CHANGES IN BLOOD PRESSURE BASED ON GYMNASTIC FREQUENCY IN HYPERSENSITIVE ELDERLY AT THE ELDERLY INTEGRATED HEALTHCARE CENTER, PAYAMAN LAMONGAN

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Abstract. Hypertension is a condition where blood pressure increases abnormally. Hypertension can be treated using non-pharmacological methods, one of which is elderly gymnastic. Elderly gymnastic is a series of regular, directed and planned movements that are followed by elderly people in the form of physical exercise which affects the physical abilities of the elderly. The aim of this study was to identify changes in blood pressure based on the frequency of exercise in hypertensive elderly at the Integrated Healthcare Center for the Elderly in Payaman Lamongan. This type of research is descriptive research with a cross sectional approach. The sample size was: 53 people. Sampling technique: purposive sampling. Data was collected by observing blood pressure measurements before and after doing elderly gymnastic which was done for 15-25 minutes twice a week for two weeks. The results showed that there was a change in blood pressure from before doing gymnastics, almost half of the elderly had stage 2 hypertension (49.1%) and half of them had stage 1 hypertension (50.9%) after doing elderly gymnastic, most of the hypertensive elderly experienced a change in blood pressure to Pre Hypertension (62,2%) and a small portion were in the normal category (22,6%) and stage 1 hypertension category (15,2%). It is hoped that elderly people with hypertension will be more active and regularly participate in elderly gymnastic activities as one of the measures to control hypertension in reducing blood pressure and maintaining ideal body weight.

Keywords: Changes in Blood Pressure, Frequency of gymnastic, Elderly, Hypertension

1 BACKGROUND

The increasing elderly population will give rise to various physical, psychological and social problems due to degenerative processes that arise as a person ages. In the elderly there is a decrease in cells which can affect the function and ability of body systems such as the nervous system, heart and blood vessels (Müller et al., 2019). An elderly disease that has high levels of morbidity and mortality is hypertension (Darmojo, 2012) (Yu et al., 2020). Most elderly people experience isolated systolic hypertension, namely an increase in systolic pressure which causes strokes even though the diastole is normal (Pramono et al., 2021) (Hariawan and Tatisina, 2020).

According to Basic Health Research (Riskesdas) in 2013, the prevalence of hypertension sufferers aged over 18 years in Indonesia was 25.8%, while in 2018, the prevalence of hypertension sufferers aged over 18 years in Indonesia was around 34.1%. (Kemenkes RI, 2018). This states that the prevalence of hypertension sufferers from 2013 to 2018 has increased by around 8.3%. The percentage of hypertension sufferers in East Java Province in 2016 reached 13.47% or around 935,736 people, whereas in 2018 it was 36.3% (East Java Health Office, 2016). Based on the results of the 2018 Lamongan District Health Profile resume, 17.90% of people with hypertension were found, whereas in 2020 it was 96.5% (East Java Health Office, 2020). Based on the Pro-

file of the Lamongan District Health Service, the Payaman Health Center experienced an increase in 2018, the incidence of hypertension was 5,015 people, while in 2020 it was 11,259 people. Based on data at the Payaman Health Center, Solokuro Lamongan District, in August-September 2022, there were 127 elderly people suffering from hypertension.

Hypertension is a condition where there is an abnormal increase in systolic blood pressure of more than 140 mmHg and diastolic of more than 90 mmHg (Böhm et al., 2018) (East Java Health Office, 2018). This increase in blood pressure in the arteries can occur due to changes in the elasticity of the aortic wall, decreased heart valves thicken and become stiff, the heart's ability to pump blood decreases, so that contraction and volume also decrease (Magder, 2021). Apart from that, high salt consumption, obesity, high cholesterol can make blood vessels narrow and as a result blood pressure will increase (Saputra et al., 2019). Stress factors, unstable emotional conditions, smoking, alcohol consumption can also trigger high blood pressure. The impact of hypertension, if not recognized from the start and treated properly, will trigger the main risk factors for stroke, heart failure and coronary disease (Ibrahim, 2016) (Kim et al., 2022).

Changing lifestyle or non-pharmacological treatment for elderly hypertension sufferers is highly recommended to reduce blood pressure. Non-pharmacological treatment such as losing weight, stopping drinking alcohol, reducing salt intake, stopping smoking (Paffer Filho et al., 2019) (Verma et al., 2021). Apart from that, hypertension can be prevented by doing elderly exercise, where by doing elderly exercise you can maintain and even improve your health status and lower blood pressure (Benetos et al., 2019). Elderly exercise is a sport that combines elements of movement to increase muscle strength, stretching to increase body flexibility and contraction of body muscles (Mua et al., 2022). Exercise is one of the fastest natural high blood pressure lowering. Not only does it lower blood pressure, exercising for 30 minutes every day can also reduce excess weight, reduce stress and improve heart health (Safitri and Astuti, 2017) (Tian & Meng, 2019).

This theory is in line with research by Andridari et al., (2019), that regular sports activities and movement exercises can overcome problems resulting from changes in body function. The mechanism for lowering blood pressure after exercise is because exercise can relax the blood vessels, so that by widening the blood vessels the blood pressure will decrease. Elderly gymnastics is good to do 3 times a week with a duration of 15-25 minutes (Nasrullah et al., 2020) (Naomi Katayama et al., 2019). Reinforced by the results of Rahmiati et al.'s research, (2020), that physical exercise and exercise can prevent or slow down loss of body function. Physical exercise such as regular gymnastics for the elderly can reduce blood pressure by 5-10 mmHg both in systolic and diastolic blood pressure.

2 RESEARCH METHODS

This research is a type of descriptive research. The population in this study were hypertensive elderly who came to visit the Integrated Healthcare Center for the Elderly in Payaman, Lamongan District for treatment. Samples were taken using a nonprobability sampling technique with purposive sampling with a total sample of 53 hypertensive patients. Variables in this study include the frequency of gymnastic in the elderly and blood pressure. Data was obtained by researchers filling in an observation sheet of respondents characteristics consisting of name, age, gender, highest level of education,

occupation, length of time suffering from hypertension, and blood pressure measurements carried out by researchers before doing elderly gymnastic, then gymnastic for 15-25 minutes and rest for 5 minutes, then measure blood pressure after gymnastic. This was done continuously until week 4 and the results of blood pressure measurements were filled in by the researchers on the observation sheet.

3 RESULT

Characteristics of Hypertensive Elderly at Integrated Healthcare Center for the Elderly, Payaman Lamongan.

Table 1. Characteristics of the elderly at the Elderly Integrated Healthcare Center, Payaman Lamongan, June 2023

Characteristics	N	%
Gender:		
Man	3	5,7
Woman	50	94,3
Total	**53**	**100**
Age:		
45-50 Years	14	26,4
51-60 Years	32	60,4
61-65 Years	7	13,2
Total	**53**	**100**
Education		
Elementary school	22	41,5
Junior High school	16	30,2
Senior High school	13	24,5
College	2	3,8
Total	**53**	**100**
Work:		
Housewife	26	49,1

Self-employed	5	9,4
Farmer	15	28,3
Trader	5	9,4
Government Employees	2	3,8
Total	**53**	**100**
family history of hypertension		
Yes	31	58,5
No	22	41,5
Total	**53**	**100**
long suffered from hypertension		
1-2 years	30	56,5
3-4 years	23	43,5
Total	**53**	**100**

Table 1 shows that almost all of the elderly are female (94.3%). In terms of age, the majority were aged 51-60 years (60.4%), with almost half of them elementary school graduates (41.5%), and in terms of occupation, most were housewives (49.1%). Based on hereditary history of hypertension, most of them had a hereditary history (58.5%). For a long time suffering from hypertension mostly 1-2 years (56.5%).

Table 2. Frequency distribution of gymnastic among hypertensive elderly at Integrated Healthcare Center for the Elderly, Payaman Lamongan, June 2023

Gymnastic Frequency	**N**	**%**
Regular	49	92,5
Irregular	4	7,5
Total	**53**	**100**

Based on table 2, it shows that almost all elderly people (92.5%) do gymnastic regularly (2x a week for 2 weeks).

Table 3. Frequency distribution of blood pressure before and after doing Gymnastic session 1 in elderly hipertensive people with at the Elderly Integrated Healthcare Center, Payaman Lamongan, June 2023

Blood Pressure Category	**Before Gymnastic**	**After Gymnastic**

	N	%	N	%
Normal	0	0	0	0
Pre-Hypertension	0	0	0	0
Stage 1 hypertension	20	37,7	27	50,9
Stage 2 hypertension	33	62,3	26	49,1
Total	**53**	**100**	**53**	**100**

Based on Table 3, it shows that before being given gymnastic to the elderly who suffer from hypertension at the Payaman Lamongan Elderly Integrated Healthcare Center, most of them had blood pressure in the stage 2 hypertension (62.3%) and after being given session 1 gymnastic time of 15-25 minutes, half of the elderly have blood pressure in the stage 1 hypertension (50.9%)

Table 4. Frequency distribution of blood pressure before and after doing Gymnastic session 2 for elderly people with hypertension at the Elderly Integrated Healthcare Center, Payaman Lamongan, June 2023

Blood Pressure Category	**Before Gymnastic**		**After Gymnastic**	
	N	**%**	**N**	**%**
Normal	0	0	0	0
Pre-Hypertension	0	0	3	5,7
Stage 1 hypertension	28	52,8	28	52,8
Stage 2 hypertension	25	47,2	22	41,5
Total	**53**	**100**	**53**	**100**

Based on table 4, it is known that before being given session 2 of gymnastic, the majority of elderly people had blood pressure in the stage 1 hypertension (52.8%) and after being given 2 sessions of gymnastic lasting 15-25 minutes, a small proportion of elderly people had blood pressure in the Pre Hypertension category (5.7%) and most of the elderly have blood pressure in the stage 1 hypertension (52.8%).

Table 5. Frequency distribution of blood pressure before and after doing Gymnastic session 3 in the elderly who have hypertension at the Elderly Integrated Healthcare Center,
Payaman Lamongan, June 2023

Blood Pressure Category	Before Gymnastic		After Gymnastic	
	N	%	N	%
Normal	0	0	0	0
Pre-Hypertension	8	15,2	16	30,1
Stage 1 hypertension	25	47,1	20	37,7
Stage 2 hypertension	20	37,7	17	32,2
Total	**53**	**100**	**53**	**100**

Based on Table 5, it can be seen that before being given the third session of gymnastic, almost half had blood pressure in the category of stage 2 hypertension (37.7%) and stage 1 hypertension (47.1%). After being given gymnastic session 3 with a time of 15-25 minutes, almost half had blood pressure in the Pre-Hypertension category (30.1%) and stage 1 hypertension category (37.7%).

Table 6. Frequency distribution of blood pressure before and after doing Gymnastic session 4 in elderly people with hypertension at the Elderly Integrated Healthcare Center,
Payaman Lamongan, June 2023

Blood Pressure Category	Before Gymnastic		After Gymnastic	
	N	%	N	%
Normal	0	0	12	22,6
Pre-Hypertension	25	47,1	33	62,2
Stage 1 hypertension	20	37,7	8	15,2
Stage 2 hypertension	8	15,2	0	0
Total	**53**	**100**	**53**	**100**

Table 6 can be seen before being given gymnastic session 4, almost half had blood pressure in the Pre-hypertension category (47.1%) and after being given gymnastics session 4 for 15-25 minutes, a small proportion had blood pressure in the normal category (22.6 %) and most of the elderly have blood pressure in the pre-hypertension category (62.2%).

4 DISCUSSION

Frequency of Elderly Gymnastic Hypertensive at Elderly Integrated Healthcare Center, Payaman Lamongan

The frequency of gymnastic in the elderly that is categorized as regular is if the elderly with hypertension at the Elderly Integrated Healthcare Center, Payaman Lamongan do exercise 2 times a week and are followed for 2 weeks. Elderly exercise is a series of regular, directed and planned movements that are followed by elderly people in the form of physical exercise which affects the physical abilities of the elderly. In English there is the term exercise or aerobic, which is a physical activity that can stimulate the heart and blood circulation and breathing which is carried out for a long enough time to produce improvements and benefits to the body (Anggriyana and Atikah, 2010) (Ardyantilova & Lidiana, 2023). The frequency of exercise for the elderly can be done 2-3 times a week (Wahyuni and Syamsudin, 2020).

This is in line with research conducted by Retno Asti Werdhani (2007) which states that the maximum frequency of exercise is 2x per week and the maximum regularity is 15 weeks. To reduce blood pressure so as to reduce the risk of hypertension and is supported by Trisnawan's research, (2010) Exercise for the elderly that is carried out continuously with sufficient time can provide benefits, namely improving the work of the heart and lungs. Elderly gymnastics is highly recommended, especially for people with hypertension as a sport that can be used to improve physical health both to increase muscle strength, joint flexibility, movement agility and to help improve blood circulation.

Almost all of the hypertensive elderly at the Payaman Elderly Integrated Healthcare Center regularly participate in exercise for the elderly with aged 45-60 years (86.8%). Someone aged 45-50 years tends to have a strong physique and is supported by high enthusiasm for participating in elderly exercise, while someone who has entered old age is less likely to participate in elderly exercise. The age of 45-50 years is the middle of old age or the preparation period for old age which shows physical strength and mental maturity (Indonesian Ministry of Health,2013)

Likewise, almost half (49.1%) of the elderly with hypertension at the Payaman Lamongan elderly Integrated Healthcare Center are housewives who regularly participate in gymnastics. A housewife tends to have more free time after taking care of household chores so that her time is used productively for activities that are beneficial to her health and has a passion for participating in elderly exercise to lower blood pressure (Miftahul, 2019).

Research conducted by Retno Asti Werdhani (2007) stated that lack of exercise regularity may be due to time constraints, most likely there will be clashes with work activities and lack of motivation to lower blood pressure.

Blood pressure before doing elderly gymnastic in elderly people who have hypertension at the Integrated Healthcare Center for the Elderly, Payaman Lamongan.

Hypertension can also be influenced by genetic factors. In this study, most of the elderly who had hypertension had a family history of hypertension (58.5%). These data

indicate that the high number of elderly people suffering from hypertension in because most of them have a family history of suffering from hypertension.

This is according to Bustan (2010) stating that the presence of genetic factors in certain families will cause that family to have a risk of suffering from hypertension. This is associated with an increase in intracellular sodium levels and a lower ratio of potassium to sodium. In addition, 70-80% of essential hypertension cases are found with a family history of hypertension. Someone will have a greater possibility of getting hypertension if their parents are hypertensive sufferers.

Based on the results of research that has been conducted on the elderly with hypertension in Payaman Village, the majority suffers from women, women are more at risk of developing hypertension due to several factors, one of which is stress due to hormonal changes. Apart from hormonal factors, women have the potential for hypertension, one of which is obesity. Because overweight or obesity is one of the characteristic causes of hypertension.

This research is in line with Wagner (2018), hypertension in women is more common than in men. This is due to the effects of postmenopausal hormone deficiency and several risk factors such as obesity, stressful situations that affect women more than men. The average age of women with hypertension is 60-69 years where women who are of that age have experienced post-menopause, so that is one of the factors causing women to have a tendency for the incidence of hypertension to be higher than men.

This research is in line with Renta (2018), age greatly influences the incidence of hypertension because at an elderly age the back process affects the elasticity of blood vessels and plaque buildup which is at great risk of influencing the occurrence of hypertension due to the similarity of genes that are prone to hypertension. Age has a significant relationship with the incidence of hypertension. Increasing age is one of the risk factors for hypertension, where there is an increase in the incidence of hypertension at the age of 60 years and over.

This statement is reinforced by Miftahul (2019), that women will experience an increased risk of hypertension after menopause. Because in this condition there will be a decrease in low estrogen levels. Meanwhile, estrogen functions to increase levels of High Density Lipoprotein (HDL) which plays a very important role in maintaining healthy blood vessels. In menopausal women, decreasing estrogen levels will also be followed by a decrease in HDL levels if a good lifestyle is not followed.

Blood pressure after doing elderly gymnastic in elderly people with hypertension at Integrated Healthcare Center for the Elderly, Payaman Lamongan

The reduction in blood pressure is caused by several factors, one of which is by doing physical activity such as exercise for the elderly. Elderly exercise is a form of exercise that is beneficial for the elderly because it can help maintain balanced blood pressure and reduce blood pressure.

Regular gymnastic and movement exercises such as regular elderly exercise can over-come problems resulting from changes in body function and exercise plays a very important role in treating high blood pressure. Existing evidence shows that exercise and gymnastic in old age can prevent or slow down the loss of body function, even regular exercise can reduce blood pressure by 5-10 mmHg in both systole and diastole. The right exercise for the elderly is elderly gymnastic. With regular and continu-ous physical exercise or exercise for the elderly, the heart valves that previously experienced sclerosis and thickening will return to normal, myocardial stiffness will no longer occur,

heart muscle contractions will occur, stroke volume and cardiac output will no longer increase. This will result in blood pressure no longer increasing or decreasing blood pressure (Khotimah, 2018). Furthermore, Izhar also believes that elderly exercise is very beneficial for reducing blood pressure in elderly people with hypertension. The benefits of elderly exercise are that the elderly feel happy, always happy, can sleep better, keep their minds fresh. Apart from having a positive impact on improving the function of body organs, elderly exercise also has an effect on increasing immunity in the human body after regular exercise (Anggriyana and Atikah, 2010) (Scheffer & Latini, 2020).

One of the non-pharmacological management of hypertension prevention and control is by exercising. The more often you do exercise, especially in the elderly, the more obvious changes in blood pressure will be in efforts to prevent and control hypertension.

5 CONCLUSION

Most of the hypertensive elderly at the Integrated Healthcare Center for the Elderly in Payaman Lamongan carry out gymnastic regularly. Almost half of the hypertensive elderly in Payaman Lamongan before doing elderly gymnastic had their blood pressure measured at Hypertension stage 2, after doing elderly exercise for 4 times in 2 consecutive weeks, most of the hypertensive elderly experienced a change in blood pressure to Pre Hypertension and a small portion were in the normal category and stage 1 hypertension category.

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