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Impact of Slow Stroke Back Massage on Blood Pressure Among Individuals With Primary Hypertension: A Quasi-Experimental Study

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ABSTRACT

Introduction: *Hypertension is a major global health issue contributing significantly to cardiovascular morbidity and mortality. In Indonesia, the increasing prevalence of hypertension highlights the need for effective, low-cost, non-pharmacological interventions, such as Slow Stroke Back Massage (SSBM), which may offer physiological and psychological benefits.* ***Objectives:*** *This study aimed to determine the effect of Slow Stroke Back Massage on reducing systolic and diastolic blood pressure among individuals with primary hypertension.* ***Methods****: A quasi-experimental study using a non-equivalent control group pretest-posttest design was conducted. Participants aged 40–70 years with primary hypertension were purposively selected and divided into intervention and control groups. The intervention group received SSBM once daily for three consecutive days, while the control group received standard care. Blood pressure measurements were recorded before and after intervention using calibrated digital sphygmomanometers. Data were analyzed using paired and independent t-tests.* ***Results:*** *The intervention group experienced a significant reduction in both systolic (from 150.2 ± 10.5 mmHg to 137.6 ± 9.8 mmHg) and diastolic (from 95.8 ± 6.2 mmHg to 87.3 ± 5.6 mmHg) blood pressure ($p < 0.001$). No statistically significant changes were observed in the control group. These results support the efficacy of SSBM as an adjunctive therapy in hypertension management.* ***Conclusions****: SSBM is an effective, low-cost, and non-invasive complementary intervention for lowering blood pressure in patients with primary hypertension. It can be integrated into nursing care practices, especially in primary healthcare settings, to enhance hypertension management outcomes.*

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A. Introduction

In recent decades, the global health landscape has shifted significantly, with non-communicable diseases, particularly hypertension, becoming increasingly prevalent among populations of all socioeconomic strata (Rahajeng & Tuminah, 2009; WHO, 2023). Once considered a disease of affluence, hypertension now poses a serious public health threat to low- and middle-income communities due to widespread adoption of unhealthy lifestyles (Tedjasukmana, 2012; Matyas et al., 2011). These lifestyles include poor dietary habits, physical inactivity, tobacco use, and excessive alcohol consumption—all of which contribute

to elevated cardiovascular risks (ESH, 2013; Smeltzer & Bare, 2002). Consequently, hypertension has emerged as one of the most significant contributors to global mortality and morbidity (WHO, 2023).

According to the World Health Organization (WHO), it is projected that by 2025, 1.56 billion adults worldwide will suffer from hypertension, with a disproportionate burden in low- and middle-income countries (WHO, 2023). These regions face structural challenges in hypertension management, including limited access to standardized treatment protocols, undertrained healthcare personnel, and inadequate medication supplies (Prihandana, 2012). As a result, approximately 75% of hypertensive patients fail to achieve adequate blood pressure control, leading to complications such as stroke and ischemic heart disease (Matyas et al., 2011; Moeini et al., 2011). In Southeast Asia alone, hypertension contributes to an estimated 1.5 million deaths annually (WHO, 2023).

Indonesia, as one of the most populous countries in Southeast Asia, faces an alarming rate of hypertension with prevalence exceeding national averages in several provinces, including East Java (Kemenkes RI, 2013; Depkes RI, 2007). Studies report that lifestyle factors, particularly dietary sodium intake and stress, play a critical role in the persistence of high blood pressure across the Indonesian population (Martiningsih, 2011; Smeltzer & Bare, 2002). Despite the availability of pharmacologic therapies, treatment adherence remains suboptimal due to side effects, cost, and patient perceptions (Prihandana, 2012; Brashers, 2006). This underscores the urgent need for complementary approaches that are culturally appropriate and accessible.

Among various non-pharmacologic interventions, massage therapy—particularly Slow Stroke Back Massage (SSBM)—has garnered attention as a feasible and cost-effective strategy to reduce blood pressure (Givi, 2013; Moeini et al., 2011). SSBM involves slow, rhythmic strokes across the back, which are thought to stimulate the parasympathetic nervous system, leading to muscle relaxation and physiological downregulation (Meek, 2014; Lindquist, 2005). Previous studies have shown that massage therapy can significantly reduce both systolic and diastolic blood pressure in prehypertensive and hypertensive individuals (Adib-Hajbaghery & Adib, 2014; Holland & Pokorny, 2001). These findings suggest that SSBM may serve as an effective adjunct to conventional hypertension treatment.

The physiological mechanisms underlying the benefits of SSBM are primarily attributed to its effects on the autonomic nervous system and hormonal regulation (Sylvia & Wilson, 2006; Aaronson, 2010). By stimulating mechanoreceptors in the skin, massage induces the release of endorphins and reduces cortisol levels, thereby mitigating the effects of chronic stress on cardiovascular health (Muttaqin, 2012; Moeini et al., 2011). Additionally, SSBM may promote peripheral vasodilation and improve blood circulation, resulting in decreased vascular resistance (Poetter & Perry, 2006; Smeltzer & Bare, 2002). These physiological responses align with current models of stress reduction and cardiovascular regulation.

Despite growing evidence supporting the efficacy of massage therapy, its integration into standard hypertension care remains limited, especially in primary healthcare settings (Givi, 2013; Olney, 2015). Barriers include lack of awareness among clinicians, insufficient training, and the absence of standardized protocols for implementation (Meek, 2014). Therefore, more rigorous, context-specific research is needed to establish the therapeutic validity of SSBM and to develop implementation strategies that are both effective and scalable (Holland & Pokorny, 2001; Lindquist, 2005). Furthermore, evaluating patient outcomes related to SSBM can enhance the credibility of holistic interventions in clinical practice.

As hypertension is often asymptomatic, early and sustained interventions are critical to preventing long-term complications such as myocardial infarction, stroke, and renal failure (Price et al., 2006; Kemenkes RI, 2013). Evidence suggests that combining lifestyle modification with supportive therapies such as SSBM may optimize patient adherence and health outcomes (Ghasempour et al., 2011; Sylvia & Wilson, 2006). Moreover, the simplicity and non-invasive nature of massage therapy make it particularly suitable for community-level

health promotion (Poetter & Perry, 2006; Olney, 2015). This is especially relevant in resource-limited settings where access to healthcare services and pharmacological treatments is constrained.

Given the increasing burden of hypertension and the need for sustainable interventions, there is a compelling rationale to explore the role of SSBM in blood pressure regulation among hypertensive individuals (Meek, 2014; Moeini et al., 2011). Previous research provides a strong theoretical and empirical basis for the use of massage therapy in clinical settings, yet further investigation is necessary to determine its efficacy across diverse populations (Givi, 2013; Adib-Hajbaghery & Adib, 2014). Understanding the impact of SSBM on physiological parameters such as blood pressure could inform holistic approaches to chronic disease management (Lindquist, 2005; Aaronson, 2010). Therefore, there is a need to assess the effectiveness of SSBM as a complementary intervention for hypertension.

B. Methods

This study applied a quasi-experimental design using a non-equivalent control group pretest-posttest approach to assess the effectiveness of Slow Stroke Back Massage (SSBM) on blood pressure in individuals with primary hypertension. The intervention group received SSBM in addition to standard care, while the control group received standard care alone. Data collection was conducted over a three-day period, with pre- and post-intervention blood pressure measurements taken daily to evaluate the short-term physiological effects of the intervention. Ethical approval was granted by the local health authority, and all participants provided written informed consent prior to enrollment.

Participants were selected using purposive sampling based on inclusion and exclusion criteria. The inclusion criteria included adults aged 40 to 70 years diagnosed with primary hypertension, who were capable of communication, not experiencing hypertensive emergencies, and willing to participate. Exclusion criteria included secondary hypertension, the presence of open wounds or skin conditions on the back, spinal deformities, use of complementary therapies, or contraindications to massage such as recent fractures. The total sample consisted of hypertensive individuals who met the criteria and were divided into intervention and control groups without random allocation.

The SSBM intervention consisted of gentle, rhythmic strokes applied to the patient's back using both hands in a structured manner, beginning at the cervical vertebrae and ending at the sacral region. The massage was performed for approximately 3 to 5 minutes per session, once daily for three consecutive days, following the technique described by Meek (2014) and adapted to clinical nursing practice. Massage was conducted by trained nurses using warm hands and unscented lotion to minimize skin friction. To maintain consistency, all procedures were performed in a quiet room with patients in a prone position, and the massage pace was maintained at 12–15 strokes per minute.

Blood pressure measurements were taken before and after each intervention using a standardized, calibrated digital sphygmomanometer. Measurements included both systolic and diastolic pressures, and were recorded with the patient in a seated and rested position, following at least five minutes of inactivity. To minimize measurement bias, blood pressure was measured at the same time each day and by the same operator for each subject. Data from the control group were collected in parallel using the same protocol, except that no massage intervention was applied.

Data were analyzed using SPSS software, and statistical tests were applied to determine the effectiveness of SSBM. Descriptive statistics were used to summarize demographic and clinical characteristics, while paired t-tests were used to compare pre- and post-intervention values within groups. Independent t-tests were applied to assess differences between the intervention and control groups. A p-value of less than 0.05 was considered statistically significant, and effect size was calculated to assess the magnitude of treatment effect.

C. Results

Table 1 presents the comparison of systolic and diastolic blood pressure (SBP and DBP) between the intervention group (receiving Slow Stroke Back Massage) and the control group. The intervention group showed a significant reduction in both SBP and DBP after three days of therapy. In contrast, the control group did not experience statistically significant changes. The p-values indicate that the observed changes in the intervention group were statistically significant ($p < 0.001$), while those in the control group were not.

Table 1: Comparison of Blood Pressure Pre- and Post-Intervention

Group	Pre-test SBP (Mean ± SD)	Post-test SBP (Mean ± SD)	Pre-test DBP (Mean ± SD)	Post-test DBP (Mean ± SD)	p-value (SBP)	p-value (DBP)
Intervention	150.2 ± 10.5	137.6 ± 9.8	95.8 ± 6.2	87.3 ± 5.6	< 0.001	< 0.001
Control	148.9 ± 11.2	147.1 ± 10.7	94.7 ± 7.1	93.9 ± 6.8	0.082	0.095

D. Discussion

These findings suggest that Slow Stroke Back Massage is effective in significantly reducing both systolic and diastolic blood pressure among patients with primary hypertension. No clinically meaningful changes were observed in the control group.

The present study demonstrates that Slow Stroke Back Massage (SSBM) significantly reduces both systolic and diastolic blood pressure in individuals with primary hypertension. This supports previous findings by Moeini et al. (2011) who reported that massage therapy produced measurable decreases in blood pressure among prehypertensive women. Physiologically, massage stimulates parasympathetic activity which promotes relaxation and vasodilation (Meek, 2014). These mechanisms contribute to reductions in vascular resistance and cardiac workload.

The magnitude of the blood pressure decrease observed in the intervention group aligns with findings by Givi (2013), who documented similar improvements in hypertensive patients receiving massage. SSBM activates pressure receptors in the skin that influence baroreceptor reflexes, leading to lowered sympathetic tone (Sylvia & Wilson, 2006). This effect enhances homeostasis of the cardiovascular system and may have long-term implications for hypertension management. In contrast, the control group in this study did not show statistically significant improvement.

From a theoretical standpoint, SSBM aligns with the Roy Adaptation Model which posits that positive sensory input can improve physiological regulation (Roy, 2009). Through physical touch and rhythm, massage delivers both physiological and psychological stimuli that can lower stress-induced blood pressure (Poetter & Perry, 2006). This supports the view that nursing interventions grounded in holistic principles can be as effective as pharmacological ones in some contexts. Such interventions can especially benefit resource-limited settings where access to medications is restricted.

The statistical significance of our findings ($p < 0.001$) emphasizes the robustness of the intervention. A reduction of more than 10 mmHg in systolic blood pressure can substantially lower the risk of cardiovascular disease by up to 30% (Chobanian et al., 2003). This underscores the clinical relevance of integrating massage therapy into hypertension management protocols. Moreover, the low cost and ease of implementation make it an attractive option for public health strategies.

Notably, this study also contributes to the growing literature advocating for non-pharmacologic treatments in chronic disease management. The European Society of Hypertension (ESH) recommends lifestyle modification as the first-line strategy for blood pressure control (ESH, 2013). However, implementation of such interventions is often inconsistent due to lack of trained personnel and structured protocols. This study

demonstrates a practical, nurse-led approach that can be standardized and taught in clinical settings.

Psychological factors also play a key role in hypertension, and SSBM may exert beneficial effects by reducing anxiety and improving emotional well-being. According to Adib-Hajbaghery, Abasi, and Rajabi-Beheshtabad (2014), whole-body massage significantly reduced anxiety levels and stabilized vital signs among cardiac patients. This neuroendocrine modulation supports the blood pressure-lowering effects of massage through reductions in stress-related sympathetic activity. Therefore, massage therapy may be viewed not only as a mechanical intervention but also as a psychophysiological therapy.

In addition, the simplicity of SSBM allows for patient and caregiver education, which can empower individuals to manage their own blood pressure at home. Teaching family members to perform basic massage techniques may extend the benefits beyond the clinical environment. This could enhance continuity of care and reduce the burden on healthcare providers. However, the need for proper training and supervision remains essential to ensure safety and efficacy.

While the findings are promising, the study is not without limitations. The quasi-experimental design and non-random allocation may introduce selection bias. Future studies using randomized controlled trials (RCTs) are recommended to validate these results. Moreover, long-term follow-up would be necessary to assess the sustainability of blood pressure reduction.

In conclusion, SSBM is an effective, low-cost, and non-invasive intervention for reducing blood pressure in hypertensive individuals. It can be integrated into holistic nursing care models and utilized in primary healthcare settings to improve cardiovascular outcomes. Further research should explore its long-term effects and potential for community-based application. The findings affirm the value of evidence-based complementary therapies in modern nursing practice.

Implication and limitation

The findings of this study demonstrate that Slow Stroke Back Massage (SSBM) is an effective complementary nursing intervention for reducing systolic and diastolic blood pressure among individuals with primary hypertension. This highlights the potential of integrating non-pharmacological therapies into routine hypertension management, particularly in resource-limited settings where access to medications may be constrained. The simplicity, low cost, and non-invasive nature of SSBM make it a feasible intervention for both clinical and community-based care. However, this study has several limitations. The quasi-experimental design with non-random group allocation may introduce selection bias and limit causal inference. The relatively short intervention duration and absence of long-term follow-up restrict the ability to assess sustained effects. Additionally, the study was conducted in a limited setting with a specific population, which may affect generalizability. Future studies using randomized controlled trials and longer observation periods are recommended to validate and expand these findings.

Relevance for Practice

This study provides important practical implications for nursing and primary healthcare practice by emphasizing the role of Slow Stroke Back Massage as a safe and effective adjunctive therapy in hypertension management. Nurses can incorporate SSBM into routine care to help reduce blood pressure, improve patient relaxation, and enhance overall cardiovascular outcomes. The intervention can also be taught to patients and family members to support home-based care and long-term blood pressure control. By integrating SSBM into standard nursing protocols, healthcare providers can offer holistic, patient-centered care that complements pharmacological treatment and improves quality of life for individuals with hypertension.

E. Conclusion

This study concludes that Slow Stroke Back Massage (SSBM) is an effective non-pharmacological intervention for reducing systolic and diastolic blood pressure in individuals with primary hypertension. The significant reduction observed in the intervention group highlights the physiological and therapeutic benefits of SSBM as a complementary approach to standard hypertension management. Given its simplicity, low cost, and non-invasive nature, SSBM can be integrated into routine nursing care, particularly in primary healthcare and community settings. Incorporating this intervention into clinical practice may contribute to improved blood pressure control, enhanced patient comfort, and better overall cardiovascular outcomes.

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Author Contribution

Wrestina Ari Bastian contributed to the study conceptualization, data collection, and initial manuscript drafting. Setiyo Adi Nugroho contributed to the study design, data analysis, and interpretation of the results. Damon Wicaksi contributed to supervision, critical revision of the manuscript, and final approval of the manuscript. All authors have read and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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Declaration of Conflicting Interest

The authors declare no conflict of interest.

Declaration of Use of AI in Scientific Writing

The authors declare that generative AI and AI-assisted technologies were used to support language editing and grammatical refinement of the manuscript.

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