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Progressive Muscle Relaxation Combined with Lavender Aromatherapy: A Nursing Approach to Blood Pressure Control in Elderly

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Abstract:
Hypertension remains a common health problem in the elderly and often requires additional non-pharmacological interventions in addition to pharmacological treatment. This study aims to be able to evaluate the effect of progressive muscle relaxation combined with lavender aromatherapy on systolic and diastolic blood pressure in the elderly with hypertension. This quantitative research uses a pre-experimental design of one pretest-posttest group. The target population consists of elderly people with hypertension who live in Balapulang Wetan Village, Indonesia. A total of 23 participants were selected as research samples through proportional random sampling in all environmental units or RWs. All selected participants underwent progressive muscle relaxation exercises with a combination of lavender aromatherapy, performed once a day for three consecutive days. Lavender essential oil with 15 drops dissolved in 30 mL of water is given using a diffuser at each session. Blood pressure was measured before and after the intervention using a digital sphygmomanometer. Data was analyzed with a pair of sample t-tests. The results of the study indicate a statistically significant decrease in systolic and diastolic blood pressure after the intervention or $p < 0.05$. The combination of progressive muscle relaxation and lavender aromatherapy has been proven to reduce blood pressure in the elderly with hypertension and can be used as an effective non-pharmacological nursing intervention.

Keywords: Elderly, Hypertension, Lavender aromatherapy, Progressive muscle relaxation, Nursing intervention

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INTRODUCTION

Hypertension is still a significant global health problem with the incidence rate continuing to increase gradually in all age groups. Based on data from the World Health Organization (WHO), around 33% of adults aged 30-79 years worldwide have hypertension. The burden of this problem is expected to continue to increase in line with the increase in population and the aging process of the global population as the elderly group will occupy an increasingly large portion of the population structure (World Health Organization, 2023a). Hypertension is projected to be one of the leading causes of death with an estimated 76 million deaths in the period 2023 to 2050 and by 2025 it is estimated that around 29% of the adult population worldwide will suffer from hypertension (Apriyeni et al., 2023; World Health Organization, 2023b).

In Indonesia itself, hypertension has become a very serious public health problem. In 2019, the prevalence of hypertension in adults aged 30-79 years who were adjusted according to age reached about 35% higher than the global average. Of the approximately 51.3 million adults in Indonesia living with hypertension, only 36% have been diagnosed, 19% are undergoing treatment, and only 4% have managed to control blood pressure well which is an indication of a large gap in the detection and treatment of hypertension (World Health Organization, 2023a). Central Java Province recorded one of the highest proportions of the elderly population suffering from hypertension at 32.5%. In Tegal Regency in 2023, there were 105,005 cases of hypertension with a reported prevalence of 81.32% (Ministry of Health, 2023). Local data from the Balapulang Community Health Center is also a clue that Balapulang Wetan Village has 810 residents who have been diagnosed with hypertension which is included in a large proportion of elderly residents.

Hypertension management focuses on efforts to reduce blood pressure using pharmacological and non-pharmacological approaches. Pharmacological therapy usually uses antihypertensive drugs such as hydrochlorothiazide (35.5%), captopril (26.2%), valsartan (20.6%), and amlodipine (15.2%) (Widyastuti et al., 2022). However, long-term drug use is often limited by the appearance of side effects, patient decision problems, and treatment cost considerations. Therefore, hypertension management is currently increasingly focused on incorporating non-pharmacological interventions as a supporting strategy to help control blood pressure more optimally and strengthen self-care practices (Putro et al., 2019).

From a behavioral and physiological point of view, a non-pharmacological intervention that focuses on stress reduction is grounded in the theory of psychophysiological stress response. This theory provides an explanation for psychological stress activating the sympathetic nervous system as well as the hypothalamic-pituitary-adrenal axis so that there is an increase in vascular resistance and an increase in blood pressure. Through interventions that provide a boost to relaxation conditions, the stress response is given the hope that it can be suppressed, the activity of the parasympathetic system can be increased, and ultimately contribute to lowering blood pressure (Gianaros & Wager, 2015).

Progressive Muscle Relaxation (PMR) is a behavioral relaxation technique whose goal is to reduce the stimulation of the autonomic system by relaxing and releasing muscles in a structured and gradual manner. Various previous studies have provided instructions on the application of PMR to be able to produce relaxation conditions, reduce narrowing of blood vessels, reduce the workload of the heart, and help reduce blood pressure (Rimadia & Khoiriyah, 2023; Rosdiana & Cahyati, 2019). However, the application of PMR requires constant attention and concentration and the level of effectiveness can vary from individual to individual. To enhance its effects, PMR may be combined with complementary sensory-based interventions. Lavender aromatherapy has been widely recognized for its stress-reducing and relaxation-inducing properties. Its bioactive components, such as linalool and linalyl acetate, act on the limbic system to modulate emotional responses and autonomic nervous system activity, thereby promoting relaxation and calmness (Pratiwi et al., 2024; Rini, 2020). Previous research has shown that lavender aromatherapy can alleviate anxiety, improve sleep quality, and enhance the relaxation effect of other therapeutic interventions (Yuli Astuti et al., 2024). Lavender was selected in this study because the administration of lavender aromatherapy for 15 minutes could affect the limbic system and cause a relaxation effect which made the heart works slower in pumping blood throughout the body and lowering the blood pressure of the respondent. The effect of aromatherapy is positive because of its fresh and fragrant scent which triggers human's sensory and caused an effect in organs that resulted in a strong effect on emotion (Rahmadhani, 2022).

Despite evidence supporting the individual benefits of progressive muscle relaxation and lavender aromatherapy in reducing blood pressure, evidence regarding their combined application particularly in community-based settings among elderly populations remains limited. Preliminary observations from the Balapulang Community Health Center further indicated that many elderly individuals with hypertension continued to experience suboptimal blood pressure control despite regular pharmacological treatment and had limited awareness of complementary non-pharmacological options. Therefore, this study aimed to examine the association of progressive muscle relaxation

combined with lavender aromatherapy with blood pressure among elderly individuals with hypertension in Balapulang Wetan Village.

METHODS

Study Design

This study employed a quantitative approach using a pre-experimental, one-group pretest-posttest design. This design was chosen to evaluate changes in outcomes before and after the intervention within the same group, thereby assessing the effect of the combined therapy. This research was carried out in Balapulang Wetan Village, Tegal Regency, Indonesia on May 9 to 11, 2025. Although this study did not use a randomized controlled trial design, the researcher still applied the principles of experimental design by being able to maintain validity through standardized intervention procedures and controlled measurement conditions.

Population and Sample

The population of this study was 343 elderly people with a diagnosis of hypertension who lived in Balapulang Wetan Village, Indonesia. The data of prospective participants can be obtained from the health records of the Balapulang Health Center, then the health worker verifies it through routine health visits. A total of 23 steering respondents were determined by proportional random sampling technique so that the elderly who have met the criteria of each Rukun Warga (RW) are represented in a balanced manner according to the number of the elderly population with hypertension in each region. The selection of participants is carried out through a drawing process for individuals who have met the inclusion criteria in each RW. This procedure was applied specifically to determine the sample and was not used in the distribution of interventions because all participants were given the same intervention.

Participant recruitment was carried out in the community of Balapulang Wetan Village through coordination with local health workers and community leaders. Data collection and implementation of interventions were carried out at participants' homes as well as at designated public health facilities in the village. The sample size was determined by the slovin formula: $n = \frac{N}{1+N\,(e)^2}$where N represents the total population and e is the margin of error. With a population of 343 elderly people who are hypertensive and have a margin of error of 20% or e = 0.2, the minimum sample size required is 23 respondents. Post hoc strength analysis was carried out using G Power software version 3.1. Based on the paired t-test, the effect size calculated was dz = 1.80 for systolic blood pressure and dz = 1.35 for diastolic blood pressure. With a total of 23 respondents and a significance level of 0.05, the statistical strength obtained exceeded 0.99 by being a sign that the sample size was more than enough (Lakens, 2022).

The inclusion criteria include patients aged 60-75 years who have been diagnosed with hypertension, routinely take the same type and dose of antihypertensive drugs, and give a statement of willingness to participate through giving approval after explanation. The exclusion criteria include the presence of cognitive impairment or inability to follow instructions, the appearance of acute illness during the intervention period, sensory limitations such as severe hearing or vision impairment, and a history of allergy to aromatherapy ingredients. Because the intervention had a minimal level of risk and the duration of the study was relatively short, the interim analysis and the discontinuation guidelines were not implemented. The trial will still be carried out according to the initial design after the target sample number has been met.

Instruments

Four sets of instruments and materials were used during the intervention:

1. Digital sphygmomanometer (Omron HEM-8712) for blood pressure measurement
2. Lavender essential oil and aromatherapy diffuser
3. Power bank as an energy source for the diffuser
4. Standard Operating Procedures (SOPs) for the combined therapy, along with observation sheets for demographic and blood pressure data

Intervention

The intervention was carried out by performing a combination of Progressive Muscle Relaxation (PMR) and lavender aromatherapy which was given once daily for three consecutive days. Blood pressure measurements are carried out before the implementation of the first intervention session or pretest and after the last session is completed or posttest to be able to assess changes in systolic and diastolic blood pressure.

Progressive Muscle Relaxation (PMR)

Each intervention session is carried out for about 20-25 minutes in the morning between 08.00 to 10.00. Participants sit comfortably in a quiet environment. Interventions are given individually and are directly guided by a trained enumerator who has a nursing background and has received prior instruction on standard PMR protocols. The PMR procedure is performed in a structured sequence, tensing and relaxing the main muscle groups, starting from the legs and moving upwards through the calves, thighs, abdomen, arms, shoulders, neck, to facial muscles. Each muscle group is tense for 5-10 seconds with a relaxation phase of 15-20 seconds while doing controlled breathing to provide ease of the relaxation process.

Lavender Aromatherapy

Lavender aromatherapy was given at the same time as the implementation of PMR using lavender essential oil which was spread through an electric diffuser placed about one meter from the participants. In each session, 15 drops of lavender essential oil are mixed into 30 mL of water. During the PMR session, the diffuser is run continuously to be able to provide certainty that participants receive consistent exposure to aromatherapy.

To provide increased compliance, the researcher explained the oral exploration clearly to the participants before the intervention began and each session was supervised directly by the enumerator so that the procedure was carried out correctly. Participants were also reminded in advance about the schedule for the implementation of the intervention. No incentives are given because participation is voluntary and the interventions carried out have minimal risks.

Assignment Method

The assignment unit in this study was individual participants where each elderly received a combined intervention of PMR and lavender aromatherapy. Participants were selected from a population of 343 elderly people with hypertension using proportional sampling techniques and the selection in each RW was carried out through lots. Because all selected participants were involved in the design of a one-group pretest posttest, no control group was used. The potential for bias is minimized by standard-compliant intervention procedures, enumerator training, and objective blood pressure measurement using a calibrated digital sphygmomanometer while basic characteristic data such as age, sex, and baseline blood pressure are recorded to allow the evaluation of disruptive factors.

Blinding

Because the interventions given are behavioral and involve sensory stimuli, participants and enumerators cannot be blinded. To be able to minimize assessment bias, the results of the study were assessed through objective blood pressure measurement using a calibrated digital sphygmomanometer. Enumerators implement standard protocols both in the implementation of interventions and in the data collection process so that consistency is maintained and potential can be reduced.

Outcomes

The main results of this study were changes in systolic and diastolic blood pressure calculated from the initial condition to the end of the three-day intervention period, which were measured using an automated calibrated and validated sphygmomanometer (Omron HEM-8712). To be able to control

confounding factors that may affect the results, the researcher asked participants to maintain their diet and medication regimen as usual during the study period. In addition, during the initial measurement, the researcher collected information about the drugs being consumed, the latest changes in diet, and the participants' lifestyle factors.

Harms

During the intervention, the researcher did not make any estimates or findings of serious adverse events. Participants received an explanation regarding the possibility of mild discomfort such as temporary dizziness or mild headaches that can occur due to exposure to aromatherapy. They were allowed to discontinue participation at any time if discomfort occurred. Throughout the sessions, researchers and enumerators monitored participants for signs of adverse reactions, and no harms were reported.

Data Analysis

Because the sample size was fewer than 50 participants, the Shapiro–Wilk test was used to test data normality. Results indicated a normal distribution (p value > 0.05) for both pre-test and post-test systolic and diastolic blood pressure. Therefore, the Paired Sample t-test was used to analyze the differences in blood pressure before and after the intervention.

All participants completed both pre- and post-intervention measurements; therefore, no missing data handling was required. No subgroup or sensitivity analyses were conducted, and no adjustment for multiplicity was needed because only one primary outcome was analyzed. Statistical significance was set at $p < 0.05$.

Ethical Considerations

This study was registered in the Indonesia Clinical Research Registry (INA-CRR) under code INA-4914807. Ethical approval was obtained from the Faculty of Health Sciences, Bhamada Slawi University (No. 418/FIK. UNIV. BMD/HM/IV/2025) and from the Health Research Ethics Committee (KEPK) of Bhamada Slawi University (Ethics No. 051/Univ.Bhamada/KEP. EC/V/2025). All participants provided informed consent. The research adhered to the ethical principles of the Council for International Organizations of Medical Sciences (CIOMS), including respect for persons, beneficence, non-maleficence, and justice.

The trial protocol and statistical analysis plan can first be approved by the trial steering committee before the participant registration process is carried out. In order to maintain confidentiality, these documents are not opened for public access. However, the main aspects of the trial design including the randomization process, the measured results, and the analysis plan have been described in detail and clearly in this Methods section.

Patient and Public Involvement

Health workers from the Balapulang Health Center can help identify hypertension prevalence and access facilities to participants who meet the criteria. In addition, four nursing students were assigned as enumerators for the implementation of the intervention. Prior to data collection, the enumerators received detailed explanations and practical training regarding research protocols and procedures. No patients or members of the public were directly involved in the study design, data analysis, or reporting of the results of the study.

Site and Intervention Provider Eligibility

This research was carried out in collaboration with the Balulangang Health Center, which is a primary health service facility that runs a structured program for hypertension management efforts in elderly patients. The researcher chose this location because the Balapulang Health Center plays an active role in screening and handling hypertension activities based on the community.

The individuals who carried out the intervention were four final year nursing students with the

role of enumerators. Researchers selected them based on their clinical training background as well as experience in the field of public health nursing. Before the study was carried out, all enumerators underwent structured training on progressive muscle relaxation procedures and aromatherapy interventions under the supervision of the principal investigator so that standardization and compliance with the implementation of the intervention could be maintained.

Changes to Trial After Commencement

No changes to the trial design, methodology, outcomes, or statistical analyses occurred after the commenced.

RESULTS

This research was carried out on May 9-11, 2025 in Balapulang Wetan Village, Tegal Regency, Indonesia. Researchers identified 343 elderly people who had been diagnosed with hypertension based on registry data from the Balapulang Health Center. The required sample size was calculated using the Slovin formula with an error rate of 5% (α = 0.05) so that a sample number of 23 respondents was obtained. The proportional random sampling technique was applied to all RWs in the village and details of the sample allocation are available in Table 1. From each RW, participants were selected randomly by drawing lots. All 23 selected participants provided written informed consent, completed the three-day combined intervention, and were included in the final analysis (no losses to follow-up). The participant is illustrated in Figure 1.

Table 1. Proportional Distribution of Sample Across RW

PC	Total Elderly with Hypertension	Assigned Sample	Proportional Calculation
01	40	3	$\frac{40 \times 23}{343} = 2.68$
02	62	4	$\frac{62 \times 23}{343} = 4.15$
03	35	2	$\frac{35 \times 23}{343} = 2.34$
04	39	3	$\frac{39 \times 23}{343} = 2.61$
05	45	3	$\frac{45 \times 23}{343} = 3.01$
06	29	2	$\frac{29 \times 23}{343} = 1.94$
07	25	2	$\frac{25 \times 23}{343} = 1.67$
08	20	1	$\frac{20 \times 23}{343} = 1.34$
09	31	2	$\frac{31 \times 23}{343} = 2.07$
10	17	1	$\frac{17 \times 23}{343} = 1.13$
	Total	23	

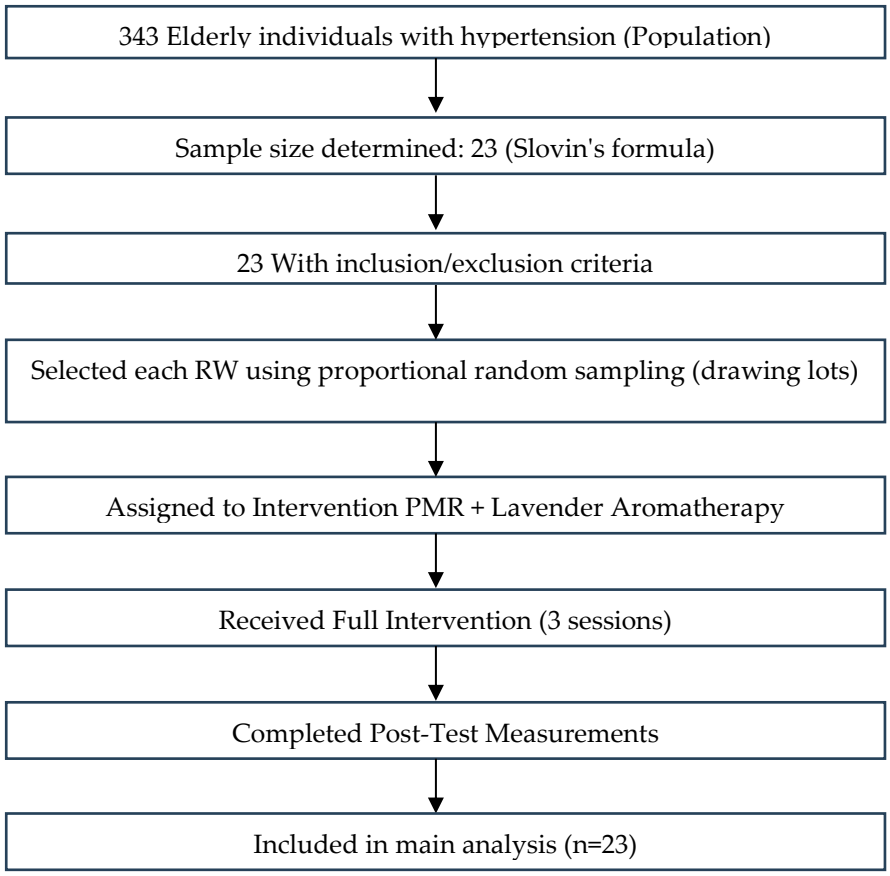

Figure 1. TREND Flow Diagram of Study Protocol

The combined intervention of progressive muscle relaxation or PMR and lavender aromatherapy was carried out by the principal investigator with the help of a trained enumerator. Each session is conducted for about 30 minutes per day for three consecutive days. Interventions can follow the protocol that has been determined: PMR is guided in stages through audiovisual instructions then participants inhale three drops of lavender essential oil using a diffuser. Attendance, and compliance of participants are recorded using a daily checklist. Compliance with protocols is maintained through standard instruction sheets and direct supervision by the principal investigator in each session. There were no protocol deviations or side effects in the discovery.

During the study period, the researchers instructed participants to continue their daily routine as usual and not to start using new antihypertensive drugs, diet programs, or relaxation techniques. The monitoring process was carried out to ensure that there were no additional interventions or contamination during the study. This intervention was assessed as safe and well tolerated and no serious adverse events or participants who withdrew from the study were found.

Demographic Characteristics

Most of the participants were in the age range of 70-79 years (57%), while the other 43% were in the 60-69 age group. Based on gender, women were able to dominate the research sample with a proportion of 87% while men only reached 13%. These findings indicate that the research is dominated by elderly individuals with a much larger proportion of women than men (Table 2.).

Table 2. Demographic Characteristics of Patients with Hypertension

	Frequency	%
Age		
Young old (60-69)	10	43%
Old (70-79)	13	57%
Sex		
Male	3	13%
Female	20	87%

Pretest Blood Pressure

Before the intervention was carried out, the participants' systolic blood pressure had an average of 165.00 ± 21.42 mmHg while the average diastolic blood pressure was recorded at 95.13 ± 11.65 mmHg. Based on this value, participants were categorized as people with 2nd degree or moderate hypertension. The details of the measurement results are shown in Table 3.

Table 3. Pre-test Blood Pressure Data

	N	Min	Max	Red ± SD
Systolic Blood Pressure	23	133	211	165.00 ± 21.42
Diastolic Blood Pressure	23	70	118	95.13 ± 11.65

Posttest Blood Pressure

After the intervention was administered for three days, the average systolic blood pressure of the participants decreased to 143.22 ± 15.76 mmHg, while the average diastolic blood pressure decreased by 83.57 ± 7.42 mmHg. This value is included in the category of level 1 or mild hypertension so it provides instructions for combination therapy to have a relationship with a decrease in blood pressure (Table 4).

Table 4. Posttest Blood Pressure Data

	N	Min	Max	Red ± SD
Systolic Blood Pressure Posttest	23	121	180	143.22 ± 15.76
Diastolic Blood Pressure Posttest	23	66	101	83.57 ± 7.42

Effect of the Combined Therapy

The results of the analysis of the paired sample t-test indicate a statistically significant difference between blood pressure before and after the intervention. The average systolic blood pressure decreased by 21.78 mmHG ($p < 0.001$) while the mean diastolic blood pressure decreased by 11.56 mmHg ($p < 0.001$). These findings are indicative of a significant decrease in systolic and diastolic blood pressure in elderly participants produced by a combination of Progressive Muscle Relaxation and lavender aromatherapy. Details of the results of the analysis are presented in Table 5.

Table 5. Comparison of Pretest and Posttest Blood Pressure

	Red	SD	t	Sig. (2-tailed)
Systolic-Diastolic pre-test	165.00-143.22	12.124	8.616	.000
Systolic-Diastolic Posttest	95.13-83.57	8.586	6.460	.000

This study did not conduct a subgroup analysis or sensitivity analysis. All analyses were carried out in accordance with the plan that had been previously determined with emphasis only on the main outcomes in the form of changes in systolic and diastolic blood pressure before and after the intervention.

DISCUSSION

The results of this study provide clues that most of the elderly participants in Balapulang Wetan

Village experienced moderate hypertension before being given intervention with an average systolic blood pressure of 165 mmHg and an average diastolic blood pressure of 95 mmHg, so it is included in the category of Level 2 hypertension. This condition is generally marked by various complaints such as dizziness, ringing in the ears, sleep disturbances, shortness of breath, stiffness in the neck, fatigue, visual disturbances, and nosebleeds that occur occasionally. The findings are in line with the results of previous studies that stated that uncontrolled hypertension in the elderly group can increase the risk of severe complications such as kidney failure, myocardial infarction, stroke, and hypertensive encephalopathy (Arifiani & Fijianto, 2021). Some participants also reported complaints of dizziness, frequent urination at night, and stiff necks, which are known as typical symptoms of chronic hypertension and are early signs of damage to blood vessels (Lukitaningtyas & Cahyono, 2023).

The difference in blood pressure values before the test with a range from normal-high to severe hypertension may be influenced by the individual's health condition, adherence to medication, anxiety during measurements, physical activity, and diet before data collection. Most of the participants had not previously undergone non-pharmacological therapy and were more likely to trust the antihypertensive drug. Lifestyle factors such as excessive salt consumption, sedentary behavior, smoking, caffeine and alcohol consumption, obesity, and stress are the main contributors to hypertension in the elderly population (Aminiyah et al., 2022; Hidayati et al., 2022; Makawekes et al., 2020; Sutamiyanti et al., 2020). Such a high intake of sodium can provide an increase in blood volume through fluid retention, while a lack of physical activity is the cause of weight gain and increased cardiac workload. In addition, smoking and caffeine consumption trigger vasoconstriction and increased heart rate, while psychological stress activates the sympathetic system that provides narrowing of blood vessels. All of these factors together increase the risk of hypertension and make it difficult to manage in the elderly. International evidence supports these findings because overactivation of sympathetic systems associated with stress and lifestyle factors has been identified as a major mechanism of causing persistent hypertension in the elderly. Thus, relaxation-based interventions that target physiological and psychological stress pathways are recommended as an effective additional strategy in efforts to manage hypertension (Chen et al., 2025).

After progressive muscle relaxation and lavender aromatherapy were applied, the participants' systolic and diastolic blood pressure decreased significantly with average post-test values of 143.22 mmHg and 83.57 mmHg, respectively, which were included in the category of grade 1 (mild) hypertension. These findings provide an indication that the interventions given are able to lower blood pressure effectively. Although degree 1 hypertension is generally only accompanied by mild symptoms such as mild headaches, tension in the neck, and fatigue, this condition still has a considerable risk if not controlled because it can develop into more severe hypertension and has the potential to cause cardiovascular complications, kidney disorders, and cerebrovascular problems (Lukitaningtyas & Cahyono, 2023). These findings are in line with the results of a systematic review and meta-analysis that reports that progressive muscle relaxation is able to significantly lower blood pressure through suppression of sympathetic nervous system activity and increased vascular adherence more specifically in the elderly age group (Yoo et al., 2022).

Some participants even managed to achieve normal blood pressure after the intervention or 121/66 mmHg which is a combination therapy guideline that gives optimal results when the participants are able to focus and follow the relaxation procedure correctly. However, some participants still experienced high blood pressure of up to 180/101 mmHg despite having undergone the intervention and the likely cause was a decrease in concentration during exercise which was the limit of relaxation effectiveness (Wulandari & Samara, 2023 ; Rosdiana & Cahyati, 2019). Providing an emphasis on progressive muscle relaxation requires full concentration to provide optimal results and its effectiveness can vary depending on the level of mental involvement of each individual. To support these findings, structured PMR has been shown to provide increased parasympathetic system activation and autonomic balance with results that are highly dependent on participant participation and their adherence to intervention protocols (Yoo et al., 2022).

Most participants stated that they routinely took amlodipine at night as recommended by health

professionals and this condition has the potential to affect post-test measurement results. Amlodipin is a long-acting calcium channel blocker with a half-life of elimination of about 35 to 50 hours so that its antihypertensive effect but lasts more than 24 hours after the drug is administered (Wang et al., (2023). Therefore, the observation of blood pressure reduction may be influenced by a combination of pharmacological and non-pharmacological therapies applied simultaneously. The application of pharmacological therapy combined with non-pharmacological interventions is also supported by various international studies which are guidelines for integrated treatment approaches that can provide more optimal and sustainable blood pressure control compared to the use of drug therapy alone (Chen et al., 2025).

Statistical analysis provides indications that combination therapy will have a significant impact. Systolic blood pressure averaged 21.78 mmHg or $p < 0.05$, while average diastolic pressure decreased by 11.56 mmHg or $p < 0.05$. These results provide confirmation that even short-term application of progressive muscle relaxation and lavender aromatherapy can yield measurable physiological benefits. These results are in line with the findings (Aminiyah et al., 2022) which provides instructions for non-pharmacological interventions that are carried out consistently can effectively support drugs in controlling blood pressure in the elderly. The addition of a sunny lavender aromatherapy can amplify the effect. A recent meta-analysis by Kim et al. (2023) found that lavender aromatherapy significantly reduced blood pressure and anxiety levels by modulating the limbic system and suppressing sympathetic nervous system activity (Kim et al., 2021).

During the implementation of interventions, some pesert requires more intensive repetition of instructions and supervision in order to carry out each stage correctly. These findings reinforce previous evidence that Progressive Muscle Relaxation (PMR) requires structured guidance for the achievement of optimal relaxation conditions. However, when PMR is combined with lavender aromatherapy, it makes the implementation process easier because the scent of lavender provides a calming sensory effect. Lavender is known to contain active compounds such as linalool and linalyl acetate which act on the limbric system and autonomic nervous system so that it triggers a sense of relaxation, a decrease in stress levels, and a slowdown in heart rate (Rini, 2020).

The strategic combination of progressive muscle relaxation and lavender aromatherapy provides benefits both physiologically and psychologically. Progressive muscle relaxation provides a decrease in sympathetic system activity, a reduction in muscle tension, and an increase in vasodilation, while lavender aromatherapy is able to stimulate the parasympathetic system through olfactory stimulation, a boost of emotional calmness and cardiovascular stability. Together, these two mechanisms support each other in the creation of homeostats and contribute to lowering blood pressure. These findings are in line with previous research that provides clues that lavender aromatherapy has a significant effect on efforts to reduce systolic and diastolic blood pressure in patients with essential hypertension. Evidence is also a clue to lavender aromatherapy through the relaxation and sedative effects on the autonomic system by significantly lowering blood pressure, so that there is support for the effectiveness of combining aromatherapy with relaxation techniques (Rahmadhani, 2022).

Although not all participants gave instructions for a large reduction in blood pressure, the results were still generally able to show consistent improvement. This variation in response may be influenced by differences in individual health conditions, participation levels, and sensitivity of individual participants to the intervention. Despite the absence of side effects and ease of implementation, providing combination therapy instructions is a safe, practical, and effective non-pharmacological approach for the management of hypertension in the elderly. Other research also confirms that combining complementary therapy with pharmacological treatment can provide improved overall health outcomes and boost self-care practices in efforts to manage chronic diseases such as hypertension (Putro et al., 2019).

In conclusion, this study can provide a combination of progressive muscle relaxation and lavender aromatherapy as an effective, safe, and applicable non-pharmacological intervention form to lower blood pressure in the elderly group. This intervention not only triggers physiological relaxation, but also provides a sense of psychological comfort so that there is support for the management of

hypertension historically. In the future, further research is given suggestions to be able to assess the long-term impact of this intervention and assess the opportunities for its integration into community-based elderly health programs.

The main limitation in this study lies in the use of a pretest-postest design of one group without a control group so that the drawing of causal conclusions is limited because the decrease in blood pressure that occurs can also be influenced by other factors such as medication adherence, diet, and psychological condition of the participants. However, this study still applies standardized intervention procedures and uses validated measurement instruments so that the internal validity of the research results can be improved. Thus, the next researcher is advised to be able to use a randomized controlled trial design with a larger number of samples and more religious characteristics of respondents to confirm and expand the findings of this study.

CONCLUSION

The results of this study were able to show that after participants received a combination therapy of progressive muscle relaxation and lavender aromatherapy, their blood pressure decreased from level 2 hypertension (Moderate) to level 1 hypertension (Mild). This decrease is an indication that combination therapy is able to provide a significant reduction in systolic and diastolic blood pressure in the elderly. In addition to producing physiological relaxation, this intervention also provides a sense of psychological comfort so that it can support the application of a holistic approach in efforts to manage hypertension. Therefore, follow-up research is suggested to examine the long-term impact of this therapy and explore the possibility of integrating it into community-based elderly health programs.

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AUTHOR CONTRIBUTIONS

E.D.P. plays the role of Principal Researcher with the task of formulating research questions, supervising the implementation of experiments, and providing critical revisions to manuscripts. In addition, E.D.P. is responsible for ensuring the integrity of research and the accuracy of the results obtained. The intervention was carried out by A.R. who also analyzed the data and contributed to the interpretation of the research results. Meanwhile, the A.S.S. is involved in the data collection process, providing technical support, contributing to the initial data analysis, conducting literature reviews, and assisting in the preparation of background information used in compiling manuscripts.

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CONFLICT OF INTEREST

The authors declare that there are no financial or non-financial conflicts of interest related to this study.

DATA AVAILABILITY STATEMENT

The dataset generated and analyzed during the current study is openly available in Zenodo at the following DOI:

Eka, D. P. (2025). Dataset of Blood Pressure of the Elderly in Balapulang Wetan Village 2025 [Dataset]. Zenodo. https://doi.org/10.5281/zenodo.17466570

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