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Effectiveness of ginger infusion as a complementary therapy to reduce blood pressure in 3-month injectable contraceptive acceptors

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Abstract:
Hypertension represents a prevalent non-communicable ailment within communities, frequently characterized as a "silent killer" owing to its subtle manifestations. Among the susceptible populations are individuals employing three-month injectable contraceptives, wherein progesterone may elevate bodily fluid retention. This investigation sought to assess the efficacy of ginger infusion (*wedang jahe*) in diminishing blood pressure levels among recipients of three-month injectable contraceptives at PMB Khusnul Khotimah in Pasuruan City. Employing a pre-experimental methodology with a one-group pretest-posttest framework, the study involved 32 participants recruited via purposive sampling. Participants ingested 4 grams of ginger steeped in 200 ml of warm water on a daily basis for seven successive days. Findings demonstrated a mean reduction in systolic blood pressure from 143 mmHg to 127 mmHg, alongside a decline in diastolic pressure from 91 mmHg to 82 mmHg. Statistical evaluation through the paired t-test produced a p-value of 0.000 (below 0.05), confirming a notable disparity between pre- and post-intervention measurements. Consequently, ginger infusion proved efficacious in lowering blood pressure for users of three-month injectable contraceptives, positioning it as a viable, accessible, and cost-effective non-pharmacological adjunct therapy within community midwifery settings.

Keywords:
complementary therapy; ginger infusion; herbal; hypertension; injectable contraceptive

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INTRODUCTION

Hypertension remains a major global public health challenge and contributes substantially to cardiovascular morbidity and mortality among women of reproductive age. The World Health Organization reported that hypertension affects more than one billion individuals worldwide and is associated with increased risks of stroke, coronary heart disease, and renal disorders. Women using hormonal contraceptives, particularly depot medroxyprogesterone acetate (DMPA) injectable contraception, may experience elevated blood pressure due to hormonal influences on fluid retention, vascular resistance, and metabolic regulation (Mills et al., 2020; Zhou et al., 2021). Long-

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term exposure to progesterone-based contraceptives has also been linked to alterations in endothelial function and increased cardiovascular risk factors among susceptible populations.

In Indonesia, hypertension among women using injectable contraceptives has become an emerging concern in reproductive healthcare services. National data from the Indonesian Ministry of Health indicated that hypertension prevalence continues to rise, particularly among adults aged above 30 years (Kemenkes RI, 2023). Injectable contraceptives remain one of the most widely used family planning methods because of their practicality and effectiveness; however, prolonged use may contribute to blood pressure elevation. Several local studies have reported that women receiving three-month injectable contraceptives frequently experience mild to moderate hypertension, yet non-pharmacological interventions within community-based maternal health services remain underutilized (Sari et al., 2022). This condition highlights the urgent need for safe, affordable, and easily applicable complementary therapies suitable for primary healthcare settings.

Recent scientific developments have increasingly explored herbal-based therapies for hypertension management. Ginger (Zingiber officinale) contains bioactive compounds such as gingerol, shogaol, flavonoids, and polyphenols that exhibit antioxidant, anti-inflammatory, and vasodilatory effects. These compounds may inhibit angiotensin-converting enzyme activity, improve endothelial function, reduce oxidative stress, and promote vascular relaxation, thereby contributing to blood pressure reduction (Mahdavi-Roshan et al., 2022). Furthermore, systematic reviews and clinical studies have demonstrated that ginger supplementation may significantly improve systolic and diastolic blood pressure among hypertensive patients and individuals with metabolic disorders (Ramadan et al., 2023; Arablou et al., 2022). Because of its accessibility and low cost, ginger has substantial potential as a complementary intervention in community health practice.

Despite growing evidence regarding ginger's antihypertensive effects, previous studies have primarily focused on elderly individuals, patients with metabolic syndrome, or general hypertensive populations. Limited evidence specifically addresses women using long-term injectable contraceptives, particularly in independent midwifery practice settings where complementary therapies may be practically implemented. Moreover, most prior studies examined ginger supplementation in capsule or extract forms rather than traditional ginger tea preparations commonly consumed in Indonesian communities (Heshmati & Namazi, 2020). Therefore, this study offers novelty by evaluating the effectiveness of ginger tea administered as a culturally acceptable intervention among three-month injectable contraceptive acceptors in a community-based reproductive healthcare context.

Accordingly, this study aimed to analyze the effectiveness of ginger tea consumption in reducing blood pressure among three-month injectable contraceptive acceptors at PMB Khusnul

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Khotimah, Pasuruan City. The findings are expected to strengthen scientific evidence regarding herbal complementary therapies in maternal and reproductive healthcare while providing practical recommendations for integrating affordable non-pharmacological interventions into community midwifery services.

METHODS

This research used a pre-experimental design with a one-group pretest-posttest approach, in which measurements were taken before and after treatment within the same group, without a comparison group. This design was chosen to evaluate the effectiveness of ginger tea on reducing blood pressure in those taking the three-monthly injectable contraceptive by observing changes in blood pressure before and after the intervention.

The research was conducted at the Khusnul Khotimah Child Health Center (PMB Khusnul Khotimah), Pasuruan City, from September to October 2025. The study population included all three-monthly injectable contraceptive users experiencing mild to moderate increases in blood pressure. The sample was selected using purposive sampling, based on predetermined inclusion and exclusion criteria, and comprised 32 respondents.

The inclusion criteria for this study included: (1) three-monthly injectable contraceptive users with blood pressure ≥130/80 mmHg; (2) willingness to participate in the intervention for the full seven days; and (3) not currently taking antihypertensive medication. Meanwhile, exclusion criteria include: (1) respondents with a history of kidney disease, diabetes mellitus, or heart problems; and (2) respondents who do not complete the intervention to the final stage.

The intervention involved administering ginger tea (wedang jahe) made with 4 grams of fresh ginger, brewed in 200 ml of warm water, and drunk twice daily—morning and evening—for 7 consecutive days. Blood pressure was measured twice, before and after the intervention, using a digital blood pressure monitor. All measurements were recorded on a validated observation sheet. The research instruments, a questionnaire and a blood pressure observation sheet, underwent validity and reliability testing, with an r value of >0.7, indicating they are suitable for use. The research data were analyzed using a paired t-test to determine the difference in average blood pressure before and after treatment, with $\alpha = 0.05$. All research procedures were approved by the PMB Khusnul Khotimah, and informed consent was obtained from the respondents.

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RESULTS

A total of 32 mothers in the first stage of labor participated in this study. Based on Table 1, the majority of respondents were aged 35–45 years (62.5%) and had used injectable contraceptives for ≥3 years (56.3%). Age and duration of injectable contraceptive use can affect blood pressure due to their association with hormonal changes, metabolism, and decreased blood vessel elasticity with age.

Table 1. Respondent Characteristics

Characteristics	Frequency (n)	Percentage (%)
Age		
35–45 years	20	62.5
>45 years	12	37.5
Duration of birth control use		
<3 years	14	43.7
≥3 years	18	56.3

Table 2. Changes in Blood Pressure Before and After Intervention

Blood Pressure Category	Before Intervention	After Intervention
Normal	4 (12.5%)	20 (62.5%)
Mild Hypertension	18 (56.2%)	9 (281%)
Moderate Hypertension	10 (31.3%)	3 (9.4%)

Table 3. Average Blood Pressure Before and After Intervention

Measurement	Systolic (mmHg)	Diastolic (mmHg)	p-value
Before Intervention	143.2	91.3	<0.001
After Intervention	126.9	81.8	

Based on Table 2, before the intervention, most respondents had mild hypertension (56.2%), while after the intervention, the majority were in the normal category (62.5%). This indicates a decrease in blood pressure after administering ginger tea. The average systolic blood pressure of respondents before the intervention was recorded at 143.2 mmHg. After receiving ginger tea for seven days, the average blood pressure decreased to 126.9 mmHg for systolic and 81.8 mmHg for diastolic. The paired t-test analysis shows $p < 0.001$ ($p < 0.05$), indicating a significant difference in blood pressure before and after treatment. These findings indicate that ginger tea consumption significantly reduces blood pressure among acceptors of three-month injectable contraceptives at PMB Khusnul Khotimah, Pasuruan City.

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DISCUSSION

The findings of this study demonstrated that ginger tea consumption significantly reduced blood pressure among three-month injectable contraceptive acceptors, as reflected by the decrease in mean systolic blood pressure from 143.2 mmHg to 126.9 mmHg and mean diastolic blood pressure from 91.3 mmHg to 81.8 mmHg after seven days of intervention, indicating that ginger tea may serve as an effective complementary therapy for blood pressure control in women exposed to long-term hormonal contraception.

The results of this study are consistent with previous international and national evidence reporting that ginger possesses antihypertensive properties through vasodilatory, antioxidant, and anti-inflammatory mechanisms, as demonstrated in studies involving hypertensive adults, postpartum mothers, and women with gestational hypertension (Mahdavi-Roshan et al., 2022; Ramadan et al., 2023; Luthfiyah et al., 2023). Previous studies also reported that long-term hormonal contraceptive use is associated with elevated blood pressure due to activation of the renin–angiotensin–aldosterone system and increased vascular resistance (van Rooyen et al., 2022; Yuniarti & Rosyada, 2021). Similar findings were reported in recent Indonesian population-based studies demonstrating that prolonged hormonal contraceptive use contributes significantly to hypertension risk among reproductive-age women (Zakiyah et al., 2025; Febriyanti et al., 2025).

The antihypertensive effect observed in this study may be explained by the pharmacological activity of ginger bioactive compounds, particularly gingerol, shogaol, flavonoids, and polyphenols, which contribute to vascular smooth muscle relaxation and endothelial protection. Experimental and clinical studies have shown that ginger inhibits calcium channel activity and suppresses angiotensin-converting enzyme pathways, thereby reducing peripheral vascular resistance and improving blood circulation (Ramadan et al., 2023; Mahdavi-Roshan et al., 2022). Additionally, antioxidant compounds in ginger reduce oxidative stress and endothelial dysfunction, which are major contributors to the development of hypertension.

Another important explanation relates to the hormonal effects of three-month injectable contraceptives containing progesterone derivatives that may induce sodium and fluid retention, increase sympathetic nervous system activity, and stimulate the renin–angiotensin–aldosterone system. Previous studies reported that hormonal contraceptive users frequently exhibit increased aldosterone and angiotensin II activity, which contributes to elevated blood pressure and vascular stiffness (van Rooyen et al., 2022). Therefore, the vasodilatory and mild diuretic properties of ginger may help counteract hormonal-induced vascular resistance and fluid retention among injectable contraceptive users.

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The significant reduction in blood pressure observed after only seven days of intervention also suggests that ginger tea may produce relatively rapid physiological responses when administered consistently. Similar short-term effects have been documented in complementary therapy studies evaluating herbal interventions for cardiovascular regulation, in which bioactive phytochemicals improved endothelial responsiveness and arterial elasticity over limited intervention periods (Arablou et al., 2022; Zhu et al., 2021). This finding strengthens the practicality of ginger tea as a simple, feasible intervention in community-based maternal healthcare settings.

The predominance of respondents aged 35–45 years and long-term contraceptive use duration in this study may also explain the relatively high baseline blood pressure observed prior to intervention. Aging is associated with decreased vascular elasticity, increased arterial stiffness, and progressive endothelial dysfunction, which may worsen the hypertensive effects of hormonal contraceptive exposure (Mills et al., 2020). Long-term hormonal exposure may further amplify cardiovascular risk through chronic neurohormonal activation and altered sodium balance, thereby increasing susceptibility to hypertension among reproductive-age women.

From a public health and midwifery perspective, this study provides important implications for integrating herbal-based complementary interventions into community reproductive healthcare services. Ginger tea represents a culturally acceptable, low-cost, accessible, and relatively safe intervention that may support blood pressure management among women using hormonal contraceptives, particularly in low-resource primary healthcare settings. The findings also support the development of preventive counseling programs that emphasize regular blood pressure monitoring, lifestyle modification, and the use of complementary therapies within family planning services.

Several limitations should be acknowledged in this study. The use of a one-group pretest–posttest design without a control group limits causal inference and increases the likelihood that confounding factors influence blood pressure changes. The relatively small sample size and short intervention duration may also limit generalizability and long-term interpretation of outcomes. Furthermore, dietary intake, psychological stress, sleep quality, and physical activity were not objectively controlled during the intervention period, although respondents were instructed to maintain their usual lifestyle patterns. Future studies using randomized controlled trials with larger populations, longer follow-up periods, and biomarker assessments are recommended to strengthen evidence regarding the effectiveness and physiological mechanisms of ginger tea in blood pressure management among hormonal contraceptive users.

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CONCLUSION

Consuming ginger tea for seven days has been shown to significantly lower blood pressure in those receiving three-monthly injectable contraceptives at the Khusnul Khotimah Community Health Center (PMB) in Pasuruan City. The average decrease in systolic blood pressure from 143 mmHg to 127 mmHg and diastolic blood pressure from 91 mmHg to 82 mmHg, with a significance value of $p = 0.000$ ($p < 0.05$), indicates that this intervention significantly lowers blood pressure. These findings indicate that administering ginger tea has a significant effect on blood pressure control in this group. Ginger infusion has the potential to be applied as a safe, accessible, and economical non-pharmacological coable contraceptive for acceptors who are at risk of increased blood pressure due to hormonal effects, implementary therapy to help control blood pressure, particularly among three-month injectables.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest related to the research, authorship, and publication of this article. All research processes were conducted independently without any financial, commercial, or personal relationships that could inappropriately influence the study.

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