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Analysis Of Family Nursing Care With Progressive Muscle Relaxation Innovation Interventions To Reduce Blood Pressure In Elderly People With Hypertension

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ABSTRACTS

Background : Hypertension is a prevalent condition among the elderly, characterized by blood pressure exceeding 140/90 mmHg. Globally, 7 out of 10 elderly individuals are affected, with over 50% of elderly people in Indonesia suffering from hypertension, contributing to significant morbidity and mortality, including 427,218 deaths annually in Indonesia. **Objective:** This study aims to evaluate the effectiveness of family nursing care with Progressive Muscle Relaxation (PMR) interventions in managing hypertension among elderly individuals. **Methods :** A case study was conducted with two elderly individuals, involving health counseling, diet modifications, and support for hypertension management. **Results :** The intervention led to a significant reduction in blood pressure for both participants, as evidenced by a p-value < 0.05 using the Wilcoxon test. **Conclusion :** Family nursing care, including PMR, effectively reduces blood pressure in elderly hypertensive patients, highlighting the importance of non-pharmacological approaches to improve adherence and manage hypertension in this population.

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1. INTRODUCTION

Since 2021, Indonesia has experienced a change in population structure towards aging, with about 1 in 10 of the population being elderly. The elderly population continues to increase, reaching 11.75% of the total population in 2022 [1]. Improving health is key to increasing life expectancy and reducing mortality, with hypertension being one of the main problems [2]. Hypertension, a subset of non-communicable diseases, is a global health issue with 1.4 billion individuals experiencing the condition. In Indonesia, hypertension is the most common NCD, with a prevalence of 33.4%. Although often asymptomatic, hypertension can lead to serious complications such as stroke and myocardial infarction (World Health Organization, 2023b; Arifin dkk. 2022)

Riskesdas (2018) shows that hypertension is a common health problem among older Indonesians, especially in West Java and Depok City. For example, Grogol Village in the UPTD area of Limo Health Center has around 6,827 residents suffering from hypertension according to the Profil Dinas Kesehatan Kota Depok (2022). Hypertension is a serious problem for the elderly, with its impact increasing mortality and worsening the quality of life of sufferers. Every year, hypertension accounts for 9.4 million deaths globally, and in Indonesia, hypertension has caused 427,218 deaths [6].

The high mortality rate due to hypertension is a serious problem in Indonesia. Therefore, cross-sector collaboration, including health professionals and the community, is important in managing hypertension with a focus on early detection, treatment, and control. The goal is to improve quality of life, reduce the risk of complications, prevent disease progression, and reduce disability and mortality from hypertension (Kemenkes 2024; WHO 2023). The management of hypertension requires a lifelong commitment, which currently involves both pharmacological and non-pharmacological therapies. Pharmacological therapies, although effective, often lead to side effects or non-adherence to therapy. Therefore, non-pharmacological approaches are important, especially for the elderly who tend to be less compliant in undergoing hypertension treatment (Pratiwi dkk. 2020).

Research shows that non-pharmacological management has additional benefits with minimal or no risk of side effects, and can help reduce the dose of drugs required and delay the progression of hypertension severity. Therefore, it is important to integrate non-pharmacological approaches along with pharmacological therapy, especially for the elderly

population, to maximize positive outcomes for people with hypertension [10]. One of the non-pharmacological therapies for elderly people with hypertension is managing stress in a healthy way, namely appropriate exercise, positive social contact, and through relaxation techniques. One of the relaxation techniques that has been proven to be efficient in the elderly with hypertension is Progressive Muscle Relaxation (PMR) (Aisyiah dan Wowor 2022).

PMR is a relaxation method that combines breathing exercises with contraction and relaxation of certain muscles. Developed in 1920 by Edmund Jacobson, PMR aims to create physiological and psychological relaxation. Various studies have shown that PMR exercises are effective in reducing blood pressure and disease-related anxiety, including hypertension [12].

An initial study involving 75 elderly people in RW 03 Grogol Village, Limo District showed that the majority suffered from hypertension with complaints such as headaches, dizziness, and pain in the back of the neck or nape. The results of blood pressure checks showed that the majority of elderly people were in the 1st degree hypertension classification with an average blood pressure of 141/91 mmHg, the highest was 205/130 mmHg, and the lowest was 90/60 mmHg, indicating the low implementation of a healthy lifestyle and hypertension management.

To reduce the prevalence of hypertension by 2025, community nurses can adopt approaches that promote self-therapy, such as Progressive Muscle Relaxation (PMR), which has been shown to be effective in lowering blood pressure. Based on the above phenomenon, researchers are interested in validating the effectiveness of PMR in the elderly with hypertension and analyzing the evaluation of PMR on blood pressure reduction in the RW 03 area of Grogol Village, Limo District.

2. METHODS

The study was conducted on two families, involving health counseling, diet, and support for a hypertension treatment program. The application of Progressive Muscle Relaxation (PMR) for reducing blood pressure was carried out over 3 weeks, with a total of 6 sessions. The intervention focused on managing high blood pressure in elderly individuals with hypertension, delivered in 6 sessions over 3 weeks. PMR promotes physiological and psychological relaxation through deep breathing exercises and muscle contraction and relaxation.

3. RESULTS

The results of the assessment and physical examination showed that the blood pressure values in the family of the managed patient (Mrs. N) and the resume patient (Mr. S) were 159/97 mmHg for Mrs. N and 171/107 mmHg for Mr. The PMR intervention, an innovation applied to both primary and resume clients, was adapted to evidence-based nursing practice. The focus of the intervention was the management of high blood pressure in elderly with hypertension, delivered in 6 sessions over 3 weeks.

Table 1. Analysis Results of the Application of Progressive Muscle Relaxation to Reduce Blood Pressure in the Main Management Client Mrs. N.

Blood Pressure (mmHg)	*Mean Pretest*	St. Deviasi	*Mean Postest*	St. Deviasi	*P-Value*
Sistolic	151.00	8.626	147.17	8.750	0.020
Diastolic	91.67	5.007	87.50	3.564	0.026

Source: Researcher Data (2024)

Table 2. Analysis Results of the Application of Progressive Muscle Relaxation to Reduce Blood Pressure in the Resume Client Mr. S.

Blood Pressure (mmHg)	*Mean Pretest*	St. Deviasi	*Mean Postest*	St. Deviasi	*P-Value*
Sistolic	157.17	8.280	153.67	4.926	0.042
Diastolic	95.33	6.088	92.00	2.191	0.026

Source: Researcher Data (2024)

The table above includes data on the distribution of evaluation of interventions from PMR on blood pressure in the elderly, where table 12 shows the results of the analysis of Mrs. N as the main managed client and table 13 shows the results of the analysis of Mr. S as a resume client. S as the resume client. Significant changes in systolic and diastolic blood pressure experienced by managed and resume patients for 2x/week are shown in the table with a description of the results of all p-values that are $< \alpha$ (0.05), which means there are changes in blood pressure that occur before and after undergoing PMR intervention.

Table 3. Comparison of Final Results of Progressive Muscle Relaxation Intervention between Main Management Patients and Resume Patients

No.	Name	Blood Pressure				
		Before Intervention	Classification Before Intervenion	After Intervention	Classification After Intervention	Difference
1.	Mrs. N	155/97 mmHg	*Hypertension Stage 1*	134/84 mmHg	*Pre-Hypertension*	21/13 mmHg
2.	Mr. S	171/107 mmHg	*Hypertension Stage 2*	146/89 mmHg	*Hypertension Stage 1*	25/18 mmHg

Source: Researcher data (2024)

The table above shows the results of blood pressure checks that Mrs. N and Mr. S had at the initial and final meetings. S at the initial meeting and the final meeting. Where Mrs. N who initially had hypertension which was in the stage 1 hypertension classification, changed her classification to pre-hypertension after being given PMR intervention. Meanwhile, the patient's resume, Mr. S, initially had hypertension with a hypertension classification of stage 1. Mr. S, who initially had hypertension with stage 2 hypertension classification, decreased to stage 1 hypertension after being given PMR intervention

4. DISCUSSION

The analysis in this study showed a significant reduction in blood pressure, in accordance with the findings of several previous studies. These studies consistently concluded that twice-weekly PMR exercise can reduce both systolic and diastolic blood pressure, with significant p-values. (Aisyiah & Wowor, 2022; Ermayani dkk., 2020; Pathan dkk., 2023).

This is in line with the theory of Potter dan Perry (2015), which states that progressive muscle relaxation exercises aim to reduce anxiety, muscle tension, and sleep disorders. This exercise induces relaxation to increase parasympathetic nerve activity, which results in arteriolar vasodilation. Progressive muscle relaxation has vasodilatory properties that help dilate blood vessels. This technique is easy to do, does not cause side effects, and can calm the body and mind [11], [15].

The decrease in blood pressure in Mrs. N described in the table above has an average decrease of ± 3.83 mmHg per meeting for systolic, and ± 4.17 mmHg for diastolic. While in table 13 it can be concluded that there was a decrease in blood pressure in Mr. S by ± 3.5 mmHg. S by ± 3.5 mmHg for systolic, and ± 3.33 mmHg for diastolic. These results are in line

with the research of Ermayani dkk. (2020) with a statement in his research that there were changes in systolic blood pressure by ± 5 mmHg and diastolic by ± 3.5 mmHg before and after the intervention. Similar results were also confirmed by the research of Ratnawati and Rosiana (2020) who also experienced a decrease in systolic blood pressure by 5 mmHg, and diastolic by 4 mmHg.

These changes occur because PMR intervention is a relaxation technique that combines breathing exercises with contraction and relaxation of certain muscles. Progressive muscle relaxation stimulates changes in blood pressure in hypertensive patients by relieving muscle tension. This relaxation response is closely related to the Hypothalamus-Pituitary-Adrenal (HPA) axis, where muscle relaxation can reduce the secretion of CRH and ACTH hormones in the hypothalamus, inhibit the release of adrenaline and nonadrenaline, reduce heart rate, dilate blood vessels, and reduce heart arterial blood pressure and total peripheral resistance [11].

Although both patients experienced a one-level decrease in the hypertension classification, there was a difference in the difference in blood pressure check results at the beginning and end of the meeting. In this case, the difference showed that Mrs. N had a smaller decrease in blood pressure compared to Mr. N. compared to Mr. S.

Mrs. N had a decrease of 21 mmHg in systolic blood pressure, while Mr. S had a decrease of 25 mmHg. S experienced a decrease of 25 mmHg. Like wise in diastolic blood pressure, where Mrs. N experienced a decrease of 13 mmHg, while Mr. S experienced a decrease of 18 mmHg. S experienced a decrease of 18 mmHg. This difference may be due to different lifestyles between the two patients.

Mrs. N's family statement indicated that Mrs. N was still not compliant in reducing salt consumption and maintaining a balanced diet, despite receiving education from the researcher. Mrs. N's habit of continuing to consume salty foods such as salted and fried fish and drinking coffee every day, as well as her lack of vegetable consumption, indicated non-compliance with her hypertension management. This continued to occur during the data collection process, despite the education provided.

This finding is supported by Jabani dkk., (2021) who found a significant relationship between a low salt diet and blood pressure control in hypertensive patients. Non-compliance with a low salt diet can increase blood volume and blood pressure. The study by Bolin dkk.

(2018) also indicated that the proportion of women who were non-adherent in a low-salt diet was higher than men.

The difference in experience between Mrs. N and Mr. Mr. S can also be seen in terms of different genders. As a woman, Mrs. N has additional risk factors for developing elevated blood pressure compared to Mr. S who is a man. S who is a man. This is related to the menopausal phase experienced by Mrs. N, as mentioned in the research of Anagnostis *et al*. (2020), that women who experience menopause tend to experience hormonal changes that can cause an increase in blood pressure.

As mentioned by Kamińska *et al*. (2023) that this phase of menopause can trigger activation of the renin angiotensin system, increased endothelial plasma levels, and increased androgen levels, all of which contribute to increased blood pressure in menopausal women. Post-menopausal women are also prone to increased blood pressure due to decreased estrogen levels, leading to loss of protective vasodilatory effects. Therefore, the difficulty in controlling blood pressure is often higher in post-menopausal women than in men.

The difference in blood pressure values may also be due to Mrs. N's habitual dislike of physical activity, as evidenced by her tendency to lead a less active lifestyle. Mrs. N tends to follow a sedentary lifestyle and has never been involved in routine gymnastic activities in the neighborhood. This finding is consistent with research by Guthold *et al*. (2018), which showed that women have a tendency to be less physically active than men, with a 6% difference in presentation. The study concluded that women generally do less physical activity in their free time, and when they are active, it tends to be of lower intensity than men.

5. CONCLUSION

The effectiveness of the intervention in Mrs. N and Mr. S in managing hypertension was revealed through the results of the reduction in hypertension. S in managing hypertension was revealed through the results of a significant reduction in systolic and diastolic blood pressure. Mrs. N recorded a difference of 21 mmHg in systolic blood pressure and 13 mmHg in diastolic pressure, while Mr. S recorded a difference of 25 mmHg. Mr. S recorded a difference of 25 mmHg in systolic blood pressure and 18 mmHg in diastolic blood pressure.

This difference in difference values is influenced by the behavioral patterns and gender of each patient. In addition, the results of the Progressive Muscle Relaxation (PMR)

intervention also showed a significant decrease in blood pressure. Mrs. N experienced a decrease in hypertension classification level from stage 1 hypertension to Pre-hypertension, while Mr. S experienced a decrease from stage 2 hypertension to Pre-hypertension. Mr. S experienced a decrease from stage 2 hypertension to stage 2 hypertension.

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