



# Elderly Exercises and Finger Grip Relaxation to Reduced Blood Pressure

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**Abstract:** The elderly experience a phase of decline in all body organ functions, such as social, physical, psychological and emotional abilities which become increasingly weakened so that the elderly become vulnerable. fights various diseases, including hypertension. Elderly exercise and finger grip relaxation are non-pharmaceutical therapies that are believed to lower blood pressure. This study aims to determine the effect of elderly exercise and finger grip relaxation on reducing blood pressure. The research design used was a quasi-experimental nonequivalent control group pre-post test design. The research sample consisted of 114 respondents who were divided into 3 groups of 38 respondents each, with inclusion criteria: Elderly people suffering from hypertension, minimum age 60 years, currently taking antihypertensive medication, blood pressure >140/90 mmHg, able to participate in gymnastics movements. / can move the whole body, does not smoke and is not obese. Group selection used consecutive sampling techniques. The research location was carried out in the Cantigi Community Health Center working area and the Wilcoxon and Mann Whitney tests were used to analyze this research data. Research results: systolic and diastolic blood pressure before and after the test in the control group (systolic  $p = 0.480$  and diastolic  $p = 0.301$ ), systolic and diastolic blood pressure before and after the test in the exercise group (systolic  $p$  and diastolic  $p = 0.001$ ), as well as relaxation of finger grip on a decrease in blood pressure (systolic  $p = 0.001$  and  $p = 0.012$  diastolic). The difference in systolic and diastolic blood pressure after elderly exercise and finger grip relaxation shows that elderly exercise produces lower diastolic blood pressure results compared to finger grip relaxation (diastolic  $p = 0.015$  and  $0.005$ ). Conclusion: elderly exercise and finger grip relaxation have an effect on reducing blood pressure and elderly exercise produces lower diastolic blood pressure results compared to finger grip relaxation (diastolic  $p = 0.015$  and  $0.005$ ).

**Keywords:** Blood pressure; Elderly; Finger grips; Gymnastics; Relaxation

## Introduction

Elderly people classify people who have successfully passed the final phase of life. Elderly people usually experience a life process called aging. In the aging process, the elderly experience a phase of decline in all body organ functions, such as social, physical, psychological and emotional abilities which become

increasingly weakened and can cause the elderly's immune system to decline, causing the elderly to become vulnerable. against various diseases. In the Southeast Asia region, the elderly population was 8% or around 142 million in 2015, projected to increase to 1.05 million in 2022, and again to 1.1 million in 2023 (WHO, 2023). One disease that many elderly people suffer from is hypertension.

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Hypertension is a global health problem that needs attention because it can cause many deaths in developed and developing countries. The opinion of some people is that elderly people are incapable, weak and sickly, causing all activities to be very limited. This condition is caused by a lack of time, space and opportunities for the elderly to carry out activities. This is caused by various factors, namely disease factors, genetic factors, age factors, gender factors, lack of exercise, salt intake, obesity, lack of sleep, oily foods, calorie and sugar levels, unhealthy lifestyles and stress (Kemkes, 2018; Raghuvanshi, 2014).

The prevalence of hypertension sufferers in Indonesia reached 34.1% with an estimated number of cases of 63,309,620 people. Meanwhile, the highest prevalence of hypertension was in West Java Province (39.6%) and the lowest was in Papua Province (22.2%). Meanwhile, the number of hypertension sufferers in Indramayu Regency is 550,316 people in Indramayu Regency in 2022 (Riskasdas, 2018).

Blood pressure in the elderly tends to be high, so the elderly have a greater risk of developing hypertension (high blood pressure). As we age, blood pressure increases along with the thickening of the arterial walls in elderly people, causing the formation of collagen substances in the muscle layers, causing the blood vessels to lengthen and gradually narrow and become stiff (Novitaningtyas et al., 2014). To avoid or reduce collagen pressure and atherosclerosis which is one of the causes of hypertension, regular exercise is needed (Putriastuti, 2017). In addition, to control arterial hypertension, including non-drug therapy, which is combined with a decrease in blood pressure and the resulting negative effects of antihypertensive drugs, non-drug therapy is carried out, including finger grip relaxation.

Gymnastics for the elderly is a series of regular, directed and planned movements carried out by the elderly in the form of physical exercises that affect the physical abilities of the elderly. This sporting activity will help the body stay fit and fresh because it trains the bones to stay strong and helps eliminate free radicals roaming the body (Arisdiani et al., 2024). Supported by research (Rahmiati & Zurijah, 2020), that there is a difference in blood pressure in the elderly before and after elderly exercise with a p-value of 0.000 and reinforced by the research of Andri Sartika et al. that the elderly exercise intervention group had an average reduction in systolic blood pressure of 21.00 mmHg, from 171.50 mmHg to 150.50 mmHg, while the average decrease in diastolic blood pressure was 13.00 mmHg, from 103.00 mmHg to 90.00 mmHg. Based on the results of the t-dependent test, it was obtained (p value = 0.000) for systolic results and for diastolic results (p value = 0.000).

Another activity that can lower blood pressure is the finger hold relaxation technique. This technique can reduce pain, meaning with this technique we can stimulate the production of endorphins which automatically lower blood pressure (Handayani, 2020). This is in accordance with Siregar's research which also concluded that blood pressure decreased by 10/10.38 mmHg (Siregar, 2024). Supported by research by Dhrik et al. (2023), that there is a difference in the meaning of blood pressure between before and after treatment (p 0.00) in both systole and diastole blood pressure. (Handayani, 2020). This was strengthened by Karunia Rosa's research, which showed that there was a decrease in blood pressure after finger grip therapy (Rosa et al., 2023).

Based on a preliminary study on February 22 2024, of the 10 respondents suffering from hypertension at the Cantigi Health Center, none of them had implemented non-pharmacological therapy, especially elderly exercise and regular finger-hold relaxation to treat hypertension, and there are still many people in the Cantigi Health Center working area who have not know about non-pharmacological therapy for hypertension in the form of exercises and finger-hold relaxation.

## Method

The design of this research is a quasi-experimental non-equivalent control group pre-post test design (Dede et al., 2023; Drennan, 2013). The research sample was 114 respondents divided into 3 groups of 38 respondents each, with inclusion criteria: Elderly people suffering from hypertension, minimum age 60 years, taking anti-hypertension medication, blood pressure >140/90 mmHg, able to participate in gymnastics movements/able to the whole body, not smoking and not obese. Group selection used consecutive sampling techniques. The research location was carried out in the working area of the Cantigi Community Health Center.

The independent variables in this study were elderly exercise and finger grip relaxation, and the dependent variable was blood pressure. The research instruments were observation sheets, a sphygmomanometer and stethoscope that had been calibrated, Standard Operating Procedures (SOP) for elderly exercise and finger grip relaxation. The elderly exercise and finger grip relaxation interventions were each carried out twice a week and the duration of each intervention was 30 minutes, then a post test was carried out after being given a 15 minute break. Wilcoxon and Mann Whitney tests were used to analyze this research data (Bekiroğlu et al., 2013; Eisensehr et al., 1998; Fandinata & Ernawati, 2020).

## Results and Discussion

### Research Result

Based on Table 1, the mean age value for the control group was 66 years, the elderly exercise group was 65.5 years, and the finger grip relaxation group was 65.9 years.

**Table 1.** Description of Age in Three Groups, Namely Control Group, Group Elderly Exercise and Finger Grip Relaxation Group (n=114)

Group	F	Means	Minimal	Maximum
Control	38	66	60	74
Elderly exercise	38	65.5	60	74
Relax your finger grip	38	65.9	61	78

**Table 2.** Description of Gender in Three Groups, Namely the Control Group, Elderly Exercise Group and Finger Grip Relaxation Group (n=114)

Gender	Control		Exercise		Relaxatio	
	F	(%)	F	(%)	F	(%)
Male	7	18.4	6	15.8	4	10.5
Female	31	81.6	32	84.2	34	89.5

Based on Table 2 above, it shows the gender of the elderly in the three groups. The results showed that the largest number of respondents were women, 34 in the relaxation group (89.5%) and respectively 31 in the control group (81.6%) and 32 in the exercise group (84.2%).

**Table 3.** Description of Pre-test and Post-test Systolic and Diastolic Blood Pressure in Three Groups, Namely the Control Group, Elderly Exercise and Finger Grip Relaxation (n=114)

Group	Variable	F	Median	Minimal	Max
Control	Systolic BP T1 BP diastolic T1 T2 systolic BP TD diastolic T2	38	148	140	195
			90	90	100
	148		140	194	
	90		80	100	
Elderly exercise	Meeting 1 Systolic BP T1 BP diastolic T1 systolic BP T2 BP diastolic T2 Meeting 2 Systolic BP T1 BP diastolic T1 T2 systolic BP TD diastolic T2	38	157	140	196
			96	90	100
	140		120	190	
	85		80	100	
Relaxation grasp finger	Meeting 1 Systolic BP T1 BP diastolic T1 systolic BP T2 BP diastolic T2 Meeting 2 Systolic BP T1 BP diastolic T1 T2 systolic BP TD diastolic T2	38	150	140	180
			90	90	98
	140		130	170	
	90		80	100	
			146	140	180
			90	80	100
	140		130	160	
	90		80	100	

Based on Table 3, it shows that the systolic and diastolic blood pressure in the control group obtained a mean value of 148/90 mmHg for the pre-test and 149/90 mmHg for the post-test. The elderly exercise group at the first meeting got a mean pre-test score of 157/96 mmHg and post-test 140/85 mmHg, while at the second meeting they got a mean pre-test score of 151/90 mmHg and post-test 140/80 mmHg. The finger grip relaxation group at the first meeting obtained a mean score of 150/90 mmHg and a post test of 140/90 mmHg, while the second meeting showed a mean score of 146/90 mmHg for the pre test and post test of 140/90 mmHg.

Based on Table 4, the research results show that in the control group there was no decrease in pre-test and

post-test systolic-diastolic blood pressure values (Wilcoxon,  $p$  systolic = 0.480 and  $p$  diastolic = 0.301), the elderly exercise group at both meeting 1 and meeting 2 showed a decrease in pressure values diastolic blood pressure before and after (Wilcoxon,  $p$  systolic = 0.001 and  $p$  diastolic = 0.000), and the finger grip relaxation group at meeting 1 and meeting 2 showed a decrease in systolic diastolic blood pressure values before and after (Wilcoxon,  $p$  systolic = 0.000 and  $p$  diastolic = 0.001).

Based on Table 5, it shows the difference in systolic blood pressure after intervention in the two groups, namely elderly exercise and finger grip relaxation. The results at the first and second meetings showed there was no significant difference between elderly exercise and

finger grip relaxation (Mann-Whitney,  $p = 0.955$  and  $0.522$ ), while the differences in diastolic blood pressure in the two groups obtained at the first and second

meetings showed a significant difference between elderly exercise and finger grip relaxation (Mann-Whitney,  $p = 0.010$  and  $0.001$ ).

**Table 4.** Decreased Systolic and Diastolic Blood Pressure Pre-test and Post-test, between the Control Group, Elderly Exercise, and Finger Grip Relaxation (n=114)

Blood pressure	Control		Elderly exercise				Relaxation grasp finger			
			Meeting 1		Meeting 2		Meeting 1		Meeting 2	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Systolic median	148	148	157	140	151	140	150	140	146	140
Min- max	140-195	140-195	140-196	120-190	140-190	120-170	140-180	130-170	140-180	130-160
P		0.480	0.001			0.000		0.001		0.000
Diastolic median	90	90	96	85	90	80	90	90	90	90
Min- max	90 - 100	80 - 100	90-100	80-100	80-100	80 - 95	90 - 98	80 - 100	80 - 100	80 - 100
P		0.301	0.00	0		0.000		0.012		0.001

**Table 5.** Differences in Systolic and Diastolic Blood Pressure after Intervention, between the Elderly Exercise and Finger Grip Relaxation Groups (n=114)

Group	Blood pressure	F	Means	Min-Max	P
Meeting 1					
Elderly exercise	T2 systolic BP	38	140	120-190	0.935
Relax your finger grip	T2 systolic BP		140	130-170	
Elderly exercise	T2 diastolic BP	38	85	80-100	0.010
Relax your finger grip	T2 diastolic BP		90	80-100	
Meeting 2					
Elderly exercise	T2 systolic BP	38	140	120-170	0.522
Relax your finger grip	T2 systolic BP		140	130-160	
Elderly exercise	T2 diastolic BP	38	80	80-95	0.001
Relax your finger grip	T2 diastolic BP		90	80-100	

*Discussion*

*Characteristics of Hypertensive Patients*

*Age*

Age is a characteristic of respondents in this study. The results of research on the age of respondents in the three groups showed an average value of 66 years. Other research conducted by Purwo states that people aged >60 years have a higher risk of developing disease because as they get older, the elasticity of blood vessels decreases and ends in decreased blood flow to the body, so the heart has to work harder, causing hypertension (Humphrey, 2021; Nugroho & Sari, 2020; Saghiv et al., 2020).

*Gender*

The results of gender research in three groups, namely: the control group, elderly exercise and finger grip relaxation, showed that the majority of respondents were women. Control group systolic and diastolic blood pressure. Research results in the control group showed pre-test results of 147/90 mm Hg. and after the test 148/90 mm Hg. Elderly exercise group. The results of research on the elderly group who did exercise at the first pre-test meeting was 156/95 mm Hg, post-test 140/85 mm Hg, and at the second pre-test meeting

150/90 mm Hg. and post-test 140/80 mm Hg. Manual Finger Relaxation Group. The learning result in the finger grip relaxation group at the first pre-test meeting was 149/90 mm Hg. and post-test 140/90 mm Hg, at the second pre-test meeting 145/90 mm Hg and post-test 140/90. mmHg.

*Decreased Systolic and Diastolic Blood Pressure Before and After Testing in the Control Group, Elderly Exercise and Finger Grip Relaxation Before and After Testing Group Control*

The results from the control group showed that there was no decrease in systolic and diastolic blood pressure values between before and after the test (Wilcoxon  $p$  systolic =  $0.480$ ). and diastolic  $p = 0.301$ ). The results of previous research conducted by Melati et al. (2021) also showed that there was no decrease in systolic and diastolic blood pressure in the pre and post tests of the control group. The researchers' summary showed that there was no significant reduction in systolic and diastolic blood pressure because the control group did not receive intervention. The control group is used as a comparison to determine the difference between the experimental group (the group that received the intervention) and the control group.

*Elderly Gymnastics Group**Decreased Systolic Diastolic Blood Pressure Before and After Elderly Exercise*

The results of research in the first and second elderly meeting exercise groups showed a decrease in pre-test and post-test systolic-diastolic blood pressure values (Wilcoxon,  $p$  systolic and  $p$  diastolic = 0.000). The results of this study are in line with research by Eviyanti (2020) that there is an influence of elderly exercise on reducing systolic and diastolic BP in hypertensive elderly in the BPSTW Abiyoso Yogyakarta unit. There is an influence of elderly exercise on reducing blood pressure in elderly hypertensive women in the Banjarsari Community Health Center working area in 2018 (Yantina & Saputri, 2021).

This shows that exercise in the elderly can reduce blood pressure in elderly patients who have hypertension. Anyone who does not exercise enough is at risk of developing hypertension. The benefit of exercise itself is that it can cause vasodilation and normalize blood pressure. If this happens, even if it doesn't, it still contributes to muscle strength (Tambunan et al., 2022). Physical exercise in old age reduces systolic and diastolic blood pressure. The benefit of exercise in old age is that it increases the cells' need for oxygen which is used for energy production, because this causes an increase in heart rate which causes an increase in cardiac output and volume. Blood pressure increases, but after rest, the blood vessels dilate (stretch) and blood flow decreases temporarily. This is in accordance with research by Larasiska et al. that exercise in the elderly has an effect on reducing blood pressure: Subject I experienced blood pressure of 5/5 mmHg, decreased systolic-diastolic pressure, while Subject II experienced a decrease in systolic-diastolic pressure of 43/5 mm Hg - 5 mm Hg (Larasiska & Priyantari, 2017). Supported by research by Tulak et al. (2017), that there is an influence of exercise for the elderly on reducing blood pressure.

The researchers' opinion is that exercise in the elderly has the effect of lowering blood pressure in hypertension sufferers, especially Lansia. The mechanism is, when resting after exercise, the body's muscles relax and then the blood vessels widen so that blood pressure slowly falls. A decrease in blood pressure occurs after resting for at least 15 minutes. Statistically, exercise in the elderly shows significance because there is a decrease between the pre-test and post-test, however clinically, exercise in the elderly does not show significance because the decrease does not reach controlled blood pressure within normal limits. Decreased systolic and diastolic blood pressure before and after the test.

*Finger-hold Relaxation Group*

The results of the research in the finger grip relaxation group at the first and second meetings showed a decrease in the pre-test and post-test values of systolic-diastolic blood pressure (Wilcoxon  $p$  systolic blood pressure).

*Differences in Systolic and Diastolic Blood Pressure After Intervention in the Elderly Exercise Group and Finger Grip Relaxation*

The effect of elderly exercise and finger grip relaxation on systolic blood pressure in both groups in the first and second sessions, there was no significant difference between elderly exercise and finger grip relaxation (Mann-Whitney,  $p = 0.945$  and  $0.526$ ), but the effect of elderly exercise and finger grip relaxation on diastolic blood pressure in both groups in the first and second sessions showed a significant difference between elderly exercise and finger grip relaxation (Mann-Whitney,  $p = 0.015$  and  $0.005$ ). The results of this study are in line with research by Nur Fadilah and Kunci, that finger grip therapy and deep breathing can reduce high blood pressure in elderly people with hypertension (Fadhilah & Maryatun, 2022). This is confirmed by Handayani's research, that the finger-hold relaxation technique is effective in reducing blood pressure in hypertensive patients (Handayani, 2020).

The researchers' opinion shows that there is no significant difference in systolic blood pressure between the group of elderly people who do exercise and relax their finger grips, while for diastolic blood pressure there is a significant difference between the group of elderly people who do exercise and relax their finger grips. Diastolic blood pressure at Meeting 1 showed an average difference of 5 mm Hg. Art. Between elderly exercise and finger grip relaxation, Meeting 2 showed that there was an average difference of 10 mm Hg. between exercise for the elderly and finger grip relaxation. This shows that elderly exercise provides lower diastolic blood pressure results than finger grip relaxation, and from these results it also appears that the reduction in blood pressure can occur gradually if done routinely.

**Conclusion**

There was no decrease in systolic and diastolic blood pressure before and after the test in the control group (Wilcoxon,  $p$  systolic = 0.480 and  $p$  diastolic = 0.301), while reducing blood pressure in elderly people who did exercise had an effect on reducing blood pressure in people with hypertension (Wilcoxon,  $p$  systolic and diastolic  $p = 0.001$ ), as well as relaxation of finger grip also have an effect on reducing blood pressure in hypertensive patients (Wilcoxon, systolic  $p =$

0.001 and diastolic  $p = 0.012$ ). The difference in systolic and diastolic blood pressure after elderly exercise and finger grip relaxation shows that elderly exercise produces lower diastolic blood pressure results compared to finger grip relaxation (Mann-Whitney, diastolic  $p = 0.015$  and  $0.005$ ).

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