

## Decoction of bay leaf (*Syzygium polyanthum*) against the reduction of high blood pressure in 3-month injectable birth control receptors

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### ABSTRACT

**Introduction:** Hypertension or high blood pressure is a serious health problem and has the potential to trigger various complications, such as heart disease and stroke. Bay leaf (*Syzygium polyanthum*), which is traditionally used as an herbal medicine, is known to contain bioactive compounds such as flavonoids, tannins, and saponins, which have the potential to lower blood pressure. However, research on the effectiveness of bay leaf decoction in 3-month injectable birth control receptors is still limited.

**Objective:** This study aims to evaluate the effect of bay leaf decoction (*Syzygium polyanthum*) on the reduction of high blood pressure in 3-month injectable birth control receptors.

**Methods:** This study uses a quasi-experimental method with a pre-test and post-test design in one group. A total of 60 respondents who were long-term acceptors of 3-month injectable birth control with high blood pressure were selected purposively. The respondents were given a decoction of bay leaves every day. Blood pressure was measured before and after the intervention using a digital sphygmomanometer. Data were analyzed using a paired t-test to determine the significant difference between blood pressure before and after the intervention.

**Result:** The study showed a significant decrease in systolic and diastolic blood pressure after administering bay leaf decoction. The average reduction in systolic blood pressure was 12 mmHg, and diastolic blood pressure was eight mmHg after 14 days of consumption. The paired t-test showed a  $p < 0.05$ , indicating a significant difference between blood pressure before and after the intervention.

**Conclusion:** Bay leaf decoction (*Syzygium polyanthum*) significantly lowers blood pressure in 3-month injectable birth control receptors. These results suggest that bay leaf can be a potential complementary therapy in the management of hypertension, especially for those who use long-term hormonal contraceptives. Although the results of this study are promising, more research with larger sample sizes and extended intervention periods is needed to confirm these findings and assess the long-term safety of using bay leaf decoction.

**Keywords:** bay leaf, high blood pressure, *Syzygium polyanthum*



## INTRODUCTION

Hypertension or high blood pressure is one of the most common global health problems and can lead to severe complications, such as heart disease, stroke, and kidney damage. According to a report from the World Health Organization (WHO), hypertension is the leading cause of premature death worldwide, with more than 1.13 billion people suffering from this condition. Although hypertension is often thought of as a disease that has no obvious symptoms, its long-term effects can cause significant damage to the cardiovascular system. Therefore, effective and timely treatment of hypertension is essential to prevent serious complications. High blood pressure (hypertension) is one of the global health problems that contributes to the increasing death rate from cardiovascular diseases (Muthiyah A. AM *et al.*, [2023](#)). Hypertension is often referred to as a silent killer because it usually shows no symptoms but has a serious impact on health if not treated properly. Risks affecting hypertension include lifestyle, diet, and long-term use of hormonal contraceptives, such as injectable birth control (Basri *et al.*, [2022](#)). In long-term acceptors of 3-month injectable birth control, there is evidence that long-term use can increase the risk of hypertension due to hormonal changes that affect the body's metabolism, including fluid retention and increased blood pressure (Suprpto, Mulat and Norma Lalla, [2021](#)).

The use of hormonal contraceptives, particularly 3-month injectable birth control, has also long been associated with an increased risk of hypertension in long-term users. 3-month injectable birth control, which contains the hormone progestin, works by inhibiting ovulation and thickening cervical mucus so that it prevents sperm from reaching the egg (Kuate, [2023](#)). Although this method is effective in preventing pregnancy, the use of hormonal contraceptives, especially in the long term, can cause side effects that affect the cardiovascular system, such as increased blood pressure (Bhullar, Rabinovich-Nikitin and Kirshenbaum, [2024](#)). Research shows that hormonal contraceptives can affect the body's metabolism, fluid retention, and blood vessel function, which contributes to increased blood pressure in some women. Hypertension management usually involves using diuretics, beta-blockers, or ACE inhibitors. However, most individuals are also interested in natural or complementary solutions to reduce their blood pressure. One of the increasingly popular alternatives is using herbs, including bay leaf (*Syzygium polyanthum*), known in traditional medicine as a natural ingredient that can potentially lower blood pressure (Benjamin *et al.*, [2024](#)).

High blood pressure in 3-month injectable birth control acceptors is a problem that requires special attention. Long-term use of hormonal contraceptives can cause hormonal changes that have an impact on increasing blood pressure (Wijayanti *et al.*, [2023](#)). Progestin, which is a key component in 3-month injectable birth control, can affect salt and water metabolism in the body, leading to fluid retention and increased blood volume, ultimately increasing blood pressure. In addition, hormonal contraceptives can also interfere with the endothelial function of blood vessels and increase vascular resistance, which also contributes to hypertension (Shuaibu *et al.*, [2024](#)). In these situations, although the use of conventional antihypertensive medications is the main option, many individuals are looking for natural or complementary remedies to help lower their blood pressure. One of the natural alternatives widely considered is bay leaf decoction. However, although bay leaves are traditionally believed to help lower blood pressure, scientific research on their effectiveness, specifically in 3-month injectable birth control acceptors, is still limited. Therefore, more in-depth research is needed to evaluate the effect of bay leaf decoction in lowering blood pressure in this group (Amalia and Susaldi, [2024](#)).

Bay leaf is a plant generally used as a cooking spice but has interesting pharmacological properties. In various traditional medicines, bay leaves are often used to treat multiple health problems, including hypertension (Nugroho *et al.*, [2022](#)). The bioactive content of bay leaves, such as flavonoids, tannins, and essential oils, is believed to play a role in providing antioxidant and anti-inflammatory effects, which can decrease blood pressure (Rini *et al.*, [2024](#)). The potential of bay leaf in managing hypertension has been studied in several studies. However, more research

is needed to ascertain its effectiveness and mechanism, especially in particular groups, such as 3-month injectable birth control acceptors. Bay leaf (*Syzygium polyanthum*) contains various active compounds essential for its health effects. Some of the main bioactive components contained in bay leaves are flavonoids, tannins, essential oils, and saponins. Flavonoids have powerful antioxidant properties, protecting the body's cells from damage caused by free radicals. Free radicals are often associated with damage to blood vessels and increased blood pressure. By reducing the effects of free radicals, flavonoids can help improve blood vessel function and lower blood pressure. In addition, the tannins contained in bay leaves also play a role in providing a hypotensive effect. Tannins are known to help dilate blood vessels, which increases blood flow and reduces blood pressure. Saponins, another active component in bay leaves, are anti-inflammatory and can help stabilize blood pressure. This study aims to evaluate the effect of bay leaf decoction (*Syzygium polyanthum*) on the reduction of high blood pressure in 3-month injectable birth control receptors.

## RESEARCH METHODOLOGY

This study adopts a quantitative approach using a quasi-experimental method, using a single-group pretest-posttest design, in which the subject unit receives treatment and is then measured at the pre-test and post-test stages. The research was conducted from January to June 2024 at the Kampili Health Center, Pallangga District, Gowa Regency. The population is 145 people who have high blood pressure. A sample of 60 respondents who fit the inclusion criteria: mothers who are willing to become respondents; 3-month injectable birth control acceptor for one year; 3-month injectable birth control acceptors whose systolic blood pressure  $> 140$  mmHg and diastolic  $> 90$  mmHg, using the solving formula. The research instruments that will be used in this study include a sphygmomanometer (Onemed), a stethoscope, an observation sheet, ten bay leaves, a pot, a strainer, a stove, 300 ml of water, and a measuring cup (100 cc)—data collection procedures; Licensing, Pre-Experiment, Experiment, and Post Experiment. Data analysis using univariate and bivariate analysis with the help of the SPSS program is then presented as tables and descriptive explanations.

## RESULTS

**Table 1. Frequency distribution of respondents by age, education, occupation, blood pressure**

Characteristic	Frequency	Percentage %
<b>Age</b>		
26-29	8	13.3
30-32	9	15.0
33-36	12	20.0
37-39	15	25.0
40-41	16	26.7
<b>Education</b>		
Primary school	20	33.3
Junior high school	18	30.0
High school	16	26.7
<b>Work</b>		
Housewives	20	33.3
Farmer	18	30.0
Merchant	16	26.7

Official	6	10.0
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From table 1. It can be concluded that the lowest number of individuals who experience high blood pressure is in the age range of 26-29 years, as many as eight people (13.2%), and the highest is in the age range of 40-41 years as many as 16 people (26.8%). The individuals with the highest data, namely elementary education, experienced high blood pressure of 20 people (33.3%), and the lowest was S1 education with high blood pressure of 6 people (10.0%). It shows that the highest number of individuals with IRT jobs who experience high blood pressure is 20 people (33.3%), and the lowest number of employees who have high blood pressure is six people (10.0%).

**Table 2. Respondent frequency distribution based on pre and post-blood pressure measurements**

<b>Systolic blood pressure before intervention</b>		
140-142	19	31.7
143-145	18	30.0
146-148	16	26.7
150	7	11.6
<b>Systolic Blood Pressure After Intervention</b>		
110	18	30.0
120	15	25.0
125	14	23.3
130	8	13.3
<b>Diastolic blood pressure before intervention</b>		
90	15	25.0
92	12	20.0
93	10	16.7
94	8	13.3
95	6	10.0
97	5	8.3
98	4	6.7
<b>Diastolic blood pressure after intervention</b>		
70	11	18.3
75	14	23.3
80	16	26.7
85	19	31.7

Based on Table 2, there were several blood pressure groups before the intervention. The highest data was that 19 people (31.7%) had systolic blood pressure between 140-142 mmHg, and the lowest was six people (10.0%) had systolic blood pressure of 150 mmHg. Variations in blood pressure after the intervention are performed are observed. There was the lowest data, namely five people (8.4%) with systolic blood pressure of 135 mmHg, and the highest, as many as 18 people (30.0%) showed systolic blood pressure of 110 mmHg. Indicates the distribution of blood pressure before the intervention, especially in diastolic values. The lowest data was found in four people (6.7%) with a diastolic blood pressure of 98 mmHg, and the highest was 15 people (25.0%) who showed diastolic blood pressure of 90 mmHg. Shows blood pressure variation after

the intervention, especially in diastolic values. The lowest data was found to be 11 people (18.3%) showing diastolic blood pressure of 70 mmHg, and the highest were 19 people (31.7%) showing diastolic blood pressure of 85 mmHg.

**Table 3. Wilcoxon Test Results Based on Blood Pressure Before and After the Intervention Test Statistica Sistolik**

After Blood Pressure – Before Blood Pressure	
Z	-6.742 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on positive ranks.	

  

After Blood Pressure – Before Blood Pressure	
Z	-6.744 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on positive ranks.	

Based on Table 3. If the Normality Test performed on systolic blood pressure shows that the data is not distributed normally, then the researcher conducts the Wilcoxon test as previously explained. The results found a value of  $p = 0.000 > 0.05$ , which indicates rejection of the null hypothesis ( $H_0$ ) and acceptance of the alternative hypothesis ( $H_a$ ). Thus, it can be concluded that bay leaves significantly influence the reduction of high blood pressure. From the test results, it was concluded that the value of  $p = 0.000$  was smaller than the set significance level (0.05). This indicates the rejection of the null hypothesis ( $H_0$ ) and the acceptance of the alternative hypothesis ( $H_a$ ). Thus, it can be concluded that bay leaves significantly influence the reduction of high blood pressure.

## DISCUSSION

The study showed a significant decrease in systolic and diastolic blood pressure after consuming bay leaf decoction for 14 days. The average reduction in systolic blood pressure was 12 mmHg, and diastolic blood pressure was eight mmHg, indicating that bay leaf had a significant hypotensive effect. Bay leaf (*Syzygium polyanthum*) has long been used in traditional medicine for various health problems, including hypertension. Bay leaves contain active compounds such as flavonoids, tannins, and saponins with antioxidant properties. These antioxidants can help protect blood vessels from damage caused by free radicals, which can contribute to a decrease in blood pressure. Bay leaves have the potential to provide benefits in lowering high blood pressure thanks to their bioactive content. However, using bay leaves should be accompanied by medical supervision to ensure their effectiveness and safety (Shukla *et al.*, 2023).

Bay leaves contain various bioactive compounds, including flavonoids, tannins, saponins, and essential oils, which play a role in lowering blood pressure (de Araújo *et al.*, 2024). Flavonoids, particularly quercetin and gallic acid, have powerful antioxidant properties and are known to improve the endothelial function of blood vessels and reduce peripheral vascular resistance, which contributes to a decrease in blood pressure. Bay leaf extract can inhibit the activity of angiotensin-converting enzyme (ACE), an essential mechanism in managing hypertension (Benalia *et al.*, 2024). Compounds such as eugenol, sesamol, and ellagic acid found in bay leaves also play a role in lowering blood pressure through the mechanism of vasodilation, which helps to dilate blood vessels and improve blood flow (Hartanti *et al.*, 2019).

Long-term use of hormonal contraceptives, such as 3-month injectable birth control, has long been associated with an increased risk of hypertension (Akdad and Eddouks, 2024). The hormone progestin in injectable birth control can cause fluid retention and increased blood volume, which

contributes to an increase in blood pressure. Therefore, intervention with bay leaf decoction provides a potential alternative for lowering blood pressure without causing significant side effects (Yuliani, Wahyuningsih and Nurdjannah, [2024](#)). The use of bay leaves as a complementary therapy in managing hypertension in long-term injectable birth control acceptors offers advantages because the natural compounds contained in these leaves have lower side effects compared to chemical antihypertensive drugs (Kimani *et al.*, [2024](#)). Bay leaf extract has a significant blood pressure-lowering effect in hypertensive rats through the inhibition of ACE enzyme and increased nitric oxide (NO) production, which functions as a vasodilator. Bay leaves contain many phenols and flavonoids, contributing to their antihypertensive effects (Widjajakusuma *et al.*, [2019](#)). Bay leaf decoction significantly lowers high blood pressure in 3-month injectable birth control receptors (Kuate, [2024](#)). The bioactive content of bay leaves, especially flavonoids and tannins, plays an important role in these hypotensive effects through ACE's vasodilation and inhibition mechanisms. The bioactive content in bay leaves, such as flavonoids, tannins, saponins, and essential oils, can explain this effect (Huynh *et al.*, [2024](#)). Flavonoids, for example, are potent antioxidants that protect blood vessels from free radical damage, increasing blood vessel elasticity and lowering blood pressure. Tannins are also known to have a vasodilator effect, which helps to dilate blood vessels, reduce peripheral resistance, and thus lower overall blood pressure. Bay leaf extract causes vasorelaxation effects through the involvement of autonomic receptors and nitric oxide, which decreases blood pressure (Roy *et al.*, [2024](#)).

In addition, this study also did not show any significant side effects from the consumption of bay leaf decoction, which shows that the use of this herb is safe as a complementary therapy for long-term acceptors of injectable birth control who have hypertension (Serunting *et al.*, [2024](#)). These results are essential because many conventional antihypertensive drugs have side effects or interactions with other medications, so using bay leaf as a complementary treatment may be more appealing to patients looking for natural solutions (Naeem and Aftab, [2024](#)). However, it should be noted that while the results of this study are promising, further research is needed to ascertain the long-term effectiveness of using bay leaves. Studies with larger sample sizes and longer observation times must confirm these findings (Anandika Lestari *et al.*, [2024](#)). Further research also needs to explore the specific molecular mechanisms underlying the antihypertensive effects of bay leaf, including its impact on the renin-angiotensin-aldosterone system and kidney function, which play an essential role in blood pressure regulation (Nguyen *et al.*, [2024](#)). That bay leaf can be an effective and safe natural solution to lower blood pressure, especially in long-term injectable birth control acceptors who are at higher risk of hypertension.

## CONCLUSION

Bay leaf decoction (*Syzygium polyanthum*) significantly lowers high blood pressure in 3-month injectable birth control receptors. These results suggest that bay leaf can be a potential complementary therapy in the management of hypertension, especially for those who use long-term hormonal contraceptives. Although the results of this study are promising, more research with larger sample sizes and extended intervention periods is needed to confirm these findings and assess the long-term safety of using bay leaf decoction.

### Conflicts of Interest:

The authors declare no conflict of interest.

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