

THE EFFECT OF CELERY (*APIUM GRAVEOLENS L.*) LEAF DECOCTION ON REDUCING BLOOD PRESSURE IN OLDER ADULTS (60-74 YEARS OLD) AT MAWAR INTEGRATED HEALTH POST, SOUTH TANGERANG CITY INDONESIA

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ABSTRACT

The prevalence of hypertension increases with age, making it one of the most common chronic conditions among older adults.. This study aimed to determine the effect of celery leaf decoction on reducing blood pressure among older adults aged 60–74 years at the Mawar Integrated Health Post (Posbindu Mawar) in Kampung Sawah, South Tangerang City, Indonesia. This study employed a quantitative approach using a quasi-experimental design with a one-group pretest–posttest design. Participants were recruited using a quota sampling technique, resulting in a total sample of 12 older adults. Blood pressure was measured before and after the intervention, and the data were analyzed using a paired-samples t-test. The results demonstrated a significant reduction in both systolic and diastolic blood pressure following the intervention ($p < 0.001$). These findings indicate that celery leaf decoction is effective in reducing blood pressure among older adults aged 60–74 years at the Mawar Integrated Health Post (Posbindu Mawar) in Kampung Sawah, South Tangerang City, Indonesia.

Keywords: Celery Leaf Decoction; Hypertension; Older Adults

INTRODUCTION

Hypertension remains one of the leading global public health challenges, affecting over 1.28 billion adults worldwide and contributing significantly to cardiovascular mortality, particularly among aging populations (Mills et al., 2020; WHO, 2023). The prevalence of hypertension increases sharply with age, leaving older adults especially vulnerable to end-organ damage and stroke (Ungar et al., 2021). At the Mawar Integrated Health Post (Posbindu Mawar) in South Tangerang, Indonesia, an initial screening identified 39 older adults living with uncontrolled hypertension. While pharmacological treatment remains the clinical standard, long-term adherence is

frequently constrained by potential adverse effects, cost, and polypharmacy risks, driving a growing global reliance on evidence-based complementary therapies (Ekor, 2020; WHO, 2023). Celery (*Apium graveolens* L.) contains active bioactive compounds—including apigenin, phthalides, flavonoids, and potassium—which promote blood pressure reduction via endothelial vasodilation, calcium-channel inhibition, and diuretic activity (Banjare et al., 2022; Kooti et al., 2020). Although previous clinical trials have broadly demonstrated the antihypertensive potential of celery preparations, limited empirical evidence exists regarding the specific efficacy, standardized preparation guidelines, and short-term response of fresh celery leaf decoction within community-based, primary-care settings (Posbindu) targeting older adults aged 60–74 years. Addressing this empirical gap, this study offers a novel contribution by systematically evaluating the immediate blood pressure-lowering effect of a standardized *Apium graveolens* L. leaf decoction in a real-world, non-institutionalized older adult population in South Tangerang, Indonesia..

METHODS

This study employed a quantitative quasi-experimental design using a one-group pretest–posttest approach to evaluate the effect of celery leaf decoction on blood pressure reduction. The research was conducted at the Mawar Integrated Health Post (Posbindu Mawar), Kampung Sawah, South Tangerang, Indonesia, from 18 to 24 January 2021. To minimize internal validity threats inherent to single-group designs, potential confounding variables were strictly controlled using exclusion criteria and procedural controls. Participants taking antihypertensive medications or antihypertensive herbal supplements were excluded to isolate the physiological effect of the intervention. Furthermore, potential confounders—including dietary intake (specifically sodium and caffeine), physical activity levels, smoking, and psychological stress—were controlled by instructing participants to maintain their habitual lifestyle patterns and refrain from strenuous exercise, alcohol, or dietary modifications during the 7-day study period. Pre- and post-intervention blood pressure measurements were conducted under standardized conditions (following a 10-minute rest period, using calibrated digital sphygmomanometers, and administered at identical times of day) to eliminate procedural variance. A total of 12 older adults aged 60–74 years diagnosed with hypertension were recruited using a quota sampling technique. The sample size determination was guided by an a priori power analysis using G*Power software (version 3.1) for a two-tailed paired *t*-test ($\alpha = 0.05$, $1 - \beta = 0.80$). Based on effect sizes reported in comparable herbal intervention studies on systolic blood pressure reduction ($d \approx 0.90$), a minimum required sample size was calculated. Furthermore, this sample size ($n = 12$) was constrained by strict inclusion and exclusion screening at the Posbindu Mawar facility during the study timeframe—specifically to exclude individuals on active pharmacological treatment—ensuring a homogeneous cohort while meeting the pilot/preliminary sample thresholds recommended for small-scale community-based clinical feasibility studies. Baseline systolic and diastolic blood pressure were measured before the intervention. Participants received 200 mL of celery (*Apium graveolens* L.) leaf decoction once daily for five consecutive days. The decoction was

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prepared by boiling 100 g of fresh celery leaves in 400 mL of water for 10–15 minutes until the volume was reduced to approximately 200 mL. Blood pressure was measured again after the intervention using the same procedure. Data normality was assessed using the Shapiro–Wilk test, and differences in pre- and post-intervention blood pressure were analyzed using the paired-samples t-test. Statistical significance was established at $p < 0.05$.

RESULTS

Analysis Univariate: The descriptive analysis of systolic blood pressure showed that the mean pre-intervention systolic blood pressure was 169.17 ± 17.81 mmHg, with a minimum value of 150 mmHg and a maximum value of 210 mmHg. After five days of celery (*Apium graveolens* L.) leaf decoction administration, the mean systolic blood pressure decreased to 130.83 ± 9.00 mmHg, with values ranging from 120 to 150 mmHg (Table 1).

Table 1. Descriptive Statistics of Systolic Blood Pressure Before and After Celery (*Apium graveolens* L.) Leaf Decoction Intervention (n = 12)

Variabel	Mean	SD	Min-Max	N
Pre Test	169,17	17,81	150-210	12
Post Test	130.83	9,00	120-150	12

The mean pre-intervention systolic blood pressure was 169.17 ± 17.81 mmHg, ranging from 150 to 210 mmHg. Following five days of celery (*Apium graveolens* L.) leaf decoction administration, the mean systolic blood pressure decreased to 130.83 ± 9.00 mmHg, with values ranging from 120 to 150 mmHg.

Table 2. Descriptive Statistics of Pre- and Post-Intervention Diastolic Blood Pressure Among Hypertensive Older Adults (n = 12)

Variabel	Mean	SD	Min-Max	N
Pre Test	100,83	9,00	90-120	12
Post Test	84,17	7,93	70-100	12

The mean pre-intervention diastolic blood pressure was 100.83 ± 9.00 mmHg (range: 90–120 mmHg). Following the intervention, the mean diastolic blood pressure decreased to 84.17 ± 7.93 mmHg, with a range of 70–100 mmHg (Table 2)

Bivariate Analysis:

Table 3. Shapiro–Wilk Normality Test of Pre- and Post-Intervention Systolic Blood Pressure Among Hypertensive Older Adults (n = 12)

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Variable	p-value	n
Pre-test Systolic Blood Pressure	0.113	12
Post-test Systolic Blood Pressure	0.560	12

The Shapiro–Wilk normality test indicated that both pre-intervention and post-intervention systolic blood pressure data were normally distributed, with p-values of 0.113 and 0.560, respectively ($p > 0.05$).

Therefore, the data met the assumption of normality and were considered appropriate for parametric analysis using the paired-samples t-test.

Table 4. Shapiro–Wilk Normality Test of Pre- and Post-Intervention Diastolic Blood Pressure Among Hypertensive Older Adults ($n = 12$)

Variable	p-value	n
Pre-test Diastolic Blood Pressure	0.560	12
Post-test Diastolic Blood Pressure	0.770	12

The Shapiro–Wilk normality test showed that the pre-intervention and post-intervention diastolic blood pressure data were normally distributed, with p-values of 0.560 and 0.770, respectively ($p > 0.05$). Therefore, the normality assumption was satisfied, indicating that the data were appropriate for parametric analysis using the paired-samples t-test.

Table 5. Paired-Samples *t*-Test of Pre- and Post-Intervention Systolic Blood Pressure
Among Hypertensive Older Adults (n = 12)

Variable	n	Mean (mmHg)	Standard Deviation	Standard Error	p-value
Pre-test Systolic Blood Pressure	12	169.17	17.81	5.14	<0.001
Post-test Systolic Blood Pressure	12	130.83	9.00	2.59	<0.001

The paired-samples *t*-test demonstrated a statistically significant reduction in systolic blood pressure following the intervention. The mean systolic blood pressure decreased from 169.17 ± 17.81 mmHg before the intervention to 130.83 ± 9.00 mmHg after five days of celery (*Apium graveolens* L.) leaf decoction administration. Statistical analysis yielded a *p*-value < 0.001, indicating a significant difference between pre- and post-intervention systolic blood pressure. These findings suggest that celery leaf decoction effectively reduced systolic blood pressure among hypertensive older adults at Mawar Integrated Health Post, Kampung Sawah, South Tangerang.

Table 6. Paired-Samples *t*-Test of Pre- and Post-Intervention Diastolic Blood Pressure
Among Hypertensive Older Adults (n = 12)

Variable	n	Mean (mmHg)	Standard Deviation	Standard Error	p-value
Pre-test Diastolic Blood Pressure	12	100.83	9.00	2.59	<0.001
Post-test Diastolic Blood Pressure	12	84.17	7.93	2.28	<0.001

The paired-samples *t*-test also revealed a statistically significant reduction in diastolic blood pressure after the intervention. The mean diastolic blood pressure decreased from 100.83 ± 9.00 mmHg before treatment to 84.17 ± 7.93 mmHg after five days of celery (*Apium graveolens* L.) leaf decoction administration. The statistical analysis showed a *p*-value < 0.001, indicating a significant difference between pre- and post-intervention diastolic blood pressure. These results demonstrate that celery leaf decoction significantly reduced diastolic blood pressure among hypertensive older adults at Mawar Integrated Health Post, Kampung Sawah, South Tangerang.

DISCUSSION

The findings of this study demonstrated that celery (*Apium graveolens* L.) leaf decoction significantly reduced both systolic and diastolic blood pressure among hypertensive older adults after five days of intervention ($p < 0.001$).

These results are consistent with previous studies reporting the antihypertensive effects of celery, which are primarily attributed to its bioactive compounds, including apigenin, flavonoids, apiin, vitamin C, calcium, and magnesium. These compounds contribute to blood pressure reduction through vasodilatory, antioxidant, and mild diuretic mechanisms, thereby improving vascular function and reducing peripheral vascular resistance.

Therefore, celery leaf decoction may be considered a safe, inexpensive, and easily accessible complementary therapy to support conventional hypertension management among older adults. However, because this study used a one-group pretest–posttest design with a small sample size ($n = 12$), further randomized controlled trials with larger samples and longer follow-up periods are recommended to confirm its long-term effectiveness.

CONCLUSION

Celery (*Apium graveolens* L.) leaf decoction significantly reduced both systolic and diastolic blood pressure among hypertensive older adults after five days of intervention ($p < 0.001$). These findings suggest that celery leaf decoction may serve as an effective complementary non-pharmacological therapy to support blood pressure management in older adults.

IMPLICATIONS FOR NURSING PRACTICE

The findings of this study suggest that celery (*Apium graveolens* L.) leaf decoction may be used as a complementary non-pharmacological intervention in nursing practice to support blood pressure management among hypertensive older adults. Nurses can incorporate evidence-based herbal education into health promotion programs, encourage healthy lifestyle modifications, and monitor blood pressure regularly to improve hypertension management in community settings.



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ETHICAL STATEMENT AND CONFLICT OF INTEREST

All participants voluntarily agreed to participate in this study and provided informed consent before enrollment. Participant confidentiality and anonymity were maintained throughout the study. No personal identifying information was disclosed in this publication.

The authors declare that there is no conflict of interest related to this research.

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