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The effectiveness of massage therapy combined with stretching toward blood pressure of elderly people with hypertension

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Abstract: The high case of hypertension in the elderly requires curative action. One of the efforts to prevent and treat hypertension is by nonpharmacological methods with massage therapy combined with stretching. This research aimed to discover the effectiveness of massage therapy followed by stretching toward the blood pressure of older people with hypertension. Employing a Quasi Experiment design with one group pretest-posttest, the study involved 25 people who had hypertension With 14 of which were selected using specific criteria. The research used Digital Sphygmomanometer to measure blood pressure. The treatment given to the samples was massage therapy for hypertension with the Ali Satia Graha method for about 20 minutes followed by stretching for about 20 minutes. The data analysis technique of this research was the paired t-test, which aimed to find the significant gap. The research findings showed that the systole value before getting the treatment was 158.36 mmHg, and after getting the treatment, it decreased to 137.93 mmHg (12,90%) with a significance value of 0.000 < 0.05. Diastolic blood pressure before getting the treatment was at 98.07 mmHg, and after getting the treatment, it dropped to 86.79 (11,50) mmHg with a significance value of 0.000 < 0.05. Hence, it could be concluded that Ali Satia Graha massage method with stretching effectively decreased the blood pressure of older people with hypertension.

Keywords: massage therapy, stretching, blood pressure, hypertension.

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INTRODUCTION

The aging process is a natural cycle in the life of every human being. As humans age, they will experience a decrease in the physiological function of body organs (Chen et al., 2022) including the digestive system, nervous system, endocrine system, neurosensory system, motion system, and cardiovascular system. Such decreases in physiological function can provoke the onset of degenerative diseases caused by a decrease in the body's physiological function due to ageing(Graha, 2019; Graha & Yuniana, 2021) Examples of degenerative diseases that are often experienced are stroke, coronary heart disease, cholesterol, diabetes mellitus, and hypertension.

Hypertension is one of the most experienced degenerative diseases that even can cause death for its sufferers (Krinock, Goyal, Goel, & Nadar, 2020). is a silent killer because this disease is asymptomatic and can be noticed mostly when examining other diseases (Tuo et al., 2022). Hypertension can attack both men and women. However, the latter are more at risk of developing hypertension because at an advanced age, they experience menopause, so there will be a decrease in the production of the hormone estrogen, which plays an essential role in the vasodilation of blood vessels. Therefore, when the hormone is reduced, blood vessels will be difficult to expand and can trigger hypertension (Suryonegoro, Elfa, & Noor, 2021).

Based on WHO data in 2015, 1.13 billion people have hypertension, which will continue to grow yearly. It is recorded that every year about 9.4 million die because of hypertension and its complications. It is estimated that 1.5 billion people will be affected by hypertension by 2025. Based on the 2018 Indonesia Basic Health Research, the number of people with hypertension in Indonesia is in aged ≥18

years was 34.1%. On the other hand, 63.309.620 people have hypertension, while mortality due to hypertension have been recorded at 427.218 deaths (Ministry of Health RI, 2019). Pharmacological and nonpharmacological treatments are two ways to control high blood pressure in people with hypertension (Wijayanto & Sari, 2015). Pharmacological treatment includes using blood pressure-lowering medicines, while nonpharmacological treatment can include exercising, regulating diet, and massage. Some forms of treatment this study suggested were massage and stretching treatments, and simultaneously to test their effectiveness on the elderly with hypertension.

As one of the traditional medicines, massage has been widely used by experts and researched for its various benefits (Walaszek, 2015). Some benefits of massage include improving blood circulation, reducing pain, and stimulating innervation (Udani, 2016). Massage can cause blood vessels to experience vaso dilatation, a condition when the blood vessels get wider to have smooth blood circulation (Sukardin, Sumartyawati, Santosa, & Rahman, 2018). Based on the above expert opinions, it can be concluded that massage has many benefits. Massage has physiological impacts, including smoothing blood circulation, relaxing muscles, reducing pain, stimulating innervation and the hormonal system, and reducing fatigue. However, massage for the therapy of degenerative hypertension had not been widely studied using the Ali Satia Graha method.

Massage therapy for people with hypertension was new, but people with hypertension do a lot of other therapies, such as exercising. As Andria (2013: 114) revealed, regular exercise can affect blood pressure because a trained heart would lessen the pulse frequency so that the pressure on the capillaries may decrease. Exercise can also relax blood vessels so the blood circulation will be smoother and the pressure decreases (Putriastuti, 2016). The expert opinion above can be concluded that regular exercise with various treatments can prevent and treat people with hypertension.

Stretching is one of the activities carried out at the opening and closing during sports and functions to prepare the muscles so that they do not experience stiffness that can result in injury. Muscles that have been given stretching treatment will increase the flexibility and space for movement of their joints. The benefits of stretching include improving circulation, strengthening muscles, increasing joint flexibility, relieving pain, and improving blood pressure (Larasati, Agustina, & Hafifah, 2018). Other benefits of stretching are reducing arterial stiffness, increasing blood flow, and increasing parasympathetic nerve activation (Ko et al., 2021). Based on the statements above, stretching can help increase muscle flexibility and ROM in the joints, reduce arterial stiffness, and activate the parasympathetic nerve.

Based on preliminary observations made on November 18, 2020, in one of the areas of Yogyakarta, some results were taken: (1) Many people aged 50-70 years had hypertension, (2) many people did not know about traditional medicine with the massage that can prevent and treat hypertension, (3) many people do not yet know the benefits of exercise that can be done regularly and lightly as an effort to prevent hypertension. From the observations above, the researchers examined the effectiveness of massage therapy using the Ali Satia Graha method by stretching the blood pressure in elderly people with hypertension.

METHODS

This quantitative descriptive study applied Quasi Experiment with a one-group pretest-postest design. The study used one sample group without using a control group. An initial test was carried out before the treatment to obtain the pretest data. Meanwhile, a re-measurement was carried out after the treatment to obtain posttest data. This study aimed to see the effectiveness of Ali Satia Graha massage method combined with stretching the blood pressure in the elderly with hypertension.

The research was carried out in Yogyakarta Province, from January 1st-5th, 2021. The population in this study was 25 elderly with hypertension. In this study, the researchers applied a purposive sampling technique with certain considerations to determine the samples. The sample criteria were based on inclusion and exclusion criteria. The inclusion criteria included the people of Ringinsari Village who were female aged 50-70 years, willing to be respondents, and had hypertension level 1 with a systole pressure range of 140-159 diastole 90-99, and level 2 with a systole pressure range of 160-179 diastole 100-109 (Flute, 2018). The exclusion criteria included pe ople with hypertension who had also experienced bone fractures, skin diseases, or open wounds, those with hypertension who were undergoing other types of therapy, and those who had experienced prehypertension and isolated

hypertension. Based on the predetermined inclusion and exclusion criteria, a sample of 14 people was obtained.

The massage treatment was carried out using the Ali Satia Graha method with scouring and elusion techniques on the back, arms, shoulders, and neck. The massage duration was 20 minutes and was carried out thrice for three days. After the massage treatment, it was followed by static stretching with the same frequency as the massage. The treatment was carried out in the morning when the probandus had not done much activity, and the muscles and blood vessels condition was still stiff. People with hypertension of level 1 and level 2 were given the same treatment. Hypertension levels 1 and 2 were widely experienced by the community, and massage therapy could still be done for the sufferer. Level 3 hypertension cannot receive massage therapy because the blood vessels have experienced damage, and it was feared that it could aggravate the condition.

This study used a Sphygmomanometer from the Omron brand to measure blood pressure. The validity and reliability of the instrument were high agreement (kappa = 0.881, $p<0.001$) (Utari, Saraswati, Winaya, & Antari, 2022). The tool was previously calibrated to yield an accurate measurement process. This tool was chosen because it can be done quickly and is compatible with the spring sphygmomanometer measuring instrument (Eriska, Adrianto, & Basyar, 2016). This tool was used to measure blood pressure in pre-treatment tests and post-treatment tests. The initial blood pressure measurement was done before the treatment to obtain pretest data. Measurement of posttest data was conducted after the treatments. Blood pressure measurements were carried out in the morning when the probandus had not done much activity. The measurement procedure was carried out with the probandus in a sitting position, then the left arm was placed at the heart level, and the set was attached to the upper arm. The researchers pressed the on/off button and waited for the tool to work for the results to be seen on the screen. The measurement data could, then, be processed to find out the difference between pretest and posttest data through a t-test statistical test using the SPSS data processing application version 25. The other tools used were writing equipment, a table to record blood pressure results, and an implementation procedure sheet. Equipment for the massage included lotion, towels, face shields, masks, and hand sanitizers.

Prerequisite tests were performed using normality tests and homogeneity tests. The data was said to be normally distributed if the p-value >0.05. Homogeneity tests were performed to find the homogeneity of the data. If $p> 0.05$, the data variant was considered homogeneous. Systolic and diastolic pressure data were then analyzed using the Levene Test. The analysis of the discrimination test used a paired t-test with a test significance of 0.05. The t-test produced a value of t and a probability value (p) that were used to prove the presence or absence of a significant pretest and posttest difference with a level of 5%. If $p<0.05$, then there was a significant difference.

RESULTS AND DISCUSSION

Pretest and posttest data were obtained through measurements using a digital sphygmomanometer tool before and after the massage treatment with stretching. Respondents were measured per the operational standards of measurements that had been made to obtain valid data. The data obtained can be seen in Table 1.

Table 1. Pretest Data on Systole and Diastole Blood Pressure

Observation 1				
Blood pressure	Min	Max	Mean	SD
Systole	146	169	158.36	8.101
Diastole	90	105	98.07	4.233
Observation 2				
Blood pressure	Min	Max	Mean	SD
Systole	142	169	152.14	8.547
Diastole	86	108	95.57	5.459
Observation 3				
Blood pressure	Min	Max	Mean	SD
Systole	135	160	148.29	7.269
Diastole	88	107	95.50	5.544
Observations 1-3				
Blood pressure	Min	Max	Mean	SD

Systole	146	169	158.36	8.101
Diastole	90	105	98.07	4.233

Table 1 shows that the systole pretest data at the first observation obtained a minimum value of 146 and a maximum value of 169. In addition, a mean value of 158.36 was obtained, and the standard deviation of the data was 8.101. Meanwhile, the diastole pretest data obtained a minimum value of 90 and a maximum value of 105. The average diastole pretest data obtained a value of 98.07 and a standard deviation of 4.233. In the second observation, it can be seen that the systole pretest data decreased its minimum value to 142, and its maximum value stayed at 169. The mean value was 152.14, and the standard deviation of the data was 8.547. The diastole pretest data obtained a minimum value of 86 and a maximum value of 108. The average diastole pretest data obtained a value of 95.57 and a standard deviation of 5.459. In the third observation, it was known that the systole pretest data obtained a minimum value of 135 and a maximum value of 160. In addition, a mean value of 148.29 was obtained, and the standard deviation of the data was 7.269. Meanwhile, the diastole pretest data obtained a minimum value of 88 and a maximum value of 107. The average diastole pretest data obtained a value of 95.50 and a standard deviation of 5.544. In observations 1 to 3, it was known that the systole pretest data obtained a minimum value of 146 and a maximum value of 169. The mean value was 158.36, and the standard deviation of the data was 8.101. In the diastole pretest data, the minimum value was 90, and the maximum value was 105. The average diastole pretest data obtained a value of 98.07 and a standard deviation of 4.233.

Table 2. Posttest Data on Systole and Diastole Blood Pressure

Observation 1				
Blood pressure	Min	Max	Mean	Sd
Systole	139	162	148.86	7.774
Diastole	86	101	92.71	3.688
Observation 2				
Blood pressure	Min	Max	Mean	Sd
Systole	134	157	143.57	7.470
Diastole	81	101	89.07	5.181
Observation 3				
Blood pressure	Min	Max	Mean	Sd
Systole	131	152	137.93	5.797
Diastole	80	98	86.79	4.949
Observations 1-3				
Blood pressure	Min	Max	Mean	Sd
Systole	131	152	137.93	5.797
Diastole	80	98	86.79	4.949

Based on Table 2, the minimum value in the first observation of the posttest systole data was 139, and the maximum value was 162. The mean value obtained was 148.86, and the standard deviation of the data was 7.774. Meanwhile, the posttest diastole data obtained a minimum value of 86 and a maximum value of 101. The average value of 92.71 and the standard deviation of 3.688 was obtained. In the second observation, the posttest systole data had a minimum value of 134 and a maximum value of 157. In addition, a mean value of 143.57 was obtained, and the standard deviation of the data was 7.470. The posttest diastole data obtained a minimum value of 81 and a maximum value of 101. The average obtained a value of 89.07 and a standard deviation of 5.181. In the third observation, the posttest systole data had a minimum value of 131 and a maximum value of 152. In addition, a mean value of 137.93 was obtained, and the standard deviation of the data was 5.797. Meanwhile, the posttest diastole data obtained a minimum value of 80 and a maximum value of 98. The average obtained a value of 86.79 and a deviation of 4.949. In observations 1 to 3, posttest systole data obtained a minimum value of 131 and a maximum value of 152. In addition, the mean value was 137.93, and the standard deviation of the data was 5.797. Meanwhile, the posttest diastole data obtained a minimum value of 80 and a maximum value of 98. The average obtained value was 86.79, and the deviation was 4.949.

Table 3. Blood Pressure Drop Results

Observation 1				
Blood pressure	Pretest	Posttest	Decline	Percentage (%)
Systole	158.36	148.86	9.5	5.99
Diastole	98.07	92.71	5.36	5.46
Observation 2				
Blood pressure	Pretest	Posttest	Decline	Percentage (%)
Systole	152.14	143.57	8.57	5.63
Diastole	95.57	89.07	6.5	6.80
Observation 3				
Blood pressure	Pretest	Posttest	Decline	Percentage (%)
Systole	148.29	137.93	10.36	6.98
Diastole	95.50	86.79	8.71	9.12
Observations 1-3				
Blood pressure	Pretest	Posttest	Decline	Percentage (%)
Systole	158.36	137.93	20.43	12.90
Diastole	98.07	86.79	11.28	11.50

Based on Table 3, In the first observation, the difference in pretest and posttest systole values based on the average obtained value before the treatment was 158.36 and decreased to 148.86 after the treatment. The decline occurred by 9.5 (5.99%). Meanwhile, diastole data obtained a pretest mean value of 98.07 and a post-test mean value of 92.71. So it decreased by 5.36 (5.46%). In the second observation, the difference in pretest and post-test systole values based on the average pre-treatment value was obtained at 152.14, and after treatment reached 143.57. The decline was 8.57 (5.63 %). At the same time, the diastole data obtained a pretest mean value of 95.57 and a posttest mean value of 89.07. So it decreased by 6.5 (6.80 %). In the third observation, the difference in pretest and post-test systole values based on the average pre-treatment value was obtained at 148.29, and after the treatment was 137.93. The decline occurred by 10.36 (6.98 %). The diastole data obtained a pretest mean value of 95.50 and a posttest mean value of 86.79. So it decreased by 8.71 (9.12 %). In observations 1 to 3, the difference between pretest and post-test systole values based on the average pre-treatment value was obtained at 158.36, and after treatment reached 137.93. The decline occurred by 20.43 (12.90 %). The diastole data obtained a pretest mean value of 98.07 and a post-test mean value of 86.74. So it decreased by 11.28 (11.50 %).

Table 4. Systole Normality Test Results

	Shapiro-Wilk		
Observation 1	Data	Sig.	Information
	Pretest	0.085	Normal
	Posttest	0.161	Normal
	Shapiro-Wilk		
Observation 2	Data	Sig.	Information
	Pretest	0.265	Normal
	Posttest	0.237	Normal
	Shapiro-Wilk		
Observation 3	Data	Sig.	Information
	Pretest	0.835	Normal
	Posttest	0.146	Normal
	Shapiro-Wilk		
Observations 1-3	Data	Sig.	Information
	Pretest	0.085	Normal
	Posttest	0.146	Normal

Table 4 shows that the result of the systole normality test in the first observation of the pretest significance value was 0.085, while the posttest significance value was 0.061. In the second observation of the systole normality test, the pretest significance value was 0.265, while the posttest significance value was 0.237. In the third observation of the systole normality test, the pretest

significance value was 0.835, while the posttest significance value was 0.146. In Observations 1 to 3 of the systole normality test, the pretest significance value was 0.085, while the posttest significance value was 0.146. It can be seen that the values of the two pretest and posttest systole data were more than 0.05, so all of the data were also normally distributed.

Table 5. Diastole Normality Test Results

Observation 1	Shapiro-Wilk		
	Data	Sig.	Information
	Pretest	0.885	Normal
	Posttest	0.738	Normal
Observation 2	Shapiro-Wilk		
	Data	Sig.	Information
	Pretest	0.114	Normal
	Posttest	0.827	Normal
Observation 3	Shapiro-Wilk		
	Data	Sig.	Information
	Pretest	0.203	Normal
	Posttest	0.386	Normal
Observations 1-3	Shapiro-Wilk		
	Data	Sig.	Information
	Pretest	0.885	Normal
	Posttest	0.386	Normal

Table 5 explained the result of the diastole normality test at the first observation of the pretest significance value was 0.885, and the post-test significance value was 0.738. In the second observation of the diastole normality test, the pretest significance value was 0.114, while the posttest significance value was 0.827. In the third observation of the diastole normality test, the pretest significance value was 0.203, while the posttest significance value was 0.386. In Observations 1 to 3 of the diastole normality test, the pretest significance value was 0.885, and the posttest significance value was 0.386. From the significance value of the two pretest and posttest diastole data of more than 0.05, it can be said that all data is normally distributed. Based on the results of the normality test calculations described above, it was concluded that the data was normally distributed because the significance value was more than 0.05. Therefore, if the distributed data was normal, the calculation used parametric analysis.

Homogeneity testing aimed to find out whether the data were homogeneous or not. The basis for decision-making was based on the significance value indicated in the calculation results. The data is homogeneous if the significance value is more than 0.05. Conversely, if the significance value is less than 0.05, then the data is not homogeneous. The results of the homogeneity test are briefly described in the table below.

Table 6. Systole Data Homogeneity Test Results

Observation 1			
Levene Statistics	df 1	df 2	Sig.
0.017	1	26	0.898
Observation 2			
Levene Statistics	df 1	df 2	Sig.
0.328	1	26	0.572
Observation 3			
Levene Statistics	df 1	df 2	Sig.
1.400	1	26	0.247
Observations 1-3			
Levene Statistics	df 1	df 2	Sig.
3.876	1	26	0.060

Table 6 demonstrates the systole data homogeneity test calculation for each observation obtained a significance value of more than 0.05. The first observation obtained a significance value of 0.898, the

second observation obtained 0.572, and the third observation obtained 0.247. For the whole observations, 1 to 3 obtained a significance value of 0.060. As the significance value was more than 0.05, it can be implied that the systole data was homogeneous.

Table 7. Diastole Data Homogeneity Test Results

Observation 1			
Levene Statistics	df 1	df 2	Sig.
0.209	1	26	0.651
Observation 2			
Levene Statistics	df 1	df 2	Sig.
0.039	1	26	0.845
Observation 3			
Levene Statistics	df 1	df 2	Sig.
0.052	1	26	0.821
Observations 1-3			
Levene Statistics	df 1	df 2	Sig.
0.271	1	26	0.607

Table 7 shows the diastole data homogeneity test results in the first observation showed a significance value of 0.451, the second observation obtained 0.845, and the third observation obtained 0.821. Overall, observations 1 to 3 got a significance value of 0.607. Because the significance value is more than 0.05, it can be implied that the diastole data was homogeneous.

Table 8. Paired-T Test Results

Observation 1				
Blood pressure	Pretest	Posttest	Sig.	Information
Systole	158.36	148.86	0.000	Significant
Diastole	98.07	92.71	0.000	Significant
Observation 2				
Blood pressure	Pretest	Posttest	Sig.	Information
Systole	152.14	143.57	0.000	Significant
Diastole	95.57	89.07	0.000	Significant
Observation 3				
Blood pressure	Pretest	Posttest	Sig.	Information
Systole	148.29	137.93	0.000	Significant
Diastole	95.50	86.79	0.000	Significant
Observations 1-3				
Blood pressure	Pretest	Posttest	Sig.	Information
Systole	158.36	137.93	0.000	Significant
Diastole	98.07	86.79	0.000	Significant

This study aimed to determine the effectiveness of massage therapy using Ali Satia Graha method by stretching blood pressure in elderly people with hypertension in Ringinsari Village, Maguwoharjo, Sleman. The massage therapy with stretching treatment was carried out correctly and effectively reduced blood pressure in elderly people with hypertension. Based on data analysis calculations, the results were obtained that the value of the systole before treatment was 158.36 mmHg and after treatment decreased to 137.93, showing a decreasing percentage of 12.90% and a significance value of 0.000<0.05. The diastole blood pressure before treatment was 98.07 mmHg, and after treatment decreased to 86.79, with a decreasing percentage of 11.50% and a significance value of 0.000<0.05. Therefore, the conclusion said that the Ali Satia Graha massage method with stretching effectively reduced blood pressure in elderly people with hypertension in Ringinsari Village, Maguwoharjo, Sleman.

This study showed that the massage treatment using the Ali Satia Graha method with stretching significantly reduced blood pressure in both systole and diastole. Measurements on systole and diastole blood pressure showed a significant decrease in all observations. In the first observation, the systole blood pressure decreased by 5.99%, and the diastole pressure decreased by 5.46%. In the second treatment, systole pressure decreased by 5.63%, and diastole pressure decreased by 6.80%. In observation 3, the systole pressure decreased by 6.98%, and the diastole pressure decreased by 9.12%.

In observations 1 to 3, data on the subduction of systole pressure was obtained by 12.90%, and diastole pressure decreased by 11.50%. Based on these data, it is proven that massage and stretching have been shown to significantly reduce systole and diastole blood pressure in people with hypertension.

Hypertension is when pressure on blood vessels increases beyond normal limits (Singh et al., 2017) or when systolic blood pressure increases to more than 140 mmHg, and diastolic is more than 90 mmHg (Ansar, Dwinata, & Apriani, 2019). The heart's activity in pumping blood throughout the body cannot be separated from contraction activities (systole) and relaxation (diastole). In this case, there will be an emphasis on blood on the walls of blood vessels. Systolic pressure is the pressure that the blood exerts on the arteries when the heart pumps forcefully so that blood enters the arteries. The systolic period is characterized by the heart contracting so that blood exits towards the arteries. Diastolic pressure is the minimum pressure inside the artery as blood exits towards the end of a small vessel. The heart also undergoes relaxation and replenishment of the blood, referred to as the diastolic period.

Hypertension is a condition where the blood pressure in the main arteries in the body is too high (Syahrini, Susanto, & Udiyono, 2012). This blood pressure is the force exerted by the heart when it contracts so that blood can flow inside the arteries. When the heart pumps too vigorously, the blood pressure will be stronger to press on the arteries. High and low blood pressure can be affected by the quality of blood vessels, the quality of the blood pumped, and the strength of the weak heart when contracting. Based on the opinions above, hypertension can be interpreted as an increase in blood pressure of systole and diastole given to arteries above the standard limit.

High blood pressure or hypertension is caused by several factors, including stress levels, sleep patterns, diet, and cardiovascular organ health conditions (Luthfil & Holidah, 2018). Another explains that hypertension is caused by internal factors such as gender, age, genetics, and external factors such as diet and exercise (Sartik, Tjekyan, & Zulkarnain, 2017). A person who enters the elderly period will experience a decrease in the physiological functioning of the cardiovascular organs. The decline in cardiovascular function in people with hypertension is seen in the condition of disturbed blood vessels. The walls of the arterial and venous vessels consist of three layers: tunica intima, tunica media, and tunica adventitia. Tunica intima is on the inner side of the blood vessel in direct contact with the blood. Tunica media is in the middle and contains smooth muscles that regulate vasodilating and vasoconstriction blood vessels. In the outermost layer of blood vessels, there is a layer of tunica adventitia which contains connective tissue that is integrated with other organs such as nerves, muscles, and other organs around it.

In people with hypertension, tunica intima experiences many cholesterol blockages and metabolic waste that makes the blood vessel holes narrow and causes blood to be difficult to flow, causing blood pressure to increase. Blood vessels in people with hypertension experience blockage by bad fat (LDL), which sticks to the blood vessel wall and causes it to inhibits blood flow. Furthermore, bad fats that stick to the walls of blood vessels make them inelastic, causing the vessels to be difficult to expand and wrinkle. If the heart contracts, it pumps blood throughout the body, but the condition of the blood vessels is stiff and narrowed, which will cause the blood flow pressure to become stronger. The condition will firmly compress the walls of blood vessels that cause hypertension.

Massage has many benefits for the body when done properly and correctly. According to (Anggriawan, Kushartanti, Choeibuakaew, & Yuniana, 2022), the physiological effects obtained after a massage include smoothing blood circulation, relaxing muscles, reducing swelling in the chronic phase, and increasing joint space (ROM) (Yuniana et al., 2022). Massage can also relieve pain through the mechanism of excitatory pain inhibition or gate control by producing endorphin hormones (Utomo & Kushartanti, 2019). The use of massage also has a positive impact on improving blood circulation and reducing anxiety and depression (Purwandari & Sari, 2016). It can also affect lymph flow, muscles, nerves, the gastrointestinal tract, and stress. Another physiological effect of massage is to stimulate innervation, especially peripheral nerves, to increase sensitivity to excitatory, increase muscle suppleness so that work power is higher, cleanse and smooth the skin, eliminate nerve tension so as to reduce pain, and improve blood circulation (Patria & Haryani, 2019). Based on the above opinion, it is stated that massage can quicken the blood vessels. Abnormal blood circulation due to obstructions such as lime and cholesterol in the blood vessels causes high blood pressure.

The massage therapy treatment was expected to be able to improve blood circulation and reduce high blood pressure. In people with hypertension, blood vessels will experience stiffness due to blockage from bad cholesterol or other metabolic waste. Bad cholesterol that accumulates on the inner side surface

of the blood vessels will cause the cross-sectional area of the blood vessels to narrow, which results in blood being difficult to flow. Blockages that accumulate will cause the blood pressure that flows to be more significant in the blood vessels. Massage can help reduce the stiffness of blood vessels so that blood pressure can be reduced. The stress carried out during massage treatment can cause muscles to relax, stimulating the sympathetic and parasympathetic nerves so that blood vessels can undergo vaso dilatation which causes blood vessels to dilate, leading to a blood pressure drop. Sympathetic and parasympathetic nerves are autonomic nerves that have a prominent role in controlling blood pressure (Yonata & Pratama, 2016). In addition, muscle relaxation can also stimulate the appearance of oxytocin produced in the hypothalamus, which results in decreased stress so that the body experiences relaxation (Muller, Ekström, Harlén, Lindmark, & Handlin, 2016). Based on the opinions of the above experts, it can be concluded that the physiological benefits of massage can relax the muscles and cardiovascular organs and cause blood pressure to decrease.

The second treatment in this study was stretching exercises for people with hypertension. Stretching is part of the modality of the exercise program for rehabilitation and injury prevention (Wong & Figueroa, 2014). Stretching is the movement of stretching certain parts of the body to prepare the body for sports activities. Based on the expert opinion described above, the notion of stretching is a process of stretching activities of body parts aimed at carrying out physiological changes that are prepared for sports activities and can also be a means of the modality of injury prevention rehabilitation therapy.

Stretching exercises have many benefits for the body. Stretching strengthens muscles, increases body flexibility, and improves blood pressure (Suryati, Resti, & Khairina, 2017). Repulsion exercises can stretch the sympathetic and parasympathetic nerves so that vaso dilatation occurs in the blood vessels making blood circulation smooth (Astuti, Sudiana, & Haryanto, 2017). Stretching can increase muscle flexibility to reduce muscle stiffness (Bahadoran, Pouya, Zolaktaf, & Taebi, 2015). Based on the above opinions, it can be concluded that repulsion exercises can increase the flexibility of the organ.

People with hypertension will experience stiffness in the muscles, joints, and blood vessels that eventually lead blood vessels to be difficult to dilate or become narrow and causes blood pressure to rise (Nishiwaki, Yonemura, Kurobe, & Matsumoto, 2015). Then it is necessary to do stretching exercises to relax the muscle organs, joints, and blood vessels. When the muscle relaxes, it will produce a mechanism of shear stress and the release of Nitrite Oxide-endothelium derivatives which trigger the vessels to experience vaso dilatation so that blood vessels dilate and blood pressure will decrease (Anjarsari, Hanan, & Widiani, 2021). The repulsion exercise treatment can cause blood vessels and other organs to be more elastic and experience relaxation that stimulates the parasympathetic nerves so that vasodilation occurs so that blood pressure will decrease (Tyani, Utomo, & Hasneli, 2015).

CONCLUSIONS

The study results showed that the systole and diastole blood pressure from the first to the third day were seen to have decreased significantly. Massage for 20 minutes combined with stretching for 20 minutes can reduce systolic blood pressure was 12.90% and diastolic blood pressure was 11.50%. Thus, this article concludes that the Ali Satia Graha therapy combined with stretching had been proven effective in reducing systole and diastole blood pressure in older people aged 50-70 years with hypertension levels 1 and 2. Massage therapy combined with stretching can be an alternative treatment for people with hypertension.

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