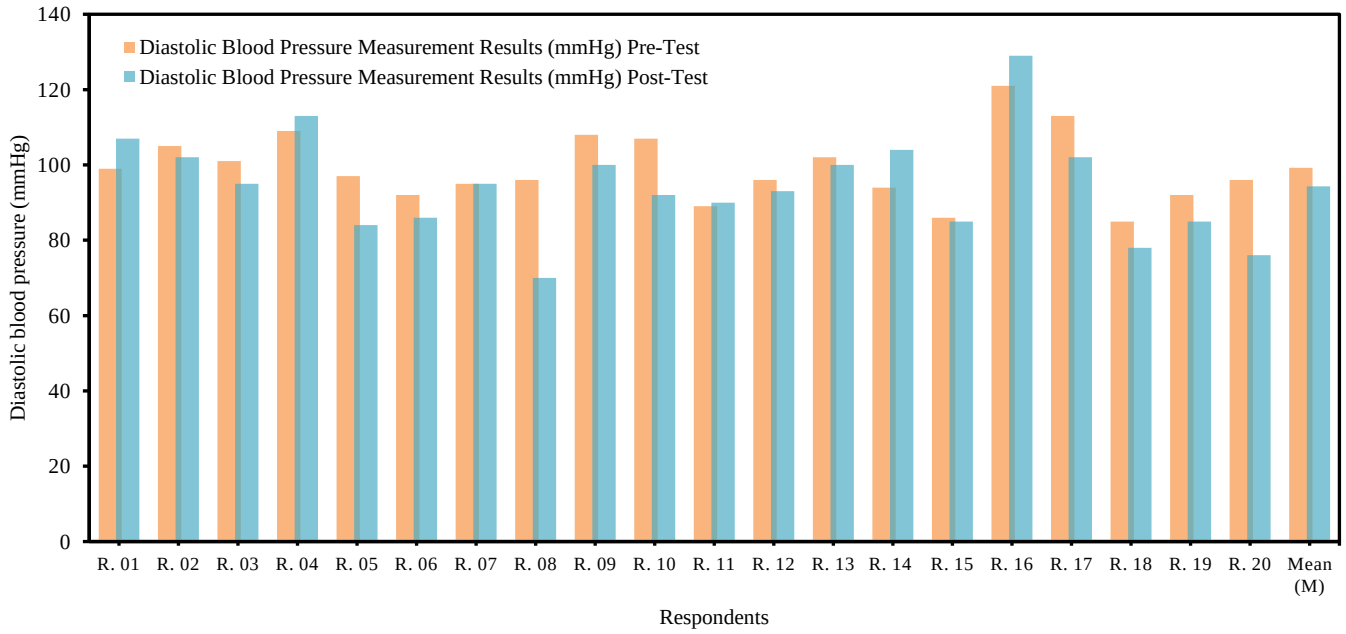

Figure 4. Bar Graph of Diastolic Blood Pressure Measurement Results Day 7

The average pre-test blood pressure value for respondents before being given treatment in the form of giving Moringa leaf decoction, red ginger, turmeric, red meniran, cinnamon, and sambiloto was 159.4 / 99.2 mmHg, with the lowest systolic blood pressure value was 141 mmHg and the highest is 200 mmHg. While the

lowest diastolic blood pressure value is 85 mmHg and the highest is 121 mmHg.

While the average final blood pressure value (post-test) in respondents after being given intervention in the form of giving boiled Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto on the third-day post-test has an average value of average systolic and diastolic blood pressure is 147.7 / 92 mmHg with the lowest systolic blood pressure value being 105 mmHg and the highest 190 mmHg which if the average value is calculated with the pre-test, there is a decrease in systolic blood pressure on the third-day post-test, namely of 11.7 mmHg can be seen in figure 1, then the lowest value of post-test diastolic blood pressure on day 3 was 64 mmHg and the highest was 118 mmHg, which also is calculated by the average pre-test, there was a decrease of 7.2 mmHg can be seen in figure 2. Then the average final blood pressure value (post-test) on the seventh day of the respondent after being given intervention in the form of giving Moringa leaf decoction, red ginger, turmeric, red meniran, cinnamon, and sambiloto has an average value of systolic blood pressure and diastolic blood pressure of 150 / 94.3 mmHg with the lowest systolic blood pressure value is 119 mmHg and the highest is 204 mmHg which if the average value is calculated with the pre-test, there is a decrease in systolic blood pressure on the seventh-day post-test, which is 9.4 mmHg can be seen in figure 3. the lowest value of post-test diastolic blood pressure on the seventh day was 70 mmHg and the highest was 129 mmHg, which also is calculated by the average pre-test there was a decrease of 4.9 mmHg can be seen in figure 4.

There is some evidence from previous studies that used the same plant composition singly. The first is Moringa leaves, in the research conducted [37] with 16 hypertensive respondents who intervened with 250 mL of Moringa leaf decoction for 7 days, the results obtained initial systolic pressure (mean = 153, 50 mmHg) and end-systolic pressure (mean = 129.56 mmHg) as well as initial diastolic blood pressure (mean = 94.38 mmHg) and the end (86.25 mmHg) which can be concluded that this study affects reducing blood pressure. The next plant is red ginger, research conducted [38] namely a study of elderly hypertension with red ginger steeping intervention for 5 consecutive days, the results of the initial (mean = 147.50 mmHg) and final (mean = 120.42 mmHg) measurement of systolic blood pressure were found to decrease, then there was also a decrease in diastolic blood pressure. with initial (mean = 92.50 mmHg) and final (mean = 82.08 mmHg) measurement data, which were also proven to be able to influence the decrease in blood pressure in hypertensive respondents. The next plant is turmeric with evidence of research on hypertension respondents conducted [39] against 13 elderly people with the intervention of giving grated turmeric steeping, the results of the initial (mean = 163.08 mmHg) and final (mean = 152.31 mmHg) measurement of systolic blood pressure decreased, then the same thing happened to the respondents' diastolic blood pressure with the initial measurement data (mean = 107.69 mmHg) and final (mean = 98.46 mmHg), which also influences reducing the blood pressure of hypertension respondents, the next plant is red meniran, for red meniran plants research on hypertension respondents is still rarely done, only its antihypertensive activity is known due to the content of the active substance called geraniin which is carried out by [15], [16], [17]. Then the next plant there is cinnamon, research done [40] using cinnamon decoction on 20 hypertensive patients (10 controls and 10 treatments) for 7 days, the results of the initial diastolic and systolic blood pressure measurements (mean = 166/96 mmHg) then the final results (mean = 144/87 mmHg) which can be concluded that there was a decrease in systolic and diastolic blood pressure. And the last plant is the sambiloto leaf, the research was carried out by [41] using sambiloto leaf decoction on 30 hypertensive respondents for 7 days, and the results of the initial measurement (mean MAP = 119.33) and final (mean MAP = 114.66 and 96.30) obtained an interpretation that showed a significant decrease which also proves that sambiloto leaf can influence pressure reduction. blood in hypertensive respondents.

This research, have different from other research because in this research have to combine six plants (Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto) which have become a complete

product, where this product also has a license and has been circulating in the community, namely Jamu Cemplung. Giving jamu cemplung in this study gave different results from several studies that have been carried out with each plant composition studied singly. The difference is in the dose of administration between Jamu Cemplung (six plant compositions) and the study of each plant singly (not combined with any plant), in the preparations used in this study each plant was given a smaller dose compared to studies using plants. So the results given are also different regarding the decrease in systolic and diastolic blood pressure, in a single composition with a larger dose it shows a greater decrease than Jamu Cemplung (with the same plant, but with a smaller dose), so it can be said that administration with higher doses for each plant has the possibility of influencing the amount of decrease in systolic and diastolic blood pressure.

Table 2. Formulation of Jamu Cemplung (contains six compositions: Moringa Leaf, Red Ginger, Turmeric, Red Meniran, Cinnamon, And Sambiloto)

No.	Name of Composition	Amount (gram)
1.	Moringa leaf: *Moringa oliefera* Folium	0,86 g
2.	Red ginger: *Zingiberis officinale* var Rubrum	0,65 g
3.	Turmeric: *Curcuma domestica* Rhizoma	0,43 g
4.	Red meniran: *Phyllantus urinaria* Herba	0,32 g
5.	Cinnamon: *Cinnamonum burmanii* Cortex	0,32 g
6.	Sambiloto: *Androghapis paniculata* Herba	0,11 g

The ability of each plant composition is influenced by the content that causes activity in it. Moringa leaves contain potassium (potassium) which is both very good for healthy blood pressure, potassium keeps blood pressure in normal conditions, and potassium works to lower blood pressure when blood pressure is high. Moringa leaves which are rich in potassium can regulate sodium levels in the blood so that it can be controlled which can prevent a decrease in high blood pressure. The phytosterol content in blood Moringa leaves can also eliminate the role of bad cholesterol in the blood. By consuming Moringa leaves, blood flow becomes smooth so that the risk of substances that can cause high blood pressure can be avoided [37]. Then the red ginger plant, one of which is gingerol and shogaol, has antioxidant activity that can inhibit the activity of the angiotensin-converting enzyme (ACE) so that it can have an effect that can lower blood pressure. Red ginger also triggers the hormone adrenaline and widens blood vessels, which causes blood to flow faster and smoother, and eases the work of the heart [38], then the antihypertensive activity can also be found in turmeric plants which contain curcumin, essential oils, high in minerals such as potassium, calcium, iron, and magnesium. Potassium itself has an important role in cells and body fluids as a component that helps to control heart rate and blood pressure. Curcumin which is owned by turmeric is an antioxidant because turmeric does not contain cholesterol and is rich in fiber, this content will control low-density lipoprotein (LDL) in the blood. [39]. Then geraniin from red meniran has antioxidant activity, the inhibitory activity of SSAO and ACE, and has an antihypertensive effect in experimental animals, namely rats induced hypertension. [15]. The next plant is cinnamon which cinnamon contains compounds with antioxidant activity, such as cinnamaldehyde and eugenol. The antioxidant activity of cinnamon can ward off free radicals so that it can protect the body from degenerative diseases, such as cancer, heart and blood vessel disease hypertension, and diabetes. In addition, the antioxidant content can be used in the treatment of hypertension and gout. From this study, the active substance in cinnamon bark can reduce blood pressure by lowering the renin enzyme and reducing blood viscosity so that the blood pressure of hypertensive patients who are given cinnamon bark decreases. [40]. Then the last plant is sambiloto, which has a hypotensive effect due to the content of 12-didehydroandrographolide. The hypotensive effect results from the action of -adrenoceptors on autonomic nerve receptors and angiotensin-converting enzyme (ACE) inhibitor-like activity. The content of 14-deoxyandrographolide (DDA) isolated from the methanol extract of sambiloto has a vasorelaxation effect on blood vessels. 14-deoxy-11, 12-didehydroandrographolide, also works to reduce heart rate. In addition, the antihypertensive effect of sambiloto is also produced through the relaxation of smooth muscles in blood vessels so that it can cause a decrease in blood pressure.

Table 2. Statistical Analysis (Test Dependent T-Test) on Respondent's Blood Pressure (Post-Test third day)

Blood Pressure	*Pre-test* *Mean ± SD*	*Post-test* *Mean ± SD*	*P Value*
Systolic	159.4 ± 15.54	147.7 ± 20.10	0.000
Diastolic	99.2 ± 9.20	92 ± 14.08	0.005
P Value	< 0.05		

Table 3. Statistical Analysis (Test Dependent T-Test) on Respondent's Blood Pressure (Post-Test seventh day)

Blood Pressure	*Pre-test* *Mean ± SD*	*Post-test* *Mean ± SD*	*P Value*
Systolic	159.4 ± 15.54	150 ± 21.22	0.012
Diastolic	99.2 ± 9.20	94.3 ± 13.68	0.030
P Value	< 0.05		

Based on table 2, it is known that on the third-day post-test there was a decrease in systolic blood pressure from 159.4 mmHg to 147.7 mmHg with a p-value of 0.000 and a decrease also occurred in systolic blood pressure from 99.2 mmHg to 92 mmHg with a p-value of 0.005, then based on table 3 for the measurement of blood pressure on the seventh day also decreased, the systolic blood pressure in the initial blood pressure of 159.4 mmHg to 150 mmHg with a p-value of 0.012 and diastolic blood pressure from 99.2 mmHg to 94.3 mmHg with a p-value of 0.030, so it can be said that moringa leaf decoction, red ginger, turmeric, red meniran, cinnamon, and sambiloto had a significant effect on reducing systolic and diastolic blood pressure after being given treatment.

There was a difference in the result on the third day and seventh day because this study has a drawback, namely the use of a quasi-experimental method that makes researchers unable to intervene in the patient's lifestyle (eating/drinking, activities) and also the patient's mindset/stress level which is completely beyond the control of the researcher, which can lead to increased or a decrease in blood pressure, considering that blood pressure is a state of fluctuation in the body of each individual. As for some respondents experiencing an increase in blood pressure, it could also be due to psychological factors, if researchers make respondents think a lot because they participate in research and give samples that make respondents feel anxious and afraid, then this can cause an increase in sympathetic nerve stimulation which has the effect of increasing the pulse rate. heart rate, cardiac output, and vascular resistance, which leads to an increase in blood pressure. Excessive anxiety can increase blood pressure by up to 30 mmHg [42]. Other factors that can also cause blood pressure to rise are lack of exercise/activity, high salt intake patterns, and smoking habits [43]. However, although the results of the decrease on the seventh day were lower than the third day, the final result still stated that the patient's average blood pressure dropped significantly, so the effect of giving Moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto still had the ability to in helping to lower systolic and diastolic blood pressure on the third and seventh day.

4 Conclusion

The conclusion is that the administration of boiled moringa leaves, red ginger, turmeric, red meniran, cinnamon, and sambiloto to respondents with hypertension for 7 days has a significant effect on decreasing systolic and diastolic blood pressure before (pre-test) and after (post-test). -test) which was able to reduce the average systolic blood pressure on the third day by 11.7 mmHg (p=0.000) and 7.2 mmHg diastolic blood pressure (p=0.005) and on the seventh day was also able to reduce the average pressure systolic blood pressure 9.4 mmHg (p= 0.012) and diastolic blood pressure 4.9 mmHg (p= 0.030).

5 Author contribution

Sekar Ningrum: conducting, researching, collecting data, and compiling manuscripts. Fajar Prasetya and Dewi Rahmawati: director, supervisor, and final coordinator of manuscript.

6 Etic

This research already has an ethical license from KEPK (Health Research Ethics Commission) Faculty of Pharmacy, Mulawarman University, with code of ethics number No.57/KEPK-FFUNMUL/EC/EXE/08/2022.

7 Conflict of Interest

The author declares no conflict of interest in this study.

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