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THE EFFECT OF MORINGA LEAF BREWING ON BLOOD PRESSURE IN HYPERTENSION SUFFERERS

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ABSTRACT

This study aimed to determine the effect of Moringa leaf decoction on lowering blood pressure in hypertensive patients in the Kandang Community Health Center (Puskesmas) area, Bengkulu City. This study was quantitative, using a quasi-experimental approach with a single-group pre-test and post-test design. The statistical analysis of Moringa leaf decoction showed a p-value of $0.000 \leq 0.005$. In conclusion, there was an effect after administering Moringa leaf decoction to hypertensive patients in the Kandang Community Health Center area, Bengkulu City.

Keywords: Moringa Leaves, Hypertension, Blood Pressure

INTRODUCTION

Hypertension is a condition in which blood pressure in the blood vessels is consistently elevated, usually defined clinically as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg, or the use of antihypertensive medications (Charchar et al., 2023; Zhang et al., 2023). Hypertension is a major risk factor for cardiovascular diseases such as coronary heart disease, heart failure, and stroke. The global prevalence of hypertension is very high, with more than 1.5 billion people affected, and its management and control remain poor in many countries (Charchar et al., 2023; Zhang et al., 2023). The mechanisms of hypertension involve a complex immune and inflammatory system, including the activation of immune cells and cytokines that lead to endothelial dysfunction and vascular remodeling (Guzik et al., 2024). The definition of hypertension also includes specific subtypes, such as pulmonary hypertension, which has distinct criteria based on a mean pulmonary artery pressure >20 mmHg (Kovacs et al., 2024; Maron, 2023).

The prevalence of hypertension in Southeast Asia, including Indonesia, shows a significant increasing trend. In Indonesia, the prevalence of hypertension in adults increased from approximately 27.9% in 2013 to 31.6% in 2023, with most cases remaining undiagnosed and blood pressure control rates low (Muharram et al., 2025). Among adolescents in Southeast Asia, the prevalence of hypertension is estimated at approximately 12.37%, with a specific figure in Indonesia of approximately 11.39% (Andrianto et al., 2024). Key risk factors include obesity, age, male gender, and lifestyle factors such as low physical activity and excessive salt consumption (Loo et al., 2024; Sudikno et al., 2023). The WHO projects that Southeast Asia will experience a high prevalence of hypertension, particularly among men, by 2040 (Boateng & Ampofo, 2023).

Based on data from the Bengkulu Provincial Health Office (2022), blood pressure measurements in Bengkulu Regency and Province showed that residents aged 15 and over had hypertension. The highest prevalence was in Rejang Lebong Regency, with 62,323 people, followed by Bengkulu City (36,404), Seluma Regency (36,007), Lebong Regency (31,161), Kepahyang (30,521), South Bengkulu (28,335), and Kaur (17,013).

Data on the prevalence of hypertension among Bengkulu City residents aged 15 and over showed 50,898 individuals. In terms of characteristics, the number of men diagnosed with hypertension reached 25,484, while the number of women was 25,414. According to information obtained, Telaga Dewa Community Health Center recorded the highest number of hypertension sufferers in 2023, with 4,248 people. Jembatan Kecil Community Health Center was second with 4,120 people, while Kandang Community Health Center was third with 3,177 people (Bengkulu City Health Office, 2023).

According to data provided by the Bengkulu City Health Office, in 2022, Kandang Community Health Center ranked fifth in terms of hypertension incidence, with 2,261 people. However, in 2023, there was a significant increase in hypertension sufferers at Kandang Community Health Center, which now ranks third with a total of 3,177 people.

Hypertension can be managed through non-pharmacological approaches, such as herbal remedies and physical activity. These methods are relatively easy to administer independently, affordable, safe, and offer various health benefits without side effects (Widyaningsih et al., 2023).

A study conducted by Wulan et al. (2023) showed that analysis using the Wilcoxon Statistical Test demonstrated the effect of Moringa leaf decoction on blood pressure before and after administration. The p-value was 0.001, meaning less than 0.05, indicating a significant effect on blood pressure after administration of Moringa leaf decoction.

The primary mechanism for this blood pressure reduction involves increased endothelial nitric oxide (NO) production, which causes vasorelaxation of blood vessels, and reduced oxidative stress, which improves vascular function (Aekthammarat et al., 2020). Bioactive compounds in moringa leaves, such as flavonoids and phenolics, also act as angiotensin-converting enzyme (ACE) inhibitors, which help lower vascular resistance and blood pressure (Qadi et al., 2025; Xu et al., 2021). Studies in animal models of hypertension have shown that moringa leaf extract can dose-dependently reduce blood pressure and improve vascular responses to stimuli (Aekthammarat et al., 2019). Furthermore, the antioxidant and anti-inflammatory effects of moringa leaves support vascular endothelial health, which is important in the management of hypertension (Pareek et al., 2023).

Although initial results are promising, further controlled clinical trials are needed to confirm the effectiveness and safety of using Moringa leaf decoction as an adjunct therapy for hypertension (Menchietti et al., 2025).

RESEARCH METHODS

This study used a pre-experimental quantitative research method. This research design is known as a one-group pre-post test design, consisting of one intervention group. The first group was the Moringa leaf decoction intervention.

Population and Sample

Population

The population of this study was all hypertension sufferers in the Kandang Community Health Center (Puskesmas) working area in Bengkulu City, totaling 3,177 people, based on 2023 data collected from the Kandang Community Health Center.

Sample

In this study, the sampling technique for hypertension was based on the productive age group of 36-69 years. A total of 30 individuals were selected using a purposive sampling technique, which was based on the researcher's own considerations based on previously known population characteristics or traits, also known as inclusion and exclusion criteria.

Inclusion Criteria

Hypertension patients in the Kandang Community Health Center Work Area; Patients aged 36-69 years; Patients with systolic blood pressure of 140-159 mmHg and diastolic blood pressure of 90-99 mmHg; Patients willing or prepared to participate.

Exclusion Criteria

Patients with complications such as stroke, kidney failure, and seizures; Patients taking antihypertensive medication or currently undergoing treatment; Patients consuming alcohol.

Research Instruments

In this study, researchers used digital blood pressure monitors, measuring cylinders, and observation sheets on respondents in the intervention group before and after administration of Moringa leaf decoction.

Data Analysis Techniques

Univariate Analysis

The aim was to examine the distribution and characteristics of each variable.

Bivariate Analysis

This was conducted by examining the effect of each dependent variable. A t-test was used to determine whether there was a significant effect before and after the intervention. The 95% confidence interval ($\alpha = 0.05$) was used. If the data is not normally distributed, we can use the Wilcoxon test. Data processing in this study used SPSS.

RESEARCH RESULTS

Univariate Analysis Results

Age

Tabel. 1
Frequency Distribution of Respondents Based on Patient Age

Variabel	N	Mean	Sd.Deviation	Min	Max
Moringa Leaf Decoction	15	50,67	10,293	36	69

Based on table 1, it is known that the average age of respondents in the Moringa leaf decoction intervention group was 50.67 years with SD = 10.293.

Gender and Medical History

Table. 2
Frequency Distribution by Gender and Medical History

	Variable			
	Gender		Medical History	
	N	%	N	%
Man	3	20		
Woman	12	80		
There is			4	27
There isn't any			11	73

Based on Table 2, it can be concluded that the characteristics of respondents who consumed Moringa leaf decoction based on gender were predominantly female (12 respondents) (80%). The characteristics of respondents who consumed Moringa leaf decoction based on gender were predominantly female (11 respondents) with no history of illness (73%).

Bivariate Analysis Results: Effect of Moringa Leaf Decoction

Table. 3
Effect of Lowering Blood Pressure
before and after Being Given Boiled Moringa Leaves

Variable	**Mean**	**N**	**Sd.Deviation**	**Max**
TD Systolic before Moringa leaf decoction	145,40	15	5.068	0,000
TD Systolic after Moringa leaf decoction	135,48		7.803	
TD Diastolik before boiling the moringa leaves	91,60	15	1.920	
TD Diastolik after boiling moringa leaves	84,94		2.588	0,000

Based on the information in table 1, it can be seen that there was a decrease in the average blood pressure of the group measured before and after receiving Moringa leaf decoction, with a decrease in systolic blood pressure of 9.92 mmHg and diastolic of 6.66 mmHg. In addition, statistical analysis showed that the p value for systolic blood pressure was 0.000 and the p value for diastolic blood pressure was also 0.000. The average systolic blood pressure before consuming Moringa leaf decoction was recorded at 145.40 mmHg and diastolic 91.60 mmHg, which is included in the category of Hypertension level 1. Meanwhile, the average systolic blood pressure after consuming Moringa leaf decoction was 135.48 and diastolic 84.94, which is included in the category of Pre-Hypertension. Thus, it can be concluded that there is an effect on hypertension after the patient received Moringa leaf decoction.

DISCUSSION

The Effect of Moringa Leaf Decoction on Hypertension Sufferers

Research results indicate that hypertension can affect both men and women. Data obtained from this study indicate that the majority of participants using moringa leaves were women, with 12 respondents (80%). Premenopausal women typically receive protection from the hormone estrogen, which functions to increase High Density Lipoprotein (HDL) levels. Research conducted by Livana & Basthomi (2020) in Kendal City showed that gender is correlated with and is a risk factor for hypertension (p=0.000, R=0.316).

The mechanisms of hypertension involve a complex immune and inflammatory system, including the activation of immune cells and cytokines that lead to endothelial dysfunction and vascular remodeling (Guzik et al., 2024). The definition of hypertension also includes specific subtypes, such as pulmonary hypertension, which has distinct criteria based on a mean pulmonary artery pressure >20 mmHg (Kovacs et al., 2024; Maron, 2023).

Moringa leaves have a relatively high potassium content, with 259 mg of potassium per 100 g of leaves. While the sodium content is relatively low, making them beneficial and safe for people with hypertension (Riniasih & Hapsari, 2021).

Moringa oleifera leaf decoction has been shown to lower blood pressure in hypertensive patients, with significant reductions in systolic and diastolic blood pressure reported in several studies. Bioactive compounds in Moringa leaves, such as flavonoids, phenolics, and angiotensin-converting enzyme (ACE) inhibitors, contribute to vasodilation, increased nitric oxide (NO) synthesis, and reduced vascular resistance, all of which contribute to the lower blood pressure (Qadi et al., 2025; Khaled et al., 2023; Xu et al., 2021). A meta-analysis of randomized clinical trials suggests that Moringa supplementation can produce a modest reduction in diastolic blood pressure, although these results require further confirmation through studies with more robust designs and larger sample sizes (Crisan et al., 2025).

Furthermore, the antioxidant and anti-inflammatory properties of Moringa also help improve vascular endothelial function, which plays a crucial role in the management of hypertension (Qadi et al., 2025; Adarthaiya & Sehgal, 2023). However, despite promising preliminary evidence, rigorously controlled clinical trials are needed to confirm the effectiveness and safety of Moringa leaf decoction as an adjunct therapy for hypertension (Menichetti et al., 2025; Pareek et al., 2023). Thus, Moringa leaf decoction has potential as a blood pressure-lowering agent in hypertensive patients, but its use must be supported by further clinical research.

CONCLUSION

There was an effect on hypertension after being given boiled moringa leaves to hypertension patients in the Kandang Community Health Center (Puskesmas) in Bengkulu City.

SUGGESTIONS

For the Community

It is hoped that this research can serve as a source of information and reference. The results can be applied by the community, especially those with hypertension.

For Researchers

It is hoped that future researchers can develop non-pharmacological therapies by applying boiled moringa leaves in combination with other herbs, and modifying it into tea powder or juice.

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