

## Does acupressure therapy decrease blood pressure in hypertensive elderly?

Sang Ayu Ketut Candrawati\* | Ni Komang Sukra Andini

<sup>a</sup> Sekolah Tinggi Ilmu Kesehatan Wira Medika Bali

<sup>b</sup> Sekolah Tinggi Ilmu Kesehatan Wira Medika Bali

\*Corresponding Author: [candrawati@stikeswiramedika.ac.id](mailto:candrawati@stikeswiramedika.ac.id)

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### ABSTRACT

**Introduction:** Hypertension is a high blood pressure condition often referred to as the "silent killer" as it is frequently asymptomatic but can lead to a range of serious health complications, including heart disease and stroke. The prevalence of hypertension continues to rise worldwide, with projections of reaching 29% of the adult population by 2025. To control hypertension, complementary therapies such as acupressure are emerging as a supportive complement to the management of high blood pressure, especially for the elderly, to improve their quality of life and ease the burden on the healthcare system.

**Objectives:** to analyze the effect of acupressure therapy on blood pressure in hypertensive elderly.

**Methods:** Pre-Experimental Design, with a One-Group Pretest-Posttest Design.

**Results:** The results showed a decrease in average systolic blood pressure by 24.08 mmHg, from 148.08 mmHg in the pre-test to 124.00 mmHg in the post-test, with a p value of 0.002. In addition, there was a decrease in mean diastolic blood pressure by 11.83 mmHg, from 85.83 mmHg in the pre-test to 74.00 mmHg in the post-test, with a value of (p value 0.013). These results indicate that acupressure therapy has a significant effect on reducing systolic and diastolic blood pressure in elderly hypertension.

**Conclusions:** These findings support using acupressure as a complementary therapy to assist in managing hypertension in the elderly, potentially improving their quality of life and reducing the burden of hypertension-related health services.

## Introduction

Hypertension is defined as systolic blood pressure (SBP)  $\geq 140$  mmHg or diastolic blood pressure (DBP)  $\geq 90$  mmHg, or a person taking antihypertensive medication (Perhimpunan Dokter Hipertensi Indonesia PDHI, 2021; WHO, 2023). Hypertension or high blood pressure is one of the globally significant non-communicable diseases (NCDs).

According to World Health Organization (WHO) data, about 70% of deaths worldwide are caused by NCDs, of which hypertension as part of cardiovascular disease accounts for about 45% (WHO, 2023). At the global level, hypertension is estimated to affect 33% of adults aged 30-79 years, based on age estimates (WHO, 2023).

The prevalence of hypertension continues to rise, with a projected 26.4% or approximately 972 million people worldwide in the coming year, which is expected to increase to 29.2% in the Asian region by 2025 (Haldar, 2013). In Southeast Asia, the prevalence of elderly hypertension is alarmingly high, particularly in Thailand (23,6%), Myanmar (21,5%), dan Indonesia (21,3%) (Haldar, 2013). In Indonesia, hypertension in the elderly shows a high prevalence rate, reaching 86.3% in respondents aged 60 years and over (Indonesian Ministry of Health, 2018). The increase



in prevalence of hypertension from 25.8% in 2013 to 34.1% in 2018 indicates an increase in health risks, especially in the female population with a prevalence of 36.85%. (Indonesia, 2019)

The Bali Health Profile Report 2021 shows that hypertension is the third major disease in Bali Province, with the prevalence of elderly reaching 32.4% in 2018, especially in Gianyar Regency with the highest prevalence rate of 9.81% (Dinas Kesehatan Provinsi Bali, 2022). The data from the Health Office of Gianyar Regency (2022) shows that the UPTD Puskesmas Blahbatuh II recorded an increase in the number of elderly people with hypertension to 6,754 people in the past year and Gianyar Regency is ranked fourth out of nine districts in Bali Province with 27.67% of hypertension cases with age  $\geq 18$  years. (Dinas Kesehatan Kabupaten Gianyar, 2017; Riskesdas, 2018). Based on the proportion of reasons for not taking medication routinely in cases of hypertension aged  $\geq 18$  in Gianyar Regency, the most reasons for feeling cured 78.76% and not routinely treated 35.43% (Riskesdas, 2018). Based on a preliminary study at the research location, Br Tusan, UPTD Puskesmas Blahbatuh II Work Area, it was found that the population of elderly hypertension was 50 cases every month.

The high prevalence of hypertension brings various negative impacts on the health of the elderly, including the emergence of nursing problems such as acute pain, decreased cardiac output, and the risk of ineffective perfusion of cerebral tissue. Hypertension is becoming a major risk factor for atherosclerotic cardiovascular disease, heart failure, stroke, and kidney failure, increasing the risk of premature morbidity and mortality, especially as blood pressure continues to rise. Uncontrolled blood pressure can cause damage to the blood vessels of vital organs such as the heart, kidneys, brain, and eyes. Risk factors that play a role in hypertension include genetics, gender, age, diet, obesity, and an unhealthy lifestyle, so hypertension is often difficult to control in patients who do not adopt healthy lifestyle changes. (Nur Dina Kamelia et al., 2021).

Management of hypertension generally involves pharmacologic and non-pharmacologic approaches. Pharmacologic therapy is often effective but has drawbacks, such as potential dependence and side effects on organs, especially the kidneys (Ainurrafiq et al, 2019). Therefore, non-pharmacological therapies are becoming increasingly important, especially for the elderly who are prone to drug side effects. Acupressure, as one of the non-pharmacological therapies, has been proven effective and safe as a complementary approach in lowering blood pressure (Maryati; Pertiwi, 2022). In addition, the regulation of the Minister of Health of the Republic of Indonesia Number 15 of 2018 concerning the Implementation of Traditional Complementary health services supports non-pharmacological therapies as part of traditional, complementary health services, providing a legal basis for the integration of methods such as acupressure in the management of hypertension (Peraturan Menteri Kesehatan Republik Indonesia Nomor 15 Tahun 2018 Tentang Penyelenggaraan Layanan kesehatan Tradisional Komplementer, 2018).

Acupressure is a complementary therapy that involves pressing or stimulating meridian points in the body. It is safe and effective as it does not involve invasive measures or injuring the skin. The benefits of acupressure include stress management, relieving nervous tension, promoting body relaxation, and improving blood circulation for optimal tissue oxygenation. This technique uses fingers to apply pressure to points associated with the management of hypertension (Maryati; Pertiwi, 2022; Nur Dina Kamelia et al., 2021).

Acupressure is done by pressing or giving vibrations for 15-30 seconds at each place or meridian point (Nur Dina Kamelia et al., 2021). The points used are the same as those used in acupuncture therapy. The dominant points used in the 10 articles are points Lr 3, Sp 6, L1 4 (Nur Dina Kamelia et al., 2021). points GV 20, GB 21, EX- HN 3 (Ayu et al., 2021).

The benefits of acupressure include helping to reduce stress, reduce anxiety, promote body relaxation, improve blood circulation to facilitate tissue oxygenation, and significantly reduce



insomnia. This treatment method applies pressure with the fingers on the area associated with hypertension. Research on hypertensive patients after being given acupressure therapy shows that acupressure therapy is effective in reducing blood pressure in hypertensive patients when applied 3 times a day for 2 consecutive days (Aminuddin et al., 2020)

The results of the study by (Aminuddin et al., 2020) showed that of the 7 respondents there was a decrease in the average systole blood pressure of 15.714 mmHg and diastole 11.429 mmHg which showed that there was an effect of acupressure therapy on lowering blood pressure in patients with hypertension in the Mamboro Health Center Working Area. The results of a similar study by (Ayu et al., 2021) showed a decrease in the average systole blood pressure of the intervention group of 18,312 mmHg and the control group of 11,458 mmHg with a p value of 0.007, while the results of a decrease in the average diastole blood pressure of the intervention group were 5,216 mmHg and the control group of 5,998 mmHg with a p value of 0.000. Dry cupping therapy combined with acupressure is recommended as a complementary therapy or companion therapy in the treatment of primary hypertension patients.

Although there have been many studies on the benefits of non-pharmacological therapies for hypertension, there is limited literature on the specific application of acupressure in the elderly in Indonesia. While global research has shown a reduction in blood pressure due to the therapy, studies examining its impact specifically on the elderly population in Bali, particularly in Gianyar Regency, have not been conducted. With the high prevalence of hypertension in the elderly in Indonesia, particularly in Bali, there is an urgent need to explore the effectiveness of this complementary therapy method in the local context.

This study aims to fill the literature gap by exploring the impact of acupressure on blood pressure of hypertensive elderly in Gianyar Regency. Acupressure therapy was chosen because it is easy to apply, affordable, and does not require special equipment, so it can be an effective method in the independent management of hypertension in the elderly community.

## Methods

This study used a pre-experiment design with a one-group pre-test and post-test design (Sugiyono, 2019). The research location was in Br Tusan, the work area of UPTD Puskesmas Blahbatuh II, and was conducted from August to September 2024. The study population was 50 hypertensive elderly, with a sample consisting of 12 elderly selected using purposive sampling technique (probability sampling). Inclusion criteria included hypertensive elderly aged  $\geq 60$  years, with a history of stage 1 to 3 hypertension, and who took antihypertensive drugs. Exclusion criteria were hypertensive elderly with complications of Diabetes Mellitus, Heart Failure, or Stroke. The instruments used in this study include acupressure therapy SOPs at meridian points GV 20, GB 20, GB 21, ExHN 3, ExHN 5, Li 4, and Lr 3. Blood pressure measurements were taken with a mercury sphygmomanometer in a sitting position. Acupressure therapy was given for 30 minutes, twice a week for 4 weeks. Blood pressure data was collected using an observation sheet.

Normality tests were performed using the Shapiro-Wilk test, showing that pretest data for systolic and diastolic blood pressure were not normally distributed (Sig. value  $0.005 < 0.05$ ), while posttest data were normally distributed (Sig. value  $0.15 > 0.05$ ). Data analysis was performed using the Wilcoxon Signed-Rank Test on the SPSS 26 program to test for differences in systolic and diastolic blood pressure between pretest and posttest in the same group.

## Results

The results of the study are presented in the form of a table that describes the characteristics of respondents and a description of blood pressure before and after the intervention.

### Characteristics of respondents



Table 1 Characteristics of research subjects based on gender and occupation

Characteristics	Frequencies (f)	Percentages (%)
<b>Age</b>		
Elderly (60-74)	11	91,7
Old (75-90)	1	8,3
<b>Gender</b>		
Male	5	41,7
Female	7	58,3
Total	12	100
<b>Occupation</b>		
Self-employed	3	25
Labourer	2	16,7
Housewife	3	25
Not working	4	33,3
Total	12	100

Based on Table 1, out of a total of 12 elderly people, 11 people (91.7%) are included in the elderly age category, and 7 people (58.3%) are female. Meanwhile, in terms of employment, there are 4 elderly people (33.3%) who do not work.

### Effect Analysis

Table 2 Effect of acupressure therapy on blood pressure in elderly hypertension

Variable	Pre-test		Post-test		p-value
	Rerata	SD	Rerata	SD	
Systole blood pressure	148,08	14,99	124,00	13,94	0.002
Diastole blood pressure	85,83	8,12	74,00	5,99	0,013

Based on Table 2, the results showed a decrease in mean systolic blood pressure by 24.08 mmHg and diastolic by 11.83 mmHg, indicating a positive effect of acupressure therapy in reducing blood pressure. The p-value for systolic blood pressure was 0.002, and for diastolic 0.013, indicating a significant decrease in systolic and diastolic blood pressure after the intervention. This proves that acupressure therapy is effective in reducing blood pressure in the elderly.

### Discussion

#### Blood pressure of hypertensive elderly before intervention

The results showed, before the intervention the average systole blood pressure was 148.08 mmHg including the grade I hypertension category, while the average diastole blood pressure was 85, 83 mmHg including the high normal category.

Blood pressure is the force needed to ensure blood flow in blood vessels, so that blood can reach all tissues of the human body. Blood that flows smoothly to all parts of the body functions as a carrier of oxygen and other important substances needed by cells in the body (Aminuddin et al., 2020). High blood pressure can lead to hypertension, which is a condition where a person has a systolic blood pressure of  $\geq 140$ mmHg and/or a diastolic blood pressure of  $\geq 90$  mmHg when



measured in a clinic or healthcare facility (Perhimpunan Dokter Hipertensi Indonesia PDHI, 2021).

Systolic blood pressure is the pressure that occurs when the heart contracts, and its normal value in adults ranges from 90-120 mmHg. If it is in the range of 120-130 mmHg, it is considered pre-hypertension, while a systolic pressure of 140 mmHg or more is considered hypertension (Saputra et al., 2023). Meanwhile, diastolic blood pressure is the pressure in the arteries when the heart is resting between beats. Normal diastolic pressure is below 80 mmHg, pressure between 80-89 mmHg indicates pre-hypertension, and diastolic pressure of 90 mmHg or higher is considered hypertension or high blood pressure (Yulisda et al., 2023).

The overall prevalence of hypertension is about 30-45% in adults. The risk of hypertension increases progressively with age, with a prevalence of >60% at age >60 years (Kemenkes, 2021). In line with the results of the study, based on age, as many as 7 elderly people (91.7%) were in the elderly age range (60-74 years).

Factors causing hypertension in the elderly due to systemic vascular resistance and vascular stiffness are the main factors. Increased vascular tone may result from  $\alpha$ -adrenoceptor stimulation or the release of peptides such as angiotensin and endothelin, which increase calcium levels in smooth muscle and cause vasoconstriction. The renin-angiotensin system, as one of the major endocrine systems, plays an important role in blood pressure regulation. Renin secreted from the renal juxtaglomerular apparatus is triggered by low blood flow to the glomerulus, lack of salt intake, or stimulation of the sympathetic nervous system (Yonata & Pratama, 2016).

### **Blood pressure of hypertensive elderly after intervention**

The results showed that, after the intervention, the average systole blood pressure was 124 mmHg including the normal category and diastole blood pressure was 74 mmHg including the optimal category.

Acupressure works by applying pressure or stimulation to hypertensive meridian points in the body with a duration of 30 minutes, twice a week for 4 weeks (Ayu et al., 2021) (W. I. R. Hartono, 2012). This technique is considered efficient and safe because it is performed non-invasively without injuring the skin. Acupressure therapy for hypertension patients aims to relax the body. The effect of acupressure can stimulate mast cells to release histamine, which acts as a mediator of vasodilation in blood vessels, thus improving blood circulation and making the body feel more comfortable (W. I. R. Hartono, 2012).

Researchers assume that when the elderly are given acupressure therapy at meridian points related to hypertension, the pressure at these points will stimulate the release of endogenous hormones such as morphine in the body, so that the heart works calmer and blood flow becomes smoother, which gradually lowers blood pressure. This assumption is supported by Potter & Perry's (2010) theory in (Aminuddin et al., 2020), which states that acupressure can stimulate nerves in the surface layer of the skin and send signals to the hypothalamus in the brain. The descending nervous system then releases endogenous opiates such as endorphins, which increases the levels of these hormones in the body and increases the production of the hormone dopamine. Higher dopamine increases the activity of the parasympathetic nervous system, which functions to regulate the body's activity when relaxed. This makes hypertensive patients feel touch as a relaxation stimulus, which ultimately helps lower blood pressure.

The results of this study are also in line with the results of research by (Saputra et al., 2023) with the title of the effect of acupressure therapy on blood pressure in patients with hypertension there are differences in systolic blood pressure (p value 0.000) and diastolic blood pressure (p value 0.025) before and after acupressure therapy. It is concluded that there are differences in blood pressure before and after acupressure therapy.



### **Analysis of the effect of acupressure therapy on blood pressure in elderly hypertension.**

This study shows a decrease in the mean blood pressure in hypertensive elderly after being given acupressure therapy. The mean decrease in systolic blood pressure was 24.08 mmHg, and diastolic blood pressure decreased by 11.83 mmHg. These results indicate that acupressure therapy has a positive effect on lowering blood pressure in the elderly.

In addition, the results of statistical analysis using the Wilcoxon Signed-Rank Test showed that the value for systolic blood pressure was (p-value 0.002), and the value of diastolic blood pressure was (p-value 0.013). Since both p-values <0.05, these results indicate a statistically significant decrease in systolic and diastolic blood pressure after acupressure therapy.

Therefore, acupressure therapy intervention was proven effective in reducing blood pressure in the elderly in Br Tusan, UPTD Puskesmas Blahbatuh II Working Area. This therapy can be an alternative non-pharmacological treatment that supports the management of high blood pressure in the elderly in the region.

According to several studies, acupressure therapy has been shown to be effective in reducing blood pressure in the elderly due to the mechanism of stimulating certain points that help relax the nervous system and reduce blood vessel tension (Nompo, 2020; Yulisda et al., 2023).

Hypertension, or elevated blood pressure, is known as the "silent killer" because it often shows no obvious symptoms but can lead to serious complications. Hypertension is characterized by systolic blood pressure  $\geq 140$  mmHg and diastolic blood pressure  $\geq 90$  mmHg, measured twice in a row. Hypertension is a serious medical condition that significantly increases the risk of heart, brain, kidney and other diseases. An estimated 1.4 billion people worldwide have high blood pressure, but only 14% have it under control (W. I. R. Hartono, 2012; World Health Organization, 2019). Virchow's Triassic Theory explains that increased blood pressure can result from increased blood viscosity, narrowing of vessels, or organ damage. Kidney damage, for example, can increase renin production that triggers the release of angiotensin and aldosterone, which increase blood pressure through vasoconstriction and sodium retention, increasing blood volume (W. I. R. Hartono, 2012).

One of the symptoms of hypertension is an increase in blood pressure which is often not felt by sufferers, common signs and symptoms such as headaches, blurred vision, ringing in the ears are often experienced by sufferers (Nur Dina Kamelia et al., 2021).

In this context, a complementary therapy approach, namely acupressure, can help reduce blood pressure in hypertensive patients. acupressure as a non-pharmacological therapy can stimulate mast cells to release histamine as a mediator of vasodilation of blood vessels, resulting in increased circulation which makes the body more relaxed and can ultimately reduce blood pressure. Acupressure works by stimulating certain meridian points on the body, which can activate a relaxation response in the nervous system and reduce blood vessel tension (Nur Dina Kamelia et al., 2021; Suwarini et al., 2021). Research shows that stimulation of acupressure points, such as GV 20 (Baihui), GB 20 (Fengchi), and LI 4 (Hegu), Lr 3 (Taichong), Ki 3 (Taixi) can lower blood pressure through several mechanisms, including: Stimulation of the Autonomic Nervous System by stimulating certain acupressure points can reduce the activity of the sympathetic nervous system, which is responsible for the body's stress response. When the sympathetic nervous system decreases, blood pressure also decreases due to the relaxation of blood vessels. Endorphin Release Acupressure is thought to increase the release of endorphins, which act as natural stress relievers. Decreased stress contributes to lower blood pressure (W. I. R. Hartono, 2012; Nur Dina Kamelia et al., 2021; Suwarini et al., 2021).

In this study, the acupressure points used included GV20, GB20, GB21, ExHN3, ExHN5, LI4, and LR3, with 30-minute sessions performed twice a week for 4 weeks. These meridian points



are believed to stimulate the sensory nerves around the acupressure points, which then activate the pituitary and hypothalamus to release endorphins, providing a sense of calm. This relaxation can affect changes in blood pressure. In addition, acupressure can also stimulate the release of serotonin, a neurotransmitter that triggers the pineal gland to produce the hormone melatonin, which also plays a role in lowering blood pressure (W. I. R. Hartono, 2012; Nur Dina Kamelia et al., 2021).

The results of this study are in line with the results of research by (Suarini et al., 2021) the results show that acupressure therapy has a significant effect on lowering blood pressure in the elderly with hypertension (p value = 0.001). Acupressure, which stimulates certain points on the body, is thought to stimulate the release of endorphins, which help reduce stress and provide a relaxing effect, thereby lowering blood pressure. This is in line with the theory that stimulation of specific acupressure points, such as points on the hands or neck, can affect the autonomic nervous system and reduce the stress response, which contributes to an overall decrease in blood pressure.

### Conclusion

The results showed that systole blood pressure before the intervention was 148.08 mmHg, after the intervention it dropped to 124.00 mmHg. Diastole blood pressure before the intervention was 85.83 mmHg, after the intervention dropped to 74.00 mmHg.

The results of the effect analysis test obtained the baseline systolic pressure value (p-value 0.002) and the baseline diastolic pressure value (p-value 0.013), this means that acupressure therapy is effective in reducing elderly blood pressure. Nursing services are expected that the results of this study can serve as guidelines for the relevant Puskesmas to include acupressure therapy into a fixed program for the implementation of the elderly posyandu or chronic disease program (Prolanis)

### Ethics approval and consent to participate

This study was conducted by tracing the medical record documents of hypertensive elderly who had obtained permission from the authorised Puskesmas with number 800/646/Pusk.BB.II/2024 and had passed ethical clearance with number 327.2/E1.STIKESWIKI/EC/VI/2024.

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