

The Effect Of Elderly Exercise On Blood Pressure In Elderly Hypertension In Sei Serindan Village

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Article Info	ABSTRACT
Keywords: Exercise in the elderly blood pressure in the elderly	The effect of elderly exercise on blood pressure in hypertension patients in the Banjarkaya Setan elderly exercise group in South Denpasar was studied using only one sample group. Blood pressure measurements were taken as a pretest only at the first meeting and as a posttest only at the sixth meeting. Therefore, it is necessary to determine the effectiveness of physical exercise in the elderly on blood pressure in elderly people with hypertension. Elderly exercise is a light exercise that is easy to do even for the elderly and does not cause stress. This physical activity helps the elderly maintain their body health and freshness. This exercise for the elderly helps strengthen and maintain strong bones, stimulates optimal heart function, and eliminates free radicals floating in the body. The type of exercise commonly performed is exercise for hypertension in the elderly (Anggriyana tri Widiyanti & Atikah Proverawati, 2010; 11). This type of research uses a prospective study, which is forward-looking in nature, starting with causal variables or risk factors and then following up with future impacts. This research takes the form of quantitative research. The results of the study showed that when blood pressure $<150>150$, the number of elderly antihypertensive drugs who participated in sports was Yes (13 people (62%), No (2 people (22%))), p (value) of 0.06%. The resulting p value was found to be less than 0.05. Based on these outputs, H_a was accepted and H_0 was rejected. This refers to the effect of exercise in old age on blood pressure of hypertensive elderly in Sei Serindan village in 2020. The conclusion of the study is that exercise in the elderly has an effect on blood pressure in elderly people with hypertension in Sei Serindan village.
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INTRODUCTION

An elderly person is someone who has reached the age of > 60 years (Indonesian Law, 1998). The elderly are susceptible to diseases related to the aging process, one of which is hypertension (Azizah, 2011). The World Health Organization (WHO, 2012) estimates that the proportion of the elderly population aged 60 years and over will double from 11% in 2000 to 22% in 2050. In 2000, the elderly population was 605 million people, and will reach two billion people in 2050.

The longer life expectancy, the higher the risk factors for various health problems. A common problem in the elderly is that their physical condition becomes more susceptible to various diseases due to a decreased immune system against external influences and a decreased efficiency of homeostatic mechanisms. Therefore, the elderly are more susceptible to various diseases (Riskesdas, 2013). The most common degenerative diseases affecting the elderly include joint disease, hypertension, cataracts, stroke, psychoemotional disorders, heart disease, and diabetes (Riskesdas, 2013).

In Indonesia itself, the number of elderly people in 2020 is estimated to be approximately 80 million. According to data, the number of elderly people in Indonesia is 18,861,820 (Ministry of Health of the Republic of Indonesia, 2013). North Sumatra ranks 7th in Indonesia with the highest number of elderly people. The number of elderly people in North Sumatra Province reached 44,403, with the largest population in Padang City at 28,896 (Central Statistics Agency, 2015).

Geriatric gymnastics is a light form of exercise that is easy to do, even for the elderly, and is stress-free. This physical activity helps seniors maintain a healthy and fit body. This exercise for the elderly strengthens bones, stimulates optimal heart function, and helps eliminate free radicals floating around in the body. Hypertension exercises are a common type of exercise for the elderly (Anggriyana tri Widiyanti & Atikah Proverawati, 2010; 11).

Regular exercise is highly recommended for the elderly to prevent chronic diseases such as high blood pressure and hypertension. The proportion of elderly people exercising in urban areas is 12.90%, significantly higher than the proportion of elderly people in rural areas, which is 2.63% (National Commission for the Elderly, 2010).

In accordance with the research results of Astari et al., (2011) research on the effect of exercise on the elderly on hypertension in the Banjarkaja Sesetan Denpasar Selatan elderly exercise group only used one sample group and blood pressure measurements were only carried out at the first meeting as a pre-test and only at the 6th meeting as a post-test. Therefore, it is necessary to know the effectiveness of physical exercise on the elderly on blood pressure in hypertensive elderly.

The World Health Organization (WHO) estimates that approximately 30% of the global population suffers from undiagnosed hypertension. This is because you may not experience symptoms such as headaches or neck pain, but this doesn't necessarily mean you have high blood pressure. High blood pressure clearly causes damage to the body, including the heart (70% of people with hypertension suffer heart damage), kidneys, brain, eyes, and other organs (Dr. Yekti, 2011). There are 333 million people (3.26%) in several developed countries and 639 million people (65.7%) in developing countries. The highest prevalence of hypertension is in Africa at 6% in adults aged 25 years and above, and the lowest in America at 35% (James, 2011). According to the latest research data, approximately 50 million (21.7%) American adults suffer from high blood pressure. Hypertension also affects 17% of the total population in Thailand, 3.6% in Vietnam, 2.9% in Singapore, 29.9% in Malaysia, and 15% in Indonesia. In this case, 15 of the 230 million population of Indonesia, or almost 35 million Indonesians, suffer from hypertension (Muhamaddun, 2011).

Based on the results of the 2013 Basic Health Survey (Riskusdas) of the Ministry of Health, approximately 76% of hypertension cases in the community are undiagnosed. This is also evident from the results of blood pressure measurements in people aged 18 years

and over. The prevalence of hypertension in Indonesia was found to be 31.7% (Ministry of Health of the Republic of Indonesia, 2013). High blood pressure often occurs in the elderly. Based on a survey of the socioeconomic status and health of the elderly conducted in 10 provinces by the National Commission on Aging in 2012, the most common diseases suffered by the elderly are joint disease (52.3%) and hypertension (38.8%). These diseases are the main causes of disability in the elderly (Ministry of Health of the Republic of Indonesia, 2013).

A preliminary study conducted in Sei Serindan Village, Sei Kepayan Barat, Asahan Regency, found that there were 30 people who participated in elderly exercise, some of whom had abnormal blood pressure such as hypertension.

From the description above, the author is interested in studying "The effect of exercise on blood pressure in elderly people with hypertension in Sei Serindan village".

METHODS

Research Design

This research uses a prospective study, which is forward-looking, starting with causal variables or risk factors and then following up with future consequences. This research is quantitative.

Place and Time of Research

Research Location

The research location was in Sei Serindan Village, West Sei Kepayang District.

Research Time

The research period started from February - March 2024 in Sei Serindan Village, West Sei Kepayang District.

Research Population and Sample

Population

The population in this study was all elderly people in the working area of Sei Serindan Village, West Sei Kepayang District, totaling 438 people.

Sample

The sampling used in this study used the Accidental Sampling method.

Data retrieval

The data collection technique used is primary data, namely by conducting observations or direct observation of an object.

RESULTS AND DISCUSSION

Senior Gymnastics Based on Age

From the results of the study, the age of the elderly who participated in elderly gymnastics is as follows:

Table 1. Distribution of Elderly Gymnastics Frequency Based on Age in Sei Serindan Village, Asahan Regency

No	Age	N	%
1	45-59	5	16.6%
2	60-90	25	83.3%
	Total	30	99.9%

Based on table 2 above, it can be seen that the elderly who participated in elderly gymnastics were aged 45-59 years, as many as 5 people (16.6%), while the elderly aged 60-90 years (83.3%).

Gymnastics for the Elderly Based on Education

From the results of research on the education of elderly people who participate in elderly gymnastics, as follows:

Table 2. Frequency of Elderly Exercise Based on Education in Sei Serindan Village, Asahan Regency.

No	Education	n	%
1	No school	12	40%
2	Elementary School	4	13.3%
3	JUNIOR HIGH SCHOOL	5	16.6%
4	High School/Vocational School	6	20%
5	College	3	10%
	Total	30	99.9%

Based on table 3 above, the education of the elderly who participated in elderly gymnastics was obtained, namely no school (40%), elementary school (13.3%), junior high school (16.6%), high school/vocational school (20%), college (10%).

Senior Gymnastics Based on Occupation

From the results of research on the work of elderly people who participate in elderly gymnastics, as follows:

Table 3. Distribution of Elderly Exercise Frequency Based on Occupation in Sei Serindan Village, Asahan Regency.

No	Work	n	%
1	housewife	13	43.3%
2	Pension	5	16.6%
3	Farmer	7	23.3%

4	Self-employed	3	10%
5	Sales	1	3.3%
6	Teacher	1	3.3%
	Total	30	99.8

Based on table 4 above, the occupations of elderly people who participate in elderly exercise are housewives (43.3%), retirees (16.6%), farmers (23.3%), self-employed (10%), sales (33.3%), teachers (33.3%).

Elderly Gymnastics Based on the Elderly Who Participate in Elderly Gymnastics

Based on the research results, the total number of elderly people who participated in gymnastics was as follows:

Table 4. Distribution of Elderly Gymnastics Frequency based on Elderly Participants in Gymnastics in Sei Serindan Village, Asahan Regency

No	Exercise	n	%
1	Yes	30	100%
2	No	0	0%
	Total	30	100%

Based on the research results, it was found that the number of elderly people who participated in elderly gymnastics was 30 who participated in elderly gymnastics (100%).

Elderly Gymnastics Based on Blood Pressure of Those Following Elderly Gymnastics

Based on the research results, the number of people who participated in elderly exercise with blood pressure was as follows:

Table 5. Distribution of the Percentage of Elderly Gymnastics Based on the Elderly Who Participate in Elderly Gymnastics in Sei Serindan Village, Asahan Regency

Variables		Blood pressure				p-value
		<150	Percentage	>150	Percentage	
Senior Gymnastics	Yes	8	38%	13	62%	0.046
	No	7	78%	2	22%	

Based on the research results, it was found that the number of blood pressure who participated in elderly gymnastics was for blood pressure <150 Yes (8 people (38%), No (7 people (78%)), for blood pressure > 150 Yes (13 people (62%), No (2 people (22%)), along with p (value) 0.046%. it is known that the resulting p-value is less than 0.05. Based on this output, Ha is accepted and H0 is rejected. This means that elderly gymnastics has an effect on blood pressure.

Discussion

Senior Gymnastics

Based on the survey results, the number of respondents was 30 people, with the assumption of a maximum participation rate of 30 (100%) seniors who participated in senior activities.

Elderly exercise is a light, easy, and stress-free exercise that can be done by seniors. This physical activity is beneficial for maintaining a healthy and fit body by strengthening bones, stimulating the heart to function optimally, and helping eliminate free radicals floating around in the body (Anggriyani, 2010).

Based on the survey results, the number of respondents was 30 people, with an assumed maximum participation rate of 30 (100%) seniors participating in senior activities. Elderly gymnastics is a light, easy, and stress-free exercise that can be done by seniors. This physical activity for the elderly is beneficial for maintaining the health and well-being of the elderly by strengthening bones, stimulating the heart to function optimally, and helping eliminate free radicals floating in the body (Anggriyani, 2010).

This is in accordance with Wiarto's theory (2013), which states that exercise (physical training) can result in changes in all bodily system functions, such as increasing cardiac output and regulating the distribution of cardiac output. Increasing the proportion of cardiac output to skeletal and cardiac muscles provides more oxygen and nutrients to support increased ATP consumption in these two tissues. When your heart rate increases during exercise, the amount of blood ejected from the heart increases, so more blood flows to the contracting muscles, but also flows more quickly to the working muscle area.

However, high blood pressure occurs during exercise. Immediately after exercise, your blood pressure drops below normal and remains there for 10 to 120 minutes. This drop occurs because blood vessels dilate and relax. In people with high blood pressure, regular exercise can lower blood pressure because the drop is significant and, with repeated exercise, the drop is sustained over a long period of time.

Blood vessels dilate and relax, lowering blood pressure. Over time, exercise relaxes blood vessels, lowering blood pressure, much like dilating a water pipe lowers blood pressure. Lowering blood pressure can also reduce the heart's ability to pump blood. The heart muscles of these individuals contract less frequently than those of those who exercise less frequently.

Exercise has been shown to increase blood endorphin levels by up to fivefold. The more movement older adults have, the higher their beta-endorphin levels. As we age, when we exercise, beta-endorphin is released and absorbed by receptors in the hypothalamus and limbic system, which are responsible for emotional regulation. Increased beta-endorphins have been linked to reduced pain, improved memory, increased appetite, sexual performance, blood pressure, and breathing. Exercise can help you lose weight, make your heart work harder, and lower blood pressure.

Blood Pressure in the Elderly

Based on research results, it was found that the number of hypertension sufferers who participated in elderly exercise was <150 > 150 organs. Emotional tension or stress can temporarily increase blood pressure, but high blood pressure does not necessarily indicate

excessive emotional tension. Therefore, it is highly inaccurate to label someone who frequently gets angry or gets easily upset as being prone to hypertension (Dr. Yekti 2011). The results of this study are similar to those of Dari (2019), which showed that blood pressure gradually decreased when measured before and after exercise. On the first day of training, the respondents' average blood pressure remained unchanged, but this may have been an adjustment period. It then gradually decreased after 1 month of training. While exercise increases blood pressure rapidly during exercise, repeated physical activity lowers resting blood pressure, making subsequent increases in physical activity more beneficial for people with high blood pressure than for those with normal blood pressure. Because hypertension is a major risk factor for coronary heart disease (CHD), the potential impact of exercise on blood pressure control is an important public health consideration.

Factors influencing the development of hypertension. In the intervention group, this was due to increasing age, with the heart contracting less frequently and the left ventricle contracting more severely in older adults. This decreased activity also leads to a reduction in heart muscle cells, resulting in decreased myocardial strength. With age, maximum heart rate and other cardiac functions gradually decline, and blood pressure gradually increases in older adults, which can lead to high blood pressure in the elderly. (Aziza, 2011).

The Effect of Elderly Exercise on Blood Pressure in Elderly People with Hypertension

Hypertension means the blood pressure in your blood vessels is very high. Blood vessels are the vessels that carry blood away from the heart and to all the body's tissues and organs. Emotional tension or stress can temporarily increase blood pressure, but high blood pressure does not necessarily mean excessive emotional tension. Therefore, it is inappropriate to call someone who frequently gets angry or gets easily upset hypertensive (Dr. Yekti 2011).

Research shows that after senior exercise, the average diastolic blood pressure in elderly adults is 170 mmHg, diastolic blood pressure is 150 mmHg, and systolic blood pressure is 207 mmHg. After physical activity, the average blood pressure value is 193 mmHg, diastolic blood pressure value is 100 mmHg, and hypertension is 10 mmHg. The results of statistical tests using the chi-square test showed a p-value of 100.0, which means there is an effect of exercise in the elderly on blood pressure in elderly hypertension.

The results of the study showed that the average diastolic blood pressure of elderly people who participated in geriatric exercise was 80 mmHg, the average diastolic blood pressure was 70 mmHg, and the average systolic blood pressure was 200 mmHg. The average diastolic blood pressure in elderly people after physical activity was 70 mmHg, and the lowest diastolic blood pressure was 70 mmHg. The results of statistical tests using the chi-square test showed a p-value of 0.06, which means that there is an effect of exercise in the elderly on blood pressure in elderly people with hypertension.

Table 2 shows that the resulting p-value is less than 0.05. Based on this result, H_a is accepted and H_0 is rejected. This means that exercise affects blood pressure in the elderly.

This research is also in line with the research conducted by Devi (2012) which stated that elderly exercise is affected by reducing systolic and diastolic blood pressure in the elderly. Research conducted by Sukartini (2010) regarding the benefits of exercise on elderly fitness can show that exercise can not only improve pulse stability, but also blood pressure

stability, breathing, and immunoglobulin levels, using statistical test results for the systolic blood pressure category p-value 0.02 means a $p < 0.5$) is that there is elderly exercise that has an effect on the elderly with hypertension.

The chi-square study results show that exercise in the elderly has a significant effect on blood pressure (p-value = 0.00) ($\alpha = 0.005$ or p-value < 1). $\alpha = 0.005$. This means that H_a is accepted and H_0 is rejected. Based on the results of this study, we also found that exercise in the elderly has a 100.0 times greater impact on blood pressure in elderly people with hypertension.

This is in accordance with Wiarto's theory (2013), which states that exercise (physical training) can result in changes in all bodily system functions, such as increasing cardiac output and regulating the distribution of cardiac output. Increasing the proportion of cardiac output to skeletal and cardiac muscles provides more oxygen and nutrients to support increased ATP consumption in these two tissues. When your heart rate increases during exercise, the amount of blood ejected from the heart increases, so more blood flows to the contracting muscles, but also flows more quickly to the working muscle area.

However, high blood pressure occurs during exercise. Immediately after exercise, blood pressure drops below normal and remains so for 10 to 120 minutes. This drop occurs because blood vessels dilate and relax. In people with high blood pressure, regular exercise can lower blood pressure because the drop is very pronounced and, with repeated exercise, the drop is sustained over a long period of time.

Blood vessels dilate and relax, lowering blood pressure. Just as dilating a pipe lowers blood pressure, over time, exercise causes blood vessels to relax, lowering blood pressure. Lowering blood pressure can also reduce the heart's ability to pump blood. The heart muscles of these individuals contract less frequently than those of those who rarely exercise.

Exercise has been shown to increase blood endorphin levels by up to fivefold. The more movement older adults have, the higher their β -endorphin levels. As we age, when we exercise, β -endorphin is released and absorbed by receptors in the hypothalamus and limbic system, which are responsible for emotional regulation. Increased β -endorphins have been linked to reduced pain, improved memory, increased appetite, sexual performance, blood pressure, and breathing. Exercise reduces weight, slows heart function, and lowers blood pressure, which in turn lowers blood pressure.

CONCLUSION

Based on the results of a study titled "The Effect of Physical Exercise on Blood Pressure in Elderly Hypertensives," conducted in Sei Serindan Village, Asahan Province, researchers used a 12-question checklist with 30 respondents. The results were then presented in the form of data analysis using frequency tables and multiple linear regression tests. From this, we can conclude that. The value of 99.9% for the elderly age variable is that the older a person is, the more elderly people who have a family history of hypertension are affected by hypertension. The value of 40% is based on the education of the elderly, where most of the elderly do not attend school. The values of 43.3% and 23.3% based on the occupation of the elderly are more mothers who are housewives and there are also farmers.

The value of 100 who have participated in elderly gymnastics with 30 respondents, for the elderly gymnastics variable, blood pressure Yes < 150 (8 people (38%)), No (7 people

(78%) and blood pressure >150 Yes (13 people (62%), No (2 people (22%). P-Value 0.046 It is known that the resulting p-value is less than 0.05. Based on this output, H_a is accepted and H_0 is rejected. This means that elderly exercise has an effect on blood pressure.

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