# APPLICATION OF PROGRESSIVE MUSCLE RELAXATION IN HYPERTENSIVE PATIENTS WITH INEFFECTIVE PERIPHERAL PERFUSION IN THE MAWAR WARD OF ARIFIN ACHMAD HOSPITAL, RIAU PROVINCE

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**Abstract**

Hypertension is a global health issue characterized by systolic blood pressure >140 mmHg and/or diastolic blood pressure >90 mmHg. One of the complications of persistent elevated blood pressure is Ineffective Peripheral Perfusion, manifested by impaired circulation to the extremities, such as cold acral areas and delayed capillary refill. Data in Indonesia show that the prevalence of hypertension has reached 34.1%, while in Riau Province it increased from 22.8% in 2021 to 32.5% in 2022. Management of this problem requires comprehensive interventions, both pharmacological and non-pharmacological. This case study aims to apply Progressive Muscle Relaxation (PMR) therapy as a non-pharmacological intervention to address Ineffective Peripheral Perfusion in hypertensive patients. The method used is a case study with a nursing care approach and Evidence-Based Practice (EBP), conducted over five days in the Mawar Ward of Arifin Achmad Regional Hospital, Riau Province, on two patients. PMR was performed four times a week with a duration of 15 minutes per session, focusing on cycles of muscle contraction and relaxation. Data were collected through observation of blood pressure, peripheral pulse rate, skin color, and acral condition before and after the intervention. After five days of PMR implementation, the average reduction in systolic blood pressure in both patients was 15 mmHg and diastolic 10 mmHg. Additionally, improvements were observed in peripheral perfusion indicators: both patients' acral areas became warm (improved), capillary refill time decreased from >3 seconds to <3 seconds, and peripheral pulses were palpated more strongly. Progressive muscle relaxation therapy proved effective in lowering blood pressure and improving symptoms of Ineffective Peripheral Perfusion in hypertensive patients. This intervention is recommended to be systematically integrated into the standard nursing care for hypertensive patients in the Mawar Ward of Arifin Achmad Regional Hospital.

**Keywords:** Hypertension; Ineffective Peripheral Perfusion; Progressive Muscle Relaxation; Blood Pressure; Evidence-Based Practice.

## INTRODUCTION

Hypertension, defined as an increase in systolic blood pressure >140 mmHg and/or diastolic blood pressure >90 mmHg, is a global health problem and a major risk factor for cardiovascular disease. Individuals with hypertension often experience sudden increases in blood pressure; therefore, early detection through regular blood pressure monitoring is essential [1]. The World Health Organization (WHO) estimates that 1.28 billion adults aged 30–79 years worldwide suffer from hypertension [15]. In Indonesia, data from the Ministry of Health in 2023 show a prevalence of 34.1%, equivalent to 70 million people. Meanwhile, the 2022 Health Profile of Riau Province recorded a 32.5% prevalence of hypertension—an increase compared to 22.8% in 2021 [11].

The increase in blood pressure is often caused by several predisposing factors, such as unhealthy lifestyles (consumption of high-salt and high-fat foods, smoking, alcohol intake) and comorbidities (high cholesterol, uric acid, and diabetes) [9]. When arterial vasoconstriction

occurs, the available space for blood flow becomes narrower, resulting in the heart needing to push blood more forcefully, which increases pressure within the blood vessels [9]. As individuals age, arterial elasticity declines, and plaque buildup (atherosclerosis) can narrow the lumen of blood vessels and impede blood flow. If left untreated, peripheral blood vessels will be affected, causing Ineffective Peripheral Tissue Perfusion [2].

One common nursing problem in hypertensive patients is ineffective peripheral perfusion, which leads to an imbalance between tissue oxygen demand and the available blood supply [7]. This condition must be managed appropriately through both pharmacological and non-pharmacological interventions. A suitable non-pharmacological intervention to address ineffective peripheral perfusion is Progressive Muscle Relaxation (PMR) or Progressive Muscle Relaxation Therapy [6]. This therapy combines deep breathing exercises with a series of contractions and releases of tension in specific muscle groups [10].

PMR works by releasing adrenocorticotropic hormone (ACTH) and corticotropin-releasing hormone (CRH) in the hypothalamus, which can reduce sympathetic nervous system activity and decrease adrenaline production, leading to vasodilation and a rapid decrease in blood pressure [14]. PMR is highly affordable, easy to apply, and provides relaxation for both the body and mind [14].

Based on preliminary observations, the Mawar Ward of Arifin Achmad Regional Hospital has not yet systematically integrated this non-pharmacological intervention. Therefore, this study aims to examine and analyze the effectiveness of implementing Progressive Muscle Relaxation in nursing care to address the problem of Ineffective Peripheral Perfusion in hypertensive patients in the Mawar Ward of Arifin Achmad Regional Hospital, Riau Province.

## RESEARCH METHODS

The method used in this scientific work is a case study with a nursing care approach based on Evidence-Based Practice (EBP). This study focuses on the application of a single nursing intervention Progressive Muscle Relaxation Therapy (PMR) as a non-pharmacological effort to address the problem of Ineffective Peripheral Tissue Perfusion in hypertensive patients. The nursing care approach was carried out through standard stages: assessment, establishment of three main nursing diagnoses (Ineffective Peripheral Tissue Perfusion, Acute Pain, and Knowledge Deficit), intervention planning , implementation, and evaluation.

Setting, Population, and Sample

The activity was conducted in the Mawar Ward of Arifin Achmad Regional General Hospital (RSUD) in Riau Province in August 2025. The sample consisted of two patients (Mr. S and Mrs. L) who met the inclusion criteria:

1. Adult patients with a history of hypertension and hospitalized with the nursing diagnosis of Ineffective Peripheral Tissue Perfusion;
2. Willing and cooperative participants;
3. Patients without contraindications to PMR (such as severe heart disease, respiratory disorders, or significant mobility limitations).

Intervention and Procedure

The main intervention was the Progressive Muscle Relaxation (PMR) Technique, implemented over five consecutive days with a frequency of once daily (initially planned as four times per week, but carried out daily to monitor immediate effects). Each PMR session lasted 15 minutes, following seven major muscle group movements from head to toe (or vice versa), emphasizing a contraction cycle of 5 seconds followed by 10 seconds of relaxation. The implementation of PMR referred to an established Standard Operating Procedure (SOP).

Data Collection and Success Indicators

Data were collected using a Vital Signs (VS) Observation Sheet and a Peripheral Perfusion Observation Sheet. Measurements were taken before (pre-intervention) and immediately after (post-intervention) each PMR session.
The main indicators of success referred to the SLKI: Improved Peripheral Perfusion, with the following criteria:

1. Reduction of systolic and diastolic blood pressure toward normal limits;
2. Improvement of extremity temperature (from cold to warm);
3. Improved capillary refill time (< 3 seconds);
4. More palpable/clear peripheral pulse;
5. Decreased acute pain scale (for the secondary diagnosis).

## RESEARCH RESULTS

This case study involved two patients: Mr. S (58 years old) with Grade II Hypertension and Mrs. L (63 years old) with Hypertension and Type 2 Diabetes Mellitus. Both patients showed manifestations of Ineffective Peripheral Tissue Perfusion, characterized by elevated initial Blood Pressure (BP) (P1: 160/100 mmHg; P2: 170/110 mmHg), cold extremities, and Capillary Refill Time (CRT) greater than 3 seconds.

Table 1. Effectiveness of Progressive Muscle Relaxation (PMR) on Blood Pressure
The implementation of PMR over five days demonstrated a consistent downward trend in blood pressure for both patients, both immediately after each session (post-PMR) and in the daily pre-session blood pressure on the following days.

| Patient | Day 1 (Pre/Post) | Day 3 (Pre/Post) | Day 5 (Pre/Post) | Total Reduction (Initial–Final) |
|---|---|---|---|---|
| Mr. S | 160/100 → 155/95 | 150/90 → 145/88 | 140/85 → 138/84 | 22/16 mmHg |
| Mrs. L | 170/110 → 165/105 | 158/98 → 150/95 | 145/90 → 140/88 | 30/22 mmHg |

Average Final BP Reduction: 26/19 mmHg
By the end of Day 5, Mr. S's blood pressure reached 138/84 mmHg (optimal category), and Mrs. L's blood pressure reached 140/88 mmHg (high-normal category.

Table 2. Effectiveness of PMR on Peripheral Tissue Perfusion
Indicators of peripheral perfusion showed significant improvements (meeting SLKI criteria) within five days:

| Outcome Criteria | Day 1 (Initial) | Day 5 (Final) |
|---|---|---|
| Extremities (Akral) | Cold (Both Patients) | Warm (Both Patients) |
| Capillary Refill (CRT) | >3 seconds (Both Patients) | 2 seconds (Both Patients) |
| Peripheral Pulse | Weak (+1) | Strong (+3) |

Additionally, neck pain (Acute Pain diagnosis) in Mrs. L decreased from a pain scale of 4/10 to 0/10 by Day 2 following the intervention, and the Knowledge Deficit diagnosis was resolved by Day 4 when both patients were able to independently demonstrate the PMR technique.

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epidemiology, details of setting, time and place should be provided. (Georgia 11 with 1,15 space).

## DISCUSSION

The findings of this case study consistently demonstrate that the application of Progressive Muscle Relaxation (PMR) is effective as a non-pharmacological intervention for hypertensive patients, not only in reducing blood pressure but also in improving the problem of Ineffective Peripheral Tissue Perfusion (IPTP). The significant reduction in blood pressure observed in both patients aligns with the physiological mechanism of PMR. During this therapy, the hypothalamus releases two key hormones (ACTH and CRH), which reduce sympathetic nervous system activity and decrease adrenaline production, leading to vasodilation and a rapid decrease in blood pressure [14].

These findings reinforce previous research by Murhan et al. (2020), which explained that PMR has been proven to produce a relaxation effect and significantly influence the reduction of blood pressure. A study by Pristya (2021) also confirmed that regular implementation of PMR can lower systolic and diastolic blood pressure [8]. This is consistent with research conducted by Apriani et al. (2024), in which the Wilcoxon test produced a value of 0.000 (<0.05), indicating that this therapy is highly effective in reducing blood pressure [3]. Improvements in Ineffective Peripheral Tissue Perfusion (IPTP), as seen from changes in the extremities from cold to warm, improvement in Capillary Refill Time (CRT) to 2 seconds, and stronger peripheral pulses, are direct effects of the vasodilation induced by PMR. The nursing problem of IPTP arises from an imbalance between tissue oxygen demand and the available blood supply [7]. With the vasodilation produced by PMR, peripheral blood flow increases, addressing issues of impaired tissue perfusion caused by arterial stiffness and atherosclerosis in hypertension [2]. This is further supported by Setyawan et al. (2023), who stated that regular Progressive Muscle Relaxation exercises stimulate the parasympathetic nervous system, working antagonistically against the sympathetic nervous system to reduce heart rate and systemic vascular resistance [13]. Additionally, Hidayat & Putri (2024) emphasized that the success of Progressive Muscle Relaxation in addressing peripheral perfusion issues depends on patient compliance in performing deep breathing techniques alongside muscle contractions [5]. In addition, this technique is very easy to apply and does not require specific equipment [14], making it a practical solution for nurses [6]. The implementation of this technique was carried out for 15–20 minutes in the morning and evening (twice a day) [12]. The implementation of PMR in the Mawar Ward of Arifin Achmad Regional Hospital shows that non-pharmacological interventions can be systematically integrated, supporting the role of nurses in providing care based on Evidence-Based Practice (EBP).

## CONCLUSION

The implementation of Progressive Muscle Relaxation (PMR) for five days in hypertensive patients with Ineffective Peripheral Tissue Perfusion in the Mawar Ward of Arifin Achmad Regional Hospital, Riau Province, proved effective in achieving the expected outcomes. There was a significant reduction in both systolic and diastolic blood pressure (an average of 26/19 mmHg), along with improvements across all indicators of Ineffective Peripheral Tissue Perfusion.

The success criteria for Improved Peripheral Perfusion (SLKI) were met: both patients experienced a change in extremity temperature from cold to warm, Capillary Refill Time (CRT) improved to 2 seconds, and peripheral pulses became palpable and strong. In addition, the issues of Acute Pain and Knowledge Deficit were also resolved.

Based on these results, PMR is recommended to be adopted as a standard operating procedure and routinely integrated by nurses as a non-pharmacological management strategy for hypertensive patients.

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