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# COMBINATION OF HIBISCUS SABDARIFFA LINN, FLOWER AND WHITE GINGER TEA ON BLOOD PRESSURE REDUCTION IN THE ELDERLY

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**ABSTRACT**

Hypertension is a common health problem among the elderly. This study aims to determine the effectiveness of Hibiscus sabdariffa Linn. flower and white ginger tea in reducing blood pressure in the elderly.

This quasi-experimental study employed a control group design. The study was conducted on 64 elderly and distributed equally to intervention and control group by total sampling technique. The intervention group received Hibiscus sabdariffa Linn. flower and white ginger tea, while the control group administered antihypertensive medication. Blood pressure was measured using a digital sphygmomanometer and analyzed using a t-test ($\alpha \leq 0.05$).

In the intervention group, the mean systolic and diastolic blood pressure decreased 11.7 and 7.8. In the control group, the mean systolic blood pressure reduced 12.5; and a decrease in mean diastolic blood pressure of 7.76. A notable change was detected between pre-test and post-test measurements in both the intervention and control groups ($p = 0.000$; $p = 0.000$). However, post-test systolic and diastolic blood pressure remained comparable between the two groups, showing no significant difference ($p = 0.441$; $p = 0.856$).

Hibiscus sabdariffa Linn. flower and white ginger tea have demonstrated efficacy in reducing blood pressure in the elderly, comparable to antihypertensive drugs.

**Keywords**

**Elderly, *Hibiscus Sabdariffa Lin*, Hypertension, White Ginger**

## INTRODUCTION

Hypertension, commonly known as high blood pressure, is a prevalent health issue experienced by older adults globally. It occurs when the pressure of blood against artery walls increases chronically, forcing the heart to work harder to pump blood throughout the body (Afriani et al., 2023). Several factors contribute to hypertension, including genetic factors and unhealthy lifestyles, such as high salt and fat intake, lack of physical activity, and excessive stress (Hayati et al., 2022).

Uncontrolled hypertension leads to serious complications, particularly among the elderly. According to the 2023 Indonesian Health Survey (IHS), hypertension is the fourth leading risk factor for mortality, contributing to 10.2% of deaths, and accounting to 22.2% of non-

communicable diseases (NCDs) (SKI, 2023). Data from 2023 Basic Health Research approximately 63.3 million hypertension cases in Indonesia, resulting in 427,218 deaths. Among individuals aged 60 years and older, the prevalence reached 22.9%, affecting around 14.5 million people (Riskesdes, 2023). In East Java, hypertension prevalence among the elderly was 35.6% in 2020, affecting around 3.9 million people. In 2018, it was estimated that 60% of the 12 million elderly people had hypertension. This number is expected to continue rising, with an estimated 9.4 million deaths per year by 2025 (Kemenkes RI, 2023).

Hypertension management relies not only on medical therapy but also on a holistic approach incorporating lifestyle changes and non-medical interventions. Hypertension management typically involves antihypertensive medications, including diuretics – which help reduce excess fluid and lower blood pressure, ACE inhibitors, and calcium channel blockers. These treatments demonstrated effectiveness in managing blood pressure and reducing the risk of complications. On the other hand, non-medical treatments include elderly exercise (Yunding et al., 2021), foot bath hydrotherapy (Widyaswara et al., 2022), Moringa leaf drink (Riniasih, 2021), oni fruit drink (Ismawati, 2018), and adherence to a healthy diet have demonstrated significant benefits in lowering blood pressure (Akbar et al., 2021). Dietary Approaches, including DASH and salt intake limitation have become the main recommendations for managing hypertension (Washington, 2024).

Hibiscus sabdariffa Linn. petals are an effective non-pharmacological therapy for grades I and II hypertension due to their flavonoid and anthocyanin content (Vasundhara., 2022). Hibiscus sabdariffa Linn. tea, available as extracts, infusions, or brewed tea, has been shown to effectively lower blood pressure while also exhibiting notable anti-dyslipidemic and anti-inflammatory properties (González et al., 2022). Moreover, H. sabdariffa tea has proven effective in both preventing and managing hypertension with minimal side effects (Sapian et al., 2023). Ginger lowers blood pressure in patients with hypertension due to its gingerol and shogaol compounds, which inhibits the activity of ACE and provides antihypertensive effects (Nadia et al., 2022). However, effect of ginger on blood pressure depends on factors such as age, gender, and other health conditions (Hayati et al., 2022).

Antihypertensive medications, such as amlodipine, are widely used to lower blood pressure. 80% of individuals aged 60 years and older who underwent amlodipine therapy achieved a systolic blood pressure of 150 mmHg or less (Andhyka et al., 2019). Similarly, Amlodipine significantly reduced blood pressure, decreasing the average systolic pressure from 171 mmHg to 149 mmHg and the average diastolic pressure from 90 mmHg to 78 mmHg (Wulandari, 2022). However, long-term antihypertensive drugs can cause complications, so it is advisable to use traditional drugs made from natural ingredients. The study found that 84% of 25 elderly patients tolerated with amlodipine 5–10 mg once daily for 10 weeks well. No patients discontinued treatment due to side effects, and no serious side effects were reported (Jiang et al., 2025).

Hibiscus sabdariffa flower tea and white ginger are recognized for their potential to lower blood pressure. These two natural ingredients may provide synergistic effects when combined, such as relaxing blood vessels (anthocyanins), reducing oxidative stress (flavonoids and shogaol), and reducing inflammation (gingerol) (Suarayasa et al., 2023). Despite these promising benefits, no research has been conducted on the combined effect of hibiscus and white ginger. The current study aims to determine the effectiveness of hibiscus tea and white ginger in lowering blood pressure among the elderly. Research hypothesis is that Hibiscus sabdariffa Linn. flower and white ginger tea intake affects blood pressure decrease in older adults.

## METHOD

This quasi-experimental research employed pretest-posttest with control group design. The study was conducted from April 15 to 21, 2025, in Latukan Village (intervention group, n=32) and Sumberwudi Village (control group, n= 32). Participants in the intervention group received Hibiscus sabdariffa flower and white ginger tea, while the control group consumed doctor-prescribed antihypertensive medication.

The study population comprised 64 elderly with hypertension, divided into two groups: an intervention group and a control group selected using the total sampling technique. Each group consisted of 32 elderly residents. Inclusion criteria required individuals aged 55 or older, diagnosed with hypertension by a doctor, having minimum 140 mmHg of systolic blood pressure and 81 mmHg of diastolic blood pressure, and provided inform consent to participate. Exclusion criteria encompassed individuals suffering from stomach acid or other chronic diseases, such as diabetes mellitus (DM), heart disease, or kidney failure. Dropout criteria applied to participants who failed the entire research process or who withdrew before study completion.

The intervention group consumed Hibiscus sabdariffa Linn. flower and white ginger tea in liquid form, with a daily intake of 250 ml twice a day for seven days. Meanwhile, the control group received doctor-prescribed antihypertensive medication. The tea was prepared by boiling three grams of dried H. sabdariffa flowers and four grams of fresh white ginger in 300 milliliters of water for 45 minutes. Then, it was filtered, honey was added while still warm, and it was served in a 250-milliliter plastic bottle. Blood pressure was measured using an Omron digital sphygmomanometer, with readings recorded on an observation sheet from day 1 (before treatment) to day 7 (45 minutes after the last treatment).

After obtaining approval from the Heads of Latukan Village and Sumberwudi Village, researchers acquired hypertension data on elderly residents from the village midwife. Data collection process was assisted by the village midwife and three research assistants, all of whom were eighth-semester undergraduate nursing students. Latukan Village comprises two hamlets, namely North Hamlet (3 elderly) and South Hamlet (19 elderly), while Sumberwudi Village consists of three hamlets, namely Glogok (11 elderly), Sumberwudi (11 elderly), and Semperat (10 elderly).

The researcher and the team made a direct visit to each participant's home to provide information about the research objectives, procedures, benefits, and risks. Participants who agree to participate completed the consent form. Before the intervention, baseline blood pressure was recorded using a digital sphygmomanometer to ensure accurate pre-treatment measurements. Then the intervention group received Hibiscus sabdariffa Linn. flower and white ginger tea of 250 ml twice a day in the morning and evening for 7 days. After the intervention was completed, blood pressure was re-measured on the seventh day (45 minutes after the last tea) to assess the effectiveness of the intervention on reducing blood pressure in the elderly.

Before conducting statistical analysis, data distribution was assessed using the Shapiro-Wilk test, confirming normality in both the intervention group (systolic: pre-test $p = 0.590$, post-test $p = 0.403$; diastolic: pre-test $p = 0.273$, post-test $p = 0.288$) and control (systolic: pre-test $p = 0.324$, post-test $p = 0.744$; diastolic: pre-test $p = 0.473$, post-test $p = 0.102$) groups. Consequently, a paired t-test was performed to evaluate pre-test and post-test blood pressure differences within each group, while an independent t-test was used to compare post-test blood pressure between the intervention and control groups, with a significance level of $\alpha \leq 0.05$.

This research has been declared ethically sound by the Research Ethics Committee of Muhammadiyah Lamongan University with Number: 116/EC/KEPK-S1/03/2025, which was issued on March 21, 2025. This ethical permit guarantees that the research has met the principles of research ethics, including aspects of information, informed consent, confidentiality of respondent data, and protection of research subjects in accordance with applicable

standards.

## RESULTS

A total of 69 elderly residents with hypertension were obtained from two villages. After screening based on inclusion and exclusion criteria, five did not meet the criteria. As a result, 64 elderly residents participated in this intervention.

**Table 1. Table 1. Elderly Characteristics (n=64)**

| Variable | Characteristics | Intervention Group | | Control Group | |
|---|---|---|---|---|---|
| | | **N** | **%** | **N** | % |
| Gender | Male | 12 | 37.5 | 16 | 50 |
| | Female | 20 | 62.5 | 16 | 50 |
| Age (Years) | 55-65 | 7 | 21.9 | 3 | 9.4 |
| | 66-74 | 9 | 18.1 | 9 | 28.1 |
| | 75-90 | 16 | 50 | 19 | 59.4 |
| | >90 | 0 | 0 | 1 | 3.1 |
| Occupation | Self-employment | 4 | 12.5 | 3 | 9.4 |
| | Farmer | 4 | 12.5 | 4 | 12.5 |
| | Retailer | 4 | 12.5 | 2 | 6.3 |
| | Laborer | 3 | 9.4 | 6 | 18.8 |
| | Civil Servant | 8 | 25 | 6 | 18.8 |
| | Retiree | 4 | 12.5 | 3 | 9.4 |
| | Housewife | 5 | 15.6 | 8 | 25 |
| Education | Elementary School | 3 | 9.4 | 6 | 18.8 |
| | Junior High School | 3 | 9.4 | 4 | 12.5 |
| | Senior High School | 5 | 15.6 | 7 | 21.9 |
| | No formal education | 11 | 34.4 | 6 | 18.8 |
| | Diploma 3 | 5 | 15.6 | 4 | 12.5 |
| | Undergraduate | 5 | 15.6 | 5 | 15.6 |
| Smoking | Yes | 16 | 50 | 17 | 53.1 |
| | No | 16 | 50 | 15 | 46.9 |

Based on Table 1, the majority of elderly participants in the intervention group are female (62.5%), compared to 50% in the control group. The most prevalence age range for the elderly in the intervention group was 75-90 years old (50%), while the highest age range for the control group was 59.4%. Occupational distribution showed that 25% of the intervention group were civil servants, whereas 25% of the control group were housewives or unemployed. Regarding education, 34.4% of the intervention group did not attend formal education, while 21.9% of the control group had a high school education. Smoking prevalence was comparable between the groups, with 50% of elderly participants in the intervention group and 53.1% in the control group identified as smokers. All of the elderly individuals had no history of chronic or gastric diseases and were taking the hypertension drug amlodipine.

**Table 2. Blood Pressure of the Elderly in the Intervention Group (n=32)**

| Group | Variable | Mean (mmHg) | Category |
|---|---|---|---|
| *Pre-test* | Systolic | 153.03 | Hypertension Level I |
| | Diastolic | 89.12 | Pre-Hypertension |
| *Post-test* | Systolic | 141.28 | Hypertension Level I |
| | Diastolic | 82.03 | Pre-Hypertension |

Based on Table 2, the findings revealed a decrease in mean systolic blood pressure, dropping from 153.03 to 141.28 (a 11.7 mmHg difference). Similarly, mean diastolic blood pressure decreased from 89.8 to 82 (a 7.8 mmHg difference), following the consumption of Hibiscus sabdariffa Linn. flower and white ginger tea.

**Table 3. Blood Pressure of the Elderly in the Control Group (n=32)**

| Group | Variable | Mean (mmHg) | Category |
|---|---|---|---|
| *Pre-test* | Systolic | 152.06 | Hypertension Level I |
| | Diastolic | 92.15 | Hypertension Level I |

| | | | |
|---|---|---|---|
| *Post-test* | Systolic | 139.53 | Pre-Hypertension |
| | Diastolic | 82.40 | Pre- Hypertension |

According to Table 3, the findings revealed a decrease in mean systolic blood pressure, dropping from 152 to 139.5 (a 12.5 mmHg difference). Similarly, the mean diastolic blood pressure decreased from 90.16 to 82.4 (a 7.76 mmHg difference), following the administration of amlodipine (5 mg) antihypertensive drugs.

**Table 4. Comparison of Blood Pressure Between Two Groups (n=64)**

| Group | Variable | | Min-Max | Mean ± SD | *p* |
|---|---|---|---|---|---|
| Intervention | *Pre-test* | TDS | 135-173 | 153±9.536 | 0.000 |
| | | TDD | 69-102 | 89.8±7.727 | |
| | *Post-test* | TDS | 125-163 | 141.3±9.364 | |
| | | TDD | 64-95 | 82±7.856 | |
| Control | *Pre-test* | TDS | 135-165 | 152±8.598 | 0.000 |
| | | TDD | 74-109 | 90.16±8.148 | |
| | *Post-test* | TDS | 122-155 | 139.5±8.688 | |
| | | TDD | 64-104 | 82.4±8.526 | |

According to Table 4, the paired t-test indicate significant differences in systolic and diastolic blood pressure in the elderly before and after consuming Hibiscus sabdariffa Linn. flower and white ginger tea (p = 0.000), as well as before and after taking antihypertensive medication (p = 0.000).

**Table 5. Differences in Blood Pressure between Two Groups (n=64)**

| Variable | Group | Mean±SD | *p* |
|---|---|---|---|
| *Pre-test* Systolic | Intervention | 153±9.536 | 0.671 |
| | Control | 89.8±7.727 | |
| *Pre-test* Diastolic | Intervention | 141.3±9.364 | 0.863 |
| | Control | 82±7.856 | |
| *Post-test* Systolic | Intervention | 152±8.598 | 0.441 |
| | Control | 90.16±8.148 | |
| *Post-test* Diastolic | Intervention | 139.5±8.688 | 0.856 |
| | Control | 82.4±8.526 | |

According to Table 5, the Independent t-test revealed no significant differences in pre- or post-test systolic or diastolic blood pressure between the intervention and control groups (p = 0.671, p = 0.863 and p = 0.441, p = 0.856, respectively). These findings suggest that Hibiscus sabdariffa Linn. flower and white ginger tea are equally effective in reducing blood pressure compared to amlodipine therapy.

## DISCUSSION

The results showed that consuming Hibiscus sabdariffa Linn. flower and white ginger tea effectively reduced blood pressure by a similar amount to Amlodipine therapy. This aligns with Melani's (2024), which showed that consuming 2 grams of Hibiscus sabdariffa Linn. flower petal powder extract per day for four weeks can reduce mean systolic from 149.7 to 135.6 and mean diastolic from 94.3 to 85.2. Other research has also shown that drinking Hibiscus tea twice daily for 14 days can reduce systolic by 17.4 and diastolic by 11.2 (Lisa et al., 2024a) and (Oktafiani et al., 2022). Steeping Hibiscus sabdariffa flowers three times a day for ten days decreased systolic blood pressure from 155.5 mmHg to 138.3 mmHg and diastolic blood pressure from 93.2 mmHg to 83.5 mmHg (Nada et al, 2024).

Based on previous study, administering white ginger decoction for seven days decreased systolic from 163.8 to 141.4 and diastolic from 97.3 to 85.9 (Sadita., 2025). Drinking 100 cc of boiled ginger water for five days decreased systolic from 158.3 to 139.6 and diastolic from 94.5

to 83.2 (Silvia et al., 2025). Additionally, consuming a white ginger drink for seven days significantly decreased systolic by 11.2 and diastolic by 9.4 (Wahyuningsih et al., 2024).

In addition to the hibiscus sabdariffa flower and white ginger, several researchers have used other non-pharmacological interventions to reduce blood pressure, including: elderly gymnastics (Vicky et al., 2025), deep breathing relaxation therapy (Nurhayani., 2022), dhikr therapy (Nadjib et al., 2025), Lavender aromatherapy (Saputra et al., 2025), music therapy (Dimas et al., 2023), foot reflexology (Lukman et al., 2020), Telang flower (Aprilia, 2023), Lemongrass water decoction (Pangestuti, 2022), Avocado leaf decoction (Ishak et al., 2022), young coconut water (Parmiyati et al., 2024), bay leaf decoction (Aminullah & Septiany, 2024).

The results showed that hibiscus sabdariffa flower tea and white ginger exhibited mean systolic and diastolic differences of 11.7 and 7.8 mmHg, respectively. In comparison, Yuliza, (2024) reported that drinking honey and white ginger for seven days decreased systolic from 150 to 138 (a 12 mmHg mean difference) and diastolic from 90 to 82 (a 8 mmHg mean difference). The comparative results showed that honey and white ginger slightly outperform Hibiscus sabdariffa Linn. flower and white ginger tea in reducing blood pressure, with a difference of 0.5 mmHg. Hibiscus sabdariffa flowers contain flavonoids and anthocyanins, which exhibit antihypertensive effects through vasodilatory mechanisms and diuretic effects that reduce blood volume (Suarayasa et al., 2023). Meanwhile, white ginger contains gingerol and shogaol, which function as ACE inhibitors, promoting blood vessels relaxation and effectively lower blood pressure (Norouzzadeh et al., 2025).

The study results indicated that consuming Hibiscus sabdariffa Linn. flower and white ginger tea, and antihypertensive drugs, has been proven to equally reduce blood pressure in the elderly. Consuming Hibiscus sabdariffa Linn. flower and white ginger tea for seven days could decrease mean systolic by 11.7 and mean diastolic by 7.8 mmHg. In comparison, antihypertensive drugs decreased systolic by 12.5 and diastolic by 7.76 mmHg. When the intervention group (Hibiscus sabdariffa L. flower tea and white ginger) was compared to the control group (amlodipine 5 mg therapy), the systolic difference between the groups was 0.8 mmHg greater with the antihypertensive drugs, while the diastolic difference was 0.04 mmHg greater with the Hibiscus sabdariffa L. flower tea and white ginger. However, the differences between the two groups were minimal, indicating comparable effectiveness.

Research by Andhyka et al., (2019) demonstrated that amlodipine administration resulted in a decrease in systolic from 153 to 118 mmHg (a 35 mmHg mean difference). Diastolic decreased from 89 to 81 mmHg (a 8 mmHg mean difference) (Wani et al., 2021). Amlodipine therapy decreased mean systolic blood pressure by 20.2 mmHg and diastolic blood pressure by 13.2 mmHg. Administering amlodipine 2.5 mg for two weeks resulted in a decrease in systolic blood pressure from 152 mmHg to 142 mmHg (mean difference: 10 mmHg) and diastolic blood pressure decreased from 81 mmHg to 82 mmHg (mean difference: 3 mmHg). Comparatively, research on amlodipine 5 mg for seven days showed mean systolic and diastolic values of 12.5 and 7.76 mmHg, respectively. The results of the comparison of previous studies showed that using Amlodipine 5 mg for seven days resulted in a greater reduction in blood pressure compared to Amlodipine 2.5 mg over two weeks (Darrell et al., 2019).

Amlodipine is an antihypertensive calcium channel blocker that works by inhibiting calcium ion entry into blood vessel muscles, thereby causing vasodilation and lowering blood pressure. It also reduces the heart's workload and is effective for daily administration. The decrease is influenced by amlodipine's action and by educational efforts, which increase elderly compliance with medication and a healthy lifestyle, thereby optimizing the effectiveness of therapy (Fernando, 2023).

Non-pharmacological interventions offer a low risk of side effects (Norouzzadeh

et al., 2025). However, the effectiveness varies between individuals, and lack a standardized dosage. They also have the potential to interact with other drugs (Dehkhoda et al., 2024). In contrast, amlodipine, a pharmacological therapy, provides a rapid and consistent reduction in blood pressure with a standardized dosage that is supervised by healthcare workers. While effective, it can cause side effects such as edema and headaches. It may also reduce compliance if not complemented by healthy lifestyle changes, particularly among the elderly (Sapian et al., 2023).

Hibiscus sabdariffa Linn. flower and white ginger tea can be used to naturally manage hypertension. It has been proven safe for the elderly because it does not cause gastric disorders in any of the respondents. However, the long-term effects of consuming this tea are unknown. Further research is needed to assess the long-term effects of Hibiscus sabdariffa Linn. flower and white ginger tea therapy, although the tea is generally safe to consume.

## CONCLUSIONS

Hibiscus sabdariffa Linn. flower and white ginger tea effectively reduce systolic and diastolic blood pressure in the elderly because they contain flavonoids, which dilate blood vessels; antioxidants, which reduce blood volume; and gingerol and shogaol, which lower blood pressure by inhibiting ACE. This tea is safe because none of the elderly participants complained of gastric pain. For practicality and to maximize the therapeutic effect, future researchers are encouraged to formulate capsules form.

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