



The Impact of Group-based Ergonomic Exercise on Blood Pressure Among Individuals with Hypertension

Eka Roslita Boru Gultom¹, Ellia Ariesti¹, Berliany Venny Sipollo¹, Emy Sutiyarsih¹
¹Department of Nursing, STIKes Panti Waluya Malang, Malang, Indonesia

Correspondence author: Eka Roslita Boru Gultom

Email: ekaroslitoruqultom@gmail.com

Address: Jl. Yulius Usman No.62, Kasin, Kec. Klojen, Kota Malang, Jawa Timur 65117, Indonesia 081235778718

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ABSTRACT

Introduction: Hypertension is a disease in which a person's blood pressure exceeds normal limits, namely systolic pressure which is above 140 mmHg and diastolic which is above 90mmHg. Exercise that is suitable for people who suffer from hypertension is low impact exercise because it is an exercise with light movements and can be done by anyone, from children to adults, even to the elderly. One of the aerobic exercise for hypertension is ergonomic exercise.

Objective: The purpose of this study was to determine The effect of ergonomic exercise on reducing blood pressure in hypertension sufferers.

Method: The research design used is correlational quantitative with Wilcoxon Signed-Rank Test. The sampling technique used purposive sampling, with a total sample of 25 people.

Result: Based on the results of the Wilcoxon Signed-Rank Test, it was obtained $p = 0.000$ where $p < 0.05$, which means that there is an effect of ergonomic exercise on systolic and diastolic blood pressure in hypertension sufferers at Posyandu Brotojoyo, Tanjung Rejo Village, Sukun District, Working Area of the Janti Malang Health Center.

Conclusion: Based on the results of the Wilcoxon Signed-Rank Test, $p = 0.000$, where $p < 0.05$, which means that there is an influence of ergonomic exercise on systolic and diastolic blood pressure in hypertension sufferers at Posyandu Brotojoyo, Tanjung Rejo Village, Sukun District, Janti Malang Health Center Working Area.

Keywords: blood pressure, ergonomic, exercise, hypertension

Introduction

Hypertension is a disease in which a person's blood pressure exceeds normal limits, namely systolic pressure which is above 140 mmHg and diastolic pressure which is above 90 mmHg. Hypertension has symptoms such as dizziness, headaches, feeling like you are going to faint, tinnitus (a buzzing sound in the ears) and blurred vision. Hypertension can be caused by controlled factors and uncontrolled factors. Controlled factors include obesity, consuming excessive salt, smoking, consuming alcohol and stress, while uncontrolled factors are heredity, gender and age (Pusat Data dan Informasi Kementrian Kesehatan RI, 2014).

Non-pharmacological management of hypertension can be done by reducing alcohol consumption, stopping smoking, reducing salt consumption, dieting to reduce obesity, not stressing, and exercising. Exercise can relax blood vessels. Gradually, exercise will relax the blood vessels, so that blood pressure will decrease (Y. Prasetyo, 2013).

Exercises that can be done by hypertension sufferers are ergonomic exercise, hypertension exercise, aerobic exercise, anti-stroke exercise and healthy heart exercise. Apart from that, non-pharmacological therapy can be done with relaxation such as deep breathing relaxation, guided imagery, progressive relaxation, music therapy, distraction, massage, and Benson relaxation therapy (Wahyuni & Syamsudin, 2020).

Ergonomic exercise itself has many benefits that can be obtained if you do it regularly, namely you will get physical freshness, consisting of joint flexibility, muscle strength, agility in movement, improving the respiratory system and preventing hardening of the arteries. Ergonomic exercise itself can be done every day, namely 2- 3 times a week or within a certain period of time. Ergonomic exercises can flex blood vessels so that blood flow becomes smooth and makes blood vessels relax. This causes blood pressure to decrease (Fernalia et al., 2021). Based on the background above, researchers are interested in researching the effect of ergonomic exercise on reducing blood pressure in elderly people with hypertension.

Objective

The purpose of this study was to determine The effect of ergonomic exercise on reducing blood pressure in hypertension sufferers.

Method

The research design used in this study was a pre-experimental design with one group pre-post test design. The population in this study were sufferers with hypertension who visited Posyandu Brotojoyo, Tanjungrejo Village, Sukun Rw.11 District with a total of 57 people. The sampling method in this research used a purpose sampling technique. Time This research was carried out from May 16 to June 6 2023 and analyzed using the Wilcoxon Signed-Rank Test.

Result

Sociodemographic - Univariate analyses

Table 1. Sociodemographic - Univariate analyses

	Variables	N	%
Sex	Female	25	100.0
	Male	0	0
Age	Pre elderly (45-59 years old)	25	100.0
Hypertension	There's History	7	28.0
	No History	18	72.0
Ergonomic Exercise	Once	25	100.0
	Never	0	0.0

Based on table 1 above, the most participant is female, pre elderly, and followed the exercise before (100%). 72% participant doesn't have hipertension history.

The impact of intervention – Bivariate analyses

Table 2. The impact of intervention – Bivariate analyses

Blood Pressure	Measurement	Research Day	N	Mean	Median	Modus	Min	Max
Systolic	Pre Test	16 Mei 2023	25	156.28	156.00	159.00	151.00	159.00
		6 Juni 2023	25	153.28	153.00	156.00	148.00	156.00
	Post Test	16 Mei 2023	25	154.28	154.00	157.00	149.00	157.00
		6 Juni 2023	25	151.28	151.00	154.00	146.00	154.00
Diastolic	Pre Test	16 Mei 2023	25	97.88	98.00	99.00	95.00	99.00
		6 Juni 2023	25	94.88	95.00	96.00	92.00	96.00
	Post Test	16 Mei 2023	25	95.88	96.00	97.00	93.00	97.00
		6 Juni 2023	25	92.88	93.00	94.00	90.00	94.00

Based on Table 2, it can be seen that the results of statistical tests in this study showed that the highest average systolic blood pressure during the pre-test was 156.28 mmHg and the highest average diastolic blood pressure was 97.88 mmHg. Meanwhile, the highest average systolic blood pressure at the post-test was 154.28 mmHg and the highest average diastolic blood pressure was 95.88 mmHg.

Table 3. Wilcoxon Signed-Rank Test Results

Time	Blood Pressure	Interpretation	N	Mean Rank	Sum of Ranks	p-Value
<i>Pre Test</i>	Systolic	Negative Ranks	25 ^a	13,00	325,00	0.000
		Positive Ranks	0 ^b	0,00	0,00	
		Ties	0 ^c			
		Total	25			
	Diastolic	Negative Ranks	25 ^d	13,00	325,00	0.000
		Positive Ranks	0 ^e	0,00	0,00	
		Ties	0 ^f			
		Total	25			
<i>Post Test</i>	Systolic	Negative Ranks	25 ^s	13,00	325,00	0.000
		Positive Ranks	0 ^t	0,00	0,00	
		Ties	0 ^u			
		Total	25			
	Diastolic	Negative Ranks	25 ^v	13,00	325,00	0.000
		Positive Ranks	0 ^w	0,00	0,00	
		Ties	0 ^x			
		Total	25			

Based on Table 3, it can be seen that the results of statistical tests in this study showed that the highest average systolic blood pressure during the pre-test was 156.28 mmHg and the highest average diastolic blood pressure was 97.88 mmHg. Meanwhile, the highest average systolic blood pressure at the post-test was 154.28 mmHg and the highest average diastolic blood pressure was 95.88 mmHg.

Discussion

Blood Pressure Before Ergonomic Exercises

Based on the results of pre-test research before doing ergonomic exercises, the average systolic and diastolic blood pressure in the sample was 156.28 mmHg and 97.88 mmHg. The results of the post test before doing ergonomic exercises showed that the average systolic and diastolic blood pressure in the sample was 153.28 mmHg and 94.88 mmHg. So that the average results of systolic and diastolic blood pressure measurements were 154.78 mmHg and 96.38 mmHg. The cause of hypertension in hypertensive sufferers at Posyandu Brotojoyo is poor diet and they often consume foods containing salt and foods containing excessive amounts of fat. This is supported by the theory of Sairaoka (2015) which states that hypertension can be caused by controlled and uncontrolled factors. Controlled factors consist of obesity, consuming excessive salt, smoking, consuming alcohol and stress, while uncontrolled factors are gender, heredity and age.

The first factor, namely gender, is because the majority of elderly people who take part in gymnastics are women, namely 25 elderly people (100%). Based on the results of data, elderly women often experience level 1 hypertension. The average blood pressure in the patients obtained is in the level 1 category (Mild Hypertension) with a systolic blood pressure range of 140 mmHg – 159 mmHg and a diastolic blood pressure range of 90 mmHg – 99 mmHg.

The second factor is age, based on the research results in Table 5.2, the sample data obtained contained 47 people (94%) who were in the pre-elderly category with an age range of 45-59 years, and 3 people (6%) who were in the elderly category with a range of aged 60-69 years. According to researchers, as a person ages, changes will occur in their body, one of which is in the cardiovascular system. In the cardiovascular system, there will be reduced effectiveness and decreased elasticity in peripheral vessels which will cause blood pressure to increase.

The third factor is heredity, based on the research results in Table 5.3, the data obtained shows that 36 people (72%) have a family history of hypertension. According to researchers, most hypertension occurs due to hereditary factors, because if the parents of a child have hypertension, it is likely that the child will experience hypertension because of the genetic characteristics passed down from the parents to the child.

The results of this research are in line with research conducted by Sartik (2017) on "Risk Factors and Incidence Rates of Hypertension in Palembang Population" showing that age and hereditary history influence the occurrence of hypertension as uncontrolled factors. In research conducted by Rian (2019) on "Factors that Influence Hypertension in Prolanis Members in the Purwodiningrat Community Health Center Area, Surakarta City" shows that age and hereditary history influence the occurrence of hypertension. So it can be concluded that a person can suffer from hypertension due to various controlled and uncontrolled factors.

Blood Pressure After Ergonomic Exercises

Based on the research results after doing ergonomic exercises, the average pre-test systolic and diastolic blood pressure results for the sample were 154.28 mmHg and 95.88 mmHg. The results of the post test after doing ergonomic exercises showed that the average systolic and diastolic blood pressure in the sample was 152.28 mmHg and 93.88 mmHg. So that the average results of systolic and diastolic blood pressure measurements were 152.78 mmHg and 94.38 mmHg. After doing ergonomic exercises, blood pressure was reduced. According to researchers, this could be caused by many factors. The factors that cause a decrease in blood pressure after doing ergonomic exercises are the frequency of exercise movements carried out by the sample, and the seriousness of the sample in doing ergonomic exercises. The benefits of exercise are good physical fitness consisting of elements of muscle strength, joint flexibility, agility, movement, flexibility, cardiovascular fitness and neuromuscular fitness. Ergonomic exercise is one of 2 treatment methods for lowering blood pressure, namely non-pharmacological therapy and the other method is with pharmacological therapy. Pharmacological therapy is by taking antihypertensive drugs and non-pharmacological therapy is by exercising, namely by doing ergonomic exercises. Ergonomic exercise itself consists of 6 movements, each of which has many benefits for the body, especially for the health of the heart and blood vessels. The movements included in ergonomic exercises are perfect standing movements, open-minded movements, grateful bowing movements, mighty sitting movements, burning sitting movements and surrendering lying movements.

The results of this research are in line with research conducted by Sri Muharni (2018) on "Reducing Blood Pressure in Hypertensive Elderly People with Ergonomic Exercises" showing that ergonomic exercise has an influence on blood pressure before and after doing exercise. Research conducted by Kikin (2016) on "The Effect of Ergonomic Exercises in Groups and

Individuals on Reducing Blood Pressure in Elderly People with Hypertension in Gisikdrono Village, Semarang" shows that there is an influence on blood pressure in hypertension sufferers after doing ergonomic exercises. So it can be concluded that ergonomic exercise can be a solution to reduce blood pressure in hypertension sufferers.

The Impact of Ergonomic Exercise on Blood Pressure

Based on the results of the pre-test research, the average results of systolic and diastolic blood pressure measurements before doing exercise were 154.78 mmHg and 96.38 mmHg. After doing the pre-test and post-test ergonomic exercises, the average results of systolic and diastolic blood pressure measurements after doing the exercises were 152.78 mmHg and 94.38 mmHg.

This study analyzed data using the Wilcoxon Signed-Rank Test, obtained $p = 0.000$, where $p < 0.05$, which means that there is an influence of ergonomic exercise on systolic and diastolic blood pressure in hypertension sufferers at Posyandu Brotojoyo, Tanjung Rejo Village, Sukun District, Janti Health Center Working Area Poor. Ergonomic exercise is exercise that is effective, efficient, logical and has a positive impact on improving the function of body organs and also has an effect on increasing immunity in the human body after regular exercise (Hanik Umi, 2018). Ergonomic exercise, if done regularly, can improve the respiratory system, prevent hardening of the arteries, and can increase muscle strength and the effectiveness of heart function.

The results of this research are in line with research conducted by Syahrani (2017) on "The Effect of Ergonomic Exercises on Systolic Blood Pressure in Elderly People with Hypertension at PSTW Budi Mulya 3, Margaguna, South Jakarta" showing that elderly people who have done ergonomic exercise have an influence on blood pressure. elderly blood. Research conducted by Suwanti (2019) on "The Effect of Ergonomic Exercises on the Blood Pressure of Elderly People with Hypertension" shows that there is an influence in the elderly on systolic and diastolic blood pressure before and after doing ergonomic exercise.

Conclusion

Based on the results of research conducted on the effect of group ergonomic exercise on blood pressure in hypertension sufferers at the Janti Malang Community Health Center, the following conclusions can be drawn: Blood pressure in hypertensive sufferers before doing ergonomic exercises showed that the average results of systolic and diastolic blood pressure measurements were 154.78 mmHg and 96.38 mmHg; Blood pressure in hypertensive sufferers after doing ergonomic exercises showed that the average systolic and diastolic blood pressure in the sample was 152.78 mmHg and 94.38 mmHg; The Wilcoxon Signed-Rank Test, $p = 0.000$, where $p < 0.05$, which means that there is an influence of ergonomic exercise on systolic and diastolic blood pressure in hypertension sufferers at Brotojoyo Posyandu, Tanjung Rejo Village, Sukun District, Janti Malang Health Center Work Area.

Conflict of interest

There is no conflict of interest.

Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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