

# Artikel

*By* ulkomah ulkomah

Original Research Article

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**Effect of Ginger Extract in Lowering Blood Pressure in The Elderly with Hypertension**

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**Abstract**

**Background:** Hypertension is a cardiovascular disease that is common to find in elderly. Its prevalence reached to 22% throughout the world in 2020. Pharmacological treatment to hypertension involves lifetime commitment to drug adherence. Ginger extract as complementary therapy has been widely common in Indonesia to reduce common flu symptoms and indigestion. It acts as a therapeutic effect that boosts immune system, improving the cardiovascular system by reducing the level of low-density lipoproteins and cholesterol. Prior studies showed its effect in lowering blood pressure in hypertension patients, while several other said the effect was stronger in less than 50 years old people. The aim of the study was to analyze red ginger extract as main therapy in hypertension in elderly. **Methods:** This study was a quasi-experimental with one group pretest-posttest without control group. Participants were 45-65 years old hypertension patients in Semper Barat II Primary Health Care. Intervention was 4 grams of minced ginger then added by 2 spoons of honey in 100 ml of water. The drink was consumed in 5 days. **Results:** Average age of participants were 62,9 (60-65) years old. Before intervention, mean blood pressure was 156,8 (140-180) / 98,03 (85-115) mmHg and lowered to 148,6 (125-170) / 92,57 (80-110) mmHg after 5 days of intervention ( $p=0,0001$ ). **Conclusion:** We recommend ginger extract as an alternative to reduce blood pressure in elderly with hypertension. We hoped the results will become a new approach to treat hypertension.

**Keywords:** Hypertension; elderly; ginger extract

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**Pengaruh pemberian Ekstrak Jahe terhadap Perubahan Tekanan Darah pada Lansia dengan Hipertensi**

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**Abstrak**

**Latar Belakang;** Hipertensi merupakan penyakit kardiovaskular yang sering ditemukan pada lansia dengan prevalensi mencapai 22% di seluruh dunia pada tahun 2020. Terapi farmakologi untuk hipertensi membutuhkan komitmen yang besar untuk minum obat secara teratur. Ekstrak jahe sebagai terapi komplementer telah dikenal di Indonesia untuk menurunkan gejala flu dan kembung. Jahe mempunyai khas terapeutik untuk meningkatkan sistem imun dan memperbaiki sistem kardiovaskular dengan menurunkan kadar LDL (low-density lipoprotein) dan kolesterol. Studi sebelumnya menyebutkan efek ekstrak jahe dalam menurunkan tekanan darah tinggi pada pasien, dan studi lainnya mengatakan efek tersebut lebih kuat pada usia kurang dari 50 tahun. Studi ini bertujuan untuk menganalisa ekstrak jahe merah sebagai terapi utama hipertensi pada lansia. **Metode:** Studi merupakan penelitian kuasi-eksperimen yang melibatkan satu kelompok tanpa grup kontrol dengan pretest-posttest. Partisipan merupakan pasien hipertensi berusia 45-65 tahun di Puskesmas Semper Barat II. Intervensi yang diberikan berupa minuman ekstrak jahe yang didapat dari campuran 4 gram ekstrak jahe dan dua sendok madu yang dilarutkan dalam 100 ml air. Minuman dikonsumsi selama 5 hari. **Hasil:** Usia rata-rata partisipan adalah 62,9 (60-65) tahun dengan rerata tekanan darah sebelum intervensi 156,8 (140-180) / 98,03 (85-

115) mmHg. Rerata tekanan darah turun menjadi 148,6 (125-170) / 92,57 (80-110) setelah intervensi ( $p=0,0001$ ). **Kesimpulan:** Kami merekomendasikan ekstrak jahe sebagai alternatif untuk menurunkan hipertensi pada lansia. Kami berharap studi ini dapat menjadi pendekatan baru terhadap terapi hipertensi.

**Kata Kunci:** Hipertensi; lansia; ekstrak jahe

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## INTRODUCTION

Hypertension is a common disorder found in elderly. Hypertension is included in cardiovascular system impairment. It is persistent elevation of systolic more than 140 mmHg and/or diastolic pressure more than 90 mmHg. Globally, its prevalence was more than 22% around the world in 2020, with highest number occurred in Africa, as 27% and the lowest in America (18%). In Southeast Asian itself, the prevalence as 25%, the third highest in the world (Cheng et al., 2020). World Health Organization (WHO) predicted 1.13 billion people throughout the world experienced hypertension in 2015-2020 or in comparison 1;3 people. It is estimated that there would be 1.5 billion people diagnosed with this chronic disease in 2025 and 9.4 million mortality case as a result of hypertension and its complications (Siagian et al., 2021).

Jakarta was included in the fifth highest prevalence of hypertension (33,4%). According to Jakarta Health Secretariat, it was estimated 2.671.915 people, more than 15 years old, had experienced hypertension and 452.099 of them were lived in North Jakarta (Dinkes Provinsi Jakarta, 2021).

Hypertension has been the most found disease at Semper Barat II Primary Health Care (PHC), North Jakarta, since 2020. Based on their annual report, incidence of the silent killer disease accounted to 1.248 people and decrease to 847 people.

In Indonesia, non-pharmacological treatment was still existed as elderly remained apply traditional method to reduce common flu symptoms and indigestion. It contains flavonoid which has inhibition effect to angiotensin-converting enzyme (ACE), that is able to initiate vasoconstrictor mechanism and rise BP as the results. Several studies mentioned its benefit as complement therapy to hypertension. A study by (Shaban et al., 2017) proved significant difference in BP before and after having ginger extract for one month. While other research didn't specify about the participants, we would like to analyze the effect of red ginger (*Zingiber Officinale var rubrum*) extract in elderly as aging process include arterial stiffness which rises risk factor of hypertension in this group. (Boutouyrie et al., 2021)

Prior studies showed efficacy of ginger extract in managing blood pressure (BP). A study of (Shaban et al., 2017) described a significant difference BP of participants who received ginger extract intervention for one month. Tjen mentioned decreasing BP both systolic and diastolic in intervention group after two weeks consuming ginger extract (Tjen, 2018). In a study of (Ojulari et al., 2014) about ginger extract (*Zingiber officinale*) effect to BP and heart rate in 60 healthy participants in Kwara State, Nigeria, it was mentioned that it reduced BP after 2 hours. The aim of the study was to analyze ginger extract as main therapy in hypertension in elderly.

## MATERIAL AND METHODS

### Study Design

The study was a quasi-experimental with one group pretest-posttest without control group. Observation was done twice, before and after intervention.

### Setting

The study was held at Semper Barat II PHC from November 2022 to January 2023.

### Participants

Target population was all elderly who had themselves examine in Semper Barat II PHC, approximately 100 people. We gathered 30 participants. Inclusion criteria were adults, 45-55 years old (early elderly) or 56–65 years old (late elderly), had history of hypertension, willing to stop hypertension drug during study period, and agreed to study's regulation. Exclusion criteria were having comorbid disease i.e.: *chronic kidney disease* (CKD), kidney parenchymal disease, kidney vascular disease, and acute gastritis. We also excluded ginger allergic and uncooperative people. To reduce data bias, participants stop their hypertension treatment temporarily during the research process. Any symptoms related to urgency hypertension had been informed to participants and in case that happened, participants would receive medical treatment.

### Instruments

Study's instruments included informed consent, questionnaire, observation paper, calibrated sphygmomanometer and stethoscope. Questionnaire contained participants' identity and characteristics. Participants would be simply circling their answer or marking their suitable options. Observation paper was filled by researcher. The paper was used to note measurement result of BP, both before and after intervention. We used sphygmomanometer by oneMed Depkes RI AKL 20501906481.

### Intervention

Intervention was made from 4grams of diced ginger (*Zingiber Officinale var rubrum*). It was then boiled in 200 ml water for 10 minutes. After that, it was filtered to 100ml and added 2 spoons of honey. Intervention was done once a day for 5 days. After-intervention BP was measured after one week since the first day of intervention.

The drink was made freshly every day by the researcher. First day intervention was done at Semper II Barat PHC. Participants and their family were explained about instruction on proper ginger extract use by the researcher. We send the drink off to the participants' house on Day 2-5. We asked them to go back to the PHC at Day 7 to measure BP.

### Data Analysis

Univariate analysis was done to describe participants' characteristic. Bivariate analysis was done by T dependent or Wilcoxon test. IBM SPSS Statistic 24 was used to perform data analysis. Power statistical number was less 0,05.

### Ethical Consideration

This study was approved by Sulianti Saroso Infectious Disease Hospital Ethical Committee. Ethical clearance number 08/XXXVIII.10/I/2023. Was released then. We also managed to get permission from North Jakarta Health Secretariat to conduct the research.

## RESULTS

We gathered 30 elderlies with average age was  $62,9 \pm 1,85$  (60-65) years old. Most of them were 65 years old (n=8 people; 26,7%), women (n=21 people; 70%) and had history of hypertension (n=20 people; 66,7%). Table 1 described participants' characteristic.

**Tabel 1.** Participants' characteristic

Characteristic	Frequency	%
<b>Age (years)</b>		
60	6	20
61	2	6,7
62	3	10
63	5	16.7
64	6	20



65	8	26,7
<b>Gender</b>		
Male	9	30
Female	21	70
<b>Family history of Hypertension</b>		
Yes	20	66,7
No	10	33,3

Before intervention, average of BP was  $156.8 \pm 11.64$  (140-180) /  $98.03 \pm 7.85$  (85-115) mmHg. When intervention had been given for one week, BP was measured again. Mean BP after intervention was  $148.6 \pm 11.88$  (125-170) /  $92.57 \pm 7.38$  (80-110) mmHg.

**Table 5.** Ginger Extract (*Zingiber Officinale Var Rubrum*) Effect to High Blood Pressure Improvement

Blood pressure		Mean	P value
Sistolic	Before	156,80	0,0001
	After	146,60	
Diastolic	Before	98,03	0,0001
	After	92,57	

## DISCUSSION

Our study found most of the participants (6 people; 26.7%) was 65 years old. It was in line to (Lampitasari, 2017) which stated most of their participants (63.3%) were more than 48 years old. It was also the case in the study of (Tamrin et al., 2019) whose majority of the participants were more than 60 years old (58.3%). Potter and Perry stated BP is rising based on age (Potter & Perry, 2015). Systolic BP correlates to decrease vessel elasticity. Structural changing and decreasing functional usually happened in older people because of aging process. It also includes atherosclerosis forming, decreasing elasticity of loose connective tissue that affected to vessel elasticity so that aorta and other main artery lose their ability to accommodate stroke volume that will decrease cardiac output and increase peripheral resistance (Smeltzer & Bare, 2018).

Our study found that participants were mostly female, (n=21 people; 70%). In line to research of (Lampitasari, 2017) which stated that most hypertensive patients were female, reaching to 76.7%. (Tamrin et al., 2019) also described most of hypertension patients in elderly were female (52,8%).

Women who have not experienced menopause are protected by estrogen which plays a role in increasing High Density Lipoprotein (HDL) level. High level of HDL cholesterol prevents occurrence of atherosclerosis process. As it results, hypertension is abundant in menopausal women, because of the decreasing level of estrogen. To cope with the decline in the hormone, they usually consume oral contraceptive drugs that contain estrogen. These drugs can cause hypertension through the mechanism of rennin-aldosterone-mediated volume expansion. Discontinuation of hormonal contraceptives return blood pressure to normal after a few months (Tamrin et al., 2019).

Our study showed significant improvement after receiving intervention for five days. A systematic review and meta-analysis by (Hasani et al., 2019) mentioned ginger supplementation reduced systolic BP (MD: -6.36 mmHg, 95% CI [-11.27, -1.46]; P = .011) and diastolic BP (MD: -2.12 mmHg, 95% CI [-3.92, -0.31]; P = .002). They were significantly decreased in  $\leq 50$  years old people, follow up duration less than 8 weeks and ginger doses more than 3 grams per day. A study by (Shaban et al., 2017) found significant difference after intervention of ginger drink after one month while a research of (Tjen, 2018) found difference in two weeks period. Supriani et al also found decreasing of BP in hypertension participants who received ginger drink than control group (p=0.001) (Supriani et al., 2019) .

One of herbal therapy in lowering high blood pressure is ginger. It acts as a therapeutic effect that boosts immune system, improving the cardiovascular system by reducing the level of low-density lipoproteins and cholesterol. It also acts as a vasodilator that can lower blood pressure and improve blood circulation (Farida et al., 2020).

Ginger is beneficial for cardiovascular system. It stimulates blood circulation and improve cell metabolism. It also has antioxidant effects and reduces the formation of prostaglandin-E2 (PGE2) & thromboxane thus reducing the risk of blood clots. So, ginger should not be used in conjunction with anticoagulant drugs such as heparin, warfarin, and aspirin because it can prolong bleeding time (Moghaddasi, M. S., & Kashani, 2012 in Muliani, 2021).

Ginger contains flavonoid, saponin, and non-flavonoid phenol compounds. Flavonoids have an inhibitory effect on angiotensin-converting enzyme (ACE) activity (Guerrero et al., 2012 in Muliani, 2021) which blocks initiation of angiotensin II from angiotensin I so that vasodilation occurs, cardiac output decreasing and blood pressure reduction (Guyton & Hall, 2016). ACE inhibition can also increase nitric oxide and lower superoxide anions which also cause vasodilation (Kojsova et al., 2006 in Muliani, 2021). Potassium in ginger affects diuretic system, resulting vasodilation of blood vessel and lowering BP (Supriani, Andinata, & Yanti, 2019).

In addition to flavonoid and phenol, ginger also contains Saponins that plays a role in inhibiting RAA system in the kidneys (Chen et al., 2013 in Muliani, 2021). Angiotensin II can also stimulate secretion of aldosterone which causes a decrease in the excretion of salt and water by the kidneys and resulting an increase of cardiac output. This leads to rising blood pressure. Thus, decreasing formation of angiotensin II will lower blood pressure (Guyton & Hall, 2016).

We had minimized data bias by stopping hypertension treatment in participants. We didn't analyse other risk factor of hypertension that possibly present regarding participants' age. Also, there was no control group in our study as comparison.

## CONCLUSION

According to our study, ginger extract (*Zingiber Officinale Var Rubrum*) was effective to decrease blood pressure in elderly with hypertension in Semper Barat II PHC, North Jakarta. We hoped the results of this study will become a new approach to treat hypertension in Primary Health Care as well as development of nonpharmacological therapies for hypertensive patients, both for pre-elderly and elderly patients.

## ACKNOWLEDGEMENTS

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