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The Effect of Bay Leaf (*Syzygium polyanthum*) Decoction on Lowering Blood Pressure in Hypertensive Patients

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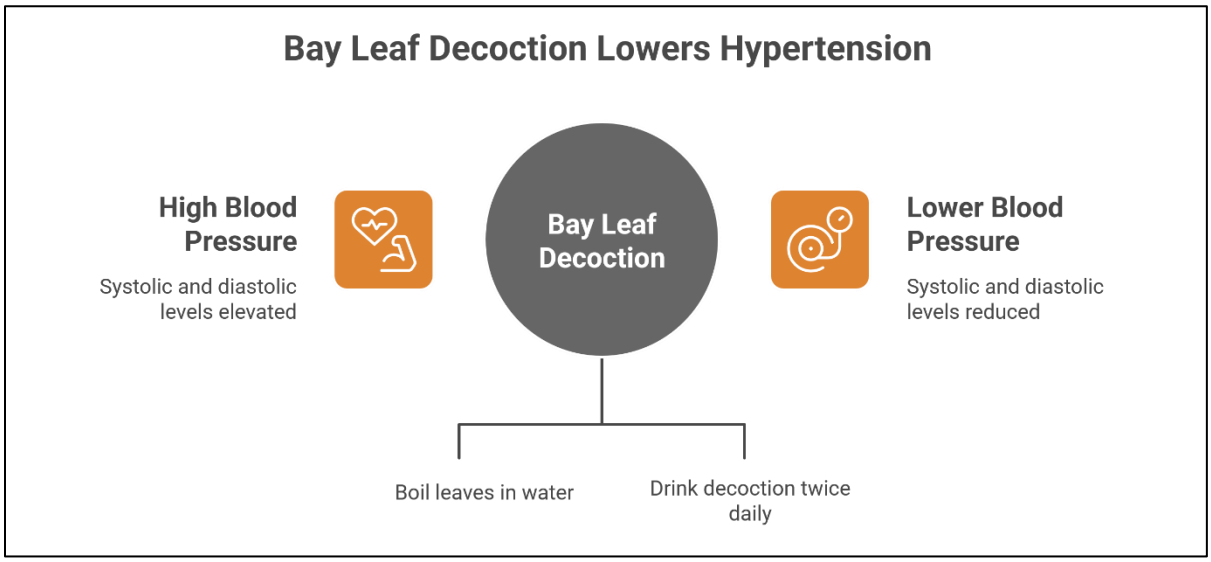
ABSTRACT

Hypertension is a chronic disease and a leading cause of global mortality, prompting interest in non-pharmacological therapies. This study aimed to investigate the effect of bay leaf (Syzygium polyanthum) decoction on blood pressure changes in patients with hypertension. This pre-experimental study employed a one-group pre-test-post-test design with 30 hypertensive patients at the Watubelah Public Health Center in Cirebon Regency. The intervention consisted of a decoction of 10 bay leaves boiled in 400 mL of water until 200 mL remained, which was consumed twice daily for seven days. Data were analyzed using the Wilcoxon test. The results showed a significant decrease in the mean systolic blood pressure from 153.6 mmHg to 138.4 mmHg and diastolic blood pressure from 93.8 mmHg to 84.1 mmHg (p = 0.001). This study concludes that bay leaf decoction is associated with a significant reduction in blood pressure in hypertensive patients, suggesting its potential as a complementary therapy in nursing practice.

Key Messages:

- The administration of bay leaf (*Syzygium polyanthum*) decoction was associated with statistically significant reductions in both systolic and diastolic blood pressure among the study participants.
- These preliminary findings suggest that bay leaf decoction shows promise as a potential non-pharmacological complementary intervention for hypertension, highlighting the need for further randomized controlled trials to confirm its clinical efficacy.

GRAPHICAL ABSTRACT



INTRODUCTION

Hypertension is a non-communicable disease with a continually increasing global prevalence, establishing it as a primary public health concern (1). The World Health Organization (WHO) reported that approximately 1.3 billion adults worldwide have hypertension (2). In Indonesia, the prevalence of hypertension has reached 34.1%, making it one of the most dominant chronic diseases in the country (3). The surge in hypertension cases is closely linked to modern lifestyle factors, including high-sodium diets, elevated stress levels, and insufficient physical activity (4). These factors contribute to a significant public health burden and necessitate effective management strategies.

The standard management for hypertension involves long-term use of antihypertensive medications such as captopril or amlodipine (5). While effective, pharmacological therapy often leads to adverse effects. The most commonly reported side effects include dry cough, swelling, dizziness, and itching (6), which can reduce patient adherence. This challenge has fueled growing public interest in alternative and complementary therapies derived from natural ingredients. One such plant that has long been utilized in Indonesian traditional medicine is the bay leaf (*Syzygium polyanthum*). Bay leaves are recognized for their bioactive compounds, including flavonoids, phenols (7), tannins (8), and eugenol, which are believed to play a role in lowering blood pressure (9).

Several studies have highlighted the potential of bay leaves as an antihypertensive agent (10,11). The bioactive compounds within bay leaves are thought to exert vasodilatory and diuretic effects, which help lower peripheral vascular resistance and reduce circulating blood volume (12). Flavonoids, for instance, may inhibit the angiotensin-converting enzyme (ACE), a key enzyme in the renin-angiotensin system that controls blood pressure (13). Furthermore, research suggests that the antioxidant properties of bay leaves help protect the vascular endothelium from oxidative stress (14). This study aims to provide further evidence by determining the effect of administering bay leaf decoction on blood pressure changes in hypertensive patients, contributing to the development of evidence-based complementary interventions in nursing

METHODS

Study Design and Participants

This study employed a pre-experimental design with a one-group pre-test-post-test approach. The research was conducted at the Watubelah Public Health Center, Cirebon Regency, involving patients diagnosed with hypertension who received outpatient care between March and May 2025.

The sample consisted of 30 respondents selected based on specific inclusion criteria: individuals aged 40 years or older, capable of verbal communication, and willing to participate. Regarding medication

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status, the inclusion criteria strictly required that participants had not taken antihypertensive medication in the seven days preceding the study. To clarify the medication status and address ethical considerations: participants included in this study were either newly diagnosed (medication-naïve) / patients currently managing hypertension solely through lifestyle modification / or patients with a history of non-adherence who were not currently taking prescribed drugs. No participants were instructed to withdraw or stop prescribed pharmacological therapy for the purpose of this study. Furthermore, to ensure the validity of the results and isolate the effect of the intervention, participants were monitored to ensure no antihypertensive medications were consumed during the seven-day intervention period.

Intervention Preparation and Standardization

The intervention involved the daily administration of a freshly prepared bay leaf (*Syzygium polyanthum*) decoction. To ensure the reproducibility of the study and the consistency of the dosage, the preparation of the decoction was standardized and performed by the research team.

While the traditional measure is "10 leaves," this study standardized the raw material by weight/size to minimize variability. Each dose consisted of approximately 2 grams of fresh bay leaves (roughly equivalent to 10 medium-sized leaves). These were boiled in 400 ml of water until the volume was reduced to 200 ml. This reduction method concentrates the bioactive compounds. Participants consumed this 200 ml decoction twice daily for seven consecutive days

Data Collection and Analysis

Blood pressure was measured using a calibrated digital sphygmomanometer before the intervention (pre-test) and after the seven-day period (post-test). Data were analyzed using the Wilcoxon signed-rank test to determine the statistical significance of blood pressure changes.

Ethical approval for this research was granted by the Health Research Ethics Committee of the Mahardika Institute of Technology and Health under letter number 009/KEPK.ITEKSMA/III/2025.

RESULTS

The characteristics of the 30 respondents who participated in this study are detailed in Table 1. The majority of respondents were female (60%), and the largest age group was 50–59 years (43.3%). A significant portion of the participants (70%) had a family history of hypertension, and an overwhelming majority (83.3%) reported excessive salt consumption, a well-known risk factor for hypertension.

Table 1. Characteristics of Respondents (n = 30)

Characteristic	Category	n	%
Gender	Female	18	60
	Male	12	40
Age	40–49 years	8	26.7
	50–59 years	13	43.3
	60–65 years	9	30
Family History of Hypertension	Yes	21	70
	No	9	30
Excessive Salt Consumption	Yes	25	83.3
	No	5	16.7
Total		30	100

The primary outcomes of the intervention are presented in Table 2. After seven days of consuming the bay leaf decoction, there was a noticeable decrease in both systolic and diastolic blood pressure. The mean systolic blood pressure decreased by 15.2 mmHg, from 153.6 mmHg to 138.4 mmHg. Similarly, the mean diastolic blood pressure decreased by 9.7 mmHg, from 93.8 mmHg to 84.1 mmHg. This demonstrates a strong physiological response to the intervention.

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Table 2. Blood Pressure Measurements Before and After Intervention

Parameter	Before Intervention (Pre-test)	After Intervention (Post-test)	Difference (Δ)
Systolic Blood Pressure (mmHg)	153.6 ± 8.2	138.4 ± 7.6	-15.2
Diastolic Blood Pressure (mmHg)	93.8 ± 6.4	84.1 ± 5.9	-9.7

The statistical significance of these changes was confirmed through bivariate analysis using the Wilcoxon signed-rank test, as shown in Table 3. The results yielded a p-value of 0.001 for both systolic and diastolic blood pressure changes, which is less than the significance level of 0.05. This indicates that the observed reduction in blood pressure was statistically significant. A statistically significant change in blood pressure following the intervention, confirming that the administration of bay leaf decoction was effective in lowering blood pressure among the hypertensive participants.

Table 3. Wilcoxon Signed-Rank Test Results for Blood Pressure Changes

Variable	Z Value	Asymp. Sig (2-tailed)
Systolic (mmHg)	-4.762	0.001
Diastolic (mmHg)	-4.315	0.001

DISCUSSION

The findings of this study indicate that the administration of bay leaf (*Syzygium polyanthum*) decoction was associated with a statistically significant reduction in blood pressure among the participants. Specifically, the mean systolic blood pressure decreased by 15.2 mmHg, and the mean diastolic blood pressure decreased by 9.7 mmHg following the seven-day intervention. These results align with previous research, such as the study by Panjaitan et al., which observed similar trends in blood pressure reduction following herbal decoction consumption (15).

Furthermore, recent meta-analytic evidence corroborates the antihypertensive potential of *Syzygium polyanthum*, particularly when analyzed alongside *Apium graveolens*. The analysis demonstrated a significant reduction in both systolic and diastolic blood pressure compared to placebo or standard care, with a standardized mean difference (SMD) of -1.40 (95% CI: -1.80 to -1.00) (16). The moderate heterogeneity observed (I^2 = 50%) indicates a relatively consistent effect across studies. Notably, the analysis revealed that extract formulations demonstrated statistically superior efficacy compared to decoctions ($p < 0.05$)(16). This suggests that standardized extraction methods may better preserve the stability and concentration of key bioactive compounds—such as flavonoids, alkaloids, and essential oils—thereby optimizing their pharmacological potency compared to traditional boiling methods

The observed reduction in blood pressure may be theoretically linked to the bioactive compounds found in bay leaves, particularly tannins and flavonoids. According to Dewi et al. (2024), tannins contribute to blood pressure regulation through their vasoconstrictive properties and their ability to mitigate oxidative stress within the vascular system (17). Complementing this, the flavonoids present in bay leaves act to improve endothelial function and inhibit the formation of free radicals. This antioxidant activity is critical, as it reduces the oxidative stress that serves as a significant contributor to the pathophysiology of hypertension (18). Literature suggests that flavonoids may act as antioxidants that stimulate nitric oxide (NO) release in the vascular endothelium, potentially promoting vasodilation and reducing peripheral resistance (19). Additionally, flavonoids have been studied for their potential to inhibit the angiotensin-converting enzyme (ACE), a key regulator in the renin-angiotensin system. However, while these mechanisms are well-documented in preclinical studies, their direct role in the changes observed in this specific study remains hypothetical (20).

It is crucial to acknowledge the limitations inherent in the one-group pre-test-post-test design employed in this study. While the statistical analysis showed a significant difference (p=0.001), the absence

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of a control group precludes the definitive attribution of these changes solely to the bay leaf decoction. Several confounding variables may have influenced the outcomes. First, the placebo effect cannot be ruled out; the participants' awareness of receiving a treatment could induce physiological responses independent of the decoction's chemical properties.

Second, the phenomenon of regression to the mean suggests that participants selected for having high blood pressure at baseline might naturally show a trend toward lower measurements upon re-testing, regardless of the intervention. Third, the Hawthorne effect may have played a role; participants might have altered their lifestyle behaviors simply because they were being observed. Notably, 83.3% of respondents reported excessive salt consumption at baseline. It is possible that enrollment in the study prompted these individuals to reduce their sodium intake or improve stress management during the intervention period, contributing to the observed blood pressure reduction. Given these limitations, the current findings should be interpreted as preliminary evidence. While they support the potential of *Syzygium polyanthum* as a complementary approach, they do not confirm efficacy. Future research requires randomized controlled trials (RCTs) with appropriate control groups to isolate the specific pharmacological effects of bay leaf decoction from these confounding variables and to validate its safety and efficacy for clinical application.

CONCLUSION

This study provides preliminary empirical evidence suggesting that the consumption of bay leaf (*Syzygium polyanthum*) decoction is associated with a reduction in systolic and diastolic blood pressure in patients with hypertension. While the statistical analysis demonstrated significant changes, the lack of a control group limits the ability to establish a direct causal relationship. The observed improvements may be influenced by factors such as the placebo effect, regression to the mean, or behavioral modifications by participants.

Therefore, while bay leaf decoction shows promise as a potential non-pharmacological complementary therapy, further rigorous investigation is necessary. We recommend that future studies utilize randomized controlled designs to confirm these findings before this intervention is formally integrated into routine nursing care or clinical guidelines. These results should serve as a foundation for more extensive research into the standardization and efficacy of Indonesian herbal interventions.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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