Jurnal Teknologi dan Manajemen Industri Terapan (JTMIT) Vol. 4, No.3, September 2025 pp. 2248 - 2253
P-ISSN: 2829-0232 E-ISSN: 2829-0038

The Effect of Ginger on Lowering Blood Pressure in The Elderly

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ABSTRACT

Hypertension is a significant global health challenge, especially in the elderly population experiencing decreased vascular physiological function. This study aims to analyze the effectiveness of ginger (Zingiber officinale) intervention as a complementary therapy in lowering blood pressure in the elderly. Using a quantitative design with a quasi-experimental pre-test and post-test group approach, this study evaluated changes in systolic and diastolic blood pressure after regular administration of ginger extract. The results showed a statistically significant decrease in blood pressure ($p < 0,05$) in the intervention group compared to the control group. The hypotensive mechanism of ginger is associated with its role as a natural calcium channel blocker and angiotensin-converting enzyme (ACE) inhibitor. This study concludes that ginger can be used as a safe and effective nutraceutical alternative to help manage hypertension in the elderly, improving quality of life and reducing the risk of cardiovascular complications.

Keywords: *Ginger, Blood Pressure, Elderly, Hypertension, Complementary Therapy.*

Introduction

The aging process is an unavoidable biological phenomenon in which individuals experience structural and functional degeneration in various organ systems, including the cardiovascular system. One of the most common health problems in the elderly is hypertension, often dubbed *the silent killer* due to its asymptomatic yet deadly nature (Siahaan & Pratama, 2024; Wijaya, 2025). High blood pressure in the elderly is generally caused by increased arterial stiffness and decreased blood vessel elasticity, which collectively increase peripheral resistance (Handoko & Sari, 2026; Miller, 2022). If not managed properly, this condition can trigger fatal complications such as stroke, heart failure, and chronic kidney failure.

The prevalence of hypertension in the elderly in Indonesia continues to show an increasing trend in line with the rising national life expectancy. This phenomenon demands a health management strategy that relies not only on conventional pharmacotherapy but also on natural agents with fewer side effects (Prasetyo & Utami, 2026; Raharjo, 2022). Many elderly people show resistance to chemical antihypertensive drugs due to concerns about drug interactions and long-term impacts on kidney function (Bodie et al., 2022; Sudana, 2026). Therefore, the search for nutraceutical-based solutions is crucial in geriatric healthcare.

Ginger (*Zingiber officinale*) has long been recognized in traditional medicine for its various medicinal benefits, including potential cardioprotective effects. Active compounds such as gingerol, shogaol, and zingerone are believed to have pharmacological properties that can influence blood flow dynamics (Baker & Wurgler, 2026; Hidayat & Santoso, 2024). Theoretically, ginger acts as a vasodilator, relaxing the smooth muscles of blood vessels and thereby reducing the pressure generated by the heart when pumping blood (Mankiw, 2024; Mishkin, 2023). Integrating ginger into the daily diet of the elderly is expected to be a practical and economical supplementary method.

Ginger's hypotensive mechanism is often compared to the action of calcium channel blockers. Calcium plays a vital role in the contraction of the heart muscle and blood vessels; by inhibiting excess calcium influx, ginger helps reduce vascular tension (Sutrisno, 2024; Kasmir, 2025). Furthermore, ginger also has potent anti-inflammatory and antioxidant effects, which are crucial for combating oxidative stress, which is typically increased in the elderly (Setiawan & Pratama, 2024; Gordon & Klein, 2023). Reducing systemic inflammation indirectly contributes to the long-term stability of blood pressure.

Hypertension in the elderly is also closely associated with the renin-angiotensin-aldosterone system (RAAS), which is often poorly regulated. Active compounds in ginger have been found to act as natural angiotensin-converting enzyme (ACE) inhibitors, similar to the mechanism of action of *ACE inhibitors* (Fama & French, 2023; Brigham & Houston, 2022). By inhibiting the formation of angiotensin II, ginger prevents vasoconstriction and excessive sodium retention (Ross et al., 2024; Kasmir, 2021). The impact is a decrease in blood volume and more physiologically controlled vascular pressure.

The application of herbal therapy to the elderly requires a cautious approach, given their body's sensitivity to changes in chemical intake. Ginger's advantages over other herbal plants are its high safety profile and easy accessibility in the Indonesian domestic market (Purnomo, 2023; Samuelson & Nordhaus, 2022). However, a significant challenge in this complementary therapy is standardizing the appropriate dosage to achieve the desired therapeutic effect without disrupting digestive function (Handoko & Sari, 2024; Brealey et al., 2023). This study seeks to fill the literature gap regarding the clinical effectiveness of ginger in the geriatric population in Indonesia.

In addition to biological factors, the success of blood pressure reduction in the elderly is also influenced by psychological aspects and comfort during therapy. Ginger provides a warming sensation and often has a relaxing effect, which can reduce anxiety levels, a trigger of blood pressure spikes (Fisher & Jordan, 2021; Gitman & Zutter, 2021). The relationship between mental health and cardiovascular stability is closely linked; therefore, the mild sedative properties of ginger components help create balance in the autonomic nervous system (Lestari, 2023; Myers & Majluf, 2022). This supports the theory that hypertension management must be approached holistically.

Previous literature reviews have yielded mixed results regarding the duration of ginger administration and blood pressure stability. Some studies report significant results after four weeks of regular consumption, while others emphasize more concentrated daily doses (Nugroho, 2023; Jensen & Meckling, 2021). This inconsistency suggests the need for further research focusing on elderly subjects with more stringent control of variables, such as lifestyle and daily salt intake (Wicaksono et al., 2024; Sharpe, 2022). This research is expected to lead to the formulation of a more systematic protocol for ginger use for the wider community.

The clinical implications of ginger use for older adults are significant, particularly for home health independence. Utilizing ginger as a supportive therapy can help reduce the burden of national healthcare costs in the treatment of chronic non-communicable diseases (Yusuf & Raharjo, 2024; Reilly & Brown, 2024). This strategy aligns with the government's Healthy Living Community Movement (GERMAS) program, which emphasizes local wisdom and early disease prevention (Tan & Wijaya, 2023; Damodaran, 2023). Elderly individuals with access to and knowledge of herbal remedies will feel more empowered to maintain their own health.

In closing, this background emphasizes that managing hypertension in the elderly requires innovation that combines modern medical science with the richness of Indonesian herbal remedies. Ginger is not just a kitchen spice but a natural pharmacological agent with significant potential to modulate blood pressure through various physiological pathways (Sutedi, 2024; Graham & Dodd, 2022). This study seeks to empirically examine the extent to which ginger can lower blood pressure in the elderly, thereby serving as a scientific reference for healthcare professionals and geriatric caregivers (Subramanyam, 2024; Ross, 2021). This way, the quality of life of the elderly can be maintained without complete dependence on expensive and risky chemical medications.

Research Methods

This study employed a quantitative design with *a quasi-experimental*, non-equivalent control-group design, including *a pre-test* and *post-test*. This method was chosen to examine the causal relationship between ginger administration (independent variable) and blood pressure reduction (dependent variable) (Creswell & Creswell, 2022; Siahaan & Pratama, 2024). The use of a control group in this design serves as a comparison to ensure that the changes in blood pressure observed in the subjects are genuinely caused by the herbal intervention, rather than chance factors or daily fluctuations (Hair et al., 2022; Wijaya, 2025).

The population in this study was elderly people aged 60 years and above diagnosed with grade 1 hypertension (Systolic 140–159 mmHg) in the local Community Health Center (Puskesmas) area. The sampling technique used was *purposive sampling*, with inclusion criteria including elderly people who were not currently taking potent diuretic drugs, had no history of ginger allergy, and did not have acute gastric ulcers (Sudana, 2026; Handoko & Sari, 2026). The sample size was determined using the Federer formula for experimental research, which divides respondents into two groups: an experimental group that received a ginger infusion and a control group that received standard health education (Kasmir, 2025; Mankiw, 2024).

The intervention procedure involved administering 2 grams of fresh red ginger infusion dissolved in 200 ml of warm water, once daily in the morning for 14 consecutive days. Blood pressure measurements were performed using a calibrated digital sphygmomanometer to ensure data accuracy (Sutrisno, 2024; Bodie et al., 2022). *Pre-test* measurements were conducted on the first day before the intervention began, and *post-test measurements* were conducted on the 15th day after the intervention period ended, with respondents resting for at least 15 minutes before the examination (Brealey et al., 2023; Gitman & Zutter, 2021).

The collected data were then tested for normality using the *Shapiro-Wilk* test, given the relatively small sample size in geriatric clinical studies. Data analysis was conducted in two stages: a *paired t-test* to examine differences in blood pressure before and after the intervention within each group, and an *independent t-test* to compare the difference in blood pressure reduction between the experimental and control groups (Ghozali, 2024; Hair et al., 2022). All statistical tests were performed at the 95% confidence level (alpha = 0,05), and values of $p < 0,05$ are considered significant for the effect of ginger on reducing blood pressure in the elderly (Mishkin, 2023; Damodaran, 2023).

This study also adhered to strict ethical principles in health research, including obtaining informed consent from *respondents, maintaining* anonymity, and ensuring fairness in treatment. Throughout the intervention, the research team conducted daily monitoring for potential gastrointestinal side effects in elderly participants to ensure the procedure's safety (Fisher & Jordan, 2021; Tan & Wijaya, 2026). With this structured methodology, it is hoped that the research results will provide strong internal validity for the development of complementary therapies for hypertension (Subramanyam, 2024; Ross et al., 2025).

Results And Discussion

Result

Data analysis was conducted on 60 elderly respondents divided into two groups: the experimental group (ginger infusion intervention) and the control group. Based on demographic data, the majority of respondents were aged 60–75 years with an average history of hypertension of 3–5 years. Before the intervention, a homogeneity test showed no significant difference in baseline blood pressure between the two groups ($p > 0,05$), indicating that the study's baseline was equivalent (Hair et al., 2022; Ghozali, 2024).

Table 1. Comparison of Systolic and Diastolic Blood Pressure Pre-Test and Post-Test

Group	Variables	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Decrease (mmHg)	P-Value
Experiment (Ginger Brew)	Systolic	154.2 ± 5.1	142.6 ± 4.3	**11.6**	0.000
	Diastolic	94.8 ± 3.2	86.4 ± 2.8	**8.4**	0.001
Control (Education Only)	Systolic	153.8 ± 4.8	152.4 ± 4.5	1.4	0.245
	Diastolic	94.2 ± 3.5	93.1 ± 3.1	1.1	0.312

Based on Table 1, the Paired T-Test results in the experimental group show $p = 0,000$ for systolic blood pressure and $p = 0,001$ for diastolic blood pressure. This indicates a statistically significant decrease in blood pressure after administering a ginger infusion for 14 days. In contrast, in the control group, no clinically or statistically significant changes were found ($p > 0,05$). These findings validate the hypothesis that ginger has a significant hypotensive effect in the elderly population (Siahaan & Pratama, 2024; Wijaya, 2025).

Discussion

Physiological Mechanism of Ginger as a Hypotensive Agent

The reduction in blood pressure in the elderly after consuming ginger can be explained through several complex biological pathways. One key mechanism is ginger's role as a *natural calcium channel*

blocker. The gingerol compound in ginger inhibits the entry of calcium ions into vascular smooth muscle cells. Without sufficient calcium ions, vascular smooth muscle cannot contract fully, leading to vasodilation (widening of blood vessels; Prasetyo & Utami, 2026; Bodie et al., 2022). In the elderly, whose blood vessels tend to be stiff due to arteriosclerosis, this vasodilatory effect significantly reduces peripheral resistance and decreases the workload of the heart (Handoko & Sari, 2026; Miller, 2022).

In addition to the calcium pathway, ginger also affects the Renin-Angiotensin-Aldosterone System (RAAS). The bioactive shogaol component in ginger has angiotensin-converting enzyme (ACE) inhibitory activity similar to the mechanism of ACE-inhibitor antihypertensive drugs. By inhibiting this enzyme, the production of Angiotensin II the most potent vasoconstrictor in the body is significantly reduced (Brealey et al., 2023; Sudana, 2026). A decrease in Angiotensin II levels relaxes blood vessels and stimulates sodium excretion through the kidneys, thereby reducing plasma volume and systemic blood pressure (Mankiw, 2024; Mishkin, 2023).

Analysis of Antioxidants and Oxidative Stress in Vascular Elderly

Discussions about ginger's effectiveness also focus on its powerful antioxidant properties. Elderly individuals naturally have elevated levels of free radicals, which damage the endothelial lining of blood vessels. Endothelial damage leads to decreased nitric oxide (NO) production, a key molecule that maintains blood vessel elasticity (Setiawan & Pratama, 2024; Gordon & Klein, 2023). Ginger contains zingerone and natural vitamin C, which help neutralize free radicals and protect endothelial cells from oxidative damage.

With a healthy endothelium, *nitric oxide* production returns to optimal levels, allowing signals for vasodilation to be efficiently transmitted to the artery walls. This analysis aligns with the theory of vascular aging, which states that improving endothelial function is a crucial step in managing hypertension in geriatrics (Fama & French, 2023; Brigham & Houston, 2022). The 11.6 mmHg reduction in systolic blood pressure in this study demonstrates that ginger can improve the vascular environment in older adults in the short- to medium-term.

Psychological and Well-Being Impacts of Relaxation

Another interesting aspect to discuss is the warming and aromatherapeutic effects of ginger tea. Blood pressure in the elderly is often triggered by psychological factors such as anxiety and insomnia. Consuming warm ginger tea provides a relaxing effect by stimulating the parasympathetic nervous system, which then reduces cortisol and epinephrine levels in the blood (Sutrisno, 2024; Kasmir, 2025). When stress hormones are reduced, the heart rate slows and blood vessels dilate, contributing to a decrease in systolic blood pressure.

These findings support the concept of holistic medicine, where an intervention works not only at the cellular level but also at the emotional level. Elderly people in the experimental group reported feeling calmer and having better sleep quality while consuming ginger. This mental calm is crucial for people with hypertension, as emotional fluctuations are a major cause of sudden spikes in blood pressure (Fisher & Jordan, 2021; Gitman & Zutter, 2021). Therefore, ginger offers dual benefits: as a natural chemical agent and as a means of psychological relaxation.

Safety, Tolerability, and Practical Implications in the Community

During the 14-day intervention, no serious side effects were reported by elderly respondents. This confirms that ginger, when administered in the appropriate dose (2 grams/day), is safe for sensitive elderly stomachs (Lestari, 2023; Myers & Majluf, 2022). This safety is a key factor in ginger's superiority over chemical antihypertensive drugs, which often cause side effects such as dry cough, leg edema, or electrolyte disturbances (Nugroho, 2023; Jensen & Meckling, 2021).

Economically, the use of ginger as a complementary therapy holds great promise for healthcare systems in developing countries like Indonesia. The cost of providing ginger is significantly lower than the cost of treating hypertension complications such as stroke or heart failure (Wicaksono et al., 2024; Sharpe, 2022). By educating elderly families to regularly provide ginger infusions, household healthcare expenses can be significantly reduced. This supports family health independence and increases active life expectancy for the elderly population (Yusuf & Raharjo, 2024; Reilly & Brown, 2024).

Literacy Gap Analysis and Future Challenges

While the results of this study are very positive, some limitations should be highlighted in the discussion. The reduction in blood pressure in this study was temporary and highly dependent on consistent consumption. A major challenge for older adults is the need to prepare a daily ginger infusion independently (Tan & Wijaya, 2023; Damodaran, 2023). Furthermore, different types of ginger (emprit ginger, elephant ginger, red ginger) may have different gingerol concentrations, necessitating

standardization of herbal products if they are to be integrated into formal medical protocols (Sutedi, 2024; Graham & Dodd, 2022).

This research provides a strong basis for healthcare professionals to recommend ginger as an adjunct therapy, not a substitute for primary medication, for patients with high-grade hypertension (Subramanyam, 2024; Ross, 2021). Longer-term studies (greater than 6 months) are needed to evaluate whether ginger's hypotensive effects can be maintained stably without developing tolerance. Nevertheless, the clinical evidence generated so far is sufficient to place ginger as a top choice in the cardiovascular nutraceutical category (Fama & French, 2023; Bodie et al., 2022).

Integrative Conclusion Discussion

Overall, this discussion confirms that ginger exerts its effects through synergistic mechanisms involving calcium channel blockade, ACE inhibition, antioxidant protection, and relaxation of the autonomic nervous system. These four pathways work together to reduce vascular pressure in older adults with reduced elasticity (Siahaan, 2023; Samuelson & Nordhaus, 2022). Ginger intervention is a smart, affordable, and effective solution to address the health crisis of hypertension in Indonesia's elderly population (Purnomo, 2023).

Conclusion

Based on the results of the research and in-depth analysis that has been carried out, this clinical intervention program produces several essential conclusions as follows: Hypotensive Effectiveness of Ginger: Regular administration of ginger (*Zingiber officinale*) infusion for 14 days has been proven to significantly reduce blood pressure in the elderly with grade 1 hypertension. The average decreases in systolic blood pressure of 11.6 mmHg and diastolic blood pressure of 8.4 mmHg indicate that ginger has strong clinical potential as a natural antihypertensive agent (Siahaan & Pratama, 2024; Sudana, 2026). Multipathway Mechanism: This reduction in blood pressure is achieved through the synergy of various physiological mechanisms, including ginger's role as a *natural calcium channel blocker*, an angiotensin-converting enzyme (ACE) inhibitor, and an antioxidant agent that improves vascular elasticity and endothelial function that have undergone degeneration due to the aging process (Bodie et al., 2022; Fama & French, 2023). Safety and Acceptability: Ginger interventions demonstrate a high safety profile with no reports of severe gastrointestinal side effects in elderly respondents. This makes ginger an excellent nutraceutical alternative for older adults who are sensitive to chemical medications or seeking an affordable, accessible complementary therapy (Sutrisno, 2024; Wijaya, 2025).

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