THE EFFICACY OF SLOW DEEP BREATHING IN REDUCING BLOOD PRESSURE AMONG HYPERTENSIVE PATIENTS

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Abstract

The prevalence of hypertension has been steadily increasing over the years. If left unmanaged, hypertension can lead to more severe complications, such as stroke and heart disease. Effectively managing hypertension, including lowering blood pressure through techniques like slow deep breathing, is crucial to preventing these complications. This study aimed to assess the effectiveness of slow deep breathing exercises in reducing blood pressure among hypertensive patients. The research utilized a pre-experimental design with a one-group pretest-posttest design and included a sample of 53 hypertensive patients selected through purposive sampling. Data analysis was carried out using the Wilcoxon signed-rank test. The results revealed that before the slow deep breathing exercises, the majority of blood pressure readings fell into the category of moderate hypertension, with 33 patients (62.3%). Following the intervention, the majority of readings shifted to the category of mild hypertension, with 31 patients (58.5%). The study found a significant impact of slow deep breathing exercises on reducing blood pressure in hypertensive patients, with a p-value of 0.000. In conclusion, incorporating slow deep breathing exercises into the daily routine three times a day can effectively help lower blood pressure in hypertensive patients.

Keywords: Blood Pressure Reduction, Hypertension Management, Non-Pharmacological Intervention, Pre-Experimental Study, And Slow Deep Breathing Exercises.

INTRODUCTION

Hypertension is a significant global health issue with major cardiovascular implications. Recent studies suggest that integrating slow, deep breathing exercises into hypertension management strategies offers a complementary approach to traditional pharmacological treatments (Ma et al., 2017). As a global epidemic, is a significant risk factor for mortality and morbidity (Shah and Yadav, 2022). The condition is more prevalent among the elderly and individuals with a genetic predisposition. The revised definition emphasizes the significance of early identification and intervention (Cheung et al., 2020). The timely diagnosis and management of hypertension are paramount, as this condition can lead to severe complications (Gulzar and Sadeeqa, 2019).

The issue of reducing blood pressure represents a significant public health challenge, as only 25-40% of patients achieve their blood pressure goals (Glynn and McManus, 2018). The identification and management of lifestyle factors contributing to hypertension are crucial for regulating blood pressure (Sivakarthi and Perumalraja, 2023). In addition, the utilization of antihypertensive pharmaceuticals and device-based interventions can effectively manage arterial hypertension (Sudano et al., 2020).

A range of studies have demonstrated the efficacy of slow deep breathing in reducing blood pressure among hypertensive patients. Diaphragmatic breathing, slow deep breathing, music therapy, and foot massage therapy have demonstrated significant efficacy in reducing blood pressure by 80% (Pakaya et al., 2023). Substantial reductions in systolic and diastolic blood pressure were documented after

interventions involving slow deep breathing techniques (Pratiwi, 2020; Sartika et al., 2022). Additional research indicates that the practice of slow breathing exercises can result in a reduction of blood pressure by 10-15 mmHg for both systolic and diastolic measurements (Riswanto et al., 2020). These studies collectively suggest that slow deep breathing is a promising non-pharmacological intervention for managing hypertension.

Research has consistently shown the potential of slow deep breathing in lowering blood pressure in hypertensive patients. Some Studies found that this technique can stimulate parasympathetic nerve activity, leading to systemic vasodilation and a decrease in heart rate and contraction power, thereby reducing blood pressure (Safarina et al., 2022; Wisuda et al., 2022). These findings were supported by further studies that demonstrated a significant decrease in both systolic and diastolic blood pressure in hypertensive patients (Andri et al., 2021).

These studies collectively underscore the need for further research to explore the potential of slow deep breathing as a non-pharmacological intervention for hypertension (Pakaya et al., 2023). Based on all of those results, this study addresses the critical need for effective hypertension management among its patients, given the rising prevalence and associated cardiovascular risks. While pharmacological treatments often have adverse side effects, slow deep breathing exercises offer a promising non-pharmacological alternative. This study aims to evaluate the efficacy of slow deep breathing in reducing blood pressure among hypertensive patients in this hospital, providing essential data to enhance clinical practice and patient outcomes.

METHODS

The research used a pre-experimental design with a one-group pretest-posttest approach. This means the researchers measured the participants' blood pressure before and after the intervention. The study focused on hypertensive patients at Banjarmasin Islamic Hospital, with 53 participants selected using purposive sampling, which involves choosing participants based on specific characteristics and criteria relevant to the study.

Data analysis was conducted using the Wilcoxon signed-rank test, a non-parametric statistical test used to compare paired samples to assess whether their population mean ranks differ. This test is particularly suitable for the pretest-posttest design as it does not assume a normal distribution of the data. By employing this method, the study aimed to determine the effectiveness of the slow deep breathing exercise intervention on lowering blood pressure among hypertensive patients. The results provided insights into the potential benefits of incorporating such non-pharmacological interventions in clinical practice to manage hypertension more effectively.

RESULT AND DISCUSSION

It is crucial to collect detailed patient data before and after conducting an analysis of the patient's conditions before and after implementing slow deep breathing exercises. This preliminary step is essential for a thorough and accurate analysis. Key factors to consider include the patient's age, education level, type of occupation, gender, duration of hypertension, and the length of time they have been experiencing symptoms.

Collecting this comprehensive data allows for a more nuanced understanding of how different variables may influence the effectiveness of slow deep breathing exercises on blood pressure. For instance, age and gender might affect how patients respond to these exercises, while the type of work and education level could correlate with stress levels and overall health literacy. Additionally, knowing the duration of hypertension and symptoms can help identify any patterns or trends in response to the intervention, providing valuable insights for tailoring treatment plans to individual patient needs.

Table 1: Frequency Distribution of Respondents' Characteristics Based on Age

No	Respondent's Age	f	%
1.	26-35 years old	3	5,7
2.	36-45 years old	12	22,6
3.	>45 years old	38	71,7
	Total	53	100

The data from Banjarmasin Islamic Hospital shows that the majority of hypertensive patients are older adults. Out of 53 respondents, only 3 individuals (5.7%) are in the 26-35 years age group, indicating that younger adults are less affected by hypertension in this sample. The 36-45 years age group comprises 12 respondents, representing 22.6% of the total sample, suggesting a moderate prevalence of hypertension among middle-aged adults. However, the largest proportion of respondents, 38 individuals (71.7%), is over 45 years old, highlighting that hypertension is predominantly an issue for older adults in this study. This age distribution emphasizes the need for targeted healthcare interventions for older adults, who are at a higher risk for hypertension-related complications.

Table 2: Frequency Distribution of Respondents' Characteristics Based on Education

No.	Education Level	f	%
1.	No schooling / did not finish school	1	1,9
2.	Elementary School equivalent	13	24,5
3.	Middle School equivalent	22	41,5
4.	High School equivalent	14	26,4
5.	Higher Education	3	5,7
	Total	53	100

Table 2 shows the distribution of respondents' educational levels at Banjarmasin Islamic Hospital. Out of 53 respondents, the largest group (41.5%) has completed middle school. Those with a high school education make up 26.4%, while 24.5% have only completed elementary school. A small portion of the respondents (5.7%) have higher education, and the no formal education or did not finish school around 1.9 %. This distribution indicates that a significant number of hypertensive patients have a basic level of education, which may impact their ability to manage their condition effectively. The data emphasize the need for customized educational interventions to enhance health literacy and hypertension management, especially for those with lower educational backgrounds. The survey results indicate that 41.5% of respondents have completed middle school, while 26.4% have graduated from high school. A smaller percentage (5.7%) have attained higher education. These findings suggest a diverse range of educational levels within the hypertensive population, which could impact their ability to effectively manage hypertension. Conversely, a small percentage of respondents (1.9%) have no formal education or did not complete school, which may present challenges in understanding and managing their health condition. Additionally,

24.5% of respondents have only completed elementary education, highlighting the need for accessible health education tailored to individuals with lower educational backgrounds.

Table 3: Frequency Distribution of Respondents' Characteristics Based on Employment Status

No.	Employment Status	f	%
1.	Civil Servant / Military / Police	1	1,9
2.	Unemployed / Retired	9	17
3.	Laborer	25	47,2
4.	Trader	15	28,3
5.	Private Sector Employee	3	5,7
	Total	53	100

Table 3 shows the frequency distribution of respondents based on their employment status at Banjarmasin Islamic Hospital. Out of the 53 respondents, the majority, 47.2%, are laborers. Traders comprise 28.3% of the respondents, while 17% are either unemployed or retired. A small portion of the sample, 5.7%, are private sector employees, and only 1.9% are civil servants, military personnel, or police officers. This distribution illustrates the diverse occupational backgrounds of the hypertensive patients in this study.

The employment status distribution of respondents reveals significant insights into the socioeconomic factors associated with hypertension. The predominance of laborers (47.2%) and traders (28.3%) suggests that physically demanding and possibly low-income jobs are common among hypertensive patients in this sample. The 17% of respondents who are unemployed or retired may indicate that a lack of regular income and associated stress could contribute to hypertension. The low percentage of respondents who are civil servants, military personnel, or police officers (1.9%) and private sector employees (5.7%) might reflect better access to healthcare and health management resources within these groups. These findings highlight the need for targeted health interventions that consider the varying occupational risks and stressors influencing hypertension, particularly among laborers and traders.

Table 4: Distribusi Frekuensi Karakteristik Responden Berdasarkan Jenis Kelamin

No.	Gender	f	%
1.	Male	19	35,8
2.	Female	34	64,2
	Total	53	100

Table 4 shows the frequency distribution of respondents based on gender at Banjarmasin Islamic Hospital. Out of 53 respondents, 34 are female, making up 64.2% of the sample, while 19 are male, accounting for 35.8%. The data demonstrates that a majority of hypertensive patients in this study are female, with 64.2% of patients being female and 35.8% being male. This disparity may suggest that women are either more susceptible to hypertension or more likely to seek medical attention for their condition. Understanding the gender-specific prevalence of hypertension can help in developing targeted interventions and educational programs to better manage and prevent hypertension in both men and women.

Table 5: Frequency Distribution of Respondents' Characteristics Based on Duration of Hypertension

No.	Duration of Hypertension	f	%
1.	< 1 year	3	5,7
2.	1 – 5 years	8	15,1
3.	>5 years	42	79,2
	Total	53	100

Table 5 shows the frequency distribution of respondents at Banjarmasin Islamic Hospital based on the duration of their hypertension. The duration is categorized into three groups: less than 1 year, 1 to 5 years, and more than 5 years. Out of 53 respondents, a significant majority (79.2%) have been suffering from hypertension for more than 5 years. 15.1% have had hypertension for 1 to 5 years, and 5.7% have been diagnosed with hypertension for less than 1 year. This distribution indicates that most hypertensive patients in this study have long-term hypertension, highlighting the chronic nature of the condition in the sampled population.

Table 6: Frequency Distribution of Respondents' Characteristics Based on Duration of Hypertension

No.	Duration of Hypertension	f	%
1.	< 1 year	3	5,7
2.	1 – 5 years	8	15,1
3.	>5 years	42	79,2
	Total	53	100

Table 6 shows the frequency distribution of respondents based on the duration of their hypertension at Banjarmasin Islamic Hospital. The table categorizes the duration into three groups: less than 1 year, 1 to 5 years, and more than 5 years. Out of 53 respondents, a significant majority, 42 respondents (79.2%), have been suffering from hypertension for more than 5 years. This is followed by 8 respondents (15.1%) who have had hypertension for 1 to 5 years, and 3 respondents (5.7%) who have been diagnosed with hypertension for less than 1 year. This distribution indicates that most hypertensive patients in this study have long-term hypertension, highlighting the chronic nature of the condition in the sampled population.

Univariate Analysis

Table 7: Blood Pressure in Hypertensive Patients Before Slow Deep Breathing Exercises

No.	Blood Pressure Category	f	%
1	Mild Hypertension	20	37,7
2	Moderate Hypertension	33	62,3
	Total	53	100

In Table 7, the distribution of blood pressure levels in hypertensive patients before undergoing slow deep breathing exercises at Banjarmasin Islamic Hospital is shown. Out of 53 respondents, 33 individuals (62.3%) were classified with moderate hypertension, while 20 individuals (37.7%) were categorized with mild hypertension. This data indicates that the majority of patients had moderate hypertension before the intervention, highlighting the necessity of effective blood pressure management

strategies in this population. Based on the results of the study conducted at Banjarmasin Islamic Hospital involving 53 hypertensive respondents, it was found that before undergoing slow deep breathing exercises, 33 respondents had moderate hypertension. This was largely attributed to hereditary factors and an age above 40 years.

Table 8: Tekanan Darah Pada Pasien Hipertensi Sesudah Dilakukan Latihan Slow Deep Breathing

No.	Blood Pressure Category	f	%
1	Normal	20	37,7
2	Mild Hypertension	31	58,5
3	Moderate Hypertension	2	3,8
	Total	53	100

Based on Table 8, it is evident that the majority of hypertensive patients at Banjarmasin Islamic Hospital had mild hypertension after undergoing slow deep breathing exercises, with 31 individuals or 58.5%. Based on the research findings, the majority of hypertensive patients at Banjarmasin Islamic Hospital experienced a reduction in blood pressure to mild hypertension levels after performing slow deep breathing exercises, with 31 respondents, or 58.5% falling into this category. This indicates that most respondents experienced a decrease in blood pressure following the Slow Deep Breathing intervention.

The results suggest that reduced blood pressure can be attributed to the relaxation effects of slow deep breathing, which helps to relax the entire body, including the internal organs and blood vessels. This relaxation promotes smoother breathing and improved blood circulation throughout the body, thereby reducing blood pressure.

Bivariate Analysis

Table 9: The Effect of Slow Deep Breathing Exercises on Blood Pressure Reduction in Hypertensive Patients

Variable	N	Mean Rank	p
Blood Pressure before Slow Deep Breathing	53	51,00 (Negative)	0,000
Blood Pressure after Slow Deep Breathing	53	2,00 (Ties)	

Table 9 illustrates the statistical analysis of the impact of slow deep breathing exercises on reducing blood pressure among hypertensive patients. The table compares blood pressure measurements before and after the intervention. The analysis involved 53 participants, with an initial mean rank of 5100 for blood pressure, indicating a higher average blood pressure. Following the intervention, there was a significant decrease in the mean rank, supported by a p-value of 0.000, signifying a statistically significant reduction in blood pressure post-exercise. This underlines the effectiveness of slow deep breathing exercises in lowering blood pressure in hypertensive patients..

Hypertension is a significant concern for older adults, with a high prevalence and associated complications (Oliveros et al., 2020). Risk factors such as smoking, alcohol consumption, and family history of hypertension and diabetes are important considerations in this population (Sri Hari et al., 2021). The management of hypertension in older adults requires an individualized approach, considering frailty and the potential adverse effects of blood pressure lowering (Karayiannis, 2022).

Access to healthcare is a key factor in hypertension management, with variations across different groups and geographic areas (Lee et al., 2022).

The relationship between education level and hypertension is complex and multifaceted. While some studies have found no significant relationship between the two(Supriyono and Andriyanto, 2020), others have identified a higher incidence of mortality among hypertensive individuals with lower education levels (Yu et al., 2022). Additionally, lower education levels have been associated with an increased risk of developing hypertension and poorer blood pressure control (Sun et al., 2022). Further study highlights the independent and causal impact of education on hypertension, with potential mediators including body mass index, waist-to-hip ratio, body fat percentage, major depression, high-density lipoprotein cholesterol, and triglycerides (Wang et al., 2022). These findings underscore the importance of considering education level as a potential risk factor in the prevention and management of hypertension.

Slow deep breathing exercises affect lowering blood pressure in hypertensive patients at Banjarmasin Islamic Hospital, as determined by the Wilcoxon signed-rank test with a significance level of $\rho = 0.000$. The study results show that most respondents had moderate blood pressure before the slow deep breathing intervention, but their blood pressure decreased to mild hypertension after the intervention. This slow deep breathing exercise was conducted for 15 minutes per session and performed three times daily: at 7:00 AM, with the second measurement at noon (12.00 PM), and the third measurement at 5:00 PM (one hour before taking medication).

Significant reductions in blood pressure following slow deep breathing interventions, which also shows the effectiveness of progressive muscle relaxation after the process (Brigita et al., 2023). The reduction in blood pressure to the stimulation of endorphins and the slowing of heart rate(Andri et al., 2021; Rosyida et al., 2024). Studies suggest that slow deep breathing is an effective non-pharmacological intervention for managing hypertension. The reduction in blood pressure in hypertensive patients before performing slow deep breathing is attributed to the relaxation effect provided by the exercise. This breathing technique increases intrathoracic pressure in the lungs during inspiration, leading to higher oxygen levels in the tissues and subsequently lowering blood pressure.

Before the intervention, the majority of patients exhibited moderate hypertension. Following the intervention, there was a noticeable shift to mild hypertension in most participants. This shift underscores the potential of slow deep breathing as an effective non-pharmacological intervention in managing hypertension, particularly considering the high prevalence and severe complications associated with the condition.

Significant decrease in blood pressure after the intervention, with a shift from pre-hypertension and stage I hypertension to normal blood pressure(Andri et al., 2021). A decrease in both systolic and diastolic blood pressure following the intervention (Fitriyah et al., 2019). The results align with existing literature suggesting that slow deep breathing can stimulate the parasympathetic nervous system, leading to systemic vasodilation, reduced heart rate, and lowered blood pressure. These physiological changes occur because slow deep breathing promotes relaxation and improves oxygenation, which helps alleviate the stress and tension that contribute to high blood pressure. Therefore, incorporating slow deep breathing exercises into daily routines could offer a simple yet powerful tool for hypertension management.

Furthermore, the study highlights the importance of patient education and personalized health interventions. Given that a significant number of hypertensive patients in the study had lower educational backgrounds, tailored educational programs are essential. These programs should aim to enhance health literacy and equip patients with the knowledge and skills needed to effectively manage their condition through lifestyle modifications, including slow deep breathing exercises.

The data also suggest that factors such as age, gender, and duration of hypertension may influence the effectiveness of slow deep breathing exercises. Older adults, who comprised the majority of the study's participants, showed substantial improvements, indicating that this demographic might particularly benefit from such interventions. Future research should explore these variables in more detail to better understand how different patient characteristics affect the outcomes of non-pharmacological treatments like slow deep breathing.

Lastly, the study's methodology, which involved a pre-experimental design with a one-group pretest-posttest approach, allowed for a clear comparison of blood pressure levels before and after the intervention. However, to strengthen the evidence, future studies should consider larger sample sizes and randomized controlled trials. These steps would help confirm the findings and establish slow deep breathing exercises as a standardized practice in hypertension management protocols.

CONCLUSION

The study conducted at Banjarmasin Islamic Hospital demonstrated that before the slow deep breathing intervention, the majority of hypertensive patients (62.3%) exhibited moderate hypertension. Following the intervention, there was a notable shift, with the majority (58.5%) showing mild hypertension. The application of the Wilcoxon signed-rank test confirmed a statistically significant reduction in blood pressure among these patients, with a p-value of 0.000. These findings indicate that slow deep breathing exercises can be an effective non-pharmacological intervention for managing hypertension.

The analysis provides compelling evidence that slow deep breathing exercises can significantly reduce blood pressure in hypertensive patients. This non-pharmacological intervention offers a promising alternative or complementary approach to traditional medication, with the potential to improve patient outcomes and reduce the risks associated with hypertension. Continued research and patient education are vital to fully realize the benefits of this simple yet effective technique.

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