

Effectiveness of Slow Stroke Back Massage (SSBM) on blood pressure, anxiety, and depression among older people with hypertension: A quasi-experimental study

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Abstract

Background: The high incidence of hypertension among older adults requires the efforts of healthcare workers to prevent complications that can worsen the condition. Hypertension can also lead to anxiety and depression due to a combination of factors, such as a physiological decline in physical condition. One of the non-pharmacological therapies considered for reducing blood pressure, anxiety, and depression is slow stroke back massage (SSBM).

Objectives: The study aimed to examine the effectiveness of SSBM in reducing blood pressure, anxiety, and depression among older adults with hypertension.

Methods: This study utilized a quasi-experimental pretest-posttest control group design. The research was conducted in March 2023 with 50 respondents aged 60-74. Aneroid Sphygmomanometer, Geriatric Depression Scale (GDS), and Geriatric Anxiety Scale (GAS) were used for data collection. Mann-Whitney and Wilcoxon tests were used to analyze data.

Results: The SSBM therapy in the experimental group was effective compared to the standard therapy in the control group in reducing blood pressure, anxiety, and depression.

Conclusion: SSBM therapy is an effective complementary therapy for reducing blood pressure, anxiety, and depression in older adults. Therefore, it can be utilized as a preventive measure against complications that may arise in the older adult population.

Keywords: *hypertension; older adults; slow-stroke back massage; SSBM; Indonesian*

Background

According to the worldwide demographic situation, many countries, such as Japan, South Korea, Malaysia, and Thailand, face an aging population (Jayawardhana et al., 2023). Indonesia is also

heading towards becoming an aging population due to the declining Total Fertility Rate (TFR) and rapid advancements in health technology. In Southeast Asia, the older adult population accounts for 142 million individuals, approximately 8% of the total population (Ministry of Health Republic of Indonesia,

2018). Given this situation, prioritizing policies for older adults becomes crucial in Indonesia. The government and private sectors should provide comfortable and accessible facilities to support older adults.

It is important to note that older adults have a lower immune system, making them more susceptible to diseases. One prevalent condition among older adults is hypertension. According to data from the World Health Organization, cardiovascular diseases cause deaths every two seconds globally. Hypertension is a significant risk factor among various cardiovascular diseases. The risk of developing hypertension increases with age, as demonstrated by a study conducted in Rotterdam, the Netherlands, which found that among 7,983 older adults individuals aged over 55 years, the proportion of those with blood pressure higher than 165/95 mmHg was 39% for females and 31% for males (Mancia et al., 2008; Suryati & Suyitno, 2020).

In Indonesia, the prevalence of hypertension is highest in South Kalimantan Province and lowest in West Papua. Hypertension contributes significantly to morbidity and mortality among the older adult population and is often associated with complications such as cardiovascular diseases, diabetes mellitus, and cancer (Jullmusi et al., 2023). When people reach old age, their biological organs have degraded, affecting various body processes. According to the WHO report, older adults are considered at high-risk for developing hypertension. Surprisingly, up to 46% of adults with hypertension are unaware that they have the condition (World Health Organization, 2019). In Indonesia, it was reported that 34.1% of the population aged 18 years and above suffered from hypertension in 2018 (Ministry of Health Republic of Indonesia, 2018). Older adults with hypertension are prone to experiencing other complications and diseases. Previous studies have indicated that in addition to unhealthy behaviors, factors such as climate change, stress, genetics, and obesity can contribute to the development of hypertension (Kriebel-Gasparro, 2022; Oktaviyani et al., 2022; Shariq & McKenzie, 2020; Sutriyawan et al., 2022; Zilbermint et al., 2019).

Preventing and reducing the morbidity of hypertension is crucial due to the potential occurrence of various other non-communicable

diseases associated with the condition. One method that has been introduced to address this is slow-stroke back massage. This technique involves slow, gentle, and rhythmic hand movements applied to the back of a patient. Elizabeth was the first person who introduced this method in 1996. It is recommended to maintain a steady speed of around 60 movements per minute and apply mild and gentle pressure for a duration of 3 to 10 minutes (Holland & Pokorny, 2001; Jalalodini et al., 2016). Older adults, who mostly have hypertension, anxiety, and depression, might seek treatment to alleviate these symptoms. The healthcare services for older adults with hypertension often involve medication and light exercise. Slow-stroke back massage (SSBM) is a safe therapy with minimal risk for patients with hypertension. SSBM entails slow and rhythmic strokes with gentle pressure and incorporates safety measures.

Given that hypertension often causes stress and anxiety in older adults, it is essential to alleviate this burden through therapies such as massage. Previous studies conducted in various countries have demonstrated a significant association between SSBM and lowered blood pressure. SSBM directly affects the muscular, vascular, and sensory systems in the body. The therapy stimulates the superficial layers of the skin, transmitting sensory signals to the brain, which in turn regulates the hormone system. Producing dopamine hormone through SSBM can help reduce stress and induce relaxation.

In the context of Primary Health Care, treating patients with hypertension solely involves medication (pharmacology). Prior to the COVID-19 pandemic, older adult patients also participated in regular exercise programs provided by the national health insurance program called PROLANIS. However, due to lockdown measures and restrictions on physical activity, patients with hypertension were only prescribed medication. An initial study conducted in the same area as this main study found that out of 10 participants, eight believed that hypertension could only be treated with medication when they experienced its effects. None of them were familiar with the concept of SSBM, and only a few realized the importance of adopting healthy behaviors to reduce the impact of hypertension. This study aims to investigate the effectiveness of slow-stroke back massage in

relation to hypertension, anxiety, and depression among older adult patients with hypertension in the Gogagoman Primary Health Care area.

Methods

Study Design and Setting

This study employed a quasi-experimental pretest-posttest control group design. The study was conducted place from February to March 2023 in Gogagoman village, Kotamobagu District. Gogagoman is one of the most populous villages in Kotamobagu City, North Sulawesi Province, Indonesia

Samples/Participants

The target population consisted of all 102 older adults residing in the study setting. A purposive sampling was employed to select the sample based on specific criteria. The inclusion criteria for this study were as follows: 1) Willingness to participate in the research until its completion, 2) Residence in RT 23 of Gogagoman Village during the study period, 3) Age between 60 and 74 years, 4) Cooperative and capable of effective communication, 5) Mild to moderate hypertension (140-159 mmHg for mild, 160-179 mmHg for moderate), 6) Mild to moderate anxiety as determined by the Geriatric Anxiety Scale (GAS) questionnaire, 7) Indications of mild depressive symptoms based on the Geriatric Depression Scale (GDS) measurement. The exclusion criteria for this study were: 1) Refusal to undergo the intervention, 2) Incomplete therapy sessions, 3) Contraindications for receiving slow-stroke back massage, such as rib or vertebral fractures, redness on the back skin, burns in the back area, and open wounds on the back. Based on the inclusion above and exclusion criteria, a sample size of 50 was determined. The researcher randomly assigned the 50 participants into a control group (25 participants) and an experimental group (25 participants).

Instruments

The Aneroid Sphygmomanometer, pre-calibrated for accuracy, was employed to measure blood pressure. The measurements were taken twice, both before and after the intervention. Trained healthcare professionals conducted the blood pressure measurements following standard operational procedures (SOP).

Geriatric Depression Scale (GDS) developed by [Yesavage \(1988\)](#) was utilized to assess depression. The GDS comprises 15 self-report items encompassing cognitive, affective, functional, and future-related factors of depression. Each item required respondents to choose between "yes" or "no," with corresponding scores of 0 or 1 assigned accordingly. The scoring system varied for each question. The GDS is publicly accessible, and a validated Indonesian version of the scale, as per [Utami \(2019\)](#), was employed in this study. However, the reliability of the scale was also measured, yielding a Cronbach's alpha value of 0.88.

Anxiety was measured using the Geriatric Anxiety Scale (GAS) developed by [Segal et al. \(2010\)](#). The GAS consists of 30 self-report items, with 25 items representing three main domains of anxiety symptoms (cognitive, somatic, and affective), and 5 items representing common areas of worry. Respondents rated their responses on a scale of not at all (0), sometimes (1), most of the time (2), and all of the time (3). An Indonesian version of the scale, validated in a previous study by [Bura \(2018\)](#), was used in this study. In our study, reliability of the scale was measured, resulting in a Cronbach's alpha value of 0.85.

Intervention

This study involved administering Slow Stroke Back Massage to the participants. The initial step involved measuring the participants' blood pressure using a Sphygmomanometer. The massage was then performed using slow, gentle, and rhythmic hand movements on the participants' backs at a consistent speed of approximately 60 movements per minute. Mild and gentle pressure was applied during the massage, lasting 3 to 10 minutes. In this study, the massage was administered for approximately 3 minutes twice a week over a period of 4 weeks. The massages were conducted by standardized nurses (research enumerators) collaborating with public healthcare providers in the participants' homes. The researchers followed the same procedure for the control group to measure their blood pressure, anxiety, and depression levels as in the intervention group.

Data Collection

Data were collected by the researchers with the help of enumerators. The enumerators involved in the research process had aligned perceptions and had

received training from the researchers based on standard operating procedures (SOPs).

Data Analysis

Univariate analysis was performed to describe the general characteristics of the participants. Bivariate analysis was conducted to examine the differences between groups and the differences between pre- and post-intervention measurements. The normality of the data was tested using the Shapiro-Wilk test with a significance level of 5%. It was found that the data did not follow a normal distribution. Therefore, the Wilcoxon test was used to assess the differences between two related variables (pre- and post-test), allowing for statistical testing. To compare the control and intervention groups, the Mann-Whitney test was employed to examine differences in blood pressure, anxiety, and depression between the two groups. All data analyses were performed using the SPSS software package.

Ethical Considerations

This research was conducted in adherence to ethical principles and received ethical approval under test number 162/KEP/UNKAHA/SLE/II/2023, allowing the study to proceed. The research commenced after receiving the ethics approval letter from the Ethics Committee at Karya Husada University Semarang, affirming that the study was deemed suitable to be conducted.

Results

Table 1 shows that the respondents' characteristics include an age range of 60-74 years old, with the mode being 61. The majority of respondents were female, accounting for 52.0% of the sample. Regarding educational attainment, most respondents completed their education at the elementary school level, comprising 52% of the participants. Additionally, the majority of the respondents were unemployed, accounting for 52% of the samples.

Table 1 General characteristics of the participants

Variables (N = 50)	Frequency	Percentage
Age		
Range: 60 – 74 years old (Mode: 61 years old)		
Sex		
Male	24	48.0
Female	26	52.0
Level of education		
Elementary School	17	52.0
Secondary School	14	20.0
Senior High School	16	22.0
University	3	6.0
Occupation		
Unemployed	26	52.0
Retired	10	20
Farmer	11	22
Self-employed	3	6

Table 2 Distribution of pre and post-test of the respondents

Variables	Pre-test				Post-test			
	Control	%	Experiment	%	Control	%	Experiment	%
Blood Pressure								
Normal	0	0	0	0	0	0	4	16.0
Prehypertension	0	0	0	0	0	0	12	48.0
Mild	8	32.0	5	20.0	9	36.0	9	36.0
Moderate	17	68.0	20	80.0	16	64.0	0	0
Anxiety								
Mild	8	32.0	6	24.0	9	36.0	18	72.0
Moderate	17	68.0	19	76.0	16	64.0	7	28.0
Depression								
No Depression	0	0	0	0	0	0	5	20.0
Mild	25	100	25	100	25	100	20	80.0
Moderate	0	0	0	0	0	0	0	0

Table 2 presents information on the characteristics of respondents after undergoing the intervention. In the control group, the pre-test blood pressure indicated moderate hypertension in 17 participants

(68.0%), while in the intervention group, this number was 20 (80.0%). After the intervention, the control group showed moderate hypertension in 16 participants (64.0%), while the intervention group

had pre-hypertension in 12 participants (48.0%) and normal blood pressure in 4 respondents. The highest pre-test anxiety level in the control group was moderate anxiety, with 17 participants (68.0%), and in the intervention group, it was 19 participants (76.0%). In the post-test, 19 participants (76.0%) in the control group experienced moderate anxiety, while in the intervention group, the highest anxiety

level observed was mild anxiety, with 18 respondents (72.0%). The level of pre-test depression in both the control and intervention groups was mild depression, accounting for 100% of participants. However, after receiving slow stroke back massage therapy in the intervention group, five respondents exhibited no signs of depression.

Table 3 Differences in blood pressure, anxiety, and depression within the intervention group

Intervention		N	Mean Rank	Z	p-value
Blood Pressure					
Pre-test	Positive Rank	0	0.00	-4.493	0.000***
Post-test	Negative Rank	25	13.00		
Ties		0			
Anxiety					
Pre-test	Positive Rank	0	0.00	-3.464	0.001**
Post-test	Negative Rank	12	6.50		
Ties		13			
Depression					
Pre-test	Positive Rank	0	0.00	-2.236	0.025*
Post-test	Negative Rank	5	3.00		
Ties		20			

Note: ***p-value <0.001, **p-value <0.01, *p-value <0.05

Table 3 presents the results of the Wilcoxon test for each expected outcome. The data indicates that 25 participants in the intervention group experienced a decrease in blood pressure, with a p-value of <0.001. This suggests a significant difference in blood pressure levels between the pre-test and post-test after administering the Slow Stroke Back Massage (SSBM). Regarding anxiety, the results show that 12 participants reported a decrease in anxiety levels following the SSBM intervention, with a p-value of 0.001. In the case of depression, it was observed that 5 participants experienced a reduction in depression levels after receiving the SSBM, with a p-value of 0.025. Based on the significance level, the SSBM demonstrated a strong effect in lowering blood pressure, a moderate impact on anxiety, and a low effect on depression when comparing the pre-test and post-test measurements.

Table 4 presents the results of the Mann-Whitney test, which compares the intervention group with the control group. The data indicate a significant difference between the blood pressure levels of the participants in the intervention group and the control group, with a p-value of <0.001. This suggests that the Slow Stroke Back Massage (SSBM) had a strong effect in decreasing blood pressure in comparison to the control group. Additionally, there

was a significant difference in anxiety levels between the intervention and control groups, with a p-value of 0.011 (<0.05). This indicates that the SSBM had a moderate effect on reducing anxiety compared to the control group.

Table 4 Differences in blood pressure, anxiety, and depression between intervention and control groups

Groups	Blood Pressure	Anxiety	Depression
Mann-Whitney U	40.500	200.000	250.000
Wilcoxon W	365.500	525.000	575.000
Z	-5.543	-2.528	-2.333
Asym.sig. (2-tailed)	0.000***	0.011*	0.020*

Note: ***p-value <0.001, **p-value <0.01, *p-value <0.05

Furthermore, the Mann-Whitney test revealed a significant difference in depression levels between the intervention and control groups, with a p-value of 0.020 (<0.05). This implies that the SSBM had a low effect in decreasing depression compared to the control group. Overall, based on the significance level, the SSBM demonstrated a strong effect in reducing blood pressure when comparing the intervention and control groups, a moderate effect on anxiety, and a low effect on depression.

Discussion

The study findings presented here align with previous research conducted in South Tangerang, Samarinda, and Surabaya, demonstrating that Slow Stroke Back Massage (SSBM) can effectively reduce blood pressure in older adults. It is worth noting that hypertension is common among older adults. These consistent results suggest that SSBM could be a viable intervention for managing and lowering blood pressure in this demographic (Jayawardhana, 2018; Kusumoningtyas & Ratnawati, 2018; Wibowo, 2018). Comparing the intervention and control groups, the literature review found that the intervention group effectively reduced systolic and diastolic blood pressure. In contrast, the control group did not demonstrate the same results (Fatimah & Punjastuti, 2020). Regarding anxiety, the study conducted in Iran also observed a significant difference between the pre-and post-intervention periods for the experimental group (Basiri et al., 2016).

Slow-stroke back massage therapy has been shown to have several beneficial effects. Regular sessions of this therapy have been found to reduce blood pressure, lower cortisol hormone levels, and alleviate anxiety (Westman & Blaisdell, 2016). The mechanism by which slow stroke back massage (SSBM) lowers blood pressure is through the release of endorphins. Endorphins promote vasodilation, which leads to the relaxation of blood vessels and a sense of calm in the body. The increased vasodilation of blood vessels achieved through SSBM helps reduce hypertension-related headaches and prevent further complications (Suwaryo et al., 2022; Wijdicks, 2016). Massage using the Slow Stroke Back Massage (SSBM) technique stimulates A-Beta sensory nerve transmission, which acts as a neurotransmitter to reduce pain. Additionally, the massage on the back area triggers the release of endorphins, leading to a sense of comfort, calmness, and reduced stress and anxiety (Saatsaz et al., 2016). This study utilized Tawang oil, which holds significant cultural value as an ancestral heritage among the South Minahasa people. It has been utilized for generations and has a long-standing history of being used for treatment by the people of North Sulawesi. Tawang oil has various beneficial ingredients that make it suitable for body treatments and promote overall well-being.

Similar studies employing Slow Stroke Back Massage (SSBM) as a non-pharmacological method have successfully reduced fatigue levels among breast cancer patients (Bahceli et al., 2022). The study conducted in Iran found that combining Slow Stroke Back Massage (SSBM) therapy with music therapy can be effective in managing cancer-related pain (CRP) and cancer-related fatigue (CRF). This intensive approach demonstrated positive results in reducing both pain and fatigue levels in cancer patients (Miladinia et al., 2015). SSBM, when combined with foot reflexology, has been found to have a significant impact on improving sleep quality, reducing fatigue, and alleviating anxiety among hemodialysis patients (Suwanto et al., 2020; Unal & Akpinar, 2016). Furthermore, in patients with leukemia, SSBM has been identified as an easy and safe method for controlling chemotherapy-induced nausea and vomiting (Miladinia et al., 2015). For patients with stroke, SSBM massage has been found to be effective in preventing and reducing anxiety (Atashi et al., 2014). Based on a study conducted in Iran, SSBM massage effectively reduces anxiety among patients or candidates undergoing cataract surgery (Keramati et al., 2019). Additionally, SSBM is effective in reducing the intensity of labor pain during childbirth (Fitri & Noviwanti, 2018). Similar to the previous study, a study conducted in Iran found that SSBM was a simple, inexpensive, noninvasive, and effective method to reduce anxiety during the first postpartum day (Jahdi et al., 2016). SSBM has also been found to impact reducing anxiety in school-age children in Thailand positively (Jalalodini et al., 2016). Furthermore, SSBM has also been shown to effectively reduce the progression of sleep disorders, alleviate pain and fatigue, and improve sleep quality (Miladinia et al., 2017). Among dialyzed patients, SSBM has been found to provide comfort and reduce fatigue (Hasankhani et al., 2013).

Conclusion

The results of this study indicate that the majority of participants were 61 years old, female, had an elementary school education, and were unemployed. The intervention and control groups had a higher proportion of participants with moderate blood pressure and anxiety levels. In terms of depression, most participants in both groups fell into the mild category. When comparing the pre-and post-tests for the intervention group,

significant differences were observed in blood pressure, anxiety, and depression. The findings suggest that SSBM has a strong effect in reducing blood pressure, a moderate effect in reducing anxiety, and a low effect in reducing depression, as indicated by the significance level. Furthermore, when comparing the intervention and control groups, significant differences were found in blood pressure, anxiety, and depression. The results indicate that SSBM has a strong effect in reducing blood pressure, a moderate effect in reducing anxiety, and a low effect in reducing depression, based on the significance level. Considering these findings, it is recommended that public health centers incorporate SSBM as a strategy to minimize the risk of hypertension-related complications.

Declaration Conflicting Interest

Authors declared no conflict of interest in this study.

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Author Contribution

Gita Sandy Patonengan was the main researcher in this study and was assisted by two supervisors, Fery Agusman Motuho Mendrofa and Umi Hani. All contributors met authorship criteria based on ICMJE.

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