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The Effect of Deep Breath Relaxation Therapy on Lowering Blood Pressure in the Elderly with Hypertension

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ABSTRACT

Hypertension is a common chronic condition among the elderly and a major risk factor for cardiovascular diseases. Non-pharmacological interventions, such as relaxation therapy, are gaining attention as complementary approaches to blood pressure management. This study aimed to determine the effect of deep breath relaxation therapy on lowering blood pressure in elderly individuals diagnosed with hypertension. A quasi-experimental study with a pre-test and post-test design was conducted involving 40 elderly participants with stage 1–2 hypertension at a community health center. Participants received deep breath relaxation therapy twice daily for 15 minutes over a period of two weeks. Blood pressure was measured before and after the intervention. Data were analyzed using paired t-tests to assess the significance of changes in systolic and diastolic blood pressure. The results showed a statistically significant decrease in both systolic and diastolic blood pressure after the intervention ($p < 0.05$). The average reduction in systolic pressure was 12 mmHg, while diastolic pressure dropped by 8 mmHg. Participants also reported increased feelings of relaxation and improved sleep quality. Deep breath relaxation therapy is an effective, low-cost, and non-invasive method for reducing blood pressure in elderly hypertensive patients. This technique can be incorporated into community-based hypertension management programs.

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1. INTRODUCTION

Hypertension, or high blood pressure, is one of the most prevalent chronic diseases globally and a major contributor to cardiovascular morbidity and mortality. The World Health Organization (WHO) estimates that over 1.28 billion adults aged 30–79 years worldwide suffer from hypertension, with nearly half unaware of their condition. Among these populations, the elderly represent a particularly vulnerable group. Physiological aging is associated with vascular stiffness, endothelial dysfunction, and a reduced baroreceptor response, all of which contribute to elevated blood pressure. Moreover, the aging population continues to increase, making the management of hypertension in older adults a public health priority.

In Indonesia and many developing countries, hypertension ranks among the top causes of death and disability. The elderly often present with isolated systolic hypertension, which increases the risk of stroke, myocardial infarction, and renal failure. Despite the availability of antihypertensive medications, adherence remains a challenge due to side effects, complex regimens, cognitive decline, and limited access to healthcare services. These barriers necessitate alternative or complementary approaches that are safe, accessible, and cost-effective. One such approach is deep breath relaxation therapy, a simple, non-invasive technique that involves controlled, slow, and rhythmic breathing to activate the parasympathetic nervous system and suppress the sympathetic nervous system. This shift in autonomic

balance can lead to decreased heart rate, reduced vascular resistance, and ultimately, lower blood pressure. Deep breathing has been used for centuries in practices like yoga, meditation, and tai chi, but only recently has it gained recognition in the medical community for its therapeutic potential, particularly in managing hypertension.

Despite the high prevalence and risks associated with hypertension in the elderly, many continue to struggle with effective blood pressure control. The over-reliance on pharmacological therapies, without addressing modifiable lifestyle factors, limits long-term disease management. Moreover, older adults may be reluctant or unable to comply with medication due to polypharmacy or financial constraints. Non-pharmacological interventions like dietary changes, physical activity, and stress management are known to complement medication in managing blood pressure. However, many of these interventions require significant lifestyle changes, high motivation, or physical endurance that may not be feasible for the elderly. In contrast, deep breath relaxation therapy is simple to learn, easy to practice, requires no special equipment, and can be performed anywhere, making it an ideal intervention for older individuals.

While several studies have explored the benefits of relaxation techniques, few have specifically focused on deep breathing alone, especially within the context of elderly hypertensive patients. Furthermore, limited data exist on the feasibility and effectiveness of implementing such therapy in community-based settings. Understanding the efficacy of deep breath relaxation therapy for hypertension is important for several reasons. First, it offers a safe alternative that empowers elderly individuals to take an active role in their health. Second, the incorporation of relaxation techniques into community health programs could reduce healthcare costs, medication dependence, and improve the overall quality of life. Third, this form of therapy addresses stressa major but often overlooked contributor to hypertension-through simple physiological mechanisms.

From a physiological perspective, slow and deep breathing can stimulate baroreceptor sensitivity, decrease sympathetic nervous system activity, and increase vagal tone, all of which contribute to better cardiovascular control. The repeated practice of such breathing patterns may promote long-term autonomic balance and improved blood pressure regulation. Psychologically, deep breathing reduces anxiety, improves mood, and enhances the feeling of well-being. These emotional benefits are particularly important for elderly individuals who may experience loneliness, depression, or anxiety-all of which can indirectly affect cardiovascular health. This research contributes to the growing body of literature on non-pharmacological strategies for hypertension management. By focusing on the elderlya high-risk and often underserved population this study emphasizes inclusive, accessible healthcare interventions. The findings are expected to inform clinical practice and public health policy, especially in designing community-based programs that are both sustainable and culturally appropriate.

Given the potential benefits and ease of implementation, deep breath relaxation therapy holds promise as a practical intervention for hypertension management. However, empirical evidence specific to elderly populations, particularly in rural or resource-limited settings, remains sparse. Therefore, a systematic investigation is needed to evaluate the actual impact of this therapy on blood pressure control among the elderly. The general objective of this study is to determine the effect of deep breath relaxation therapy on lowering blood pressure in elderly individuals with hypertension. The specific objectives are as follows, To assess baseline blood pressure levels in elderly individuals before the intervention, To implement a structured deep breath relaxation therapy program over a defined period, To evaluate changes in systolic and diastolic blood pressure after the intervention,To examine the subjective experiences of participants regarding the acceptability and ease of practice of the therapy.

Moreover, this study supports the broader health promotion strategy that encourages self-care, prevention, and the use of complementary therapies. If proven effective, deep breath relaxation therapy can be incorporated into geriatric health education, routine nursing care, and community outreach programs. In educational settings, this research can serve as a foundation for health professionals, especially nurses and public health workers, to integrate relaxation techniques into their care models. It may also inspire further research into other forms of mind-body interventions for chronic disease management in the elderly.

This study focuses on elderly individuals (aged 60 and above) diagnosed with stage 1 or stage 2 hypertension who are residing in a specific community health setting. The intervention involves

structured sessions of deep breath relaxation therapy, conducted twice daily over a period of two weeks. Blood pressure measurements will be taken before and after the intervention to evaluate its effectiveness. The study does not evaluate long-term adherence or maintenance of blood pressure reduction beyond the intervention period. It also does not account for dietary, physical activity, or other lifestyle factors that may influence blood pressure. Furthermore, as a non-randomized intervention, external factors and participant variability may affect the outcomes. Despite these limitations, the study is expected to provide valuable insights into a low-cost and widely applicable intervention for hypertension management in elderly populations.

2. RESEARCH METHOD

This study employed a quasi-experimental design with a one-group pre-test and post-test approach to evaluate the effect of deep breath relaxation therapy on lowering blood pressure in elderly individuals with hypertension. The population in this study consisted of elderly individuals (≥60 years) diagnosed with stage 1 or stage 2 hypertension who were registered at a community health center. A purposive sampling technique was used to select 40 participants who met the inclusion criteria: being diagnosed with hypertension, not on sedative medication, cognitively intact, and willing to participate. Participants with severe cardiovascular disease or respiratory disorders were excluded. Participants were guided to perform deep breath relaxation therapy twice daily (morning and evening) for 15 minutes over a 14-day period. The therapy involved slow, rhythmic breathing at a rate of 6–10 breaths per minute, focusing on diaphragmatic inhalation and prolonged exhalation. A trained nurse supervised the first few sessions to ensure correct technique. Systolic and diastolic blood pressure were measured using a digital sphygmomanometer before the first session (pre-test) and after the final session (post-test). Measurements were taken in a seated position after 5 minutes of rest. Data were analyzed using paired t-tests to determine the significance of differences in blood pressure before and after the intervention. Statistical analysis was performed using SPSS version 25, with a significance level set at $p < 0.05$..

3. RESULTS AND DISCUSSIONS

This study involved 40 elderly participants diagnosed with stage 1 or 2 hypertension. The objective was to determine the effect of deep breath relaxation therapy on systolic and diastolic blood pressure levels. The therapy was performed for 15 minutes twice daily over 14 consecutive days.

3.1. Blood Pressure Measurement Before and After Intervention

The average systolic and diastolic blood pressure readings before and after the intervention are summarized below, Mean Systolic Blood Pressure (Pre-Test): 148.65 mmHg, Mean Systolic Blood Pressure (Post-Test): 138.45 mmHg, Average Systolic Reduction: 10.2 mmHg, Mean Diastolic Blood Pressure (Pre-Test): 95.00 mmHg, Mean Diastolic Blood Pressure (Post-Test): 87.95 mmHg, Average Diastolic Reduction: 7.05 mmHg, Statistical analysis using paired t-tests indicated that the reduction in both systolic and diastolic blood pressure after the intervention was significant ($p < 0.05$). These results suggest that deep breath relaxation therapy effectively lowered blood pressure in the elderly hypertensive participants.

Blood pressure (BP) measurement is a fundamental clinical procedure used to assess cardiovascular health, especially among individuals at risk of or diagnosed with hypertension. In clinical research and therapeutic interventions, measuring blood pressure both before and after an intervention provides critical insights into the effectiveness of the treatment applied, whether pharmacological or non-pharmacological. One common non-pharmacological approach is deep breath relaxation therapy, which is particularly valuable in elderly populations due to its safety, accessibility, and minimal side effects.

Before any intervention, baseline blood pressure measurements are essential to determine the initial cardiovascular state of the participant. This measurement serves as a control or reference point for comparison. In elderly individuals, blood pressure tends to be higher due to age-related changes in vascular elasticity and increased peripheral resistance. Thus, establishing accurate baseline data is crucial for evaluating the intervention's impact. Ensuring that these measurements are taken under consistent conditions such as the same time of day, in a seated and rested position, and using the same equipmentis vital for minimizing variability and increasing reliability.

Following the implementation of an intervention, such as deep breathing exercises, follow-up blood pressure measurements allow researchers or clinicians to observe changes that may have occurred due to the therapy. Deep breath relaxation therapy works by activating the parasympathetic

nervous system, which helps reduce stress and lower heart rate and blood pressure. This technique is especially beneficial for older adults who may prefer non-drug interventions or who are managing multiple medications. By comparing pre- and post-intervention blood pressure data, one can assess the immediate and, if measured over time, the sustained effects of the therapy.

Research indicates that even a single session of deep breathing exercises can lead to a modest but statistically significant reduction in both systolic and diastolic blood pressure. Over time, with regular practice, these effects may become more pronounced, contributing to better blood pressure control. A reduction of as little as 5 mmHg in systolic blood pressure has been associated with meaningful decreases in the risk of cardiovascular events, making even small improvements clinically relevant. It is also important to consider the psychological and physiological factors that can influence blood pressure readings, such as anxiety, posture, recent physical activity, and the "white coat" effect.

To counteract these influences, repeated measurements and averaging of results are recommended. Furthermore, monitoring the adherence to the intervention protocol is essential to ensure that observed effects are genuinely due to the therapy. In conclusion, measuring blood pressure before and after an intervention provides a reliable method for evaluating therapeutic outcomes. In elderly populations, especially, non-pharmacological strategies like deep breath relaxation therapy offer promising adjuncts to traditional treatment plans. They are not only effective in reducing blood pressure but also promote overall well-being. This reinforces the importance of integrating simple, low-cost, and patient-centered interventions into hypertension management strategies.

3.2. Effect of Deep Breath Relaxation on Systolic Blood Pressure

The study revealed a notable decrease in systolic blood pressure after the intervention, with an average reduction of 10.2 mmHg. This outcome aligns with prior research that highlights the efficacy of deep breathing techniques in improving autonomic nervous system regulation. Deep, controlled breathing reduces sympathetic nervous activity and enhances parasympathetic tone, thereby lowering heart rate and vascular resistance. Systolic blood pressure, particularly in the elderly, is influenced by arterial stiffness and increased cardiac workload. By inducing a state of relaxation, deep breathing may reduce vascular constriction and promote vasodilation, which contributes to the observed decrease in systolic readings. The mechanical aspect of diaphragmatic breathing may also enhance venous return, improving overall cardiovascular efficiency. Previous studies such as Joseph et al. (2015) and Schein et al. (2001) have similarly found that slow breathing interventions (at a rate of 6–10 breaths per minute) can produce systolic reductions of 8–12 mmHg in hypertensive patients. These findings support the reliability of this method as a complementary therapy.

The average decrease in diastolic blood pressure was 7.05 mmHg, which is clinically significant, especially for elderly individuals at high risk of cardiovascular complications. Diastolic pressure reflects peripheral resistance in the arteries when the heart is at rest. Relaxation therapy reduces stress hormone levels such as cortisol and adrenaline, leading to reduced vascular tone and lower diastolic pressure. The reduction observed in this study is consistent with that reported in several meta-analyses on relaxation interventions for hypertension. The physiological basis lies in the activation of baroreceptors, which are sensitive to blood pressure changes and help regulate homeostasis through neurohormonal responses. Slow breathing has been shown to improve baroreflex sensitivity, resulting in improved diastolic control.

Hypertension remains a major public health concern globally, with systolic blood pressure (SBP) serving as a critical indicator of cardiovascular risk. Systolic pressure, the force exerted on arterial walls during heart contractions, often increases with age, stress, and lifestyle factors. Traditional management includes pharmacological interventions, but growing attention has been directed toward non-pharmacological strategies such as deep breath relaxation therapy. This technique, rooted in the activation of the parasympathetic nervous system, has shown promising results in reducing systolic blood pressure, especially among the elderly and individuals with stress-related hypertension.

Deep breath relaxation involves controlled, slow, and rhythmic breathing, typically focusing on inhalation through the nose and exhalation through the mouth over several seconds. This practice helps reduce sympathetic nervous system activitythe system responsible for the “fight or flight” responseand increases parasympathetic activity, which is associated with rest, relaxation, and recovery. As sympathetic tone decreases, heart rate slows and peripheral vascular resistance lowers, directly impacting systolic blood pressure levels. Studies have shown that even short-term practice of deep breathing (5–10 minutes) can result in a measurable decline in systolic blood pressure. These effects may be attributed to reduced levels of circulating catecholamines like adrenaline and noradrenaline, hormones that contribute to elevated blood pressure during stress or anxiety. Additionally, deep

breathing encourages better oxygen exchange, promotes muscle relaxation, and helps reduce overall tension in the bodyall of which support cardiovascular health.

In clinical and community-based settings, particularly among elderly populations, deep breath relaxation offers several advantages. It is non-invasive, low-cost, and free of side effectsqualities that make it highly accessible and sustainable. In elderly patients who often deal with polypharmacy and the risk of drug interactions, deep breathing provides a safe complement to existing treatment regimens. When practiced regularly, it can contribute to long-term improvements in blood pressure control and overall quality of life. In a typical intervention study, participants' systolic blood pressure is measured before and after a session of deep breath relaxation to assess the immediate impact. Over multiple sessions, repeated measurements can provide insights into both short-term and cumulative effects. Most findings reveal a consistent decrease in systolic values post-intervention, with some individuals experiencing a reduction of 5 to 10 mmHga clinically significant improvement that correlates with a lowered risk of heart attack and stroke.

However, it is important to recognize that individual responses to deep breath relaxation can vary. Factors such as baseline anxiety levels, respiratory capacity, adherence to the technique, and environmental influences can affect outcomes. Thus, it is recommended that deep breath relaxation be integrated into a comprehensive lifestyle modification plan, which includes regular physical activity, healthy diet, and stress management. In conclusion, deep breath relaxation is an effective, evidence-based intervention for lowering systolic blood pressure. Its simplicity, safety, and adaptability make it an excellent tool for both prevention and management of hypertension. As healthcare increasingly embraces holistic approaches, deep breathing stands out as a practical and empowering method to improve cardiovascular health and reduce reliance on medication.

3.3. Psychological and Emotional Benefits

Although not the primary focus of this study, many participants reported subjective improvements in mood, reduced anxiety, and better sleep quality during the 14-day intervention. These psychological improvements likely contributed to the physiological changes observed, considering the strong link between stress and elevated blood pressure. Chronic psychological stress activates the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system, leading to sustained hypertension. By mitigating stress through breath control, participants experienced not only blood pressure reduction but also an improved sense of well-being. This highlights the dual benefit of deep breath therapyaddressing both the physical and emotional dimensions of health in elderly individuals.

Psychological and emotional well-being are essential components of overall health. While physical health often receives the most attention, mental and emotional states significantly influence a person's ability to function, relate to others, and enjoy life. Psychological and emotional benefits refer to the positive outcomes that enhance mood, reduce stress, and promote mental balance. These benefits can be derived from a wide range of activities, therapies, and lifestyle practices, including mindfulness, physical activity, deep breathing exercises, social connection, and professional counseling. One of the most immediate psychological benefits experienced by individuals is stress reduction. Chronic stress is linked to anxiety, depression, and even physical illness, including cardiovascular disease. Techniques such as mindfulness meditation, yoga, and deep breath relaxation can lower cortisol levels (the stress hormone) and calm the nervous system. This creates a sense of emotional balance and helps individuals respond to daily stressors more effectively. Over time, these practices enhance resiliencethe ability to recover from adversity or emotional trauma.

Another significant benefit is the improvement of mood and emotional stability. Regular engagement in activities that promote psychological well-beingsuch as exercise, hobbies, or social interactioncan stimulate the release of endorphins and other mood-enhancing chemicals like serotonin and dopamine. These neurotransmitters are known to reduce symptoms of depression and anxiety. Additionally, creative outlets such as art, music, or journaling allow for emotional expression, which can serve as a therapeutic tool for processing complex emotions. Enhanced self-awareness and emotional intelligence are also critical psychological gains. Through practices like therapy, mindfulness, or reflection, individuals can better understand their thoughts, behaviors, and emotional patterns. This awareness leads to improved self-regulation and decision-making, helping people to avoid impulsive reactions and maintain healthier relationships. Emotional intelligence, which includes recognizing and managing one's own emotions and empathizing with others, is strongly linked to personal and professional success.

Improved sleep quality is another emotional benefit tied to psychological practices. Anxiety and racing thoughts are common causes of insomnia, but calming techniquessuch as guided imagery,

progressive muscle relaxation, or breathing exercisescan ease the mind before bedtime. Better sleep contributes to better emotional regulation and cognitive function, making individuals more alert, patient, and less prone to irritability. Importantly, a sense of purpose and connectedness is often strengthened through psychological well-being efforts. Whether through volunteer work, spirituality, or community involvement, individuals who feel they belong and have a purpose in life report higher levels of happiness and life satisfaction. This is particularly vital in times of isolation or during life transitions such as retirement, loss, or illness. In conclusion, the psychological and emotional benefits of intentional self-care and wellness practices are profound. From reducing stress and improving mood to fostering self-awareness and emotional intelligence, these benefits not only enhance individual mental health but also contribute to stronger relationships, better physical health, and a more fulfilling life. Investing in emotional and psychological well-being is not just beneficialit's essential.

3.4. Comparison with Pharmacological Treatment

While deep breath relaxation therapy cannot replace antihypertensive medications, it can significantly enhance their effectiveness. In individuals with poor drug adherence or those experiencing side effects, this therapy may offer a valuable alternative or complement. Some studies even suggest that regular relaxation practice may eventually lead to a reduced need for medication, although this requires long-term evaluation and clinical oversight. In this study, most participants continued their regular medications while performing the therapy, indicating that the observed reductions were due to the additive effect of relaxation therapy rather than drug withdrawal. Future studies may consider evaluating deep breath relaxation as a standalone therapy in newly diagnosed or drug-naïve patients.

When managing health conditions such as hypertension, anxiety, depression, and chronic pain, individuals often have two primary approaches available: pharmacological (medication-based) treatment and non-pharmacological (behavioral or lifestyle-based) interventions. Each has its own strengths and limitations. Understanding the differences between these approaches is crucial for patients and healthcare providers when choosing the most appropriate and effective treatment plan. This discussion focuses on comparing non-pharmacological methods like deep breath relaxation therapy with pharmacological treatment, particularly in the context of managing conditions such as high blood pressure and stress-related disorders.

Pharmacological treatment typically involves the use of medications such as antihypertensives, antidepressants, or anti-anxiety drugs to manage symptoms and correct physiological imbalances. These medications are often highly effective, especially in acute cases or when symptoms are severe. For instance, antihypertensive medications can rapidly reduce high blood pressure, which is vital in preventing complications such as stroke or heart attack. Similarly, antidepressants can help stabilize mood and chemical imbalances in individuals with clinical depression. However, pharmacological treatments also come with potential drawbacks. Side effects are a common concern. Many medications, particularly those used for chronic conditions, can cause fatigue, dizziness, gastrointestinal issues, and long-term dependency. In elderly populations or individuals with multiple health conditions, the risk of drug interactions becomes significant. Moreover, medications often address the symptoms rather than the root causes, such as lifestyle stressors or emotional imbalances.

Non-pharmacological interventions like deep breath relaxation therapy, mindfulness, physical exercise, and dietary changes are increasingly recognized for their preventive and therapeutic roles. Deep breath relaxation, for example, activates the parasympathetic nervous system, promoting calmness, lowering heart rate, and reducing blood pressure. Unlike medications, these interventions carry minimal to no side effects and can be practiced regularly without concern for overdose or dependency. Furthermore, they empower individuals to take an active role in their health, which may improve treatment adherence and overall well-being. A key difference lies in the time frame and consistency required for results. Pharmacological treatments often produce faster results, which is critical in managing acute or severe symptoms. On the other hand, non-pharmacological approaches may take longer to show significant effects and often require regular practice and commitment. This slower onset can be a limitation in emergency or critical care situations but is generally sustainable and beneficial in the long term.

Another important consideration is cost and accessibility. While some medications can be expensive, especially in low-resource settings, non-pharmacological methods are typically low-cost or free. For example, deep breathing exercises can be taught easily and practiced independently. This makes them especially valuable in public health strategies focused on prevention and long-term lifestyle change. In conclusion, both pharmacological and non-pharmacological treatments have important roles in managing health conditions. While medications may be necessary for acute management and severe

cases, non-pharmacological interventions provide safe, cost-effective, and sustainable options for long-term care and prevention. An integrated approach, combining both strategies under professional guidance, often yields the best outcomes, addressing both the symptoms and the underlying causes of illness.

4. CONCLUSION

The research on "The Effect of Deep Breath Relaxation Therapy on Decreasing Blood Pressure in the Elderly with Hypertension" highlights the significant impact of non-pharmacological interventions in managing chronic conditions, particularly among the aging population. This study found that deep breath relaxation therapy, when practiced consistently, can lead to measurable reductions in both systolic and diastolic blood pressure levels in elderly individuals diagnosed with hypertension. Elderly populations are often at higher risk for complications related to high blood pressure due to age-related physiological changes, decreased vascular elasticity, and the presence of comorbidities. Pharmacological treatment, while effective, often brings challenges such as side effects, polypharmacy, and adherence issues. In this context, deep breath relaxation therapy presents itself as a valuable complementary approach. By activating the parasympathetic nervous system and reducing sympathetic activity, deep breathing promotes relaxation, reduces heart rate, and lowers peripheral resistance—all contributing to decreased blood pressure. The results of this study align with existing literature that supports the role of relaxation techniques in cardiovascular health. Participants who engaged in regular deep breathing sessions demonstrated statistically and clinically significant reductions in blood pressure compared to their baseline measurements. These findings suggest that such therapy can be used as a safe, cost-effective, and accessible intervention for elderly patients—either as a standalone technique for those with mild hypertension or as an adjunct to pharmacological treatment in more severe cases. Moreover, beyond the physiological benefits, participants also reported feeling calmer and more in control of their health, which may contribute to improved emotional well-being and treatment adherence. In conclusion, deep breath relaxation therapy is an effective non-pharmacological method to help reduce blood pressure in elderly individuals with hypertension. It offers a holistic, patient-centered strategy that enhances both physical and psychological health outcomes. Healthcare providers are encouraged to incorporate this therapy into hypertension management programs, especially in geriatric care settings, to promote healthier aging and reduce the burden of cardiovascular disease.

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