

JOURNAL OF HEALTH COMMUNITY SERVICE



Empowerment of the Elderly with Hypertension Through Progressive Muscle Relaxation Exercise at UPT PSTW Jember

Muhammad Alfarizi¹, Dinda Angelina Hariyono¹, Siti Nur Wahidah¹, Tantut Susanto²

¹Nurse Internship Program, Faculty of Nursing, University of Jember, Indonesia

²Department of Community, Family & Geriatric Nursing, Faculty of Nursing, University of Jember, Indonesia

ARTICLE INFORMATION

Received: August 16, 2022

Revised: September 28, 2022

Available online: September 2022

KEYWORDS

Hypertension, Elderly, Progressive Muscle Relaxation

CORRESPONDENCE

E-mail: tantut_spsik@unej.ac.id

A B S T R A C T

Hypertension in the elderly is a common problem that is often found. Many factors affect hypertension in the elderly, so it is necessary to empower them elderly. The purpose of this empowerment to control the blood pressure of the elderly through progressive muscle relaxation (PMR) techniques. The method used is counselling and exercise demonstration, which consists of 3 main activities: screening, PMR technique training, and activity evaluation. The empowerment was attended by nine elderly at UPT PSTW Wisma Cempaka Jember. The evaluation of activities is to measure blood pressure with a stethoscope and sphygmomanometer. Wilcoxon statistical test was used to determine changes in blood pressure before and after PMR intervention. The elderly are 100% male, 55.6% are 60-70 years old, 44.4% live in an orphanage for 1-5 years, and 66.7% are from outside Jember and have itching 44.4%. The p-value was $0.02 < 0.05$ in systole, which means there was a difference before and after PMR, and the p-value was $0.705 > 0.05$ in diastole, which means there was no difference in blood pressure after PMR. PMR focuses on maintaining a relaxed state that can secrete CRH (Corticotropin-releasing Hormone) and ACTH (Adrenocorticotropic releasing hormone) so that adrenaline and non-adrenaline secretion decrease, which has an impact on heart contraction activity and decreased blood pressure. Elderly empowerment with progressive muscle relaxation can control blood pressure, specifically systolic, after one week of exercise. This exercise must be included in the PSTW exercise program, which can be done regularly to control blood pressure.

INTRODUCTION

Hypertension is a global health problem that requires attention because it can cause death in both developed and developing countries (Arisjulyanto, 2018). The World Health Organization (WHO) assesses hypertension as one of the most important causes of premature death worldwide, and this problem continues to grow (Owenga et al., 2019). Hypertension occurs due to several causes, namely age, gender, heredity and modifiable factors such as obesity, smoking, lack of group activity, excessive salt consumption and dyslipidemia (Kemenkes, 2016). The pattern of hypertension changes with age; the systolic blood pressure increases, but the diastolic blood pressure decreases after the age of 60 years. These distinct patterns show us the diverse etiological and hemodynamic mechanisms for hypertension in the elderly population (Delacroix et al., 2014).

In the elderly, the cause of hypertension is due to changes in the elasticity of the aortic wall, thickening and stiffening of the heart valves, the ability of the heart to pump blood, increased peripheral vascular resistance, and loss of elasticity of blood vessels. Age over 20 years will experience a decrease in the ability of the heart to pump blood by 1% per year, so there is a decrease in contractions (Fitriani dkk.,

2020). Research from Adam (2019) states that getting older will cause a decrease in the ability of the body's organs, including the cardiovascular system, namely the heart and blood vessels. The blood vessels become narrower so that there is stiffness in the walls of the blood vessels which will cause blood to increase (Adam, 2019).

The high incidence and risk factors for hypertension in the elderly indicate that it is necessary to treat hypertension; namely, empowerment carried out in the elderly. Empowerment for the elderly can be in the form of providing non-pharmacological therapy. Non-pharmacological therapy is always an option because it costs very little, is easy to do, and rarely even causes side effects (Murhan, 2020). Therapy that can be used in lowering blood pressure is progressive muscle relaxation therapy. Progressive muscle relaxation is a relaxation technique that combines deep breathing exercises and specific muscle contraction and relaxation techniques (Rahayu dkk., 2018).

Based on the results study conducted by Nursing Profession students at the Faculty of Nursing, University of Jember on April 18, 2022 at Wisma Cempaka UPT PSTW, Jember Regency, the data obtained that most of elderly had hypertension with systolic blood pressure 130-180 mmHg totaling 10 people (63%) of 16 people with a history of stroke as many as 2 people. The elderly did not know about progressive muscle relaxation and said they had never done it. Therefore, it is necessary to practice progressive muscle relaxation therapy a decrease blood pressure levels in the elderly at Wisma Cempaka UPT PSTW Jember. Therefore, this empowerment was carried out to determine the effect of progressive muscle relaxation therapy on reducing blood pressure in the elderly at Wisma Cempaka UPT PSTW Jember.

METHOD

This service activity is carried out through counselling and demonstration of directed exercises, which consist of 3 main activities, namely screening for elderly problems at Wisma Cempaka, progressive muscle relaxation exercises and evaluation of activities that have been carried out. This service is at Wisma Cempaka UPT PSTW Jember at UPT PSTW Jember for one week. The first activity is screening elderly data. The data obtained were then analyzed to find the most common problems in Wisma Cempaka.

The second activity is doing progressive muscle relaxation techniques. Before the exercise, the elderly was explained the benefits and how to do progressive muscle relaxation exercises. Furthermore, the time contract and the elderly's readiness to participate in training activities are carried out. The training started with the Standard Operating Procedures (SOPs) that had been made. Progressive muscle relaxation exercises are performed a week for 20 to 30 minutes thrice. After the progressive muscle relaxation exercise, an evaluation, and a time contract to do the next gymnastics session was carried out.

The last activity is to evaluate the exercise performed and the blood pressure of the elderly in the managed guesthouse using a sphygmomanometer. After 3 sessions of progressive muscle relaxation exercise for the elderly, a subjective evaluation of feelings after participating in the exercise was carried out, evaluating the ability of the elderly to carry out progressive muscle relaxation activities, then measuring blood pressure using a sphygmomanometer to determine the difference in blood pressure before and after progressive muscle relaxation.

The elderly at Wisma Cempaka UPT PSTW Jember consists of 9 people who will be measured using a sphygmomanometer and manual stethoscope to determine systolic and diastolic blood pressure. Then, the demographic data of the elderly were also studied, consisting of name, age, gender, complaint, address of origin, and length of stay in the orphanage. Data analysis was performed using IBM SPSS 21, where demographic data were presented in a table containing frequency and percentage. Blood pressure data are presented entirely before and after progressive muscle relaxation. The differences in blood pressure were analyzed using the Wilcoxon statistical test to determine changes in blood pressure before and after the progressive muscle relaxation intervention in the elderly.

RESULT AND DISCUSSION

Characteristics of the Elderly

Table 1. Distribution of the elderly by age, gender, length of stay, origin and complaints at UPT PSTW Jember (n=9)

Variable	Category	Frequency	Percentage (%)
Age	49-59 years old	2	22.2
	60-70 years old	5	55.6
	71-100 years old	2	22.2
Gender	Man	9	100
	Woman	0	0
Length of stay	>1 year	3	33.3
	1-5 years	4	44.4
	> 10 years	2	22.2
Origin	Jember	3	33.3
	outside Jember	6	66.7
Complaint	Itchy rash	4	44.4
	Dizzy	3	33.3
	neck pain	2	22.3

Source: Primary data 20 April 2022

Table 1 shows that most of the elderly at Wisma Cempaka is the age of 60-70 years (late elderly) with a percentage of 55.6%, all elderly is male with a percentage of 100%, and 44,4% of the elderly live in the orphanage for 1-5 years. The elderly at Wisma Cempaka come from outside Jember, with a percentage of 66.7%, and mostly the complaints experienced by the elderly are itching, with a percentage of 44.4%. According to the journal from Sari et al (2022) it was found that the average age of the elderly affected by hypertension is 69 years old (Sari dkk., 2022).

Elderly Blood Pressure

Table 2. Results of measuring systolic and diastolic blood pressure before and after progressive muscle relaxation at Wisma Cempaka UPT PSTW Jember

No.	Pretest Blood Pressure		Posttest Blood Pressure	
	systole	diastole	systole	diastole
1.	150	80	140	90
2.	150	90	140	90
3.	180	100	180	100
4.	170	100	150	100
5.	140	100	140	100
6.	110	90	110	90
7.	180	100	160	100
8.	170	90	140	90
9.	120	60	100	90
Minimum	110	80	100	60
Maximum	180	100	180	100
mean	157.8	92.2	140	91.1
SD	22.8	8.3	24	12.7

Source: Primary data 20 April 2022

Table 2 shows changes in systolic and diastolic blood pressure in the elderly at Wisma Cempaka. There was a decrease systolic blood pressure before and after the progressive muscle relaxation exercise from 157.8 to 140. In addition, there was also a decrease in the mean diastolic blood pressure from 92.2 to 91.1.

Differences in Blood Pressure Before and After Progressive Muscle Relaxation

Table 3. Wilcoxon systole statistical test results before and after intervention at Wisma Cempaka UPT PSTW Jember

Variable	N	Mean Rank	Sum of Rank	P-Value
Negative Ranks	6(a)	3.50	21.00	0.02
Positive Ranks	0 (b)	0.00	0.00	
Ties	3(c)			

Source: Primary data 20 April 2022

Based on table 3, there are 6 elderly who experience a decrease in systolic blood pressure, 0 elderly who experience an increase in systolic blood pressure, and 3 elderly who have no change after doing progressive muscle relaxation exercises. The p-value is 0.02 <0.05, which means that there is a difference before and after progressive muscle relaxation.

Table 4. Wilcoxon diastole statistical test results before and after the intervention at Wisma Cempaka UPT PSTW Jember

Variable	N	Mean Rank	Sum of Rank	P-Value
Negative Ranks	2(a)	3.00	6.00	0.705
Positive Ranks	2(b)	2.00	4.00	
Ties	5(c)			

Source: Primary data 20 April 2022

Table 4 shows that two elderly did not experience a decrease in diastolic blood pressure, two elderly people experienced an increase in diastolic blood pressure, and five elderly did not experience a change in diastolic blood pressure. The p-value is $0.705 > 0.05$, which means that there is no difference in diastolic blood pressure after progressive muscle relaxation.

After giving community service to the elderly through the practice of progressive muscle relaxation, it is proven to be effective in reducing blood pressure in the elderly. Systolic blood pressure decreased significantly with an average decrease of 10 mmHg after progressive muscle relaxation intervention. Different results were obtained in the measurement of diastolic pressure, the decrease was not too significant, namely 1.1 mmHg. Progressive muscle relaxation is a therapy that focuses on maintaining a relaxed state which will involve the process of muscle contraction and relaxation from the feet to the head which will increase awareness of the body's muscle response. This technique in addition to lowering blood pressure can also reduce levels of pain, anxiety, difficulty sleeping, and reduce fatigue (Wijaya dan Nurhidayati, 2020). When the body and mind relax, automatically the tension that often makes the muscles tighten will be ignored. Relaxation aims to reduce the activity of the sympathetic nervous system and increase parasympathetic activity, reduce metabolism, lower blood pressure and pulse rate and reduce oxygen consumption. Progressive muscle relaxation can reduce the secretion of CRH (Corticotropin releasing Hormone) and ACTH (Adrenocorticotropin releasing hormone). The decrease in the secretion of these two hormones can reduce the activity of the sympathetic nerves which will result in a decrease in the expenditure of adrenaline and non-adrenaline. This will also have an impact on a decrease in heart rate, dilate blood vessels, decrease blood vessel resistance and a decrease in heart pumping so that the arterial blood pressure of the heart decreases (Baharuddin, 2016).



(a)



(b)



(c)

Fig 1. Activities for empowering the elderly with hypertension at Wisma Cempaka UPT PSTW Jember. (a) Screening for problems and measuring blood pressure before performing progressive muscle relaxation. (b) Progressive muscle relaxation exercise activities with the elderly. (c) Evaluation of blood pressure results after progressive muscle relaxation exercises.

Source: Primary data 20 April 2022

The diastolic blood pressure before and after the intervention were not significant due to many other uncontrolled factors such as the habitual pattern of the elderly. Hypertension is one of the health problems that has a high prevalence in Jember Regency. The absence of signs and symptoms that appear causes them to feel healthy and do not do health checks (Kurdi dkk., 2022). Mostly, the length of stay of the elderly in the orphanage along 1-5 years that can lead the change pattern of habits of the elderly. The pattern of habits of the elderly can become maladaptive, such as uncontrolled food and lack of physical activity which can cause high blood pressure in the elderly. The results showed that the factor that causes hypertension is the consumption of foods high in sodium (Linda dkk., 2020). In PSTW Jember there is no special provision of dietary food for the elderly who are affected by hypertension. All meals given to the elderly are similar and do not consider the health conditions of the elderly. Based on research by Rihiantoro and Widodo (2017), it is stated that the poor diet of the elderly has a relationship with the incidence of hypertension. According to the same study, the elderly who are less active can increase blood pressure because physical activity affects blood pressure stability. People who are not physically active tend to have a higher pulse rate. This causes the heart muscle to work harder with each contraction. The effort of the heart muscle in pumping blood is directly proportional to the pressure imposed on the arterial walls and results in an increase in peripheral resistance and will have an impact on an increase in blood pressure (Rihiantoro & Widodo, 2017). If a person does exercise regularly, it will cause a decrease in blood pressure and make blood vessels more elastic (Anwari dkk., 2018). Most of the respondent's age factor, namely the elderly, is also caused by the fact that the elderly will have low physical activity due to physical conditions that are not possible (Konitatillah dkk., 2021). All the elderly in PSTW Jember do not work and only do light activities so they do not do sports that cause high blood pressure.

The empowerment service for the elderly with hypertension using progressive muscle relaxation is time constraints, only in one week. Dense devotional activities make the implementation of progressive muscle relaxation therapy can only be done once. It is necessary to make scheduled PMR activities so that the blood pressure of the elderly is maintained properly.

CONCLUSION

The community service to the elderly through the practice of progressive muscle relaxation, it is proven to be effective in reducing blood pressure in the elderly. Systolic blood pressure decreased significantly with an average decrease of 10 mmHg. Relaxation aims to reduce the activity of the sympathetic nervous system and increase parasympathetic activity which will have an impact on lowering blood pressure. In the future, community service program to the elderly at UPT PSTW Jember with progressive muscle relaxation exercises can be done regularly and regularly throughout the guesthouse so that it can control blood pressure.

UNKNOWLEDGEMENTS

We would like to express our deepest gratitude to the Faculty of Nursing, University of Jember for providing opportunities for professional practice at UPT PSTW Jember and our supervisor Ns. Tantut Susanto, M.Kep., Sp.Kep.Kom., Ph.D for providing support and supportive input. We also thank the head of UPT PSTW Jember who has allowed us to practice gerontic nursing and do service to the elderly.

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