

Research Article

Progressive Muscle Relaxation Reduces Blood Pressure in Older Adults with Hypertension

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ABSTRACT

Introduction: The physiological aging process in older adults may lead to various disturbances in the cardiovascular system, including hypertension. One approach to controlling blood pressure is through progressive muscle relaxation therapy. This study aimed to investigate the effect of progressive muscle relaxation on blood pressure in older adults with hypertension at the Social Service Unit for Older Adults in Blitar and Nursing Home in Tulungagung in 2023. **Methods:** This study employed a quasi-experimental method with a one-group pre-post test design. The population consisted of all older adults with hypertension at the research site in 2023, totaling 80 individuals. Purposive sampling was used to recruit the samples of 39 participants. Observation sheets and a sphygmomanometer were utilized for data collection. **Result:** The results showed that before receiving progressive muscle relaxation therapy, most participants had stage-1 hypertension, with 23 participants (59%), and stage-2 hypertension, with 16 participants (41%). After the therapy, the majority of participants were included in the stage-1 hypertension category, with 26 participants (67%), and prehypertension, with 5 participants (13%). The Wilcoxon test showed a significant value of $p = 0.000 < \alpha = (0.05)$, indicating the effect of progressive muscle relaxation therapy on blood pressure. This means that regular therapy sessions may lead to better blood pressure control in hypertensive patients. **Conclusion:** Progressive muscle relaxation therapy can increase endorphin hormone production and reduce stress levels, thereby stabilizing blood pressure.

Keywords: Hypertension, Older adult, Progressive muscle relaxation

Introduction

Older adults are individuals aged 60 years and above who typically experience a decline in their immune function, leading to health issues. These individuals undergo changes in the cardiovascular system [1], which is one of the primary factors contributing to the onset of other diseases, such as hypertension [2]. Certain

older adults undergo various changes, including physiological, biological, social, and even spiritual aspects. One example of physical decline in older adults is susceptibility to diseases, especially degenerative ones. Generally, degenerative diseases experienced by older adults include hypertension [3].

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Hypertension occurs due to stiffness in the arterial blood vessels, resulting in increased blood pressure[4]. It is a disorder of the blood vessels that hinders the circulation of nutrients and oxygen carried by blood to the body tissues, causing the heart to work harder to meet these needs. If left untreated for an extended period, symptoms of high blood pressure, known as hypertension, may develop [5]. Currently, hypertension remains a significant risk factor for stroke, heart failure, and coronary heart disease [6].

Systolic blood pressure in older adults often increases due to atherosclerosis, making the large arteries more compliant [7]. Hypertension in older adults occurs when the flexibility and elasticity of blood vessels become hardened and rigid, leading to the inability of blood vessels to distribute the required blood flow to every organ in the body [8]. The impact of hypertension is diverse, including complications such as brain disorders, cardiovascular system disorders, eye problems, and kidney issues if not properly managed. In the long term, hypertension can lead to heart disease and even stroke [9].

In East Java, the number of hypertensive patients in 2018 reached 375,127 individuals [10]. Meanwhile, according to the Health Profile of Malang District in 2018, the number of primary hypertensive patients in this region was 58,046 individuals [11]. Various factors influence hypertension in individuals, including age, gender, education, genetics/family history, unhealthy diet, irregular physical activity, obesity, alcohol consumption, smoking habits, stress, coffee consumption, and irregular blood pressure checks. Blood pressure tends to increase with age [12].

Preventive measures for hypertensive patients involve lowering blood pressure through pharmacological and non-pharmacological methods [13]. Pharmacological therapy entails administering antihypertensive drugs, while non-pharmacological treatment includes quitting habits such as smoking, reducing excess weight, engaging in physical activity, reducing salt intake in meals, consuming plenty of fruits and vegetables, and reducing fat intake [14]. Non-pharmacological therapy for hypertensive patients includes complementary therapy

using natural ingredients, such as progressive muscle relaxation, meditation, aromatherapy, herbal therapy, and nutritional therapy. Relaxation therapy enables the body to control discomfort or pain [15].

Progressive muscle relaxation therapy reduces peripheral resistance and increases blood vessel elasticity. This allows muscles and blood circulation to become more relaxed in taking up and distributing oxygen. Progressive muscle relaxation can act as a vasodilator, widening blood vessels and directly lowering blood pressure [16]. Accordingly, this study was conducted to investigate the effect of progressive muscle relaxation therapy on reducing blood pressure in older adults with hypertension.

Methods

Study design

This study employed a quasi-experimental method with a one-group pre-posttest design. It was conducted at the Social Service Unit for Older Adults in Blitar and the Nursing Home in Tulungagung in February 2023.

Sampling

Purposive sampling was utilized to recruit the participants, totaling 39 individuals, calculated using the Slovin formula. Inclusion criteria included older adults aged 60 years and above with hypertension who were willing to participate and cooperative. Meanwhile, exclusion criteria included older adults with total bed rest and those with high-risk illnesses.

Intervention

Researchers collected data in two stages. First, a pre-test is carried out by measuring the blood pressure of older adults before the intervention is given. Next, intervention is given, namely older adults are taught progressive muscle relaxation techniques by alternately tensing and relaxing the muscles. The intervention was carried out for one week with a duration of one intervention of 20-30 minutes. After the sixth day of intervention is given, a post-test will be carried out by measuring older adults' blood pressure after they are given rest for 30 minutes after carrying out progressive muscle relaxation.

Data collection

The instruments used for data collection included progressive muscle relaxation technique sheets, observation sheets, and a sphygmomanometer. Data collection involved conducting interviews with the participants to gather demographic information, followed by administering a pretest and providing guidance on progressive muscle relaxation therapy. Subsequently, progressive muscle relaxation therapy treatment was administered the next day, and this process continued for six days. On the final day, a posttest was administered to the participants. This study utilized primary data, specifically the blood pressure of older adults with hypertension before and after receiving progressive muscle relaxation therapy.

Data analysis

In the study, the univariate analysis consists of age and sex. Data analysis involved the

Wilcoxon signed rank test to compare pre-test and post-test results.

Ethical considerations

This research has obtained ethical approval with the number 57/K-STIKesHAH/EC/V/2024. The risks and benefits of this study were explained to the participants. Researchers have also provided informed consent. Prospective respondents have the right to refuse or withdraw if they are not willing to be involved in this research.

Result and Discussion

The general characteristics of the participants in this study included gender and age. The majority of participants were aged 66-70, constituting 17 participants. Figure 1 illustrates the characteristics of participants based on age.

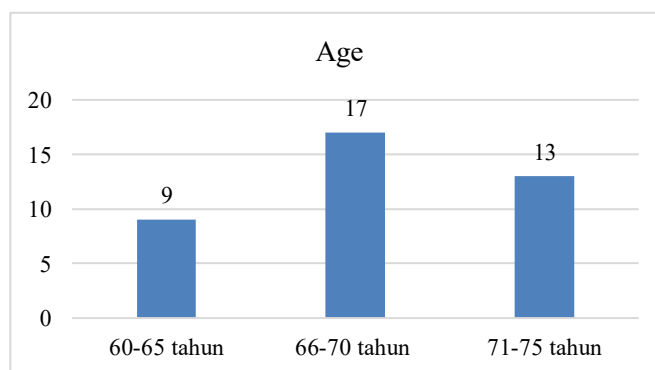


Figure 1. Characteristics of Participants Based on Age

In this study, female participants outnumbered male participants. There were 20 female participants and 19 male participants. Figure 2

illustrates the participants' characteristics based on gender.

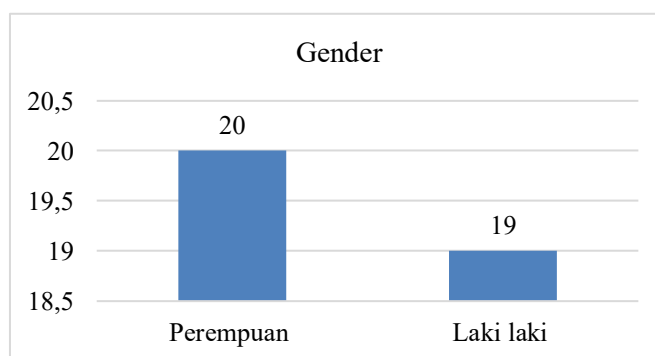


Figure 2. Characteristics of Participants Based on Gender

In this study, the participants underwent blood pressure measurement before receiving the intervention, followed by six progressive muscle relaxation therapy sessions and a final

blood pressure check afterward. Table 1 displays the participants' blood pressure levels before and after receiving progressive muscle relaxation therapy.

Table 1. Blood Pressure Levels Before and After Progressive Muscle Relaxation Therapy (N=39)

Blood Pressure Levels	Group			
	Pre		Post	
	F	%	F	%
Prehypertension	0	0	5	13
Stage 1 hypertension	23	59	26	67
Stage 2 hypertension	16	41	8	20
$p = 0.000$				

Blood pressure is the pressure exerted on the walls of the arterial blood vessels when the heart pumps blood throughout the body [17]. The higher the blood pressure, the harder the heart has to work. A normal blood pressure value for individuals with average height, weight, activity level, and overall health is 120/80 mmHg. Hypertension occurs when the systolic and diastolic blood pressure exceeds 140 mmHg and 90 mmHg, respectively [18].

According to Table 1, the majority of participants experienced stage 1 hypertension, with 23 participants (59%). Meanwhile, 16 participants (41%) were found to have stage 2 hypertension.

The result of this study showed that the majority of participants had stage 1 hypertension, with almost half experiencing stage 2 hypertension. According to the researchers, most respondents are only familiar with effective hypertension prevention methods through pharmacological therapy. However, physical activity, particularly progressive muscle relaxation therapy, can induce a reduction in heart-pumping activity and the dilation of arterial blood vessels, leading to increased fluid exiting the bloodstream [19]. This phenomenon occurs because the heartbeats of hypertensive patients work faster to pump blood due to increased blood volume [8].

According to Figure 1, it is evident that among the 9 participants aged 60-65 years, the majority experienced stage 2 hypertension, with 6 participants (67%). Conversely, among the 17 participants aged 66-70 years, the

majority had stage 1 hypertension, accounting for 10 participants (59%).

Age stands out as a significant factor inherent in hypertensive patients. As individuals age, there is a decline in physiological function and a decrease in the body's resilience, making them susceptible to diseases, including hypertension [20]. Age contributes to the onset of hypertension because, with advancing age, the risk of hypertension increases. Furthermore, as individuals age, their blood pressure tends to rise due to various factors, such as natural changes in the heart and blood vessels [21].

The results of this study indicate that participants aged 60-65 years mostly experienced stage 2 hypertension, while those aged 66-70 years predominantly had stage 1 hypertension. According to the researcher, blood pressure tends to increase with age. In older adults, this rise in blood pressure is associated with a decrease in blood vessel elasticity.

Furthermore, according to Table 1, it was observed that among the 19 male participants, the majority experienced stage 2 hypertension, with 11 participants (58%). The prevalence of hypertension in men is comparable to that in women. In premenopausal women, there is a decline in estrogen hormones, which are responsible for safeguarding blood vessels from damage [22]. This process continues as the quantity of estrogen hormone naturally alters with age. Consequently, women who have entered menopause are at a higher risk of hypertension [23]. Men are more prone to hypertension due to lifestyle habits such as smoking,

emotional instability, and alcohol consumption [24].

Moreover, according to the findings in Table 1, the majority of participants were in the stage 1 hypertension category, comprising 26 participants (67%) after undergoing progressive muscle relaxation therapy. Additionally, 5 participants (13%) were classified as having prehypertension, while 8 participants (20%) were categorized as having stage 2 hypertension.

A non-pharmacological approach serves as the initial treatment before resorting to blood pressure medication and should be considered by individuals undergoing treatment. One such approach is the progressive muscle relaxation therapy [25]. This therapy aims to reduce tension or anxiety by training patients to relax their muscles [26].

Based on the findings of this study, there was an increase in participants classified in the stage 1 hypertension category after undergoing progressive muscle relaxation therapy, accompanied by a decrease in the stage 2 hypertension category ($p = 0.000$). According to a study conducted by Utami and Nasution, the implementation of progressive muscle relaxation therapy has been shown to alleviate anxiety, stress, muscle tension, and sleep difficulties [27]. When the body and mind are relaxed, the tension that often leads to muscle tightness is alleviated [28,29].

Progressive muscle relaxation therapy is a relaxation technique that can alleviate the intensity of back pain by facilitating movements that tighten and loosen muscles [30]. Furthermore, progressive muscle relaxation exercises have proven effective in reducing sleep latency, prolonging sleep duration, enhancing sleep quality, minimizing sleep disruptions, and reducing daytime activity disturbances, thereby improving overall satisfaction with sleep quality [31].

Limitations

This research has limitations regarding other factors that influence blood pressure, such as eating habits, environment, and lifestyle, which should be controlled in this research.

Implications

The success of this research could also pave the way for the development of more specific clinical guidelines. These guidelines can serve as a foundation for healthcare practitioners to provide more personalized care, considering progressive muscle relaxation interventions as an important element in patient care strategies. The practical implications of this research are not limited to the clinical setting. Patients themselves can benefit from increased awareness of the importance of progressive muscle relaxation. Therefore, it is hoped that patients will be actively involved in their care.

Overall, this research not only provides new insights into the care of elderly patients with hypertension but also opens up opportunities for further improvements in health aspects. Through collaboration between health practitioners, researchers, and patients, the results of this research can determine the future of more effective and comprehensive care for elderly individuals who have experienced hypertension.

Conclusion

Based on the study's findings, it was concluded that there was a reduction in hypertension indicators both before and after participants received progressive muscle relaxation therapy. The proportion of participants with stage 2 hypertension decreased from 41% to 20%, while those with stage 1 hypertension increased from 59% to 67%, and prehypertension participants increased from 0% to 5%. These results suggest that progressive muscle relaxation therapy can impact blood pressure in older adults with hypertension.

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