

**THE EFFECT OF PROGRESSIVE MUSCLE RELAXATION
TECHNIQUES ON BLOOD PRESSURE OF ELDERLY
HYPERTENSION AT THE UPT TRESNA WERDHA KHUSNUL
KHOTIMAH SOCIAL ASSOCIATION IN PEKANBARU CITY**
**TITLE
OF THE ARTICLE**

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Abstract

Background: Hypertension is an increase in blood pressure above normal, commonly occurring in the elderly due to declining organ function. If left untreated, it can lead to serious complications such as heart disease and stroke. In addition to pharmacological therapy, progressive muscle relaxation is a non-pharmacological method that helps lower blood pressure by gradually relaxing the muscles. **Methods:** This study used a quasi-experimental design with a One Group Pretest-Posttest Design. The sample consisted of 19 elderly individuals with hypertension, selected using total sampling. Blood pressure was measured using a digital sphygmomanometer (Omicron brand), and the intervention involved 14 progressive muscle relaxation movements performed for five consecutive days. **Results:** The mean systolic and diastolic blood pressure before the intervention was 152.37/96.21 mmHg, which decreased to 150.32/94.26 mmHg after the intervention. Statistical analysis using the Paired t-test showed a pretest p-value of 0.001 and a posttest p-value of 0.002, indicating a significant difference before and after the intervention. **Conclusion:** Progressive muscle relaxation is expected to serve as an alternative method for managing hypertension in the elderly, particularly in social care settings.

Keywords: Progressive muscle relaxation; hypertension; elderly

INTRODUCTION

Individuals living to an old age enter the stage known as elderly (lansia), which the World Health Organization (WHO) defines as those aged 60 years [64]. This phase is marked by biological, economic, and social changes, as well as a decline in physical strength that increases vulnerability to various illnesses [7]. The global elderly population is growing rapidly, estimated to increase from 1 billion in 2020 (13.5% of the total population) to around 2.1 billion by 2050 (>21% of the global population) [64]. In Indonesia, the percentage of the elderly population reached 11.75% in 2023 [23]. Specifically in Pekanbaru, the elderly account for 7% of the total population, approximately 71,978 people [59].

Elderly individuals often struggle to perform daily activities independently and become reliant on others [24]. Health issues in this group are linked to various physical changes, including continuous aging, characterized by a decrease in physical strength, and increased susceptibility to diseases [7]. Common physiological changes include reduced sleep time, diminished physical endurance, and elevated blood pressure [54]. Consequently, they are more vulnerable to various diseases, particularly hypertension [66].

Hypertension is a condition characterized by high blood pressure, defined as a systolic blood pressure (SBP) of ≥ 140 mmHg or a diastolic blood pressure (DBP) of 90 mmHg [10]. The higher the blood pressure, the greater the risk of myocardial infarction, heart failure,

stroke, or kidney disease [10]. Globally, hypertension prevalence is currently 22% of the total population [42]. In Indonesia, hypertension is the third leading cause of death after stroke and tuberculosis [12]. National data reports a prevalence of 30.8 % based on measurement results [23]. In Riau Province, the prevalence in 2022 was 32.5 % [14].

Risk factors for hypertension include unmodifiable aspects (age, gender, family history, genetics) and modifiable ones (smoking, obesity, lack of physical activity, and stress) [40]. Hypertension is often called the *silent killer* because most patients may die without experiencing specific symptoms, although signs like dizziness, nosebleeds, and ringing in the ears can occur [47]. If left uncontrolled, hypertension can lead to fatal complications affecting the cardiovascular, nervous, and renal systems [41].

Hypertension management includes pharmacological (antihypertensive drugs) and non-pharmacological treatments [52]. Non-pharmacological therapy is crucial to avoid side effects and the high costs associated with long-term medication, which can lead to Drug Related Problems (DRPs) [6]. Non-pharmacological methods include restricting salt intake, specialized diets, routine exercise, and relaxation therapies [52].

Progressive Muscle Relaxation (PMR) is a complementary therapy method, originally developed by Edmund Jacobson [25], aimed at reducing both physical and psychological stress [36]. The technique involves the gradual tightening and releasing of muscle groups, creating an overall relaxing effect [36]. PMR promotes a relaxed state by reducing sympathetic nervous system activity and enhancing parasympathetic activity. It also functions as a vasodilator, which directly helps lower blood pressure [11]. It is an economical, side-effect-free, and easy-to-perform method [11]. Prior studies have confirmed PMR's effectiveness in lowering blood pressure in hypertensive elderly patients [11].

A preliminary study conducted on October 5, 2024, at UPT Pelayanan Sosial Tresna Werdha Khusnul Khotimah in Pekanbaru identified 19 elderly individuals with hypertension out of 73 residents. These seniors primarily rely on routine medication. While they had participated in anti-hypertension exercises and yoga, Progressive Muscle Relaxation had never been implemented. Therefore, this study aims to investigate the effect of Progressive Muscle Relaxation technique on the blood pressure of the elderly with hypertension, specifically using 14 movements administered over 5 consecutive days.

RESEARCH METHODS

This research employed a quantitative approach [49] using a Pre-Experimental Design with a One Group Pretest-Posttest approach [8]. This design measures the dependent variable (blood pressure) both before (pre-test) and after (post-test) the PMR intervention on the same group to explore a potential cause-and-effect relationship [8], [62]. Population and Sample: The population consisted of all elderly individuals with hypertension at the social home. The total sample size was 19 people with hypertension, selected using the total sampling technique [34].

Intervention and Instruments: Data was collected using observation sheets/checklists, informed consent forms, and Standard Operating Procedures (SOP) for PMR. Blood pressure was measured using an Omicron digital sphygmomanometer. Measurements were taken twice on the same individual after the intervention, with a 5-minute interval. The PMR intervention, consisting of 14 movements, was administered for 5 consecutive days.

Data Analysis: Data analysis began with initial processing, followed by tabular presentation. Bivariate analysis was conducted using the paired t-test to compare the mean blood pressure (systolic and diastolic) before and after the PMR intervention. Ethical approval

for this study was obtained from the ethics committee of the Payung Negeri Pekanbaru Health Institute (No. 164/IKES PN/KEPK/II/2025).

RESEARCH RESULTS

A. Univariate Analysis

Table 1. Characteristics of Elderly with Hypertension Based on Age and Gender (n=19)

Variable	Count (n)	Percentage (%)
Age		
55-65 years (Elderly)	4	21.1
66-74 years (Young Old)	8	42.1
75-90 years (Old)	7	36.8
Gender		
Male	17	89.5
Female	2	10.5
Hypertension Classification		
Grade 1	19	100.0
Grade 2	0	0.0

Source: primary data

The results show that the majority of respondents were aged **66-74 years (Young Old)** (42.1%) and predominantly **male** (89.5%). All respondents had **Grade 1 Hypertension** (100.0%).

Table 2. Mean Systolic and Diastolic Blood Pressure Before and After Progressive Muscle Relaxation

Measurement	Mean (mmHg)	SD	Min-Max
Pre-test Systolic	152.37	6.627	144-167
Post-test Systolic	150.32	6.438	140-165
Pre-test Diastolic	96.21	2.417	91-99
Post-test Diastolic	94.26	2.306	90-98

Source: primary data

The mean systolic blood pressure decreased from **152.37** mmHg to **150.32** mmHg, and the mean diastolic blood pressure decreased from **96.21** mmHg to **94.26** mmHg after the PMR intervention.

B. Bivariate Analysis

Table 3. Effect of Progressive Muscle Relaxation on Blood Pressure (n=19)

Blood Pressure	Mean Difference	p value
Systolic (Pre-Post)	2.053	0.001
Diastolic (Pre-Post)	1.947	0.002

Source: primary data

The p values for both systolic (0.001) and diastolic (0.002) blood pressure are **less than α 0.05**. This indicates that the null hypothesis (H_0) is rejected, and there is a **significant effect** of the PMR technique on the blood pressure of the elderly.

DISCUSSION

The results show a **significant effect of Progressive Muscle Relaxation (PMR) on reducing blood pressure** in the elderly with hypertension. The highly significant p values for both SBP ($p = 0.001$) and DBP ($p = 0.002$) confirm that the decrease observed after the 5-day PMR intervention was not random. The respondent characteristics, with the majority aged **66-74 years** ($\mathbf{42.1\%}$), align with other studies [60]. Age is an unmodifiable risk factor for hypertension. The risk increases due to changes in blood vessel structure, such as reduced elasticity and arterial stiffness, which cause increased SBP [50]. The predominance of **males** ($\mathbf{89.5\%}$) in the study is often attributed to a history of unhealthier lifestyles (e.g., smoking, high-salt/fat diets) compared to elderly women [50].

The mean SBP decreased by **2.05 mmHg** and DBP by **1.95 mmHg** after PMR. Physiologically, relaxation helps lower anxiety and stress levels [15]. When the body is relaxed, the production of stress hormones like norepinephrine and epinephrine decreases. Norepinephrine is a powerful vasoconstrictor; its reduction decreases peripheral resistance, which subsequently **lowers blood pressure** [31]. Furthermore, the relaxed state stimulates the release of substances like serotonin (a vasodilator) and endorphins, which further help stabilize and reduce blood pressure [45].

This research is consistent with previous findings supporting PMR as an effective non-pharmacological therapy for lowering blood pressure in the hypertensive elderly [60], [43]. PMR works by focusing attention on muscle activity to alleviate tension and promote deep relaxation [15]. The proper implementation of the PMR technique—including correct movements, sequence, positioning, and a calm environment—is crucial for maximizing its benefits as a non-pharmacological management strategy for hypertension.

CONCLUSION

Based on the research findings, the following conclusions are drawn:

1. Respondent characteristics were predominantly **male** (89.5%) and aged **66-74 years** (42.1%).
2. Mean systolic blood pressure decreased from 152.37 mmHg to 150.32 mmHg, and mean diastolic blood pressure decreased from 96.21 mmHg to 94.26 mmHg after the PMR intervention.
3. There is a **significant effect** of the Progressive Muscle Relaxation technique on the blood pressure of the elderly with hypertension, as demonstrated by the p values for systolic ($0.001 < 0.05$) and diastolic ($0.002 < 0.05$) blood pressure.

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