



**EFFECTIVENESS OF STARFRUIT LEAF TEA IN REDUCING BLOOD PRESSURE  
IN PREGNANT WOMEN WITH HYPERTENSION**

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**ABSTRACT**

Hypertension is a cause of maternal morbidity and mortality. Hypertension in pregnancy can cause complications such as thrombocytopenia, myocardial infarction, pulmonary edema, maternal death. The impact on the fetus is death and low birth weight (LBW). The impact of hypertension that can be dangerous and life-threatening, so it is necessary to do early treatment by providing pharmacological and non-pharmacological treatment. Starfruit leaves have several compounds such as potassium citrate which functions as a diuretic so that it can help to lower blood pressure, also has the potential as an antioxidant to lower blood pressure. The purpose of this study was to determine the effectiveness of giving starfruit leaf tea on reducing blood pressure in pregnant women with hypertension. The research method is Quasi Experiment pre-test and post-test with control group design, the study was conducted in Pasar Kemis District, Tangerang Regency, a sample of 30 respondents, namely 15 pregnant women as the intervention group and 15 pregnant women as the control group. Researchers conducted pre-tests and post-tests on respondents by measuring blood pressure. Researchers gave starfruit leaf tea to the intervention group for 7 days as much as 200 cc, data analysis using SPSS by conducting univariate and bivariate analysis using the Mann Whitney test. The results of the Mann-Whitney test of starfruit leaf tea intervention obtained a p-value of 0.001 for systolic pressure and diastolic pressure of 0.002 ( $\alpha = 0.05$ ). This means that there is effectiveness between blood pressure before and after starfruit leaf tea is given to pregnant women with hypertension.

Keywords: hypertension; lowering blood pressure; pregnant women; starfruit leaves; tea

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**INTRODUCTION**

Hypertension is a type of non-communicable disease that is still a serious problem. Hypertension occurs in society, but is often not realized because this disease does not cause any typical signs. Hypertension in general cannot kill sufferers directly (the silent killer), but if this disease does not get immediate treatment, it will trigger complications (Putri, 2022). Every day in 2020, almost 800 women died due to pregnancy and childbirth. According to the World Health Organization (WHO), the Maternal Mortality Rate (MMR) is 430 per 100,000 live births. Hypertension is a cause of maternal morbidity and mortality (Maternal Mortality, 2020). As many as 839 million pregnant women were diagnosed with hypertension in 2015. The incidence of hypertension in pregnant women is estimated to reach 1.15 billion in 2025, or around 29% of the global population (Andriyani et al., 2021). In 2021 in Indonesia there were 7,389 maternal deaths and as many as 1,077 (27.1%) cases of pregnant women experiencing hypertension (Shofi Jasmine et al., 2022). In Banten Province, the Maternal Mortality Rate (MMR) increased from 168.8 per 100,000 live births in 2017 to 215 per 100,000 live births in 2019 (Dinas kesehatan & Banten, 2017). In 2022 in Tangerang Regency, there were 177 pregnant women who experienced pregnancy-related hypertension (Tangerang, 2023).

Hypertension can occur due to several factors such as an unhealthy lifestyle, genetics, lack of exercise, obesity, emotions, stress, smoking, age factors, etc. (Ariyani, 2020). The impact of

pregnancy hypertension will be an imperfect placenta, where the placenta is implanted shallowly and the spiral arteries are not all dilated, lack of blood flow to the placenta, hypoxia, which will inhibit fetal growth, and the possibility of fibrin deposition in the blood of the placental blood vessels which can cause narrowing of the blood vessels (Haslan & Trisutrisno, 2022). The impact of hypertension on the fetus can affect fetal nutrition through the supply of maternal nutrients to the fetus which directly depends on the growth and function of the fetal placenta. When the placenta is not functioning, the placenta is unable to supply oxygen, nutrients, and other factors in sufficient quantities for fetal growth, and without this important support, the fetus cannot grow and develop optimally (Mohan et al., 2018). The impact of hypertension which is likely to be dangerous and life-threatening, it is necessary to carry out early treatment, namely by providing pharmacological and non-pharmacological treatment. Pharmacological treatment by utilizing various drugs such as beta blockers, diuretics, vasodilators and sympathetic (Putri, 2022). While non-pharmacological treatment by utilizing complementary therapies, namely herbal therapy, progressive relaxation, nutritional therapy, laughter therapy, acupuncture, aromatherapy, meditation, and reflexology (Silvitasari, 2018).

There have been many non-pharmacological treatments for hypertension, one of which is by using herbal therapy, namely by utilizing plants including celery leaves, rosella flowers, avocado leaves, starfruit leaves, soursop leaves, etc. (Aryantini, 2020). However, the use of starfruit leaves as an alternative non-pharmacological treatment for hypertension is still not widely known by the general public. In fact, starfruit leaves have several compounds such as potassium citrate which functions as a diuretic so that it can help lower blood pressure, and flavonoid content which also has the potential as an antioxidant to lower blood pressure (Simandalahi & Sukma, 2019). The aim of this study was for researchers to find out whether giving starfruit leaf tea can lower blood pressure in pregnant women with hypertension.

## **METHOD**

This study used a Quasi Experiment design with a pre-test post-test control group design, namely giving starfruit leaf tea to pregnant women with hypertension 1 time/day for 7 days as much as 200 cc. The study was conducted by observing the decrease in blood pressure of pregnant women with hypertension before (pretest) and after (posttest). In this plan, blood pressure measurements were taken twice to measure the blood pressure of pregnant women, namely before being given treatment (the first time being given starfruit leaf tea) and after being given treatment (the last day being given). The study was conducted in the Pasar Kemis District, Tangerang with a sample of 30 respondents divided into 2 groups, namely 15 pregnant women given intervention and 15 pregnant women not given intervention as a control group. Inclusion criteria were pregnant women with hypertension, aged 20-35 years, did not have complications and were not undergoing other traditional treatments. The instruments/measuring tools used included an ABN brand tensiometer with an accuracy level of  $\pm 3$  mmHg, a Onemed brand stethoscope, observation sheets, tabulation sheets, SOP for making, 2 grams of dried starfruit leaves, trays, blenders, scales, measuring cups, drinking bottles, 200 cc of clean water, stoves, pans and stirrers. The stages of the research carried out were submitting a permit letter to the Tangerang Regency Health Office and the Pasar Kemis District Health Center, submitting an ethical test, determining respondents, implementing the research and preparing the report.

The data analysis used was univariate and bivariate analysis. Univariate analysis was used to determine the frequency distribution of respondent characteristics, maternal blood pressure before and after intervention. Bivariate analysis in this study was used to determine the effectiveness of giving starfruit leaf tea on reducing blood pressure in pregnant women with

hypertension. Data analysis used Mann-Whitney because it was not normally distributed and the type of comparative hypothesis was 2 unpaired groups.

**RESULT**

Table 1.  
Frequency Distribution of Respondent Characteristics

Variable	f	%
Mother's Age		
Healthy Reproductive Age	30	100
Gestational Age		
Trimester II	14	46,7
Trimester III	16	53,3
Number of Pregnancies		
Primigravida	9	30
Multi Gravida	20	66,7
Grande Multi Gravida	1	3,,3

Table 1 shows that all respondents have a healthy reproductive age, namely 30 respondents (100%). In the characteristics of respondents based on gestational age, most respondents with gestational age in Trimester II, namely 16 respondents (53.3%). While the number of respondents' pregnancies is mostly with the number of Multi Gravida pregnancies, namely 20 respondents (66.7%).

Table 2.  
Frequency Distribution of Respondent Groups

Respondent Group	f	%
Intervention	15	50
Control	15	50

Table 2 shows that respondents were divided into 2 groups, namely the intervention group and the control group, each with a total of 15 respondents (50%) who had undergone a pre-test and post-test.

Table 3.  
Blood Pressure of Respondents before Being Given Starfruit Leaf Tea

Tekanan Darah	Mean	Min	Max	SD
Pretest Sistol	145,00	140	160	5,724
Pretest Diastole	103,33	100	110	4,795

Table 3 shows that the blood pressure value before being given starfruit leaf tea obtained an average pre-intervention systolic blood pressure of 145.00 mmHg, with a minimum value of 140 mmHg, a maximum value of 160 mmHg, and a standard deviation of 5.724. As for diastolic blood pressure, it is known that before being given starfruit leaf tea intervention, the average diastolic blood pressure was 103.33 mmHg, with a minimum value of 100 mmHg, a maximum value of 110 mmHg, and a standard deviation of 4.795.

Table 4.  
Respondents Blood Pressure after Being Given Starfruit Leaf Tea

Tekanan Darah	Mean	Min	Max	SD
Postest Sistol	137,33	120	150	9,072
Postest Diastole	96,00	80	110	7,240

Table 4 shows that the average value of post-intervention systolic blood pressure was 137.33 mmHg, with a minimum value of 120 mmHg, a maximum value of 150 mmHg, and a standard deviation of 9.072. While the average value of post-intervention diastolic blood pressure was 96.00 mmHg, with a minimum value of 80 mmHg, a maximum value of 110 mmHg, and a standard deviation of 7.240.

Table 5.

Effectiveness of Giving Starfruit Leaf Tea on Lowering Blood Pressure in Pregnant Women with Hypertension

Tekanan Darah	Mean			Homogenitas	p-value
	Pre	Post	Selisih		
Sistol	145,00	137,33	7,67	0,285	0,001
Diastole	103,33	96,00	6,67	0,157	0,002

Table 5, the results of the baseline homogeneity test of the data on the pretest systolic starfruit leaf tea were 0.285, where  $p > \alpha$  (0.05), so it can be interpreted that the data is homogeneous. While for diastole, it is known that the baseline homogeneity of the data on the pretest diastolic starfruit leaf tea was 0.157, where  $p > \alpha$  (0.05), so it can be interpreted that the data is homogeneous. Furthermore, the Mann-Whitney test of the starfruit leaf tea intervention obtained a p-value of 0.001 for systolic pressure and diastolic pressure of 0.002 ( $\alpha = 0.05$ ). This means that there is effectiveness between blood pressure before and after starfruit leaf tea is given.

**DISCUSSION**

The results of the study showed that respondents had a healthy reproductive age (20-35 years), namely 30 respondents (100%). The results of Bunga's (2024) study showed that maternal age had an effect on the incidence of hypertension with a risk level of 70% in mothers who were not at risk, while the age of pregnant women who were not at risk had a risk level of hypertension of 85% (Indraswari et al., 2021). Based on the results of research conducted by Tiara (2023), the factors that can cause hypertension in pregnant women are maternal age, parity or number of births and history of hypertension (Dayani & Widyantari, 2023). This is supported by Yurianti's theory (2020) that being too young and too old can increase the risk of hypertension. Mothers who are pregnant at an age that is too young in terms of biological development of their reproductive organs are not optimal and at an age that is too old will increase the occurrence of pregnancy complications. Meanwhile, the increasing age of the mother causes the body's absorption to tend to worsen and her reproductive organs have begun to degenerate, allowing complications to occur (Yurianti et al., 2020).

Based on the results of the study, it shows that some respondents with gestational age in Trimester III were 16 respondents (53.3%). Gestational age (gestational age) is the period or since conception at birth, calculated from the first day of menstruation and the last menstruation. Gestational age can affect the occurrence of hypertension in pregnant women. This is supported by the results of Ryska's research (2021) which states that there is a relationship between gestational age and the incidence of hypertension in pregnancy (Ningtias & Wijayanti, 2021). The results obtained from the study, most respondents with the number of Multi Gravida pregnancies, namely 20 respondents (66.7%). The results of the chi-square statistical test conducted by Alvionita (2022) obtained a  $p$ -value = 0.030  $< \alpha = 0.05$ , meaning that there is a significant relationship between parity and the incidence of pregnancy hypertension (Warini, 2022). This is supported by the results of Hellen's research (2019) which states that there is a significant relationship between parity and the incidence of hypertension in pregnant women (Okoye et al., 2019). According to Yingying's theory (2021), pregnant women with the number of multigravida pregnancies can experience hypertension which can cause babies to be born with low birth weight and experience preeclampsia both in early pregnancy and late pregnancy (Liu et al., 2021).

The results of the study showed the effectiveness of giving starfruit leaf tea to reduce blood pressure in pregnant women with hypertension in the Pasar Kemis sub-district with a p-value of 0.001 for systolic pressure and a p-value of 0.002 for diastolic blood pressure. This is in accordance with research conducted by Putri (2022) which stated that consuming starfruit leaf tea is effective in lowering blood pressure in people with hypertension (Putri, 2022). The

results of Sari's study (2023) stated that starfruit leaf tea therapy obtained an average blood pressure of 134.06/75.00 mmHg. Therefore, it can be interpreted that systolic blood pressure in hypertensive patients decreased by 20.06 mmHg and diastolic blood pressure by 17.50 mmHg after treatment with starfruit leaf tea. Starfruit contains flavonoids, potassium, and vitamin C which can help lower high blood pressure (Sari et al., 2024). The active substances that can be obtained from starfruit leaves include saponins and flavonoids. Saponins function as antihyperglycemics by preventing glucose uptake at the brush border in the small intestine. While flavonoids are alpha-glucosidases which function to delay carbohydrate absorption so that blood glucose levels will decrease. The purified ethanol extract from starfruit leaves has the potential to be developed into an antihypertensive drug, because it has the effect of lowering blood pressure. Vitamin C is an antioxidant that plays a role in neurotransmitters which can contribute to antihypertensive activity (Salam, 2023). Panaungi's theory (2024) states that starfruit leaf tea can be used as a traditional medicine to lower hypertension because the plant has antimicrobial properties (Panaungi et al., 2024). In addition, the mechanism of starfruit leaves can lower blood pressure empirically or traditionally, starfruit leaves can lower blood pressure through a diuretic mechanism, namely reducing the amount of water in blood plasma by excreting it as urine (Simandalahi & Sukma, 2019). Renin inhibition will inhibit these changes so that vasoconstriction can be prevented, which ultimately helps lower blood pressure (Patricia, Venny, Yani, 2022). Starfruit leaves are a good alternative, besides starfruit leaves are easily available to the public (Simandalahi & Sukma, 2019).

## **CONCLUSION**

It shows that after the respondents were given intervention for 7 consecutive days, there was a decrease in systolic pressure of 7.67 mmHg and a decrease in diastolic pressure of 6.67 mmHg. So these results show that starfruit leaves have an influence in reducing blood pressure, both systolic and diastolic, in pregnant women with hypertension.

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