

REDUCING BLOOD PRESSURE IN HYPERTENSION PATIENTS USING EXERCISE INTERVENTION SLOW RESPIRATORY

Juli Andri¹, Padila², Ramadhan Trybahari Sugiharno³,
Muhammad Bagus Andrianto⁴, Harsismanto J⁵
University of Muhammadiyah Bengkulu^{1,2,4}
Health Polytechnic of the Ministry of Health Jayapura³
Pematang Tiga Health Center⁵
juliandri@umb.ac.id¹

ABSTRACT

This study aims to determine the effect of slow deep breathing exercises on reducing blood pressure in hypertensive patients in the Telaga Dewa Health Center work area, Bengkulu City. The research method used in this research is quantitative research with a quasi-experimental research design. The results of univariate analysis obtained that the average respondent was 64 years old, with the majority gender being female, namely seven respondents (53.3%). Most respondents have a family history of hypertension, as many as 12 (80%). The results of the bivariate analysis showed that the p-value <0.05. In conclusion, there is a decrease in systolic and diastolic blood pressure before and after slow deep breathing intervention in hypertension sufferers in the Telaga Dewa Health Center Work Area, Bengkulu City.

Keywords: Hypertension, Slow Deep Breathing Exercise, Blood Pressure

INTRODUCTION

The group of non-communicable diseases that are very common and easily detected in the community is hypertension (Wulandari & Puspita, 2019). Hypertension is a chronic disease due to increased systemic arterial blood pressure, both systolic and diastolic, and is one of the main risk factors for heart disorders. (Berek, 2018). In general, hypertension or hypertension is measured twice with an interval of five minutes under adequate rest. Systolic blood pressure increases by more than 140 mmHg and diastolic blood pressure increases by more than 90 mmHg (Harsismanto et al., 2020; Putri et al., 2019; Whelton et al., 2018).

The prevalence of hypertension will increase sharply, and it is estimated that by 2025, 29% of adults worldwide will be affected by hypertension. High blood pressure causes about 8 million deaths every year, and 1.5 million people die from high blood pressure in Southeast Asia, which can increase the burden of 4,444 health care items. In addition, hypertension was more common at the age of 35-44 years (6.3%), 45-54 years (11.9%), and 55-64 years (17.2%) (Permata et al., 2021; Sartika et al., 2020). According to people's economic status, the highest level of hypertension is in the lower middle (27.2%) and middle (25.9%) range (Kemenkes RI, 2017; Sulistyawati & Aminah, 2017).

WHO (World Health Organization) states that hypertension affects 22% of the world's population, and reaches 36% of the incidence in Southeast Asia. Hypertension is also the cause of death with 23.7% of the total 1.7 million deaths in Indonesia in 2016 (Faridah et al., 2022; Zulfitri et al., 2019).

According to the latest Rikesdas data in Southeast Asia in 2018, the number of people with hypertension in Indonesia reached 36, an increase of 34.1% from year to year. Compared to the 2013 Riskesdas data, this incidence rate has increased quite high. The results show that according to blood pressure measurements of Indonesians aged 18 years and over, up to 25.8% of people have high blood pressure, and blood pressure measurements have increased significant. the value of the population over 60 years accounts for 25.8% (Andri et al., 2021; Tirtasari & Kodim, 2019).

In fact, this disease is one of the most common diseases suffered by the community, the number reaches 11,332 or more than other non-communicable diseases, such as coronary heart disease, stroke, diabetes, cancer, lung disease, asthma, osteoporosis and chronic diseases. Kidney failure is quite a lot in Bengkulu Province, reaching 11,000 people. Among them, Bengkulu City has the highest number of patients with 4,264 people, and the lowest is the southern Bengkulu region, with 400 patients (Dinas Kesehatan Provinsi Bengkulu, 2019). Common symptoms that are usually experienced by people with hypertension are headache, fatigue, neck discomfort, spinning vision, irregular heartbeat, and tinnitus (Sartika et al., 2020; Goleman et al., 2019). With the high incidence of hypertension in Indonesia, various efforts need to be made to control the high incidence of hypertension so that it can reduce the number of hypertension (Andri et al., 2018; Sartika et al., 2018).

Non-Pharmacological Therapy or also known as lifestyle modification which includes smoking cessation, reducing excess weight, avoiding alcohol, reducing salt levels, diet modification and psychological aspects, among others, reducing stress, exercise, rest and relaxation. Relaxation therapy combined with pharmacological therapy has been shown to be safe and effective. One of the relaxation therapies that can be done to reduce blood pressure is the slow deep breathing technique (Mayasari, 2019). There are many types of relaxation techniques, including slow deep breathing relaxation techniques (Siska, 2022; Suranata et al., 2019).

Slow deep breathing relaxation can also be given to lower blood pressure in patients with hypertension, where the advantages of this relaxation therapy can be done independently at home, are relatively easy to do, do not take long to carry out therapy, and can reduce the impact of pharmacology therapy for patients with hypertension. This treatment can be done six times per minute for 15 minutes will have an impact on blood pressure through increasing baroreceptor sensitivity and decreasing sympathetic nerve activity in patients with primary hypertension (Suib & Mahmudah, 2022).

According to research by Sumartini & Miranti (2019) slow deep breathing is a relaxation technique that affects the nervous system and affects blood pressure regulation, besides that it can be used as a non-drug alternative therapy, exercise or treatment for hypertensive patients. According to research by Samosir & Triyulianti (2021) the difference between pre-test and post-test can be seen from the systolic blood pressure, and the p-value is 0.027. For diastolic blood pressure, the value changed from before the test and after the test, the p-value was 0.015, which means there was a difference between and after the intervention and slow back massage had the effect of lowering high blood pressure in hypertensive patients.

Relaxation techniques and regular deep breathing can increase blood flow in obstructed hypertensive patients, thereby lowering blood pressure. If practiced regularly, this slow, deep breathing will give the best results. The success of slow deep breathing therapy in this study was influenced by family support, because the family accompanied the respondents on days 2 to 4 and motivated them to breathe slowly and deeply. The average

decrease in blood pressure of interviewees is small because there are factors that affect the blood pressure of interviewees, namely daily salt intake > 1/2 teaspoon will affect the increase in blood pressure (Kurniasari et al., 2020).

When there is relaxation, muscle fibers in the body stretch, the process of sending nerve impulses to the brain is reduced, and the function of other body parts is the same. The results of doing deep breathing relaxation are characterized by a decrease in pulse rate, respiration, and blood pressure (Sumartini & Miranti, 2019; Yusuf et al., 2021).

Research on non-pharmacological therapy has been carried out in several previous studies, but this study focuses on slow deep breathing interventions in hypertensive patients. In addition, this intervention is still rarely used in an effort to reduce blood pressure in Bengkulu province, especially in the working area of the Telaga Dewa Health Center, Bengkulu City.

RESEARCH METHODS

This study used a quasi-experimental approach, the sampling technique in this study was purposive sampling, namely the sample was taken according to the researcher's criteria with a sample of 30 people. Where 15 for slow deep breathing interventions and 15 for alternate nostril breathing interventions. Data analysis in this study was dependent t test, Wilcoxon and Mann Whitney.

RESULTS

Table. 1
Distribution of Respondents by Age, Gender,
Family History of Hypertension

Characteristics	Intervention			
	Mean	SD	N	%
Age	64	-	-	-
Gender				
Male	-	-	7	46,7
Female	-	-	8	53,3
Family History of Hypertension				
There is	-	-	12	80
There isn't any	-	-	3	20

Based on table 1 shows that the average respondent is 64 years old with the majority gender being female, as many as 7 respondents (53.3%). The majority of respondents have a family history of hypertension as many as 12 respondents (80%).

Table. 2
Distribution of Mean Blood Pressure Before
and After Intervention

Variabel	Kelompok	Mean	SD	P value
Sistolik	Sebelum	159,27	12,959	0.001
	Setelah	142,47	14,937	
Diastolik	Sebelum	104,13	11,445	
	Setelah	86,27	4,267	

Based on table 2 shows that the p value is $0.000 < 0.05$, so it can be concluded that there is an effect before and after the administration of slow deep breathing intervention on reducing blood pressure in hypertensive patients in the work area of the Telaga Dewa Public Health Center, Bengkulu City.

DISCUSSION

Overview of Age, Gender and Family History Characteristics

The results showed that the average age was 64 years. The older a person is, the higher their blood pressure, so older people tend to have higher blood pressure than younger people. This study is in line with research conducted by Arum (2019) which conducted research on the productive age population (15-64 years) in the Jagir Health Center Work Area with a total of 36 respondents because at the age of more than 55 years, women are more prone to hypertension because women are more likely to have hypertension. going through menopause.

Most of the sexes in this study were women. This is in line with Arum's research (2019) which showed that more female respondents than male respondents had hypertension. Aryantiningsih & Silaen (2018) research states that the incidence of hypertension is related to gender. This can be caused by the hormone estrogen in women, this hormone is obtained by women during menstruation every month and continues to be updated. In line with the research of Yousefabadi et al., (2018) it shows that some respondents with hypertension are women with the age of 50 years and above. At the time of entering the age of 50 years, women will have a tendency to lose the hormone estrogen where this hormone is owned by women more than men (Suarni et al., 2018).

Women who are going through menopause can also cause high blood pressure. This is due to reduced estradiol and decreased ratio of estrogen to testosterone resulting in endothelial dysfunction and increased BMI leading to an increase in sympathetic nerve activation. Activation of this sympathetic nerve will release stimulants renin and Angiotensin II. An increase in angiotensin and endohotelin can cause oxidative stress that leads to hypertension (Sartika et al., 2022).

Other factors that can cause hypertension include family history where this study as a whole has a family history of hypertension. The same results were obtained in Lita's research (2017) that heredity occurs more in patients with hypertension. Then in a study by Angesti et al., (2018) it was found that a family history of hypertension was associated with the incidence of hypertension and the risk of hypertension was 3,884 times in adolescents. This is because genetic factors in certain families will cause the family to have a risk of suffering from hypertension. The incidence of hypertension in a person is the result of changes in genetics.

Supported by other studies which state that individuals who have a family history of hypertension have a high risk of hypertension attacks with a 1.518 times chance compared to individuals who do not have a family history of hypertension (Maulidina et al., 2019).

Effect of Slow Deep Breathing (SDB) Intervention on Blood Pressure Reduction in Hypertensive Patients

Based on the results of the research that has been done by the researcher, there were 15 respondents, group 1 was given the slow deep breathing intervention. The intervention for this researcher was given for 4 days with a frequency of 2 times a day, in the morning and evening.

The results of the univariate analysis of the frequency distribution of systolic blood pressure before and after the slow deep breathing intervention was given with a p value of 0.001. The distribution of the frequency of diastolic blood pressure before and after the slow deep breathing intervention was given with a p value of 0.000. Thus, it was concluded that the slow deep breathing intervention was effective in reducing blood pressure in patients with hypertension, where within 4 days after the intervention there was a decrease in blood pressure.

This research is supported by the results of Andri et al., (2018) which shows that there is a decrease in systolic with t value = 3.632, p value = 0.002 and diastolic t value = 4.226, p value = 0.001, that there is an effect on decreasing blood pressure. This is in line with the research of Tarigan et al., (2020) which shows that there is an effect of slow deep breathing on reducing blood pressure in the elderly at the Pustu Desa Stungkit Binjai in 2020.

The results of the study by Marliando & Herawati (2021) showed that there was an effect of slow deep breathing exercise on blood pressure in patients with hypertension. The results of the study of Nafi'ah et al., (2020) showed that there was a significant difference between systolic and diastolic blood pressure before and after slow deep breathing with a p value of <0.05. In line with Azhari's research (2019) which states that there is an effect of slow deep breathing on the blood pressure of hypertension patients at the Simpang IV Sipin Health Center, Jambi City.

This is in line with the research of Yusuf et al., (2021) which showed that there was a significant change between the Pretest and Post-test respondents who were given Slow Deep Breathing therapy to decrease blood pressure in patients with hypertension. The results of the study by Azizah et al., (2022) showed that after applying slow deep breathing for 3 days, there was a decrease in blood pressure in patients with hypertension. Hypertensive patients should be able to apply slow deep breathing exercises independently to help lower or control blood pressure.

According to research by Gholamrezaei et al., (2021) which states that slow deep breathing can reduce blood pressure levels in the long term and has a role in reducing psychological pressure associated with the cause of hypertension. It is known that the slow deep breathing technique in the form of purse lip breathing (PLB) can make the patient more comfortable and calm compared to other breathing techniques. In addition, this study also supports that slow deep breathing can increase baroreceptor stimulation which is influenced by variations in blood pressure based on the response of breathing exercises carried out based on certain mechanisms, as well as autonomic and emotional modulation which is beneficial for pain and hypertension conditions.

Based on the journal Ublosakka-Jones et al., (2018) breathing exercises in the form of slow-loaded breathing with a relatively low inspiratory load from the load often used by other studies, it can be proven that it is quite efficient to reduce blood pressure levels. In addition, it can improve lung functions such as lung capacity, inspiratory muscle strength and duration of arm exercise. Inspiratory muscle strength training applied to slow loaded breathing has been shown to increase exercise capacity which may be because stronger inspiratory muscles are able to work at a lower percentage of the maximum force of contraction compared to before. This is especially relevant because during exercise, the intercostal and accessory muscles of respiration act to stabilize the arms and torso, limiting the expansion of the chest wall, thereby increasing the work of the inspiratory muscles.

In SDB breathing technique or slow deep breathing can increase the intrathoracic pressure, thereby increasing the oxygen content in the tissues. The chemoreceptor and baroreflex systems are sensors that detect changes in blood pressure, and the central

nervous system usually involves both of these sensors. The chemoreceptor system is very sensitive to changes in oxygen levels and plays a role in detecting changes in oxygen and blood pressure (Mughtar et al., 2022). Signals sent to the brain cause an increase in parasympathetic nerve activity and a decrease in sympathetic nerve activity, which causes a decrease in blood pressure. In addition, SDB can stimulate the release of endorphins. Endorphins have a direct effect on the autonomic nervous system, reducing the work of the sympathetic nervous system and increasing the work of the parasympathetic nervous system, causing a decrease in blood pressure (Nafi'ah et al., 2020).

This is in line with the research conducted by Izzati et al., (2021); Sumartini & Miranti (2019) at the Ubung Health Center, Central Lombok, stated that there was a significant decrease in blood pressure in the intervention group after being given treatment with a statistical test result (p value) of 0.000 which could be concluded that doing slow deep breathing therapy was able to reduce blood pressure in sufferers. hypertension. SDB can stimulate the release of endorphins. Endorphins also have a direct effect on the autonomic nervous system, which reduces the work of the sympathetic nervous system which causes a decrease in blood pressure, if slow deep breathing therapy is carried out repeatedly, over time the decrease in blood pressure will last longer, which is why slow deep breathing is performed regularly and regularly can lower blood pressure.

The results of the study stated that slow deep breathing can reduce blood pressure levels in the long term and has a role in reducing psychological pressure related to the cause of hypertension. It is known that the slow deep breathing technique in the form of purse lip breathing (PLB) can make the patient more comfortable and calm compared to other breathing techniques. In addition, this study also supports that slow deep breathing can increase baroreceptor stimulation which is influenced by variations in blood pressure based on the response of breathing exercises carried out based on certain mechanisms, as well as modulate autonomic and emotional benefits for pain and hypertension conditions (Gholamrezaei et al., 2021).

Slow deep breathing exercises can cause a decrease in sympathetic output so that it will cause a decrease in the production of the hormone epinephrine which is captured by alpha receptors so that it will affect the smooth muscle of the blood vessels so that vasodilation occurs, vasodilation in blood vessels will reduce peripheral resistance which also causes blood pressure to fall.

Breathing that is done deeply and slowly during slow deep breathing exercises will improve oxygen saturation and increase oxygen consumption in the body. An increase in the amount of oxygen in the body will stimulate the emergence of nitrite oxidation, nitrite oxidation will enter the brain and lungs which will make the body calmer, nitrite oxidation will also affect blood vessels to become more elastic, causing vasodilation in blood vessels so that blood pressure becomes down (Maulidina et al., 2019).

Deep Breathing Relaxation is controlling the breathing pattern which is done by adjusting the frequency of inspiration and expiration breathing and taking deep and slow breaths with a respiratory frequency of 6-10 times per minute, so as to increase the cardiopulmonary strain (Juwita & Efriza, 2018). This can cause stretching stimulation of the aortic arch and carotid sinus received by baroreceptors, because baroreceptors are very sensitive to arterial stretch which then conveys impulses or stimuli into the central nervous system in the medulla oblongata (Fitriyah et al., 2019). These impulses will inhibit sympathetic nerve stimulation so that it can reduce the tension in the sympathetic nerve center (Muslim & Arofiati, 2019). Afferent impulses from these baroreceptors will reach the heart and stimulate parasympathetic nerve activity and inhibit sympathetic nerves, so

that vasodilation of blood vessels will occur, heart rate and contraction power of the heart can decrease so that a decrease in blood pressure can occur (Yitno & Farida, 2021; Cahyanti, 2017).

Based on the results of research Kurniasari et al., (2020) argue that slow deep breathing if done regularly and correctly it can reduce the blood pressure of the elderly and the elderly can stop taking antihypertensive drugs to avoid possible side effects of drugs.

CONCLUSION

It is known that the age of respondents with hypertension in the Bengkulu City Health Center Work Area with an average age of 64 years, while the gender of the most respondents is female respondents and the average respondent has a family history of hypertension. Based on the results of the study, it is known that blood pressure before and after the slow deep breathing intervention was given a significant decrease

SUGGESTIONS

It is recommended for the Telaga Dewa Health Center in Bengkulu City to use slow deep breathing relaxation techniques and alternate nostril breathing to reduce blood pressure in patients with hypertension.

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