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# The Combined Effect of Syzygium Polyanthum and Honey Decoction on Lowering Blood Pressure: A Pra Experimental Approach

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## Abstract

**Background:** As of 2026, hypertension, often referred to as the "silent killer," has reached unprecedented prevalence globally

**Methods:** This pilot study utilized a pra-experimental pre-post-test design without a control group. Total sampling was employed, resulting in a sample size of 35 participants. The Wilcoxon Signed-Rank Test was used to assess the effects of a boiled bay leaf-honey mixture on blood pressure

**Result:** The intervention significantly reduced mean systolic blood pressure from 151.49 mmHg to 144.83 mmHg (p=0.018). In contrast, the reduction in diastolic pressure (84.89 mmHg to 83.29 mmHg) was not statistically significant (p=0.158).

**Conclusion:** The findings indicate that this intervention may benefit elderly patients or those with isolated systolic hypertension (ISH). By significantly lowering systolic pressure without inducing unstable diastolic fluctuations, this decoction may serve as a safe complementary therapy to reduce cardiac workload in geriatric populations.

**Keywords:** Hypertension, Blood Pressure, Nonpharmacologic.

## BACKGROUND

Contemporary societal developments have led to the widespread adoption of modern lifestyles characterized by a preference for instant gratification. This shift is closely associated with reduced physical activity and increased consumption of high-fat, high-sodium fast food. Additionally, the demands of modern routines frequently contribute to elevated stress levels, increased smoking, and excessive intake of alcohol and caffeine. Such lifestyle factors significantly elevate the risk of cardiovascular diseases, with hypertension being a prominent clinical manifestation (1). According to the World Health Organization (WHO), the global prevalence of hypertension is currently 22%. Africa has the highest prevalence at 27%, while Southeast Asia ranks third at 25% (2). Projections indicate that by 2025, approximately 1.5 billion individuals will have hypertension, and an estimated 9.4 million hypertension-related deaths will occur annually. Hypertension is often referred to as the silent killer because it typically presents without symptoms, resulting in many individuals remaining unaware of their condition until complications arise (3,4).

Prevention of hypertension. Effective prevention of hypertension requires the management of modifiable risk factors, such as smoking cessation, dietary improvements (including increased consumption of vegetables and fruits and reduced intake of sugar, salt, and fat), maintenance of an ideal body weight, increased physical activity, limited alcohol consumption, and stress management (5). Data from the 2018 Basic Health Research (Riskesdas) survey of individuals aged 15 years and older revealed a high prevalence of risk factors: 95.5% had low vegetable and fruit intake, 33.5% lacked sufficient physical activity, 29.3% were active smokers, 31% exhibited central obesity, and 21.8% had general obesity. A comparison with 2013 Riskesdas data demonstrates an increase in these risk factors, suggesting a likely rise in hypertension prevalence in the future (6). Comprehensive government involvement, including health service institutions (hospitals, health centers, and policy initiatives) and human resources (physicians, nurses, nutritionists, public health experts, and psychologists), is essential for hypertension control. Both pharmacological and non-pharmacological interventions have been implemented to address hypertension. Pharmacological approaches utilize conventional antihypertensive medications, while non-pharmacological strategies include the use of boiled bay leaves and honey (7,8).leaves is thought to help lower blood pressure. Bay leaves (Syzygium polyanthum) are herbal plants often used in traditional medicine. The bioactive compounds contained in them, such as tannins, essential oils and flavonoids, are thought to have the potential to lower blood pressure. Tannins help relieve inflammation and increase the elasticity of blood vessels. Meanwhile, essential oils are known to have a diuretic effect that can help lower blood pressure by increasing the excretion of sodium and water from the body (9). Flavonoids act as antioxidants and can support endothelial function in blood vessels. Flavonoid compounds can reduce systemic vascular resistance (SVR) because they cause vasodilation and affect the work of angiotensin converting enzyme (ACE) which can inhibit the change of angiotensin I to angiotensin II. Vasodilation and ACE inhibitors can lower blood pressure. Thus bay leaves can act as a blood pressure lowering agent. In addition, the possibility of a mechanism for lowering blood pressure is also caused by the diuretic effect of bay leaves. Diuretic substances can accelerate urine formation and increase the excretion of dissolved substances in water. The main function of diuretics is to mobilize interstitial fluid, thereby restoring fluid balance and normalizing extracellular fluid volume and blood pressure (10).

Honey serves as a protective agent against capillary dysfunction and atherosclerosis. It contains 0.3–0.5 mg/kg choline and 0.06–5 mg/kg acetylcholine. Acetylcholine exerts a direct vasodilatory effect on blood vessels and can also reduce cardiac function, both of which contribute to blood pressure reduction. Additionally, honey is rich in antioxidants that enhance the bioavailability of nitric oxide, further supporting blood pressure regulation. Endothelial cells synthesize several bioactive substances, including nitric oxide, prostaglandins, endothelin, and angiotensin II, which collectively regulate

vascular structure and function. Honey contains nitric oxide (NO), a metabolite that plays a critical role in modulating vascular tone and blood flow by relaxing smooth muscle and promoting vasodilation. No also participates in the regulation of mitochondrial oxygen consumption and other functions within the pulmonary vascular system. Elevated nitric oxide levels in honey have demonstrated protective effects against cardiovascular disease (11–13).

The aforementioned properties of bay leaves and honey suggest their potential utility in controlling hypertension as non-pharmacological interventions. At the global level, the World Health Organization (WHO) has recognized the importance of traditional medicine, as demonstrated by the publication of best practice and research guidelines in this field (5). National and regional governments have also taken proactive measures to address hypertension. For instance, in the Special Region of Yogyakarta (DIY), local authorities and associated institutions have implemented various initiatives to manage hypertension (14,15).

Several studies have also been conducted by previous researchers on bay leaves to reduce blood pressure. Research conducted by Musmuliadin and Sri Dewi Pusvita on the effects of boiled bay leaves on hypertension showed results that there was a difference in blood pressure between the intervention group and the control group in hypertensive patients with a p value of 0.01 (16). Similar research that also supports the research on the benefits of boiled bay leaves is research conducted by Wulandari with the results that there is an effect of boiled bay leaf water on blood pressure; the results of statistical tests with the Paired Samples Test p-value produced were 0.000 <0.05 (17).

Research on the effects of honey on blood pressure has also been conducted. One study demonstrated that administration of a lemongrass honey herbal drink (serdu) for seven days reduced average systolic blood pressure by 18 mmHg ($p < 0.001$) and diastolic blood pressure by 8 mmHg ($p < 0.001$) (18). Another study found that consuming a combination of starfruit juice and honey significantly reduced blood pressure in individuals with hypertension, with p-values of 0.002 for systolic and 0.001 for diastolic pressure ($p < 0.05$) (19).

The difference between previous research and the current study is that the former used separate interventions, either boiled bay leaf water alone or honey alone. The current study, however, combined two ingredients: boiled bay leaf water and honey, in specific doses (100 cc of boiled bay leaf water plus 10 cc of honey) and at specific times (8-10 AM in the morning and 4-6 PM in the afternoon) for non-diabetic hypertension patients. Theoretically and scientifically, this is expected to produce better results. This study aims to provide scientific evidence regarding the effect of administering boiled bay leaf and honey on blood pressure in patients with hypertension.

# METHODS

### *Study Design*

This study was a pilot study using a quasi-experimental pretest–posttest design without a control group.

### *Sample/Participants*

The subjects were limited to patients with hypertension without diabetes mellitus and without allergies to either intervention ingredient (bay leaf decoction and honey). A total sampling technique was used, resulting in a sample size of 35 participants.

### *Data Collection*

The researchers identified the independent variables as boiled bay leaf water and honey, and the dependent variable as hypertension. Respondents in this study were selected from among all hypertension sufferers in the Jetis II Bantul Yogyakarta Community Health Center coverage area who

had signed an agreement to participate as research subjects. Initially, there were 39 respondents, but during the study, 4 dropped out, bringing the total to 35. One day before the intervention, blood pressure measurements were taken using the correct technique, and the results served as the baseline for the study (pre-test data). The intervention involved administering 100 cc of boiled bay leaf water mixed with 10 cc of honey in the morning between 8 and 10 am and in the afternoon between 4 and 6 pm for six consecutive days. On the 7th day, blood pressure measurements were taken again, and the results served as post-test data.

**Tabel 1**. Form of reseach design

| | A | 1 | 2 | 3 | 4 | 5 | 6 | B |
|---|---|---|---|---|---|---|---|---|
| Int | O1 | X1 | X2 | X3 | X4 | X5 | X6 | O2 |

Information:
O1: Blood pressure measurement before intervention
X1: Administration of boiled bay leaves and honey on day 1 (morning-evening)
X2: Administration of boiled bay leaves and honey on day 2 (morning-evening)
X3: Administration of boiled bay leaves and honey on day 3 (morning-evening)
X4: Administration of boiled bay leaves and honey on day 4 (morning-evening)
X5: Administration of boiled bay leaves and honey on day 5 (morning-evening)
X6: Administration of boiled bay leaves and honey on day 6 (morning-evening)
O2: Blood pressure measurement after intervention

***Data Analysis***

Data were analyzed using thematic analysis as described by Braun and Clarke (49). Thematic analysis is a systematic and flexible method for identifying, analyzing, and reporting patterns within qualitative data. It is particularly appropriate for qualitative descriptive studies seeking to organize experiential data into coherent themes without excessive theoretical abstraction (49).

The analysis followed six phases: familiarization with the data, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report (49).

***Trustworthiness and Rigor***

Trustworthiness was established using the criteria of credibility, dependability, confirmability, and transferability as articulated by Lincoln and Guba (53).

***Ethical Consideration***

Ethical approval was obtained from the Sekolah Tinggi Ilmu Kesehatan (STIKES) Guna Bangsa with number: 003/KEPK/VII/2024.

# RESULT AND DISCUSSION

## RESULT

### *Characteristics of Participants*

| Characteristics | | |
|---|---|---|
| Gender | n | % |
| Male | 6 | 17,14 |
| Women | 29 | 82,86 |
| Age | | |
| Infants/toddlers (0 to <5 years) | 0 | 0 |
| Children (5 to 10 years) | 0 | 0 |
| Teenagers (>10-18 years) | 0 | 0 |
| Adults (>18-59 years) | 0 | 0 |
| Elderly (>60 years) | 35 | 100 |
| Occupation | | |
| Housewife | 15 | 43 |
| Farming | 6 | 17 |
| Laborer | 14 | 40 |
| Living with another family | | |
| Yes | 30 | 86 |
| No | 5 | 14 |
| Marital Status | | |
| Married | 24 | 68,6 |
| Divorced | 11 | 31,4 |
| Duration of illness | | |
| < 5 years | 10 | 29 |
| 5-10 years | 20 | 57 |
| > 10 years | 5 | 14 |

**Table 2.** Systolic blood pressure pre-post intervention

| Category | Pre-intervention Systolic blood Pressure | | Pre-intervention Diastolic Blood Pressure | |
|---|---|---|---|---|
| | n | % | n | % |
| Normal | 0 | 0 | 2 | 5,71 |
| Pre-hypertension | 10 | 28,57 | 14 | 40,00 |
| Stadium 1 | 12 | 34,29 | 11 | 31,43 |
| Stadium 2 | 13 | 37,14 | 8 | 22,86 |
| Total | 35 | 100 | 35 | 100 |

As shown in Table 2, the classification of hypertension has increased for the categories of normal and pre-hypertension. The number of stage 1 and 2 hypertension classifications has decreased. These statistical figures indicate the benefits obtained by respondents, resulting in controlled systolic blood pressure.

**Table 3.** Diastolic blood pressure pre-post intervention

| Category | Pre-intervention diastolic blood pressure | | Post-intervention diastolic blood pressure | |
|---|---|---|---|---|
| | n | % | n | % |
| Normal | 9 | 25,71 | 12 | 34,29 |
| Pre-hypertension | 16 | 45,71 | 15 | 42,86 |
| Stadium 1 | 6 | 17,14 | 5 | 14,29 |
| Stadium 2 | 4 | 11,43 | 3 | 8,57 |
| Total | 35 | 100 | 35 | 100 |

As shown in Table 3, the number of respondents classified as normal or pre-hypertensive has increased, while those in hypertension stages 1 and 2 have decreased. These results suggest improved control of diastolic blood pressure among respondents.

***Bivariate Analysis***

**Table 4.** Effects of Combining Boiled Bay Leaf Water and Honey on Blood Pressure

| Blood Pressure | N | *Mean* | *-Rank* | *+Rank* | *Ties* | *r* | *p-value* |
|---|---|---|---|---|---|---|---|
| Pre-intervention Systolic Blood Pressure | 35 | 151,49 | 22 | 10 | 3 | 0,40 | 0,018 |
| Post-intervention Systolic Blood Pressure | 35 | 144,83 | | | | | |
| Pre-intervention Diastolic Blood Pressure | 35 | 84,89 | 19 | 11 | 5 | 0,24 | 0,158 |
| Post-intervention Diastolic Blood Pressure | 35 | 83,29 | | | | | |

**Wilcoxon Signed Ranks Test analysis test with a confidence level of 0.95*

Based on Table 4, the following can be stated:

The mean systolic blood pressure decreased from 151.49 mmHg to 144.83 mmHg, representing a reduction of 6.66 mmHg. The mean diastolic blood pressure decreased by 1.6 mmHg, from 84.89 mmHg to 83.29 mmHg. The Wilcoxon Signed Ranks Test for systolic blood pressure showed that 22 respondents exhibited lower systolic blood pressure following the intervention. Conversely, 10 respondents experienced an increase, and 3 respondents demonstrated no significant change. The Wilcoxon Signed Ranks Test for diastolic blood pressure indicated that 19 respondents experienced a decrease after the intervention, while 5 showed no change. At the 0.95 confidence level, the test yielded a significant p-value of 0.015 for systolic blood pressure, with an r-value of 0.40. This result suggests that consuming 100 ml of boiled bay leaves and honey twice daily for six consecutive days led to a significant reduction in systolic blood pressure, with a moderate effect size. For diastolic blood pressure, the p-value was 0.158, with an r-value of 0.24, indicating an insignificant decrease with a small effect size.

## DISCUSSION

Bay leaves contain flavonoids, which function as antioxidants that help prevent oxidative damage to cells in the body. Increased cellular oxidation is associated with a higher risk of developing degenerative diseases. The flavonoid content in bay leaves can help prevent hypertension, reduce cholesterol and blood sugar levels, and lower uric acid levels. In the body, these flavonoids work on the kidneys. Flavonoids are useful for inhibiting ACE, preventing the conversion of angiotensin I to angiotensin II, which increases sympathetic nervous system activity, causes vasoconstriction of vascular smooth muscle, and enhances water and sodium retention. Therefore, the presence of flavonoids can lower blood pressure (20). The antihypertensive effects of bay leaves involve several physiological and biochemical mechanisms, including angiotensin-converting enzyme (ACE) inhibition, diuretic effects that increase sodium and water excretion, and vasodilation that increases

nitric oxide (NO) production. Additionally, bioactive compounds such as flavonoids and alkaloids in bay leaves modulate the renin-angiotensin-aldosterone system (RAAS) and reduce oxidative stress, which contributes to increased blood pressure (21).

Honey also contains antioxidants that reduce blood pressure by promoting vasodilation of the coronary arteries, resulting in a hypotensive effect. These antioxidants mitigate oxidative stress and contribute to reduced blood pressure. Nitric oxide (NO) present in honey can stimulate insulin secretion, thereby enhancing magnesium ion uptake and inducing vascular dilation, thereby lowering blood sugar levels and facilitating coronary artery vasodilation (22). Additionally, honey is an efficient energy source, rapidly absorbed into the bloodstream to increase endurance and stamina. It supports hematopoiesis and helps maintain healthy blood circulation. Honey possesses antibacterial properties, making it effective for treating burns and infectious diseases. Its high carbon-to-nitrogen ratio, viscosity that limits oxygen release, glucose oxidation, which produces hydrogen peroxide ($H_2O_2$), and high osmolarity collectively inhibit bacterial growth. The antioxidants in honey, through coronary artery vasodilation, further reinforce its hypotensive effects. Moreover, the nitric oxide content in honey can stimulate insulin secretion, promote magnesium ion absorption, and induce vascular dilation, which collectively lower blood sugar levels and support coronary artery vasodilatby exerting amitigatensive effect (23).

Empirical studies have confirmed the antihypertensive effects of both boiled bay leaf and magnesium ion uptake, causing vascular dilation that lowers pressure among adult men, reducing 79.30/71.80 mmHg to 105.20/71.80 mmHg, thereby providing boiled bay leaf water ($p < 0.01$) (24). Research on honey has demonstrated significant effects on blood pressure, with systolic blood pressure showing $p = 0.000$ ($p < 0.05$) and diastolic blood pressure showing $p = 0.001$ ($p < 0.05$) before and after intervention. These findings indicate that honey solution interventions at doses of 35 and 70 g (5–10 ml) significantly reduce both systolic and diastolic blood pressure in older adults (23, 24).

The combination of boiled bay leaf water and honey, when consumed regularly over an extended period by individuals with hypertension, is theorized to be effective for lowering and maintaining blood pressure within normal limits. According to the author's hypothesis, the antioxidants present in both ingredients may help reduce oxidative processes in the body, thereby optimizing cellular recovery. Overall, this combination could minimize the risk of developing degenerative diseases.

## CONCLUSION

The administration of boiled bay leaf water combined with honey has the potential to support the reduction of systolic blood pressure in patients with hypertension. However, its effect on diastolic blood pressure appears to be less pronounced. These findings suggest that this intervention may be considered as a complementary approach to support blood pressure management, particularly in helping reduce systolic pressure.

Complementary therapy should be understood as a supportive intervention that accompanies conventional medical treatment, not as a replacement for prescribed antihypertensive therapy. Its benefits may require regular and consistent use according to the recommended dosage and schedule. Nevertheless, this intervention should be used with caution and is not recommended for individuals with allergies, intolerance to the aroma or taste of bay leaf and honey, or patients with hypertension who also have diabetes mellitus. Effective hypertension management requires a multidisciplinary approach involving physicians, nurses, nutritionists, psychologists, and other healthcare professionals. In addition, patient commitment, self-discipline, adherence to treatment, lifestyle modification, and regular monitoring are essential to achieve optimal blood pressure control and prevent hypertension-related complications.

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### AUTHOR'S CONTRIBUTION STATEMENT

DAN: Conceptualization, Writing- Original Draft, Formal analysis, Review & Editing. PS. ERT: Conceptualization, Methodology, Manuscript review, Supervision, Validation.

### CONFLICT OF INTEREST

None

### DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The Authors acknowledge the use of AI-Assisted Technologies to support language improvement, improve clarity, and improve the overall readability and structure of the manuscript.

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### DATA AVAILABILITY

The dataset generated and analyzed during the current study is available from the corresponding author upon request.

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