MEDISAINS
Jurnal Ilmiah Ilmu - Ilmu Kesehatan

Original Article

The effect of consuming rosella flower-infused water on control blood pressure in pregnant women with hypertension

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ARTICLE INFORMATION

Received: October 02, 2024
Revised: October 26, 2024
Accepted: December 02, 2024

KEYWORDS

Blood pressure;Hypertension; Pregnancy; Rosella Flower-infused water

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A B S T R A C T

Background: Hypertension during pregnancy is one of the leading causes of maternal morbidity and mortality. Rosella flower infused-water, rich in bioactive compounds such as flavonoids and polyphenols, have been shown to lower blood pressure safely. Although previous studies have highlighted the antihypertensive effects of rosella in the general population, research specifically focusing on its use in pregnant women with hypertension is still limited.

Objective: This study aims to investigate the effect of rosella flower-infused water on control blood pressure reduction in pregnant women with hypertension.

Method: The research design used is quasi-experimental with a pre-test and post-test approach involving 100 pregnant women with hypertension in Desa Karangraharja. The intervention group received 200 ml of rosella flower-infused water for 14 days in conjunction with nifedipine 10 mg, while the control group only received nifedipine 10 mg. The blood pressure of the control and intervention groups was measured using the Mann-Whitney Test.

Results: The rosella flower-infused water effectively reduced systolic blood pressure in the intervention group by 24.92 mmHg compared to the control group by 18.78 mmHg (p=0.000). Diastolic blood pressure in the intervention group decreased by three mmHg, although this was not statistically significant compared to the control group's decrease of 3.6 mmHg (p=0.715).

Conclusion: The 200 ml rosella flower-infused water for 14 consecutive days reduced systolic blood pressure in pregnant women with hypertension.

INTRODUCTION

Hypertension in pregnancy is an increase in systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg in pregnant women who were previously normotensive, and it returns to normal within 12 weeks postpartum.[1] HDP is one of the primary causes of maternal and perinatal morbidity and mortality, with a prevalence of approximately 10% worldwide. About 75% of the leading causes of maternal death are due to severe bleeding, postpartum infections, and high blood pressure during pregnancy, with nearly 99% of maternal deaths occurring in developing countries.

Hypertension during pregnancy can cause serious complications such as severe preeclampsia, placental blood flow disturbances, fetal growth restriction, and premature birth. Adequate and appropriate management of hypertension in pregnant women is crucial to reduce the risk of complications.[2,3] Hypertension can be managed through pharmacological and non-pharmacological methods. According to standard care, pharmacological management includes administering antihypertensive medications and adequate antenatal care. Although antihypertensive medications have good efficacy, long-term use can lead to side effects such as headaches, tachycardia, placental abruption, maternal and fetal hypoperfusion, peripheral edema, increased risk of pulmonary edema, intrauterine growth restriction, and low birth weight.[4] Therefore, non-pharmacological complementary therapies that are safer, more comfortable, and have minimal side effects are increasingly sought after.[5]

Interest in alternative therapies has increased, with numerous studies aimed at uncovering the potential of these therapies in safely reducing blood pressure in pregnant women. One of the alternative therapies that has been well-known for a long time is rosella flower-infused water, which is known to have potential effects in lowering blood pressure in hypertensive patients.[6] Rosella flowers contain bioactive compounds such as flavonoids an d polyphenols, which have vasodilatory and antioxidant effec-

https://doi.org/10.30595/ medisains.v23i1.24075

ts, thereby potentially reducing blood pressure.[7]

Although several studies have evaluated the efficacy of rosella flower-infused water in increasing hemoglobin levels in pregnant women and reducing blood pressure in non-pregnant hypertensive patients, there remains a research gap regarding its specific efficacy in pregnant women with hypertension. [6,8] Therefore, this study is important to fill this gap and provide more substantial scientific evidence about the potential of rosella flower-infused water as a safe and effective additional therapy for pregnant women with hypertension.

METHOD

Study Design

The research design of this study is a quasi-experimental design with a pre-post test control group design. [9–11]

Setting and Respondent

This study was conducted in the Karang Raharja village area from July to September 2024. The study population consisted of pregnant women, with a total sample size of 100 participants. The inclusion criteria included primigravid women aged 20–35 years, with a gestational age of 20 weeks, systolic blood pressure >120 mmHg, and diastolic blood pressure >80 mmHg, who were willing to adhere to the research schedule, non-smokers, and non-alcohol consumers. Meanwhile, the exclusion criteria included pregnant women with preeclampsia, diabetes mellitus, or a history of bleeding. The sampling technique used was purposive sampling.[12]

Variables, Instruments, and Measurement

The independent variable in this study is rosella flower-infused water, while the dependent variable is blood pressure in pregnant women with gestational hypertension. The instrument used in this study is a sphygmomanometer. All variables were measured through observation and recording of blood pressure measurements.[13]

Experimental Procedure

The rosella flower-infused water, 200 ml, was given once a day in the morning for 14 days. Meanwhile, the control group received 10 mg of nifedipine once a day for the same 14-day period.[14,15]

Data analysis

This study's design was pre-experimental, using the mann-whitney test to compare blood pressure before and after the intervention.

Ethical considerations

This research has received ethical approval from the ethical Health Research Ethics Committee of Universitas Harapan Bangsa, with the permit number No.BLPPM-UHB/702/07/2024.

RESULTS

Table 1 shows that the intervention group, consisting of 50 respondents, was dominated by mothers aged between 26-30 years and 31-35 years, with the majority in the third trimester of pregnancy. Most respondents in this group were multiparous, and many were housewives, with the highest level of education predominantly at the high school level.

Table 1. Characteristics of Respondent (n=100)

	Result	
Characteristic	**Intervention**	**Control**
Age		
20-25 Years	14 (28%)	8 (16%)
26-30 Years	18 (36%)	22 (%)
31-35 Years	18 (36%)	20 (40%)
Gestational Age		
Second Trimester	18 (36%)	15 (30%)
Third Trimester	32 (64%)	35 (70%)
Parity		
Primipara	3 (6%)	3 (6%)
Multipara	30 (60%)	30 (60%)
Grandemulti	17 (34%)	17 (34%)
Occupation		
Teacher	1 (2%)	3 (6%)
Housewife	37 (74%)	38 (76%)
Private Employee	12 (24%)	10 (10%)
Education		
Bachelor's Degree	18 (36%)	5 (10%)
High School	32 (64%)	45 (90%)

Table 2. Changes in Systolic Blood and Diastolic Pressure in Pregnant Women

Variable	Intervention	Control	p-value
Systolic Blood Pressure (mmHg)			
Before	148.30±7.667	150.08± 7.403	
After	123.38±7.467	131.30± 4.819	0.000[a]
P	0.000[b]	0.000[b]	
∆	24.92 ± 0.2	18.78±2.58	
Diastolic Blood Pressure (mmHg)			
Before	101.60±5.095	101.80± 6.911	
After	98.60±5.718	98.20± 5.956	0.715[a]
P	0.003[b]	0.000[b]	

Exp: [a] Mann Whitney Test, [b] Wilcoxon Test

Table 2 shows that after 14 days of treatment, the intervention group receiving rosella flower-infused water and 10 mg nifedipine experienced a significant reduction in systolic blood pressure, nearing the normal range for pregnant women (p=0.000). The control group, treated with 10 mg nifedipine alone, also decreased systolic blood pressure but remained within the hypertensive range

(p=0.000). However, no significant difference was observed in diastolic blood pressure changes between the two groups (p=0.715).

DISCUSSION

The findings of this study indicate that giving rosella flower-infused water for 14 days effectively lowers blood pressure in pregnant women with hypertension. Rosella flowers contain antioxidant and anti-inflammatory compounds that help dilate blood vessels, reducing blood vessel resistance. The vasodilating effect contributes to a decrease in systolic blood pressure, where the study's results showed a decrease in average systolic blood pressure from 148.30 mmHg before the intervention to 123.38 mmHg after 14 days.

This study's results are from previous studies that showed the antihypertensive effect of rosella flowers, namely a significant decrease in blood pressure. Previous studies have shown that giving rosella tea can lower systolic blood pressure by up to 14 mmHg with a p-value = 0.000, which shows the potential of rosella as a non-pharmacological drug.[16] Other studies also found that giving rosella flowers with different doses (1 g, 5 g, and 10 g) showed a significant decrease in systolic blood pressure, especially at a dose of 10 g, which resulted in a decrease of up to 25 mmHg.[17]

Rosella is a tropical plant native to India and Malaysia, widely cultivated in tropical and subtropical regions worldwide, such as Central and West Africa and Southeast Asia. Rosella is known as Karkade, Bissap, sour, and red tea.[18,19] Rosella has been used in traditional culinary practices (food, food coloring, drinks) and as a traditional medicine for various conditions. For example, various parts of the plant (flowers, leaves, petals, and calyxes) are widely consumed as refreshing drinks in China, Taiwan, and Thailand. Pharmacological evidence suggests that Roselle has antihypertensive, antihyperlipidemic, anti-inflammatory, antimicrobial, diuretic, and uricosuric effects and has been used to treat hyperuricemia and anemia. Moderate consumption of Roselle is generally considered safe for most people.

Roselle is also an important source of nutritional components, bioactive compounds, and coloring agents, as it is rich in anthocyanins and water-soluble pigments. [20,21] The red anthocyanin pigment in the petals is used as a food coloring agent. Anthocyanins are associated with hypotensive effects; their direct and indirect mechanisms have been described in previous studies.[22] This study found that anthocyanins reduce the synthesis of vasoconstrictor molecules by inhibiting angiotensin II-converting enzyme, thereby preventing vasoconstriction and hypertension.[23]

rosella flower-infused water works by increasing metabolism and improving blood circulation.[24] Flavonoids in roselle flowers play a role in increasing the elasticity of blood vessels, thereby helping to lower blood pressure. In addition, the diuretic effect of rosella can reduce circulating blood volume, which also contributes to lowering blood pressure.[25] Although the results of this study are promising, there are limitations, including uncontrolled factors that may influence the effect of rosella on blood pressure.[26]

CONCLUSIONS AND RECOMMENDATION

This study concludes that the administration of rosella flower-infused water significantly reduces blood pressure in pregnant women with hypertension. The active compounds in rosella, such as anthocyanins and flavonoids, contribute to vasodilation, improved blood circulation, and reduced blood pressure. Additionally, rosella's antioxidant and anti-inflammatory properties help protect blood vessels from damage caused by free radicals and chronic inflammation, which are critical factors in the pathogenesis of hypertension.

Given its non-pharmacological nature, rosella may serve as a safer alternative for pregnant women compared to chemical antihypertensive drugs, which often come with side effects. However, it is important to recognize that medicinal plants like rosella are not primary replacements for medical treatments but rather complementary therapies that should be used wisely and within recommended limits. Future studies should consider these variables to obtain more comprehensive conclusions about the benefits of rosella flower-infused water in pregnant women with hypertension.

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