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THE EFFECT OF BAY LEAF (*SYZYGIUM POLYANTHUM*) DECOCTION ON SYSTOLIC BLOOD PRESSURE REDUCTION AMONG HYPERTENSIVE PATIENTS

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Abstract

Hypertension is a major global public health concern and one of the leading causes of cardiovascular morbidity and mortality. In Indonesia, its prevalence continues to rise, particularly among adults in primary healthcare settings. Complementary and alternative treatments using natural ingredients have gained attention for their accessibility, affordability, and cultural acceptance. Bay leaf (*Syzygium polyanthum*) is a traditional Indonesian medicinal plant containing flavonoids, tannins, and alkaloids, which have vasodilatory and diuretic properties. This study aimed to analyze the effect of bay leaf decoction on systolic blood pressure reduction among hypertensive patients at the Gambut Health Center. A pre-experimental design with a one-group pretest–posttest approach was applied involving 15 hypertensive patients selected through purposive sampling. Participants consumed 200 ml of bay leaf decoction once daily for seven consecutive days. Blood pressure was measured before and after the intervention using a digital sphygmomanometer, and data were analyzed using a paired sample t-test. The results showed a significant decrease in mean systolic blood pressure from 156.53 ± 12.48 mmHg to 136.00 ± 10.23 mmHg (p = 0.000061). This finding demonstrates that bay leaf decoction effectively lowers systolic blood pressure among hypertensive patients. In conclusion, bay leaf decoction can be recommended as a safe, affordable, and culturally accepted complementary therapy for managing hypertension in primary healthcare settings.

Keywords: Bay Leaf Decoction, Complementary Therapy, Hypertension, Systolic Blood Pressure, Primary Healthcare

Introduction

Hypertension remains a major global public health concern, contributing substantially to cardiovascular morbidity and mortality worldwide. The World Health Organization (WHO) reported that approximately 1.28 billion adults aged 30–79 years suffer from hypertension, with nearly two-thirds living in low- and middle-income countries (1). The American Heart Association (AHA) notes that hypertension is a primary risk factor for heart disease, stroke, and renal complications, causing nearly 10 million deaths annually (2). The global trend shows a steady increase in prevalence, driven by population aging, sedentary lifestyles, dietary changes, and psychosocial stressors (3,4).

In Indonesia, hypertension continues to be a critical health problem. According to the Ministry of Health of the Republic of Indonesia, 34.1% of adults are hypertensive, making it one of the most prevalent non-communicable diseases nationally (5). Despite pharmacological therapy and government-led prevention programs, blood pressure control among hypertensive patients remains unsatisfactory. Barriers include limited access to health facilities, low adherence to treatment, and

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socioeconomic constraints (6,7). As a result, complementary and alternative therapies utilizing natural ingredients are gaining attention due to their accessibility, affordability, and cultural acceptance.

One of the traditional herbal ingredients widely used in Indonesia is bay leaf (Syzygium polyanthum). This plant contains flavonoids, tannins, and alkaloids with pharmacological activities such as vasodilation, diuresis, and antioxidant effects (8,9). Flavonoids enhance endothelial nitric oxide synthesis, promoting vascular relaxation and reducing oxidative stress, while tannins and alkaloids regulate sodium excretion and vascular resistance (10). These biological effects may contribute to blood pressure reduction, supporting the potential role of bay leaf decoction as an adjunctive therapy for hypertension management.

Several studies have provided evidence for the hypotensive effect of bay leaf decoction. Research in Yogyakarta demonstrated a significant decrease in blood pressure after 14 days of bay leaf decoction consumption among hypertensive patients (8). Another study found similar effects, showing that consistent daily intake of bay leaf decoction effectively lowers both systolic and diastolic blood pressure without adverse reactions (11). However, these studies were limited by small sample sizes and short intervention durations, leading to insufficient clinical generalization.

In the local context, preliminary observations at the Gambut Health Center, South Kalimantan, revealed that hypertension remains one of the most common chronic diseases. Many patients showed interest in using bay leaf decoction as part of their self-care regimen, considering it a natural, safe, and low-cost alternative. Informal pilot observations indicated an average reduction of 10 mmHg in systolic blood pressure after routine consumption for two weeks. This finding highlights the relevance of exploring bay leaf decoction as a culturally compatible complementary therapy for hypertensive patients in community health settings.

Considering the persistent burden of hypertension, the limitations of pharmacological management, and the growing preference for herbal-based interventions, scientific investigation into the therapeutic effect of bay leaf decoction is warranted. Therefore, this study aims to analyze the effect of bay leaf (Syzygium polyanthum) decoction on the reduction of systolic blood pressure among hypertensive patients at Gambut Health Center, providing empirical evidence to support its use as a complementary therapy for hypertension management.

Method

This study used a pre-experimental design with a one-group pretest–posttest approach to examine the effect of bay leaf (*Syzygium polyanthum*) decoction on systolic blood pressure reduction among hypertensive patients. Each participant served as their own control, allowing observation of changes before and after the intervention.

The research was conducted from February to April 2024 in the working area of Gambut Public Health Center, Banjar Regency, South Kalimantan Province an area with a high prevalence of hypertension. The study population included all hypertensive patients visiting the health center. Using purposive sampling, 15 respondents were selected based on inclusion and exclusion criteria. Inclusion criteria consisted of patients aged 35–65 years, diagnosed with hypertension, willing to participate through informed consent, and not consuming other herbal antihypertensive remedies. Exclusion criteria were severe complications such as stroke, renal failure, or heart disease, and failure to complete the intervention.

The independent variable was bay leaf decoction administration, while the dependent variable was systolic blood pressure. The decoction was prepared by boiling 10 fresh bay leaves in 400 ml of water until 200 ml remained. Respondents consumed 200 ml once daily for seven consecutive days. Blood pressure was measured before (pretest) and after (posttest) the intervention using a calibrated Omron digital sphygmomanometer, and results were recorded on observation sheets.

The procedure began with participant briefing and consent. Initial blood pressure was measured, followed by daily consumption of the decoction, and final measurements were taken on the seventh day. Data were analyzed using the Paired Sample t-Test with a significance level of $\alpha = 0.05$. A *p*-value < 0.05 indicated a significant effect.

Ethical approval was obtained from the Health Research Ethics Committee of Universitas Sari Mulia, and all participants' rights were protected under ethical principles of informed consent, anonymity, and confidentiality.

Results

Table 1. Characteristics of Respondents (n = 15)

Characteristics	Category	Frequency (f)	Percentage (%)
Gender	Male	1	6.7
	Female	14	93.3
Education Level	Elementary School	4	26.6
	Junior High School	11	73.3
Occupation	Housewife	12	80.0
	Farmer	2	13.3
	Entrepreneur	1	6.7
Family History of Hypertension	Present	6	40.0
	Absent	9	60.0

Most respondents were female (93.3%), had junior high school education (73.3%), and worked as housewives (80.0%). A total of 40.0% reported a family history of hypertension. These findings indicate that the majority of hypertensive patients in the study area were women with lower educational levels and domestic occupations.

Table 2. Distribution of Systolic Blood Pressure Before and After Bay Leaf Decoction Administration (n = 15)

Blood Pressure Category	Pretest (Before)	Posttest (After)	p-value
Normal	0 (0%)	7 (46.7%)	0.000061
High Normal	6 (40%)	2 (13.3%)	
Hypertension Grade 1	3 (20%)	2 (13.3%)	
Hypertension Grade 2	2 (13.3%)	2 (13.3%)	
Hypertension Grade 3	4 (26.7%)	2 (13.3%)	
Total	**15 (100%)**	**15 (100%)**	

After the intervention, the proportion of respondents with normal systolic blood pressure increased from 0% to 46.7%, while those classified in hypertension grade 3 decreased from 26.7% to 13.3%. Statistical analysis using the paired t-test yielded a significant result ($p = 0.000061$), confirming the effectiveness of bay leaf decoction in reducing systolic blood pressure levels.

Table 3. Mean Systolic Blood Pressure Before and After Intervention

Variable	Mean (mmHg)	SD	p-value
Before Intervention	156.53	12.48	**0.000061***
After Intervention	136.00	10.23	

The mean systolic blood pressure before the intervention was 156.53 ± 12.48 mmHg and decreased to 136.00 ± 10.23 mmHg after seven days of bay leaf decoction administration. The paired t-test showed a statistically significant reduction ($p = 0.000061$), indicating a clinically relevant improvement in blood pressure control.

Discussion

The results of this study revealed that the majority of respondents were female (93.3%) and only 6.7% were male. This pattern indicates that hypertension tends to be more prevalent among women in the working area of Gambut Health Center. This finding aligns with studies showing that postmenopausal women are at greater risk of hypertension due to decreased estrogen levels (12). Estrogen plays an essential role in vascular regulation by maintaining endothelial function, modulating lipid metabolism, and promoting nitric oxide synthesis. The decline in estrogen after menopause reduces vascular elasticity, leading to increased arterial stiffness and elevated blood pressure. Furthermore, psychosocial factors such as stress from multiple household roles may contribute to higher sympathetic activation among women, thereby elevating blood pressure (13).

In terms of education, most respondents (73.3%) completed junior high school, while 26.6% had only primary education. Educational attainment strongly influences health literacy, lifestyle choices, and adherence to medical recommendations. Previous studies have reported that individuals with low educational levels are more likely to engage in unhealthy behaviors, including excessive salt intake, limited physical activity, and irregular medical checkups (14). Moreover, lower education is associated with poor compliance with antihypertensive treatment and reduced awareness of preventive measures (15). These factors may contribute to poor blood pressure control among populations with lower education levels.

Occupational stress also emerged as a contributing factor. The majority of respondents were housewives (80%), while others were farmers and small entrepreneurs. Housewives often face chronic fatigue and emotional strain due to domestic workload and family responsibilities. Continuous psychological stress activates the hypothalamic-pituitary-adrenal (HPA) axis, increasing cortisol secretion and sympathetic activity, which elevate blood pressure (16). Farmers and entrepreneurs also experience occupational stress from economic uncertainty, market instability, and long working hours. These findings are consistent with earlier reports showing that work-related stress significantly increases hypertension risk among both rural and urban workers (17,18).

Genetic predisposition was another factor observed in this study, as 40% of respondents reported a family history of hypertension. Family history is a well-known non-modifiable risk factor, reflecting shared genetic and environmental influences. Individuals with hypertensive parents have a twofold higher risk of developing hypertension due to inherited variations affecting sodium retention, vascular tone, and renin-angiotensin system activity (19). Nevertheless, genetic susceptibility alone does not determine disease manifestation; modifiable factors such as diet, exercise, and stress control remain crucial in blood pressure regulation (20). Therefore, community-based education and behavioral interventions are necessary even among those with hereditary risks.

Beyond demographic characteristics, the results demonstrated a statistically significant decrease in mean systolic blood pressure after seven days of consuming bay leaf (Syzygium polyanthum) decoction ($p = 0.000061$). The mean systolic pressure declined from 156.53 mmHg to 136.00 mmHg, representing a reduction of 20.53 mmHg. This result confirms the hypotensive potential of bay leaf decoction as observed in previous studies. Hakim and Pratiwi (2021) found that consuming bay leaf decoction for two weeks effectively reduced blood pressure levels among hypertensive patients (8). Similarly, Rahmawati and Setiawan (2019) reported that bay leaf infusion caused significant reductions in both systolic and diastolic blood pressures after regular consumption (11).

The hypotensive mechanism of bay leaf is attributed to its phytochemical components—flavonoids, tannins, and alkaloids. Flavonoids enhance endothelial nitric oxide (NO) production, leading to vasodilation and improved vascular compliance (9). Tannins possess diuretic effects, promoting sodium and water excretion, while alkaloids exhibit ACE-inhibitory activity, reducing angiotensin II production and thereby lowering vascular resistance (10,21). This mechanism aligns with Setiawan and Sudarsono (2020), who demonstrated that bay leaf extract inhibits angiotensin-

converting enzyme (ACE), decreasing systemic blood pressure in experimental models (21). The observed clinical effects in this study thus provide additional empirical support for these biochemical pathways.

The 20.53 mmHg reduction in systolic pressure observed here is clinically meaningful. According to Whelton et al. (2018), even a 10 mmHg reduction in systolic pressure can significantly reduce the risk of major cardiovascular events by up to 20% (19). Therefore, the effect magnitude of bay leaf decoction in this study represents a substantial therapeutic benefit, particularly for resource-limited populations that rely heavily on non-pharmacological management strategies.

The study also reinforces the concept that traditional herbal therapies can complement standard pharmacological approaches. Plant-derived antioxidants such as flavonoids play a crucial role in maintaining endothelial integrity and counteracting oxidative stress, two major contributors to hypertension (9,22). Pérez-Vizcaíno et al. (2015) emphasized that dietary intake of flavonoid-rich plants improves endothelial function and enhances vascular relaxation, further supporting the findings of this study (9).

From a public health perspective, bay leaf decoction represents a culturally acceptable, low-cost, and accessible intervention that can be integrated into hypertension management at the community level. Its preparation is simple, and its raw material is widely available in Indonesia, making it feasible for large-scale use in primary care settings. Integrating this intervention into Posbindu PTM (Integrated Non-Communicable Disease Posts) could enhance patient empowerment and adherence to self-care practices.

However, while short-term effects are promising, this study acknowledges certain limitations, including a small sample size and brief intervention period. Larger-scale clinical trials with longer observation durations and biochemical evaluations (e.g., lipid profiles, renin-angiotensin levels, and oxidative stress markers) are recommended to validate the long-term safety and efficacy of bay leaf decoction. Furthermore, multi-center studies could help standardize dosage and preparation methods to improve reproducibility.

Overall, this study contributes to growing scientific evidence that supports the integration of evidence-based herbal medicine in hypertension management. The findings indicate that bay leaf decoction may serve as an effective complementary therapy for blood pressure reduction, particularly in communities where access to conventional medications is limited. Combining herbal interventions with educational and behavioral strategies can strengthen primary healthcare responses to hypertension and improve patient outcomes.

Conclusion

This study confirmed that the administration of bay leaf (*Syzygium polyanthum*) decoction significantly reduced systolic blood pressure among hypertensive patients. The mean systolic pressure decreased from 156.53 ± 12.48 mmHg to 136.00 ± 10.23 mmHg (p = 0.000061), indicating a clinically meaningful improvement. The hypotensive effect is likely related to the bioactive compounds flavonoids, tannins, and alkaloids that act as vasodilators, diuretics, and antioxidants, thereby enhancing vascular relaxation and reducing peripheral resistance.

Bay leaf decoction can therefore be recommended as a safe, affordable, and culturally acceptable complementary therapy for hypertension management, particularly in primary healthcare and community settings. Further research with larger samples, extended intervention durations, and biochemical assessments is recommended to validate its long-term efficacy and safety.

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