

## THE EFFECT OF SLOW DEEP BREATHING ON REDUCING BLOOD PRESSURE IN ADULTS WITH HYPERTENSION

Musta'in<sup>1</sup>, Septiyana Indri Wulandari<sup>2</sup>, Tri Yuniarti<sup>3</sup>, Ady Irawan<sup>4</sup>,

Universitas Duta Bangsa Surakarta<sup>1</sup>, Universitas Duta Bangsa Surakarta<sup>2</sup>, Stikes Mamba'ul 'Ulum Surakarta<sup>3</sup>, Universitas Duta Bangsa Surakarta<sup>4</sup>

### ABSTRACT

*Hypertension is a condition where a person experiences blood pressure that exceeds normal blood pressure. Normal blood pressure in adults is 120/80 mmHg. The aim of this study was to determine the effect of the Slow Deep Breathing (SDB) technique on reducing blood pressure in adults with hypertension. The method used in this study was a pre-experimental study design with a total of 30 subjects selected by purposive sampling technique. Blood pressure data was taken before and after SDB intervention for 15 minutes. The results showed that there was a significant effect between SDB and a decrease in blood pressure in the elderly with hypertension ( $p < 0.05$ ). It is hoped that the SDB technique can be used as an alternative non-pharmacological therapy for elderly people with hypertension.*

### KEYWORDS

Hypertension elderly, decreased blood pressure, slow deep breathing



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### INTRODUCTION

Hypertension is an increase in systolic blood pressure that exceeds normal limits, namely systolic blood pressure  $\geq 140$  mmHg and diastolic blood pressure  $\geq 90$  mmHg. Symptoms of hypertension include headaches, palpitations, fatigue, nosebleeds, ringing in the ears to vertigo (Pradnyani & Ni Kadek Dwi, 2022). Based on global Burden of Disease data, non-communicable diseases have killed nearly 41 million people each year, or the equivalent of 71% of total deaths. Globally, the prevalence of hypertension is estimated to double in adults aged 30-79 years from around 650 million to 1.28 billion between 1990 and 2019 (Utomo EK., 2019). The prevalence of hypertension in Indonesia always increases every year. According to Riskesdes data in 2013, it reached around 25.8%, in 2018 the prevalence of hypertension was 34.1%. The high prevalence of hypertension will increase the risk of various serious diseases such as heart disease, stroke and kidney failure, as well as reduce a person's quality of life.

The most serious health problem suffered by the elderly is hypertension (Sari et al., 2022). The elderly group (elderly) is characterized by a decline in the function of various organs in the body so that they are vulnerable to various diseases. As we get older, there are changes in cell structure and function which have an impact on declining physical health (Putra et al., 2019).

Hypertension is one of the non-communicable diseases (NCDs) that is still dominant every year, so it really requires intensive treatment, namely with pharmacological and non-pharmacological therapy. Pharmacological therapy that can be given to lower blood pressure in hypertension sufferers such as diuretic drugs, adrenergic inhibitors. Meanwhile, complementary therapies that can be used for hypertension sufferers are slow deep breathing, progressive muscle relaxation, aromatherapy, acupuncture, physiotherapy, psychotherapy, yoga and medication (Anggraini, Murwati & Sofais, 2023)

Slow deep breathing or slow, deep breathing relaxation is a condition where respiratory inspiration and expiration with a frequency of 6-10 times per minute results in increased baroreflex sensitivity and reduced sympathetic activity and chemoreflex activity, thus making the body calm and can reduce blood pressure in hypertension sufferers. (Safarina & Setya Roswendi, 2022).

According to data from the Central Java Provincial Health Office in 2018, hypertension has reached 57.10% (Kiki, 2021). Whereas in 2019 hypertension increased to 68.6% (Widiastuti, Maliya & Yulian, 2022). Central Java Province ranks fourth in terms of hypertension cases in Indonesia, which is 37.57% (Siswanto et al., 2020).

Hypertension in Sukoharjo Regency reached 3.9% where 436,621 people aged over 18 years had their blood pressure measured and the results were that 26,789 people were diagnosed with hypertension (Nabilla, Laksmi & Supratman, 2021). Meanwhile, a preliminary study conducted by researchers on 15 -21 February 2023 at the Integrated Development Post, Gatak District, Sukoharjo Regency, resulted in 143 adults experiencing hypertension.

## **RESEARCH METHOD**

This research uses a quasi experimental design with a non-equivalent control group design. This research was conducted at the Jati Village Integrated Development Post, Gatak District, Sukoharjo Regency with a population of 143. The sample used was 30 respondents with the inclusion criteria being 20-59 years old, having systolic blood pressure  $\geq 140$  mmHg and diastolic blood pressure  $\geq 90$  mmHg, willing to be a respondent, able to follow instructions and have never received slow deep breathing therapy. The sampling technique used in this research is non-random sampling with a purposive sampling method. Standard Operating Procedures using SOPs carried out by Yanti, 2022. This research was conducted in December 2022 – July 2023. The research instruments used questionnaires, digital blood pressure monitors and observation sheets. The demographic questionnaire instrument includes gender, age, occupation and duration of suffering from hypertension. Observation is used to monitor the results of blood pressure measurements taken before and after Slow Deep Breathing. slow deep breathing is carried out for 5 consecutive days with a frequency of 1x a day in the morning and a duration of  $\pm 15$  minutes for each intervention. Bivariate analysis used the Shapiro Wilk test with the parametric Paired T-Test.

## RESULTS AND DISCUSSION

In this study, the characteristics of respondents included age, gender, occupation, duration of suffering from hypertension, blood pressure before and after the slow deep breathing intervention, the data is presented as follows:

Table 1.1 Data of Respondent Characteristic Frequency Distribution by Age

Age	Intervention <i>slow deep breathing</i> (n=30)	
	f (n)	(%)
20-30 year	1	3,3
31-40 year	1	3,3
41-59 year	28	93,3
Total (n)	30	100

Based on table 1.1 the characteristics of the respondents from 30 respondents based on age, slow deep breathing was carried out, the majority were aged 41-59 years with a total of 28 respondents (93.3%) The results of this study were in line with the research of Rosadi & Hildawati (2022) which stated that there was a relationship with hypertension in the community in the Sungai Raya Health Center work area (p-value 0.0001 <0.05). The higher a person's age, the higher their blood pressure, so that older people tend to have higher blood pressure than younger people (Subrata and Wulandari, 2020). Research conducted by Syamsu, Nuryanti & Semme (2021) shows that age is a very strong risk factor for hypertension. Pressure increases with age so the risk of hypertension is higher. Age factors influence the incidence of hypertension. Research conducted in Bangladesh by Bhowmik B, at all, in 2019 found that the prevalence of hypertension in the 20-39 year age group was 29.8%, while in the 40-59 year age group it was 43.1%. This study found that the older age group had a higher prevalence of hypertension. Research conducted in Nigeria by Dike IE, at all, in 2020 found that the prevalence of hypertension in the 18-24 year age group was 3.8%, while in the 55-64 year age group it was 52.4%. This study shows that the prevalence of hypertension increases with age. Research conducted in Indonesia in 2021 found that the prevalence of hypertension in the age group 18-44 years was 5.6%, in the age group 45-64 years was 36.8%, and in the age group 65 years or more was 54.3 %. This study shows that the prevalence of hypertension also increases with age.

Table 1.2 Data on Frequency Distribution of Respondent Characteristics by Gender

Gender	Intervention <i>slow deep breathing</i> (n=30)	
	f (n)	(%)
Man	6	20
Woman	24	80
Total	30	100

Based on table 1.2, the characteristics of respondents, of the 30 respondents who underwent slow deep breathing, the majority were female with a total of 24 respondents (80%). The results of this study are in line with research conducted by Putri et al (2023) that the majority of hypertension sufferers were female with 34 respondents (60%). The majority of women aged >50 years have experienced menopause, resulting in hormonal changes that result in increased blood pressure (Rosadi & Hildawati, 2022). The results of research from Falah (2019) state that most people with hypertension are women. This is because women over the age of 45 have experienced menopause. Menopausal women have decreased estrogen levels so that High Density Lipoprotein (HDL) levels also decrease. When HDL decreases and Low Density Lipoprotein (LDL) results in atherosclerosis so

that blood pressure increases. Women experience hypertension at a higher rate than men because women who experience menopause experience a decrease in hormones, while women who have not experienced menopause are protected by the hormone estrogen so it protects the heart (Syamsu, Nuryanti & Semme, 2021).

Table 1.3 Data of Frequency Distribution of Respondent Characteristics by Occupation

Work	Intervention <i>slow deep breathing</i> (n=30)	
	f (n)	(%)
Doesn't work	2	6,7
Farmer	3	10
Housewife	2	6,7
Self-employed	9	30
Laborer	14	46,7
Total	30	100

Based on the research results in table 1.3, the characteristics of respondents, of the 30 respondents who did slow deep breathing, most of them worked as laborers with a total of 14 respondents (46.7%) These results are in line with research by Taiso, Sudayasa & Paddo (2020), p-value = 0.006 < 0.05 (H0 is rejected and H1 is accepted) shows that there is a relationship between work and the incidence of hypertension. Respondents who work tend to be 3.2 times more likely to experience hypertension than respondents who don't work. Hypertension can occur due to busyness and hard work. This is because busyness and hard work can cause stress so that blood pressure can increase. Apart from that, being busy also causes a person to rarely or not have time to exercise so that fat in the body accumulates and obstructs blood flow in the body. If ignored, over time the blood vessels will narrow, resulting in hypertension (Lestari & Nugroho, 2019).

The research results of Tamala, Rohmawati & Marwan (2023) show that someone who has a heavy workload will affect their health. Prolonged work can increase stress so that ketocolamine increases and affects the work of sympathetic nerve activity. When sympathetic nerve activity increases, heart muscle contractility also increases. This will cause cardiac output to increase so that blood pressure also increases (Orange & Indarjo, 2022).

Table 1.4 Data on Frequency Distribution of Respondents' Characteristics Based on the Length of Time they Suffered from Hypertension

Duration of suffering from hypertension	Intervention <i>slow deep breathing</i> (n=30)	
	f (n)	(%)
<5 years	14	46,7
5-10 years	15	50
>10 years	1	3,3
Total	30	100

Based on table 1.4 the characteristics of the respondents from 30 respondents who underwent slow deep breathing therapy, most of them had suffered from hypertension for 5-10 years with a total of 15 respondents (50%). The results of this study were in line with the research of Syamsu, Nuryanti & Semme (2021) many in the group < 5 years, namely as many as 19 people (59.4%). Meanwhile, the research by Listiana, Effendi & Saputra (2020) shows that the majority of respondents suffer from hypertension  $\geq 5$  years. Research conducted by Tamala, Rohmawati & Marwan, (2023) shows that the duration of suffering from hypertension depends on the quality of life of hypertensive sufferers in controlling their condition.

Table 1.5 Distribution of Data on the Average Frequency of Blood Pressure Before Slow Deep Breathing in Adults with Hypertension

<b>Blood Pressure</b>	<b>Intervention <i>Slow Deep Breathing</i> (n=30)</b>
<b>Systole</b>	
Mean±SD	153,10±10,984
Min-Max	135-179
<b>Diastole</b>	
Mean±SD	93,30±4,252
Min-Mas	86-101

Based on table 1.5, the average blood pressure of 30 respondents before being given slow deep breathing intervention was 135.10/93.30 mmHg (stage 1 hypertension). According to Warjiman et al., (2020) stage 1 hypertension is when the systolic blood pressure is between 140-159 mmHg and the diastolic blood pressure is 90-99 mmHg. Stage 1 hypertension is a condition in the body where there is a disturbance in the blood vessels which causes blood flow distributed throughout the body to become obstructed so that blood pressure continuously increases (Kurniasari, 2020). Prolonged hypertension, if not treated or controlled appropriately, can cause complications such as stroke, diabetes mellitus, heart and kidney disease (Warjiman et al., 2020). Untreated hypertension will damage the body's organs, including the brain, heart, kidneys, eyes and peripheral blood vessels (Mutmainnah, Djalal and Suyuti, 2021). Kurniasari's (2020) research results show that the impact of hypertension complications can cause a decrease in quality of life and can even cause a person's death. Therefore, it is necessary to treat hypertension both pharmacologically by taking antihypertensive medication regularly and non-pharmacological therapy such as slow deep breathing.

Table 1.6 Data on Average Frequency Distribution of Blood Pressure After Slow Deep Breathing in Adults with Hypertension

<b>Blood Pressure</b>	<b>Intervention <i>Slow Deep Breathing</i> (n=30)</b>
<b>Sistolik</b>	
Mean±SD	131,90±10,111
Min-Max	117-153
<b>Diastolik</b>	
Mean±SD	82,53±3,928
Min-Max	70-90

Based on table 1.6, the average blood pressure of 30 respondents after slow deep breathing was 131.90/82.53 mmHg (pre hypertension). Slow deep breathing is a non-pharmacological therapy for hypertension sufferers which is easy to do and effective for lowering blood pressure in hypertension sufferers. Slow deep breathing aims to reduce stress, reduce sympathetic nerve activity, increase parasympathetic nerve response, increase breathing, improve cardiovascular function and improve physical and mental health (Rima Ambarwati, Masroni & Anita Dwi Ariyani, 2021). Slow deep breathing is also beneficial for reducing stress, reducing anxiety and increasing feelings of calm and comfort (Anggraini, Murwati & Sofais, 2023).

The working mechanism of slow deep breathing is to increase the tidal volume so that the Hering-Breuer reflex becomes active. This causes the chemoreflex activity to decrease resulting in an increase in baroreflex sensitivity. As a result, sympathetic activity and blood pressure decrease (Pertiwi & Prihati, 2020). According to Fera Siska (2022) slow deep breathing is relaxing deep breaths and exhaling slowly with a frequency of 6-10x/minute. This relaxation therapy is carried out twice a day, namely in the morning at 07.00-10.00 WIB and in the afternoon at 18.00-19.00 WIB, for ± 15 minutes (Dumalang, Lintong & Danes, 2022).

The results of a slow deep breathing therapy study conducted for 5 consecutive days with a duration of 1x a day in the morning for  $\pm 15$  minutes in adults with hypertension, it is known that slow deep breathing can reduce blood pressure in people with hypertension.

Table 1.7 Differences in Blood Pressure Before and After Slow Deep Breathing in Adults with Hypertension

Blood pressure	Intervention	Mean		Difference (d)	p-value
		Pre	Post		
Systolic mean	Slow deep breathing	153,10	131,90	21,2	0,000
Diastolic mean	Slow deep breathing	93,30	82,53	10,77	0,000

Based on 1.7 it is known that the results of the Wilcoxon test showed a difference in blood pressure before and after slow deep breathing, the difference in pre-post systolic was 21.1 mmHg with a p-value (systolic) = 0.000 ( $<0.05$ ) and the difference in pre-post diastolic is 19 mmHg with p-value (diastolic) = 0.000 ( $<0.05$ ).

Based on the results of the study table 1.7 shows that there is a difference in blood pressure before and after slow deep breathing in adults, the systolic blood pressure before it is done is 153.10 mmHg, the systolic after it is done is 131.90 mmHg and the difference in systolic blood pressure before and after is 21.2 mmHg with p-value (systolic) = 0.000 ( $<0.05$ ). while the diastolic blood pressure before was 93.30 mmHg, after diastolic was 82.53 mmHg and the difference between diastolic blood pressure before and after was 10.77 mmHg with a p-value (diastolic) = 0.000 ( $<0.05$ ). Research conducted by Damayanti & Hasnawati (2022) states that giving slow deep breathing interventions to hypertensive patients can reduce systolic blood pressure by 12.14 mmHg and diastolic blood pressure by 5 mmHg. These results are also in accordance with the results of Witriyani (2023) showing that the slow deep breathing treatment is effective for reducing blood pressure in people with hypertension. Meanwhile, research conducted by Ilham, Armina & Kadri (2019) stated that hypertension sufferers who were given progressive muscle relaxation interventions obtained systolic blood pressure p-value 0.0001 and diastolic blood pressure p-value 0.002  $< (0.05)$  and showed significant effect on blood pressure in hypertension sufferers before and after being given progressive muscle relaxation intervention.

The results showed that respondents with hypertension who intervened in slow deep breathing and progressive muscle relaxation for 5 consecutive days were carried out once a day in the morning with a duration of  $\pm 15$  minutes each intervention was effective in reducing blood pressure, both systolic and diastolic because there was differences in blood pressure before and after slow deep breathing and progressive muscle relaxation in adults with hypertension.

## CONCLUSION

Based on the results of the study on the effect of slow deep breathing on reducing blood pressure in adults with hypertension in Jati Village, it can be concluded as follows (1) Characteristics of adult respondents with hypertension in Jati Village, at the age of 48, 24 respondents (80%) were female, 14 respondents (46.7%) worked as laborers, 15 had suffered from hypertension for 5-10 years respondents (50%), (2) The average blood pressure before slow deep breathing therapy in adults with hypertension in Jati Village was 153.10/93.30 mmHg (stage 1 hypertension), (3) The average blood pressure after slow deep breathing therapy in adults with hypertension in Jati Village was 131.90/82.53 mmHg (pre hypertension), (4) There is a difference in average blood pressure before and after slow deep breathing in adults with hypertension, (5) Slow deep breathing has a weak effect on

reducing systolic blood pressure and has a moderate effect on reducing diastolic blood pressure

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