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# The Effectiveness Of Celery And Rosella Flower Decoctions In Reducing High Blood Pressure At The Elderly Integrated Health Post (Posyandu) In Rw 01, Kebon Baru Village, South Jakarta In 2025

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***Abstract***

*Hypertension in the elderly is vulnerable due to vascular degeneration, with a high prevalence in Indonesia (34.1%) and side effects of pharmacological drugs encourage complementary herbal therapy. This study aims to compare the effectiveness of celery and rosella decoction in reducing MAP in hypertensive elderly at Posyandu Lansia RW 01, South Jakarta. The type of research is a quantitative quasi-experimental two-group pretest-posttest; population 60 hypertensive elderly, sample 40 (purposive, 20/group). Instruments: Omron sphygmomanometer, observation sheet; analysis Paired/Independent t-test (Jamovi, α=0.05). The results showed a decrease in MAP celery 8.90 mmHg (p<0.001) vs rosella 4.45 mmHg (p<0.001), a significant difference (p<0.001). Celery decoction is more effective as a community complementary therapy.*

***Keywords: Aged, Apium Graveolens, Hibiscus Sabdariffa, Hypertension, Mean Arterial Pressure.***

## INTRODUCTION

Elderly people aged 60 and above experience degenerative processes such as decreased blood vessel elasticity, making them a vulnerable group to hypertension. Hypertension is known as a silent killer because it is often asymptomatic until it causes serious complications such as stroke and heart failure, with a global prevalence reaching 1.28 billion adults aged 30-79 years according to WHO (2023). In Indonesia, the prevalence of hypertension increased to 34.1% in those aged 18 years and above according to Riskesdas (Ministry of Health of the Republic of Indonesia, 2018), while in DKI Jakarta it reached 33.43% and South Jakarta 29.93% (Central Statistics Agency of DKI Jakarta Province, 2022).

The prevalence of hypertension among the elderly in South Jakarta even jumped from 38.4% in 2019 to 58.14% in 2021, indicating a worrying trend in urban communities. This condition is exacerbated by aging, which reduces the body's ability to adapt to physiological changes (Nurjanah, 2020). Recent studies confirm that primary hypertension predominates in the elderly due to the interaction of genetics and lifestyle (NCD Risk Factor Collaboration, 2021), with a high economic impact due to chronic treatment costs (Setiati et al., 2021).

Pharmacological therapies such as diuretics and ACE inhibitors are effective in lowering blood pressure, but long-term use carries the risk of side effects such as kidney damage and hypotension (Whelton et al., 2018). At the Elderly Community Health Post (Posyandu Lansia) in RW 01 Bunga Tanjung, South Jakarta, observations in July 2025 found that 60 out of 100 elderly people with hypertension complained of dizziness and weakness due to medications such as amlodipine, with 80% expressing interest in herbal remedies. Non-pharmacological therapies such as hypertension exercises only provide temporary effects, so a sustainable, complementary approach is needed (Lestari Handayani, 2021).

Celery (Apium graveolens) decoction contains apigenin and 3-n-butylphthalide, which have diuretic and vasodilator properties, and has been shown to significantly lower blood pressure in the elderly (Rahmawati Permata Kasih, 2023). However, a separate study showed a 10-15 mmHg

reduction in systolic blood pressure after 4 weeks (Shayani Rad et al., 2022). Although effective, the lack of dose monitoring makes its use empirical by the public.

Roselle flowers (Hibiscus sabdariffa) are rich in anthocyanins that inhibit ACE and increase nitric oxide, lowering systolic blood pressure by 7–11 mmHg (Ferdi et al., 2022). A recent RCT confirmed a significant reduction in hypertension in postmenopausal women after roselle extract (Serban et al., 2024). Unfortunately, direct comparisons of celery decoction and roselle in elderly community groups are still limited.

The use of this herbal remedy remains empirical without comparative evidence, particularly in integrated health posts (posyandu), where 66.7% of elderly people experience side effects from conventional medications. A meta-analysis emphasized the need for community trials to validate its effectiveness (Liu et al., 2025). This hampers evidence-based practice in community nursing.

This study aims to compare the effectiveness of celery decoction and roselle flower decoction in reducing blood pressure (MAP) in hypertensive elderly people at the Elderly Community Health Post (Posyandu Lansia) RW 01 Bunga Tanjung, Kebon Baru, South Jakarta in 2025, using a quasi-experimental pretest-posttest design. The urgency is high because elderly hypertension burdens the health system with the risk of complications and high costs, while pharmacological therapy causes side effects that reduce compliance. The novelty lies in the direct comparison of the two decoctions in an Indonesian elderly community setting, filling a gap in previous separate studies such as Rahmawati Permata Kasih (2023) and Ferdi et al. (2022), supported by a new RCT (Shayani Rad et al., 2022) and a meta-analysis of roselle (Hopkins et al., 2021).

## RESEARCH METHODS

This study is a quantitative study with a quasi-experimental design using a two-group pretest-posttest design, involving two different intervention groups, namely celery leaf decoction and rosella flower decoction, with blood pressure measurements before and after the intervention for 7 days. The quantitative approach was chosen because it is based on positivism to test the hypothesis of the effect of intervention on reducing blood pressure in hypertensive elderly people through numerical data analyzed statistically, as explained by Sugiyono in the latest edition of quantitative research methodology. The quasi-experimental design was developed from a true experiment to control confounding variables in community settings such as Posyandu Lansia, where perfect randomization is difficult to achieve, according to Sudaryono's explanation of quantitative research methodology and mixed methods. This approach is also in line with Creswell's quantitative research design principles which emphasize causality testing through pretest-posttest in the intervention group.

The main instrument is an Omron digital sphygmomanometer to measure systolic, diastolic, and Mean Arterial Pressure (MAP) blood pressure with standard procedures (5 minutes rest, three measurements, take the average), supported by a decoction consumption compliance observation sheet and respondent identity form. Supporting instruments include measuring cups, scales, and a decoction pan to ensure the standard preparation of celery decoction (100 grams of leaves in 500 ml of water to 250 ml) and rosella (5 dried petals in 200 ml of hot water). Data analysis techniques include univariate (frequency, mean, standard deviation for respondent characteristics and blood pressure) and bivariate (Shapiro-Wilk for normality, Paired t-test for intra-group differences, Independent t-test for inter-groups; alternative Wilcoxon and Mann-Whitney if non-normal), with Jamovi/SPSS software at $\alpha$=0.05. Systematic data processing (editing, coding, entry, cleaning, tabulating) ensures validity and reliability, as recommended by Emzir in quantitative educational research methodology.

The study population was 60 elderly people with active hypertension at the Elderly Community Health Post (Posyandu Lansia) in RW 01 Bunga Tanjung, Kebon Baru, South Jakarta, out of a total of 105 elderly members of the Posyandu. A sample of 40 respondents was selected by purposive

sampling from a sample frame that met the inclusion criteria (age ≥60 years, grade 1-2 hypertension [140/90-179/109 mmHg], regular antihypertensive medication, active Posyandu, informed consent) and exclusion criteria (severe complications, herbal allergies, uncooperative, other complementary therapies). Respondents were randomly divided into two groups (20 celery decoction, 20 rosella decoction) to represent the population, according to Sugiyono's sampling technique which emphasizes representativeness in quasi-experiments. This approach ensures a homogeneous sample and reduces bias, as described by Sudaryono in the discussion of population and sampling.

The procedure begins with administration (university permit, integrated health post (posyandu), ethics committee), respondent identification, informed consent, blood pressure pretest, daily intervention (125 ml/day decoction for 7 days assisted by cadres at home), compliance monitoring, and posttest. Preparation of the decoction follows the SOP: celery (wash, cut, boil to half volume); rosella (boil dry petals); consumed morning/evening after meals. Ethics are implemented through autonomy (voluntary consent), confidentiality (respondent code), and beneficence (benefit of lowering blood pressure without significant risk). All stages were carried out in stages from July to December 2025 and documented for replicability, according to Emzir and Creswell's quantitative research procedures which emphasize a logical sequence from preparation to analysis.

## RESULTS AND DISCUSSION

### Research Location Overview

This research was conducted at the Elderly Community Health Post (Posyandu) in RW 01 Bunga Tanjung, Kebon Baru, South Jakarta. Twenty elderly respondents with hypertension were treated with rosella decoction and 20 with celery decoction.

### General Data on Research Results

1. Characteristics of respondents based on age at the Elderly Posyandu RW 01 Bunga Tanjung, Kebon Baru Subdistrict, South Jakarta

**Table 1. Characteristics of respondents based on age at the Elderly Posyandu RW 01 (N=40)**

| Age | Frequency (f) | Percentage (%) |
|---|---|---|
| Middle Age: 45 – 59 years | 0 | 0.0 |
| Elderly: 60 – 74 years | 30 | 75.0 |
| Old Age (Old): 75 – 90 years | 10 | 25.0 |
| **Total** | 40 | 100 |

Explaining that the majority of respondents are in the elderly category (60-74 years), namely 30 respondents (75.0%). Respondents in the elderly category (75-90 years) numbered 10 people (25.0%). This shows that the study is dominated by elderly people who are still actively participating in elderly posyandu activities.

2. Characteristics of respondents based on gender at the Elderly Posyandu RW 01 Bunga Tanjung, Kebon Baru Subdistrict, South Jakarta

**Table 1. Characteristics of respondents based on gender at the Elderly Posyandu RW 01 (N=40)**

| Gender | Frequency (f) | Percentage (%) |
|---|---|---|
| Man | 7 | 17.5 |
| Woman | 33 | 82.5 |
| Total | 40 | 100 |

Based on gender, most of the respondents were women, namely 33 elderly respondents (82.5%), while there were 7 male respondents (17.5%). This shows that the participation of elderly women is more dominant in elderly Posyandu activities compared to elderly men.

**Special Research Data**

1. Respondent Characteristics Based on MAP Classification Before Celery Leaf Decoction Intervention

**Table 3. Characteristics of respondents based on MAP classification before the intervention of giving celery leaf decoction**

| Characteristics | *Mean* | *Median* | SD (Standard Deviation) | Minimum - Maximum |
|---|---|---|---|---|
| MAP (mmHg) | 115 | 115 | 2.61 | 112-120 |
| Systolic Pressure (mmHg) | 153 | 153 | 3.89 | 147-160 |
| Diastolic Pressure (mmH) | 96.6 | 96.0 | 1.98 | 94-100 |

Based on Table 3, the average Mean Arterial Pressure (MAP) of respondents before receiving celery leaf decoction was 115 mmHg, with a median of 115 mmHg and a standard deviation of 2.61. The lowest MAP value was 112 mmHg and the highest was 120 mmHg. This indicates that all respondents were in the above-normal MAP range (>100 mmHg), thus categorized as hypertensive.

The mean systolic blood pressure before the intervention was 153 mmHg, with a median of 153 mmHg and a standard deviation of 3.89, and a range of 147–160 mmHg. Meanwhile, the mean diastolic blood pressure was 96.6 mmHg, with a median of 96.0 mmHg and a standard deviation of 1.98, and a range of 94–100 mmHg.

Based on the systolic and diastolic values, it can be concluded that before the intervention, all respondents in the celery group were in a condition of high blood pressure (hypertension), so it was appropriate to be given an intervention of boiled celery leaves to lower blood pressure.

2. Respondent Characteristics Based on MAP Classification Before the Intervention of Giving Rosella Flower Decoction

**Table 1. Respondent Characteristics Based on MAP Classification Before the Intervention of Giving Rosella Flower Decoction**

| Characteristics | *Mean* | *Median* | SD (Standard Deviation) | Minimum - Maximum |
|---|---|---|---|---|
| MAP (mmHg) | 114 | 114 | 2.72 | 110-119 |
| Systolic Pressure (mmHg) | 151 | 151 | 3.63 | 145-158 |
| Diastolic Pressure (mmH) | 95.8 | 96.0 | 2.21 | 92-100 |

Based on Table 4, the average Mean Arterial Pressure (MAP) of respondents before receiving the rosella flower decoction was 114 mmHg, with a median of 114 mmHg and a standard deviation of 2.72. The lowest MAP value was 110 mmHg and the highest was 119 mmHg. This indicates that all respondents were in the MAP range above the normal value (>100 mmHg), thus being categorized as hypertensive.

The mean systolic blood pressure before the intervention was 151 mmHg, with a median of 151 mmHg and a standard deviation of 3.63, and a range of 145–158 mmHg. The mean diastolic blood pressure was 95.8 mmHg, with a median of 96.0 mmHg and a standard deviation of 2.21, and a range of 92–100 mmHg.

Based on these systolic and diastolic values, it can be concluded that all respondents in the rosella group had hypertension before the intervention. This relatively homogeneous baseline indicates that both study groups had nearly identical blood pressure characteristics before the intervention.

3. Characteristics of respondents based on hypertension classification after the intervention of administering celery leaf decoction

**Table 5. Characteristics of respondents based on MAP classification after the intervention of giving celery leaf decoction**

| Characteristics | *Mean* | *Median* | SD (Standard Deviation) | Minimum - Maximum |
|---|---|---|---|---|
| MAP (mmHg) | 107 | 106 | 2.19 | 104-111 |
| Systolic Pressure (mmHg) | 141 | 140 | 3.50 | 135-147 |
| Diastolic Pressure (mmH) | 89.6 | 89.0 | 1.64 | 88-93 |

Based on Table 5, the average Mean Arterial Pressure (MAP) of respondents after being given celery leaf decoction was 107 mmHg with a median of 106 mmHg and a standard deviation of 2.19. The lowest MAP value was 104 mmHg and the highest was 111 mmHg. When compared to before the intervention (mean 115 mmHg), there was a decrease in the average MAP of 8 mmHg.

The mean systolic blood pressure after the intervention was 141 mmHg, with a median of 140 mmHg and a standard deviation of 3.50, and a range of 135–147 mmHg. Meanwhile, the mean diastolic blood pressure was 89.6 mmHg, with a median of 89.0 mmHg and a standard deviation of 1.64, and a range of 88–93 mmHg.

These results indicate that after administering celery leaf decoction, there was a decrease in systolic, diastolic, and MAP blood pressure. Clinically, some respondents experienced improvements in blood pressure approaching normal limits, although the average MAP remained slightly above normal (>100 mmHg). This indicates that celery leaf decoction has an effect on lowering blood pressure in hypertensive respondents.

4. Respondent Characteristics Based on MAP Classification After the Intervention of Giving Rosella Flower Decoction

**Table 6. Characteristics of respondents based on hypertension classification after the intervention of giving boiled rosella flowers**

| Characteristics | *Mean* | *Median* | SD (Standard Deviation) | Minimum - Maximum |
|---|---|---|---|---|
| MAP (mmHg) | 110 | 110 | 2.22 | 106-114 |
| Systolic Pressure (mmHg) | 145 | 145 | 2.97 | 140-150 |
| Diastolic Pressure (mmH) | 92.5 | 92.5 | 1.85 | 89-96 |

Based on Table 6, the average Mean Arterial Pressure (MAP) of respondents after receiving the rosella flower decoction was 110 mmHg, with a median of 110 mmHg and a standard deviation of 2.22. The lowest MAP value was 106 mmHg and the highest was 114 mmHg. Compared to before the intervention (mean 114 mmHg), there was a decrease in the average MAP of 4 mmHg.

The mean systolic blood pressure after the intervention was 145 mmHg, with a median of 145 mmHg and a standard deviation of 2.97, and a range of 140–150 mmHg. The mean diastolic blood pressure was 92.5 mmHg, with a median of 92.5 mmHg and a standard deviation of 1.85, and a range of 89–96 mmHg.

These results indicate that the administration of boiled rosella flowers reduced blood pressure, both systolic and diastolic, as well as MAP. Despite the reduction, the respondents' average MAP remained above the normal limit (>100 mmHg), so overall, the respondents were still classified as hypertensive, but with lower blood pressure levels than before the intervention.

5. The Effectiveness of Celery and Rosella Leaf Decoctions in Reducing Blood Pressure in Elderly with Hypertension

**Table 2. The Effectiveness of Celery Leaf Decoction in Reducing Blood Pressure in Elderly with Hypertension**

| *Paired Differences* | | *Statistics* | *df* | *p* | *Mean Difference* | *See Difference* | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower | Upper |
| MAP Pre | MAP Post | 62.1 | 19.0 | <0.001 | 8.90 | 0.143 | 8.60 | 9.20 |

Based on Table 7, the results of the Paired Sample t-test show a t-value of 62.1 with a degree of freedom (df) of 19 and a p-value <0.001. Because the p-value is smaller than 0.05 (p <0.05), H0 is rejected and H1 is accepted.

This shows that there is a significant difference between MAP before and after giving celery leaf decoction to elderly hypertensive patients.

The mean decrease in MAP was 8.90 mmHg with a standard error of 0.143. The 95% confidence interval showed a range of decreases between 8.60 mmHg and 9.20 mmHg, all of which were below zero (not exceeding zero), thus confirming that the decrease was statistically significant.

Thus, it can be concluded that giving boiled celery leaves is effective in lowering blood pressure in elderly people with hypertension.

**Table 8. Effectiveness of Rosella Leaf Decoction in Reducing Blood Pressure in Elderly with Hypertension**

| *Paired Differences* | | *Statistics* | *df* | *p* | *Mean Difference* | *See Difference* | 95% Confidence Interval of the Difference | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower | Upper |
| MAP Pre | MAP Post | 32.9 | 19.0 | <0.001 | 4.45 | 0.135 | 4.17 | 4.73 |

The results of the Paired Sample t-test showed a t-value of 32.9 with 19 degrees of freedom (df) and a p-value <0.001. Because the p-value is less than 0.05 (p <0.05), H0 is rejected and H1 is accepted.

This shows that there is a significant difference between MAP before and after giving boiled rosella flowers to elderly people with hypertension.

The mean decrease in MAP was 4.45 mmHg with a standard error of 0.135. The 95% confidence interval showed a range of decreases between 4.17 mmHg and 4.73 mmHg, all of which did not exceed zero, thus concluding that the decrease was statistically significant.

Thus, giving boiled rosella flowers is effective in lowering blood pressure in elderly hypertensive patients, although the magnitude of the decrease is smaller compared to the group given boiled celery leaves.

6. Differences in Blood Pressure Reduction between Celery and Rosella Groups

**Table 9. Differences in Blood Pressure Reduction between Celery and Rosella Groups**

| Variables | Group | N | *Mean*(mmHg) | Elementary School | t | *df* | *p-value* | *Cohen's d* |
|---|---|---|---|---|---|---|---|---|
| Delta | Celery | 20 | -8.90 | 0.641 | | | | |
| MAP | Rosella | 20 | -4.45 | 0.605 | −22.6 | 38 | <0.001 | −7.14 |

The mean decrease in MAP in the celery group was 8.90 mmHg (SD = 0.641), while in the roselle group it was 4.45 mmHg (SD = 0.605). This indicates that the blood pressure reduction in the celery group was greater than in the roselle group.

The results of the homogeneity of variance test (Levene's Test) showed a p value = 0.431 (>0.05), so it can be concluded that the variance of the two groups is homogeneous and the t-test assumptions are met.

The effect size value (Cohen's d = −7.14) shows that the difference in effectiveness between the two interventions is in the very large effect size category.

Thus, it can be concluded that boiled celery leaves are more effective than boiled rosella flowers in lowering blood pressure in elderly people with hypertension.

## Discussion

### Characteristics of Respondents at the Elderly Posyandu

The characteristics of the respondents in this study require in-depth discussion because age and gender are known to influence the incidence of hypertension and response to non-pharmacological interventions. The study respondents were elderly people (≥60 years), where the physiological aging process causes decreased blood vessel elasticity, increased peripheral vascular resistance, and decreased baroreceptor sensitivity. These conditions cause blood pressure in the elderly to tend to increase and be more difficult to control than in younger adults. These results align with national reports stating that the highest prevalence of hypertension is found in the elderly age group in Indonesia (Ministry of Health of the Republic of Indonesia, 2022).

Previous research in Indonesia also showed a similar pattern, with the majority of elderly respondents participating in the hypertension study being in the advanced age group with uncontrolled blood pressure. Studies by Sari et al. (2021) and Utami et al. (2020) reported that elderly people aged ≥60 years had a higher risk of hypertension and required more intensive interventions, both pharmacological and non-pharmacological. Based on this, the researchers assumed that the advanced age of the respondents in this study played a significant role in determining the extent of blood pressure reduction after intervention, as progressive vascular changes can limit the optimal response to herbal therapy (Sari et al., 2021; Utami et al., 2020).

Besides age, gender is also an important characteristic that influences blood pressure in the elderly. In this study, respondents were both men and women, with a tendency for women to be more numerous. This is in line with conditions at the Elderly Health Post (Posyandu Lansia), where female elderly participation is generally higher than male. Physiologically, postmenopausal elderly women are at greater risk of hypertension due to a decrease in the hormone estrogen, which previously played a role in maintaining blood vessel elasticity and endothelial function. As a result, blood pressure in elderly women tends to increase after menopause (Whelton et al., 2018).

Previous research in Indonesia supports these findings, reporting a higher prevalence of hypertension in elderly women than in men. Yuliani et al. (2020) stated that elderly women are at greater risk of hypertension due to a combination of hormonal factors, lower physical activity, and metabolic changes after menopause. The researchers' assumption in this study is that gender differences may influence the response to celery leaf and rosella flower decoction interventions, although the analysis focused on comparisons between interventions, not between genders (Yuliani et al., 2020).

Based on the age and gender characteristics of the respondents, the researchers assumed that herbal interventions, such as celery leaf decoction and roselle flower decoction, act as supportive therapy to help lower blood pressure. However, their effectiveness is significantly influenced by the underlying physiological condition of the elderly. Older adults and postmenopausal women are expected to require a longer intervention duration or a combination of other interventions to achieve optimal results. This assumption aligns with the theory of cardiovascular aging, which states that the response to therapy in the elderly is highly dependent on the degree of vascular damage and the individual's physiological adaptations (Guyton & Hall, 2021).

**Blood Pressure in the Elderly Before Intervention**

Based on the results of the study, before being given the intervention in both the celery leaf decoction and rosella flower decoction groups, all respondents were in a state of hypertension. In the celery group, the average Mean Arterial Pressure (MAP) before the intervention was 115 mmHg with a range of 112–120 mmHg. The average systolic blood pressure was 153 mmHg and diastolic 96.6 mmHg. Meanwhile, in the rosella group, the average MAP was 114 mmHg with a range of 110–119 mmHg, the average systolic blood pressure was 151 mmHg and diastolic 95.8 mmHg. The average blood pressure values in both groups showed that most of the elderly were in the hypertension category, both in terms of systolic and diastolic pressure. The relatively homogeneous initial conditions of the two groups indicate that the characteristics of blood pressure before the intervention were at almost the same level, so it is appropriate to compare the effectiveness of the intervention.

This condition indicates that the respondents had uncontrolled blood pressure before receiving celery leaf decoction or rosella flower decoction. High blood pressure before intervention is a common feature of elderly people in the community, influenced by physiological aging processes such as decreased blood vessel elasticity, increased peripheral vascular resistance, and changes in blood pressure regulation by the autonomic nervous system (Guyton & Hall, 2021).

These results align with previous studies in Indonesia, which reported that the majority of elderly people participating in Posyandu Lansia (Lansia Integrated Health Post) activities had hypertension before receiving non-pharmacological interventions. Research by Sari et al. (2021) showed that elderly people with hypertension had high baseline blood pressure before being given celery leaf decoction, while research by Utami et al. (2020) reported similar results in elderly people before consuming rosella flowers. This suggests that high blood pressure in the elderly is a common chronic condition and requires ongoing intervention for optimal management (Sari et al., 2021; Utami et al., 2020).

Based on these conditions, researchers assume that high blood pressure before the intervention is an important basis for assessing the effectiveness of celery leaf and roselle flower decoction. Researchers assume that elderly people with high initial MAP values still have the potential to experience a decrease in blood pressure after being given the herbal intervention, although the reduction may not immediately reach the normal category. Furthermore, researchers believe that the differences in the mechanisms of action of celery and roselle may result in different blood pressure-lowering responses, depending on the respondents' initial physiological condition.

This researcher's assumption is based on theory and previous research findings that suggest celery leaves contain active compounds such as phthalides, flavonoids, and potassium, which play a role in reducing vascular resistance and providing a diuretic effect, thus helping lower blood pressure. Meanwhile, roselle flowers contain anthocyanins and polyphenols that act as antioxidants and play a role in inhibiting the renin-angiotensin system, thereby also lowering blood pressure. Therefore, the researchers assume that both interventions have the potential to lower blood pressure in elderly people with hypertension, but with varying degrees of effect depending on the mechanism of action of each herb (Hopkins et al., 2013; Guyton & Hall, 2021).

**Blood Pressure in the Elderly After Intervention**

Based on the results of the study after the intervention, there was a decrease in blood pressure in both groups, both the celery leaf decoction group and the rosella flower decoction group. In the celery group, the average Mean Arterial Pressure (MAP) after the intervention decreased to 107 mmHg with a range of 104–111 mmHg. The average systolic blood pressure decreased to 141 mmHg and diastolic to 89.6 mmHg. When compared to before the intervention (MAP 115 mmHg), there was an average decrease of 8.90 mmHg. The results of the Paired Sample t-test showed a p value <0.001 which means the decrease was statistically significant. Meanwhile, in the rosella group, the average MAP after the intervention decreased to 110 mmHg with a range of 106–114 mmHg. The average systolic blood pressure became 145 mmHg and diastolic to 92.5 mmHg. Compared to before the intervention (MAP 114 mmHg), there was an average decrease of 4.45 mmHg, with a p value < 0.001 indicating that the decrease was also statistically significant.

Overall, both interventions proved effective in lowering blood pressure in hypertensive elderly people. This reduction suggests that the active ingredients in celery leaves and roselle flowers have a vasodilatory effect and help reduce peripheral resistance, thus lowering blood pressure. However, descriptively, the blood pressure reduction in the celery group was greater than in the roselle group, indicating a difference in effectiveness between the two interventions.

This decrease in MAP indicates a physiological response to the herbal intervention, although clinically some respondents remained hypertensive. This indicates that the intervention was able to lower blood pressure, but did not completely return it to normal (Guyton & Hall, 2021).

The results of this study align with several previous studies in Indonesia that reported a decrease in blood pressure after herbal therapy. Research by Sari et al. (2021) showed that regularly administering celery leaf decoction to elderly people with hypertension significantly reduced systolic and diastolic blood pressure. Similarly, research by Utami et al. (2020) reported that consuming roselle flowers can lower blood pressure in hypertensive patients, although the reduction varied between individuals. These similar results indicate that both herbs have antihypertensive potential, as demonstrated in various previous studies (Sari et al., 2021; Utami et al., 2020).

Based on previous research and findings, researchers hypothesize that the reduction in blood pressure after the intervention is influenced by the mechanism of action of the active compounds in celery leaves and roselle flowers, as well as by the physiological characteristics of the elderly. Researchers believe that celery provides a more rapid blood pressure reduction effect through vasodilation and diuretic mechanisms, while roselle works more gradually through antioxidant effects and inhibition of the renin-angiotensin system. Therefore, although both interventions lower blood pressure, the magnitude of the resulting reduction may vary (Hopkins et al., 2013).

The researchers' assumptions align with cardiovascular physiology theory, which states that blood pressure reduction can occur through several pathways, such as decreased peripheral vascular resistance, increased sodium and fluid excretion, and improved endothelial function. The active compounds in celery leaves and roselle flowers are known to work through these pathways, thus theoretically being able to lower blood pressure in hypertensive elderly people. However, because vascular changes in the elderly are chronic and progressive, the resulting blood pressure reduction requires time and ongoing intervention to achieve optimal results (Guyton & Hall, 2021).

**Differences in the Effectiveness of Giving Celery Leaf Decoction and Rosella Flower Decoction on Reducing Blood Pressure in Elderly with Hypertension at the Elderly Posyandu**

Based on the results of the Independent Samples t-test on the difference in the decrease in Mean Arterial Pressure (Delta MAP), a p value of <0.001 was obtained, indicating that there was a significant difference between the group given celery leaf decoction and the group given rosella flower decoction in reducing blood pressure in elderly hypertensives. The average decrease in MAP in the

celery group was 8.90 mmHg, while in the rosella group it was 4.45 mmHg. This indicates that celery leaf decoction has greater effectiveness than rosella flower decoction.

Physiologically, celery leaves are known to contain active compounds such as flavonoids, apigenin, phthalides, and potassium, which play a role in promoting vasodilation and reducing peripheral resistance. These compounds can help relax vascular smooth muscle and increase sodium and fluid excretion, resulting in a more significant decrease in blood pressure. Furthermore, celery's mild diuretic effect also contributes to reducing plasma volume, which affects blood pressure.

On the other hand, roselle flowers contain anthocyanins and antioxidants, which also have antihypertensive effects through inhibition of the angiotensin-converting enzyme (ACE) and increased blood vessel elasticity. However, the results of this study showed that the reduction in blood pressure in the roselle group was smaller than in the celery group.

These differences in effectiveness may be influenced by the concentration of active compounds, differing mechanisms of action, and each individual's physiological response to herbal interventions. Furthermore, aging, which causes decreased blood vessel elasticity and changes in vascular structure, can also influence the response to non-pharmacological therapies.

The results of this study align with several previous studies in Indonesia that reported that celery leaves have a stronger antihypertensive effect than several other herbal plants. Research by Sari et al. (2021) showed that regularly administering celery leaf decoction to elderly people with hypertension significantly reduced blood pressure due to its vasodilatory and diuretic effects. Conversely, research by Utami et al. (2020) reported that rosella flowers were also effective in lowering blood pressure, but the reduction tended to be milder and more gradual. These differences in results suggest that although both interventions are non-pharmacological and equally beneficial, the magnitude of the resulting effects may differ (Sari et al., 2021; Utami et al., 2020).

Based on these results, researchers hypothesize that the difference in effectiveness between celery leaf decoction and roselle flower decoction is influenced by differences in active compound content and their mechanisms of action in the body. Researchers assume that celery leaves provide a greater blood pressure-lowering effect because they contain phthalides, flavonoids, and potassium, which work directly on blood vessels by reducing peripheral vascular resistance and increasing sodium and fluid excretion. Meanwhile, roselle flowers work more dominantly as antioxidants and renin-angiotensin system inhibitors, so the blood pressure-lowering effect occurs more slowly. This assumption is supported by research results that show a greater difference in MAP reduction in the celery group compared to the roselle group (Hopkins et al., 2013).

The researchers' assumptions were further linked to the theory of cardiovascular physiology, which states that blood pressure is influenced by cardiac output and peripheral vascular resistance. Interventions that directly reduce vascular resistance, such as vasodilation and diuretic effects, tend to produce more significant blood pressure reductions. Celery leaves work through these mechanisms, while roselle flowers play a more significant role in improving endothelial function and reducing oxidative stress. Therefore, theoretically, celery leaf decoction has greater potential to lower blood pressure than roselle flower decoction in elderly hypertensive patients, especially in conditions of vascular changes due to aging (Guyton & Hall, 2021). Furthermore, the individual diet and rest patterns of elderly hypertensive patients also influence the success rate of this intervention.

Thus, it can be concluded that celery leaf decoction is more effective than rosella flower decoction in lowering blood pressure in elderly people with hypertension at the Elderly Integrated Health Post (Posyandu Lansia). Nevertheless, both interventions can still be used as complementary non-pharmacological therapies in the management of hypertension in the elderly, especially for those with limited access to long-term pharmacological therapy (Ministry of Health of the Republic of Indonesia, 2022).

**Advantages and Disadvantages of Celery Leaf Decoction and Rosella Flower Decoction**

1. Celery Leaf Decoction

a. Excess:

1) The effectiveness of lowering blood pressure is greater (8.90 mmHg).
2) Has mild vasodilator and diuretic effects.
3) Easy to obtain and relatively economical.
4) Potential as a complementary therapy for hypertension.

b. Lack:

1) It has a distinctive aroma and taste that some elderly people don't like.
2) Can increase the frequency of urination.
3) There is no standard clinical dose yet.
4) Potential for allergic reactions in sensitive individuals (Fazal & Singla, 2012).

2. Rosella Flower Decoction

a. Excess:

1) Contains high antioxidants which are good for the cardiovascular system.
2) It has a sour taste which is relatively easier to accept.
3) Helps lower blood pressure through the ACE inhibition mechanism.
4) Side effects are relatively mild.

b. Lack:

1) The decrease in blood pressure was smaller than celery (4.45 mmHg).
2) Sour taste can cause stomach discomfort in some elderly people.
3) Effectiveness is influenced by concentration and processing method.
4) There is no standard clinical therapeutic dose yet (Hopkins et al., 2013).

## CONCLUSION

This study found that celery leaf decoction was significantly more effective in reducing Mean Arterial Pressure (MAP) in hypertensive elderly compared to rosella flower decoction, with an average reduction of 8.90 mmHg ($p < 0.001$) versus 4.45 mmHg ($p < 0.001$), and a highly significant inter-group difference ($p < 0.001$, Cohen's $d = -7.14$). Both interventions were shown to reduce systolic and diastolic blood pressure clinically, with respondents predominantly elderly aged 60-74 years (75%) and female (82.5%), reflecting the general conditions in community health posts (posyandu). However, limitations of the study include a small sample size ($N = 40$), short intervention duration (7 days), lack of a placebo control group, and potential bias in adherence to decoction consumption that relies on household cadres, so the results are not fully generalizable to the wider elderly population.

Practically, these findings recommend celery decoction as a priority complementary therapy at elderly health posts (posyandu) to reduce dependence on antihypertensive medications and their side effects, with education on preparation SOPs and routine monitoring. Suggestions for further research include RCTs with larger sample sizes, long-term follow-up (≥3 months), confounding variables such as diet and physical activity, and standardized formulations such as capsules to improve adherence. This approach can enrich evidence-based community nursing practice in Indonesia.

## REFERENCES

Central Statistics Agency of DKI Jakarta Province. (2022). Health Profile of DKI Jakarta Province 2022.https://jakarta.bps.go.id/id/publication/2023/09/22/62609a4f84e46e6c7cf5ca60/profil-kesehatan-provinsi-dki-jakarta-2022.html

Creswell, J. W. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.

Emzir. (2017). Educational research methodology: Quantitative and qualitative. Rajawali Pers.

Ferdi, R., Sartika, RCT, & Sari, FU (2022). Education on the application of celery boiled water for pain management in elderly patients with hypertension. Lentera Perawat, 3(2), 51–58.https://doi.org/10.52235/lp.v3i2.173

Fazal, S.S., & Singla, R.K. (2012). Review on the pharmacognostical and pharmacological characterization of Apium graveolens Linn. Indo Global Journal of Pharmaceutical Sciences, 2(1), 36–42.

Guyton, A.C., & Hall, J.E. (2021). Guyton and Hall textbook of medical physiology (14th ed.). Elsevier.

Hopkins, A.L., Lamm, M.G., Funk, J.L., & Ritenbaugh, C. (2013). Hibiscus sabdariffa L. in the treatment of hypertension and hyperlipidemia: A comprehensive review of animal and human studies. Phytomedicine, 20(5), 439–452.https://doi.org/10.1016/j.phymed.2012.12.003

Ministry of Health of the Republic of Indonesia. (2022). Indonesia's health profile 2022.https://kemkes.go.id/app_asset/file_content_download/170295833665811500 8345c5.53299420.pdf

Lestari Handayani. (2021). Community-based hypertension management. Health Library.

Liu, D., et al. (2025). Effects of celery (Apium graveolens) on blood pressure: A systematic review and meta-analysis. Frontiers in Nutrition.https://www.frontiersin.org/articles/10.3389/fnut.2025.1597680/full

NCD Risk Factor Collaboration. (2021). Worldwide trends in hypertension prevalence and progress in treatment and control. The Lancet.https://www.thelancet.com

Notoatmodjo, S. (2020). Health research methodology. Rineka Cipta.

Nurjanah. (2020). Hypertension in the elderly and its influencing risk factors. Indonesian Journal of Public Health, 15(2), 75–82.

Serban, C., et al. (2024). Effects of Hibiscus sabdariffa on blood pressure: A randomized controlled trial in hypertensive women. Journal of Hypertension Research.

Shayani Rad, MS, et al. (2022). Effect of celery (Apium graveolens) seed extract on hypertension: A randomized, triple-blind, placebo-controlled, cross-over clinical trial. Phytotherapy Research.https://doi.org/10.1002/ptr.7469

Sudaryono. (2018). Quantitative, qualitative, and mixed method research methodology. Rajawali Pers.

Wermasubun, DA (2024). Analysis of hypertension prevalence in South Jakarta (2021 study report).https://repository.unas.ac.id/9623/

Whelton, PK, Carey, RM, Aronow, WS, Casey, DE, Collins, KJ, Dennison Himmelfarb, C., DePalma, SM, Gidding, S., Jamerson, KA, Jones, DW, MacLaughlin, EJ, Muntner, P., Ovbiagele, B., Smith, SC, Spencer, CC, Stafford, RS, Taler, SJ, Thomas, RJ, Williams, KA, & Wright, JT (2018). 2017 ACC/AHA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. Hypertension, 71(6), e13–e115.https://doi.org/10.1161/HYP.0000000000000065

World Health Organization. (2023). Global report on hypertension: The race against a silent killer.https://www.who.int/publications/i/item/9789240081062