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The Effect of Hypertension Exercise on Blood Pressure Reduction in The Elderly at Wisma Seruni UPT PSTW Jember

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Abstract

As the elderly population increases and the aging process they experience, triggers the occurrence of various diseases, especially hypertension. Improper management of hypertension causes a decrease in quality of life and morbidity in the elderly. This study aims to determine the effect of hypertension exercise on the blood pressure of the elderly at Wisma Seruni UPT PSTW Jember. The design of this study used a quasi-experimental with pretest and posttest one group design. The sampling technique used was a total of 8 respondents who met the inclusion criteria. Changes in blood pressure were measured using an aneroid sphygmomanometer and data analysis using the statistical test T-Test Dependent. The results showed that the average systolic blood pressure (SBP) before the first day of therapy was 147.5 mmHg and the second day 138.75 mmHg while the average systolic blood pressure after the elderly hypertension exercise was carried out on the first day of 140 mmHg and the second day 131.25 mmHg, the average diastolic blood pressure (DBP) before the first and second day of therapy was 84.38 mmHg while after the first day of therapy it was 82.5 mmHg and the second day was 80.63 mmHg. Based on the results of the analysis test using the dependent t-test, the SBP results before and after the intervention were 0.000 (p<0.005). There was an effect on the decrease in systolic blood pressure on the first and second day of intervention. Hypertension exercise therapy is an alternative solution to reduce blood pressure in the elderly with hypertension.

Keywords: *Hypertension Exercise, Elderly, Blood Pressure*

Abstrak

Seiring bertambahnya populasi lansia dan proses penuaan yang dialaminya, memicu terjadinya berbagai penyakit terutama hipertensi. Penatalaksanaan hipertensi yang tidak tepat menyebabkan penurunan kualitas hidup dan morbiditas pada lansia. Penelitian ini bertujuan untuk mengetahui pengaruh senam hipertensi terhadap tekanan darah lansia di Wisma Seruni UPT PSTW Jember. Rancangan penelitian ini menggunakan quasi eksperimental dengan pretest and posttest one group design. Teknik pengambilan sampel yang digunakan adalah sebanyak 8 responden yang memenuhi kriteria inklusi. Perubahan tekanan darah diukur menggunakan sphygmomanometer aneroid dan analisis data menggunakan uji statistik T-Test Dependent. Hasil penelitian menunjukkan rata-rata tekanan darah sistolik (TDS) sebelum terapi hari pertama adalah 147,5 mmHg dan hari kedua 138,75 mmHg sedangkan rata-rata tekanan darah sistolik setelah senam hipertensi lansia yang dilakukan pada hari pertama adalah 140 mmHg. dan hari kedua 131,25 mmHg, rata-rata tekanan darah diastolik (TDD) sebelum terapi hari pertama dan kedua adalah 84,38 mmHg sedangkan setelah terapi hari pertama adalah 82,5 mmHg dan hari kedua adalah 80,63 mmHg. Berdasarkan hasil uji analisis dengan menggunakan dependent t-test didapatkan hasil TDS sebelum dan sesudah intervensi sebesar 0,000 (p<0,005). Terdapat pengaruh terhadap penurunan tekanan darah sistolik pada intervensi hari pertama dan kedua. Terapi senam hipertensi merupakan solusi alternatif untuk menurunkan tekanan darah pada lansia dengan hipertensi.

Kata kunci: *Senam Hipertensi, Lansia, Tekanan Darah*

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INTRODUCTION

The increasing population of the elderly cannot be separated from the health problems that occur in the elderly, the decline in organ function triggers the occurrence of various diseases. This degenerative disease in the elderly, if not handled properly, will increase the financial burden of the state which is not small and will reduce the quality of life of the elderly because it increases morbidity and can even cause death [1]. Degenerative diseases that are usually suffered by the elderly include cataracts, stroke, mental emotional disorders, heart disease, hypertension, joint disorders and diabetes mellitus (Riskesdas, 2013). The prevalence of hypertension which is known as the main cause of premature death in the world, according to WHO estimates, globally is 22% of the total world population. of these patients, only less than one-fifth make efforts to control blood pressure. WHO estimates that 1 in 5 women worldwide have hypertension, the number is greater among men, namely 1 in 4 people [2]. The prevalence of hypertension sufferers is more at the age of 55-64 years (55.2%), 65-74 years (63.2%) and >75 years (69.5%) in Indonesia[3]. The older a person is, the higher the blood pressure will be due to several factors such as reduced elasticity of blood vessels, the function of the kidneys as a counterweight to blood pressure will decrease. The older a person is, the more at risk of developing diseases such as hypertension and other degenerative diseases [4].

One therapy that can be done to reduce blood pressure in the elderly is hypertension exercise. Hypertension exercise is able to encourage the heart to work optimally, where exercise can increase energy requirements by cells, tissues and organs of the body, which consequently can increase blood flow. venous return causing stroke volume which will directly increase cardiac output, causing arterial blood pressure to increase, causing arterial pressure to increase, this will cause respiratory and nerve activity which in turn stimulates sympathetic nerve activity to decrease causing the heart rate to decrease, stroke volume to decrease, arteriolar vasodilation, because this decrease causes a decrease in cardiac output and a decrease in total peripheral resistance, resulting in a decrease in blood pressure[4]. This is supported by the research of [5] which shows the effect of hypertension exercise on blood pressure in the elderly. Based on this description, it is necessary to conduct a study related to the Effect of Hypertension Exercise on Blood Pressure

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Reduction in The Elderly at Wisma Seruni UPT PSTW Jember.

METHODOLOGY

This research is a quantitative research that is quasi-experimental with pretest and posttest one group design. This study compares the pretest and posttest scores for blood pressure in the elderly after administering hypertension exercise at Wisma Seruni UPT PSTW Jember. The population of this study were all elderly people at Wisma Seruni PSTW Jember who met the inclusion criteria of 8 elderly people. Samples were taken using the Total Sampling technique. Inclusion criteria included systolic blood pressure ≥ 140 mmHg.

This study uses primary data in the form of gender, age and latest education which is done by simple interview. Assessment of the impact of giving hypertension exercise on changes in blood pressure in the elderly was carried out by 1) Examination of the respondent's vital signs before the intervention; 2) Giving hypertension exercise intervention for 20 minutes; and 3) checking the respondent's vital signs after 10 minutes of intervention. The research is carried out by collecting, analyzing and interpreting the data that has been obtained

Data processing in this study used the SPSS 23 program which was carried out through the stages of editing, coding, entry and cleaning. Data were analyzed by univariate analysis and bivariate analysis. Univariate analysis in the form of descriptive statistics, namely frequency and percentage to analyze categorical data and numerical data expressed in mean (M), Standard Deviation (SD), median (Md). Meanwhile, for the bivariate analysis in this study, the Sapirho Wilk normality test (p-value > 0.05) was used to test the normality of the data and to test the hypothesis of this study, namely the impact of antihypertensive exercise on changes in systolic and diastolic blood pressure in the elderly with the T-Test Dependent. The research ethics used are social values, scientific values, usefulness, freedom, confidentiality, fairness, and informed consent.

RESULT AND DISCUSSION

Table 1. Shows the results that the most elderly people who participated in the study were in the age range of 60-70 years (62.5%) with all of them being female (100%). The most recent education of the elderly in participating in this study was elementary school as many as 5 elderly (62.5%).

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Table 2 shows the results of the mean value of systolic blood pressure before performing hypertension exercise on the first day of 147.5 mmHg with a minimum value of 130 mmHg and a maximum value of 180 mmHg, while on the second day 138.75 mmHg, a minimum value of 120 mmHg and a maximum of 170 mmHg. The average result after the intervention on the first day of systolic pressure was 140 mmHg and on the second day 131.25 mmHg.

Table 3 shows the results that the average value of diastolic blood pressure before performing hypertension exercise on the first and second days was 84.38 mmHg with a minimum value of 80 mmHg and a maximum value of 90 mmHg. After giving therapy, the average DBP value of the elderly on the first day was 82.50 mmHg and on the second day 80.63 mmHg.

Based on table 4. Showing the dependent t-test, the results of systolic blood pressure before and after the intervention were 0.000 ($p<0.005$), thus Ho was rejected and Ha was accepted, which means that there is an effect of hypertension exercise on reducing systolic blood pressure in the elderly with hypertension in Wisma Seruni UPT PSTW Jember Regency. While the diastolic blood pressure indicator has no significant effect with $p = 0.069$.

Table 1. Characteristics of Elderly Respondents at Wisma Seruni UPT PSTW Jember

Variable	Frequency	%
Gender	8	
Female		100
Total	**8**	**100**
Age (years old)		
60-70	5	62.5
70 – 80	2	25
>80	1	12.5
Total	**8**	**100**
Education		
No School	2	25
Elementary School	5	62.5
Junior High School	1	12.5
Total	**8**	**100**

Source: Researcher Primary Data (2022)

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Table 2. Systolic blood pressure (SBP) values before and after hypertension exercise intervention

First Day	Mean (mmHg)	SD (mmHg)	Min (mmHg)	Max (mmHg)
Before	147.5	18.33	130	180
After	140	17.25	120	170
Second Day	**Mean (mmHg)**	**SD (mmHg)**	**Min (mmHg)**	**Max (mmHg)**
Before	138.75	19.59	120	170
After	131.25	13.62	120	150

Source: Researcher Primary Data (2022)

Table 3. Diastolic blood pressure (DBP) values before and after hypertension exercise intervention

First Day	Mean (mmHg)	SD (mmHg)	Min (mmHg)	Max (mmHg)
Before	84.38	4.95	80	90
After	82.50	3.78	80	90
Second Day	**Mean (mmHg)**	**SD (mmHg)**	**Min (mmHg)**	**Max (mmHg)**
Before	84.38	6.23	80	95
After	80.63	6.23	75	90

Source: Researcher Primary Data (2022)

Table 4. T-test dependent Analysis of Systolic Blood Pressure and Diastolic Blood Pressure

First Day (Pre dan Post)	*P-value*
Systolic blood pressure	0.000
Diastolic blood pressure	0.006
Second Day (Pre dan Post)	***P-value***
Systolic blood pressure	0.000
Diastolic blood pressure	0.069

Source: Researcher Primary Data (2022)

Characteristics of Elderly Respondents at Wisma Seruni UPT PSTW Jember

Gender

Based on the results of research at Wisma Seruni UPT PSTW Puger, Jember Regency, the elderly are female (100%). This is in accordance with a study conducted by [1] that almost all the elderly who experience high blood pressure, namely almost all women 29 out of 30 people (96.7). This result is also in line with the research conducted by [6], which was 27 people (45%). Gender is one of the factors that cause a person to experience hypertension. According to Wahyuni and Eksanoto (2013) in [6] said that women who experience menopause are one of the factors that cause women to have a tendency to have a higher incidence of hypertension than men. Women who have gone through menopause have low levels of estrogen. Whereas This estrogen functions to increase levels of

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High Density Lipoprotein (HDL) which plays a very important role in maintaining healthy blood vessels. In menopausal women, decreased estrogen levels will also be followed by a decrease in HDL levels if it is not followed by a good lifestyle as well [6].

Age

Based on the results of the study, the most elderly people at Wisma Seruni UPT PSTW Puger, Jember Regency were 60-70 years old (62.5%). This is in line with research conducted by Hernawan et al (2017), namely 19 (64%). There are several Ages Based on the results of the study that the most elderly people in Wisma Seruni UPT PSTW Puger Jember Regency are 60-70 years old (62.5%). This is in line with research conducted by [7], namely the elderly age 19 (64%). There are several risk factors for hypertension including age and physical activity (Junaidi ,2010 in [4]. As a person's age increases, there is a decrease in physiological function and body resistance that occurs due to the aging process which can cause a person to be susceptible to diseases, one of which is hypertension [2]. The older a person is, the higher the blood pressure will be due to several factors such as reduced elasticity of blood vessels, the function of the kidneys as a counterweight to blood pressure will decrease. The older a person is, the more at risk of developing diseases such as hypertension and other degenerative diseases [4]

Education

Based on the results of the study that the most recent education of the elderly at Wisma Seruni UPT PSTW Puger, Jember Regency was not in school, as many as 5 people (62.5%). According to [8] a person's level of education has an influence on behavior in disease control, one of which is hypertension. Higher education will affect the mindset and increase one's knowledge

Systolic Blood Pressure Value Before and After Performing Hypertension Exercise

This study shows the results of p = 0.000 (p <0.005) which means that there is an effect of hypertension exercise on reducing systolic blood pressure in hypertensive patients at Wisma Seruni UPT PSTW Jember Regency. The average value of systolic blood pressure before the first and second day of intervention was 147.5 mmHg and 138.75 mmHg, then after the first and second day of intervention, it was 140 mmHg and 131.25 mmHg. This study is in line with previous research from [7] there is an effect of hypertension exercise on reducing the respondent's systolic blood pressure, namely before the intervention 151.463 mmHg and after the intervention 130.36 mmHg. Research [9] also supports this study which shows the average systolic blood pressure before hypertension exercise for the elderly is 151.80 mmHg then after being given

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exercise hypertension twice a week for one month is 137.13 mmHg.

According to [5] explained that elderly exercise consisting of warm-up exercises, core exercises, and cooling exercises in which the movements in it aim to reduce anxiety, stress, and reduce depression levels. The decrease will stimulate the work of the system Peripheral nerves (autonomous nervous system), especially the parasympathetic, which causes vasodilation of the cross-section of blood vessels will result in a decrease in blood pressure, both systolic and diastolic. This is reinforced by [10] explain that reduced sympathetic activity occurs after physical exercise. Changes in vascular reactivity are associated with decreased sympathetic conduction for vascular resistance and local release of vasodilator substances (eg, nitric oxide) in response to muscle contraction and increased blood flow to the muscle. After strenuous physical exercise, reactivity blood vessels to alpha-adrenergic stimulation is reduced. Local release of nitric oxide, prostaglandins, and adenosine is increased during physical activity, thereby facilitating peripheral postactivity vasodilation.

According to the theory of Smeltzer (2012) in [9] a decrease in blood pressure occurs because blood vessels experience dilation and relaxation. The longer the exercise exercise can relax the blood vessels because exercise can reduce peripheral resistance. The heart muscle in people who exercise regularly is very strong so that the heart muscle in these individuals contracts less than the heart muscles of individuals who rarely exercise, because exercise can cause a decrease in heart rate and exercise will also reduce cardiac output, which in turn can lower blood pressure.

Diastolic Blood Pressure Value Before and After Performing Hypertension Exercise

Based on the research data, the average diastolic blood pressure of the elderly at Wisma Seruni before being given hypertension exercise on the first and second days was 84.38 mmHg. After being given hypertension exercise, the average diastolic blood pressure of the elderly at Wisma Seruni on the first day was 82.5 mmHg and the second day is 80.63 mmHg. The results of the first day dependent T-Test showed the p value was 0.080 and the second day was 0.009. These results show that there is no effect of giving hypertension exercise to the diastolic blood pressure of the elderly at Wisma Seruni UPT PSTW Jember.

These results are due to several factors that influence the successful implementation of hypertension exercise, one of which is the number of implementations carried out. The number of implementations of hypertensive exercise carried out affects the success of changes in diastolic pressure. Hypertension exercise in the elderly with blood pressure, especially in the elderly, is

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quite effective in reducing blood pressure which is carried out 6 times in a row Rizki (2016) in Sumartini et al (2019). Whereas in this study it is not in accordance with the existing theory because it is only done 2 times of exercise in 2 days with a duration of 20 minutes which is done in the morning so that diastolic blood pressure does not experience significant changes. In addition, according to [9], various hypertension exercise movements can also affect the success of implementation. In this study, exercise movements were limited because the elderly had impaired physical mobility such as limb weakness, pain or aches and pains, so that many movements were not appropriate or not perfect with standard operating procedures.

CONCLUSION

Based on the results of the analysis test using the dependent t-test, the results of systolic blood pressure before and after the implementation on the first and second days were 0.000 ($p<0.005$), which means that there was an effect of systolic blood pressure before and after doing hypertension exercise. Meanwhile, on the first day of diastolic blood pressure, the results were 0.006 ($p<0.005$) and the second day was 0.009 ($p<0.005$), which means that there was no effect of diastolic blood pressure before and after performing hypertension exercise.

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