Research Article

The Effect of *Slow Deep Breathing* on Blood Pressure in Hypertension Patients in the Internal Medicine Ward of Permata Medika Hospital, Semarang

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Abstract: Due to non-compliance in treatment, the risk of hypertension complications remains high, as well as the lack of evidence of the use of non-pharmacological techniques *of slow deep breathing* in hypertensive patients in the inpatient ward. The purpose of this study was to determine whether there is an effect of *slow deep breathing* on blood pressure in hypertensive patients. The quantitative research method with *a quasi-experimental design* and *a two-group pretest-posttest with control design*. The sample in this study was 40 respondents with hypertension aged 25 years and over who were conscious and cooperative and signed *an informed consent*. The location of the study was at Permata Medika Hospital, Semarang. The instruments used included the researcher himself, a *slow deep breathing SOP sheet*, a digital sphygmomanometer, and an observation sheet. Data analysis used the *Mann-Whitney test*. The results showed that there was an effect of *slow deep breathing* on blood pressure in hypertensive patients in the internal medicine ward of Permata Medika Hospital, Semarang with a *p value of 0.001. It can be concluded that slow deep breathing* intervention helps reduce blood pressure in hypertensive patients.

Keywords: Blood Pressure; Hypertension; Non-Pharmacology; Relaxation; Slow Deep Breathing.

1. Background

Hypertension is a non-communicable disease often referred to as "dark veins" because it can strike suddenly and without the patient's awareness. Consequently, hypertension is often only discovered after complications or other comorbidities have developed (Muliyadi et al., 2023) . Kidney damage or kidney failure, heart failure, myocardial infarction, blood vessel damage (atheropathy), and stroke are some of the complications that can be found (Muliyadi et al., 2023) .

data (2025) shows that by 2024, approximately 1.4 billion people worldwide aged 30-79 years suffer from hypertension, with a prevalence of 33%, and approximately 600 million people, and 44% are unaware that they suffer from hypertension. Hypertension in the world causes approximately 10.8 million deaths each year (Rizki et al., 2022) . Hypertension reaches 294 million people in Southeast Asia, causing 2.4 million deaths each year (WHO, 2024) .

SKI data (2023) shows that 30.8% of people in Indonesia suffer from hypertension at the age of ≥ 18 years (Ministry of Health, 2024) . In Central Java Province in 2024, the prevalence of hypertension in those aged over 15 years reached 26.9% (Dinas, 2025) . In

addition, the number of female hypertension sufferers in Semarang City in 2022 was 161,877 (56%), higher than that of men at 129,033 (44%) (Semarang, 2022) .

Antihypertensive drugs such as amlodipine or captopril can be used to treat hypertension. However, this method may not provide optimal results because patients continue to experience hypertension, and long-term use can affect kidney physiology (Rizki et al., 2022) . Therefore, non-pharmacological therapies have been added as alternatives. One such therapy is slow and deep breathing relaxation, which has been clinically shown to significantly lower blood pressure. Stimulation of baroreceptors through cardiopulmonary stretch activates the parasympathetic nervous system and sympathetic responses. This reduces heart rate, dilates blood vessels, and stabilizes high blood pressure (Zulkarnaini et al., 2025) .

Based on a preliminary study at Permata Medika Hospital Semarang from July 28 to August 1, 2025, it was found that there were 110 patients suffering from hypertension from April to June 2025, with an average of 36 patients per month. Patients had systolic pressure of at least $\geq$ 140-180 mmHg and diastolic pressure of at least $\geq$ 90-110 mmHg.

Interview results showed that the non-pharmacological intervention *of slow deep breathing* had not been implemented in the hospital. Of the 10 respondents who received pharmacological intervention, 7 of them did not take antihypertensive medication regularly, and 9 of them did not know how to do slow deep breathing relaxation.

2. Theoretical Study

Hypertension is a chronic condition characterized by systolic blood pressure levels of 140 mmHg or higher and diastolic blood pressure levels of 90 mmHg or higher. This pathological condition can range from asymptomatic to serious complications, including kidney damage, heart failure, and stroke. It is divided into primary hypertension, the cause of which is unknown, and secondary hypertension, which is influenced by genetics and lifestyle. Hypertension triggers include controllable factors, such as lifestyle, and uncontrollable factors, such as heredity, age, and gender.

Therapy given to hypertension sufferers includes pharmacology by administering antihypertensive drugs and a non-pharmacological approach with *slow deep breathing* which aims to provide relaxation so that arterial pressure decreases due to the dilation of blood vessels.

3. Research Methods

This quantitative research applied a *quasi-experimental design* with *a two-group pretest-posttest with control design model.* The research sample was determined using a *total sampling technique,* totaling 40 respondents who were then grouped into two, namely the intervention group of 20 respondents and the control group also of 20 respondents. The instruments in the study used SOP *slow deep breathing* , a digital sphygmomanometer, and a blood pressure observation sheet. This study used analysis with the *Mann-Whitney test* .

4. Results And Discussion

Univariate Analysis

Table 1Respondent Characteristics Based on Age, Gender, Education, Occupation, Body Mass Index (BMI), Smoking, Caffeine Consumption, Alcohol Consumption, History of Hypertension, and Taking Medication for Blood Pressure in Hypertension Patients

Respondent Characteristics	Frequency (n)	Percentage (%)
Age		
Young Adults 25-44 years	1	2.5
Middle Age 45-60 years	25	62.5
Elderly >60 years	14	35.0
Gender		
Man	18	45.0
Woman	22	55.0
Education		
No school	6	15.0
Elementary School	13	32.5
JUNIOR HIGH SCHOOL	9	20.0
SENIOR HIGH SCHOOL	12	30.0
College	1	2.5
Work		
Doesn't work	9	22.5
Housewife	20	50.0
Laborer	1	2.5
Private	8	20.0
Self-employed	2	5.0
civil servant	0	0
Indonesian National Armed Forces/Indonesian National Police	0	0
Body Mass Index (BMI)		
Underweight <18.5	2	5.0
Normal Body Weight 18.5-24.9	23	57.5
Overweight 25-29.9	10	25.0
Obesity ≥ 30.0	5	12.5
Smoke		
Yes	14	35.0
No	26	65.0
Caffeine Consumption		

Yes		24	60.0
No		16	40.0
Alcohol Consumption			
Yes		10	15.0
No		30	75.0
History of Hypertension			
Yes		26	65.0
No		14	35.0
Take medicine			
Regular		13	32.5
Irregular		27	67.5
Total		**40**	**100**

Table 2 Distribution of Blood Pressure Before and After Intervention Group in Hypertension Patients

Blood pressure (mmHg)	Pretest	Presentation (%)	Posttest	Presentation (%)
No Hypertension <140-<90	0	0	4	20,l0
Mild Hypertension 140-159/90-99	2	10.0	16	80.0
Moderate Hypertension 160-179/100-109	16	80.0	0	0
		10.0	0	0
Severe Hypertension 180-209/110-119	2	0	0	0
Very Severe Hypertension ≥210/≥120	0			
Total	**20**	**100**	**20**	**100**

Table 3 Distribution of Blood Pressure Before and After Control Group in Hypertension Patients

Blood pressure (mmHg)	Pretest	Presentation (%)	Posttest	Presentation (%)
No Hypertension <140-<90	0	0	0	0
Mild Hypertension 140-159/90-99	0	0	8	40.0
Moderate Hypertension 160-179/100-109	16	80.0	11	55.0
	4	20.0	1	5.0
Severe Hypertension 180-209/110-119	0	0	0	0
Very Severe Hypertension ≥210/≥120				
Total	**20**	**100**	**20**	**100**

Respondent Characteristics

a. Age

The results obtained from 40 respondents, dominated by middle-aged (45-60) years old, amounting to 25 respondents (62.5%). After the *slow deep breathing intervention* , there was a decrease in blood pressure from 177/110 mmHg to 154/98 mmHg in the intervention group, while the control group experienced a more minimal decrease from 176/117 mmHg to 162/97 mmHg. Changes in the structure of the cardiovascular system with increasing age, characterized by narrowing of the lumen of blood vessels and the elasticity of their walls, resulting in high blood pressure (Miming et al., 2023) .

These findings are supported by Ristin et al. (2024) , who stated that age is an unmodifiable factor and that increasing age causes changes in heart function, hormones, and blood vessels, thereby increasing arterial stiffness. Research by Defitrianti et al. (2023) also showed that aging causes hardening of the arteries, which increases the risk of hypertension.

b. Gender

The majority of 22 respondents (55%) were female. This condition is related to physiological and hormonal factors, particularly the decrease in estrogen during menopause, which plays a role in maintaining blood vessel elasticity (Miming et al., 2023) .These findings were reinforced by Defitrianti et al (2023) who emphasized that female respondents with hypertension experienced hormonal factors, while Nanda et al (2025) stated that hypertension was higher in women due to hormonal changes, weight gain, and decreased physical activity during menopause.

c. Education

A total of 13 respondents (32.5%) had elementary school education. (Defitrianti et al., 2023) The results showed that the majority of respondents had an elementary school education (40.0%). Low education is associated with a lack of knowledge, which leads to unhealthy lifestyles. Research by Joan & Cusmari (2024) and Defitrianti et al. (2023) found that individuals with low education tend to have difficulty controlling their blood pressure due to limited understanding of health information, which leads to unhealthy lifestyle behaviors.

d. Work

Twenty respondents (50.0%) worked as housewives. Blood pressure in the intervention group decreased from 169/92 mmHg to 143/90 mmHg, and in the control group from 165/103 mmHg to 153/98 mmHg.

Research by Defitrianti et al (2023) and Annisa et al (2025) stated that housewives have a higher risk of hypertension due to low physical activity and unhealthy lifestyles.

e. Body Mass Index (BMI)

Twenty-three respondents (57.5%) had a normal BMI, but obese respondents showed higher blood pressure. In the intervention group, obesity experienced a decrease in blood pressure from 179/108 mmHg. Body mass index influences blood pressure

through hyperlipidemia and atherosclerosis, which increase heart workload (Miming et al., 2023) .

Research by Risna & Hasnawati (2022) and Brigita et al (2023) states that being overweight increases the risk of hypertension due to narrowing of blood vessels.

f. Smoke

Fourteen respondents (35.0%) smoked. In the intervention group, blood pressure decreased from 161/105 mmHg to 139/85 mmHg, while in the control group, it decreased from 172/102 mmHg to 158/90 mmHg. Nicotine and carbon monoxide cause atherosclerosis and damage to the arterial endothelium (Miming et al., 2023) . Research by Risna & Hasnawati (2022) and Annisa et al . (2025) suggests that smoking can increase the risk of hypertension.

g. Caffeine Consumption

A total of 24 respondents (60.0%) consumed caffeine. In the intervention group, blood pressure decreased from 167/92 mmHg to 147/95 mmHg. Caffeine increases catecholamine secretion and accelerates heart rate (Miming et al., 2023) . Research by Dewi & Rlindhan (2024) and Annisa et al. (2025) suggests that caffeine has the potential to increase blood pressure.

h. Alcohol Consumption

Thirty respondents (30.0%) did not consume alcohol. Respondents who consumed alcohol experienced a relatively smaller decrease in blood pressure compared to respondents who did not consume alcohol. Alcohol consumption can increase blood pressure and blood volume because it increases the hormone cortisol. Research by Dewi & Rlindha (2024) showed that respondents who consumed alcohol experienced higher blood pressure compared to those who did not consume alcohol, based on the available data.

i. History of Hypertension

A total of 26 respondents (60.0%) had a history of hypertension. Research by (Joan & Cusmarih, 2024) stated that recurrent or uncontrolled hypertension is influenced by a previous history of hypertension. This condition is also influenced by changes in blood vessel structure and function, including decreased arterial elasticity. Research by Rindiani et al. (2022) stated that a history of hypertension resulted in respondents having unstable blood pressure, requiring further pharmacological and non-pharmacological therapy.

j. Take medicine

Twenty-seven respondents (67.5%) were irregular in their medication intake. Regular medication use indicates more stable blood pressure. This finding is supported by Ristin et al. (2024) and Defitrianti et al. (2023) , who explain that medication adherence is crucial for optimizing blood pressure.

Blood Pressure Before and After Intervention Group in Hypertension Patients

Of the respondents who had not received the intervention, 16 (80%) experienced moderate hypertension, and after the *slow deep breathing intervention* , 16 (80%) experienced mild hypertension. *The slow deep breathing intervention* works by relaxing the body by controlling the inhibition of sympathetic nerve activity, thus optimizing high blood pressure (Angreit & Jamaluddin, 2025) .

Research by Ristin et al (2024) , Rindiani et al (2022) , and Rizki et al (2022) stated that non-pharmacological intervention *of slow deep breathing* is effective in reducing blood pressure through relaxation mechanisms and reducing sympathetic nerve activity.

Blood Pressure before and after Control Group in Hypertension patients

The research data from the control group, both pretest and posttest, showed that the majority of respondents experienced moderate hypertension, ranging from 16 (80.0%) to 11 (55.0%).

Research by Abdul et al (2025) and Annisa et al (2025) stated that the control group experienced a decrease in blood pressure which was influenced by other factors such as compliance in taking antihypertensive medication.

Bivariate Analysis

Pretest-Posttest Blood Pressure Analysis of Intervention and Control Groups in Hypertension Patients

Table 4Results of the *Mann Whitney Test* on the Effect of *Slow Deep Breathing* on Blood Pressure in Hypertension Patients in the Internal Medicine Ward of Permata Medika

Characteristics	N	*P Value*
Blood Pressure (intervention)	40	0.001
Blood Pressure (control)		

Hospital, Semarang

Statistical analysis using the *Mann-Whitney test* yielded a *p-value of* 0.001 (<0.005), thus Ho was rejected and Ha was accepted. This indicates that *slow deep breathing has an effect* on blood pressure in hypertensive patients in the internal medicine ward of Permata Medika Hospital, Semarang.

This research is supported by research by Rizki et al (2022) , Rindiani et al (2022) , Ristin et al (2024) , and Abdul et al (2025) , which obtained a *p-value of* 0.000 indicating that *slow deep breathing* has an effect on blood pressure in hypertensive patients. In addition, research by Annisa et al (2025) obtained a *p-value of 0.001 < (0.005), which indicates that slow deep breathing* intervention is effective in reducing high blood pressure.

5. Conclusion and Suggestions

Based on the research results, data processing, and descriptions of *slow deep breathing therapy* on blood pressure in hypertensive patients, it was concluded that the changes in blood pressure in the intervention group were relatively more optimal compared to the relatively minimal decrease in blood pressure in the control group. The analysis showed the effect of *slow deep breathing* on blood pressure in hypertensive patients in the internal medicine ward at Permata Medika Hospital, Semarang.

a) Nursing profession: Increasing knowledge of health science and references related to *slow deep breathing interventions* in helping control blood pressure in hypertensive patients.

b) Institution: To be a reference library for the development of further research related to non-pharmacological management of hypertension.

c) Patient: Provides an understanding of efforts to lower blood pressure independently through non-pharmacological *slow deep breathing therapy* .

d) Further research: Conduct periodic blood pressure measurements after each intervention and expand the sample to a larger one.

e) Hospital: To become the standard basis for *slow deep breathing relaxation therapy* as a complementary intervention in hypertensive patients.

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