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## The Influence of Aerobic and Ergonomic Combination Gymnastics in Blood Pressure in Adult Age Patients

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### ABSTRACT

**Introduction:** Hypertension is a disease characterized by increased blood pressure in the body. One of the non-pharmacological management of hypertension is to do a combination of aerobic and ergonomic exercises to optimize the heart and blood vessels. This study describes the effect of a combination of aerobic and ergonomic gymnastics on blood pressure in adult sufferers in Kepuh Village, Palimanan District, Cirebon.

**Methods:** The research design used in this study was a pre-experimental design with a pretest-posttest one-group design and using a probability sampling technique with a purposive sampling type of 25 respondents which included patients aged 25-45 years who suffered from hypertension. This study used observation sheets and blood pressure measurements using a sphygmomanometer, and data analysis using the Wilcoxon test with a significance value of 5% (0.05).

**Results:** Research results in the Wilcoxon test for the pre and post-systolic blood pressure showed a value of  $p = 0.000$ , while for pre and post-diastolic blood pressure the value was  $p = 0.001$  which indicates that there is an effect of combined aerobic and ergonomic exercise on blood pressure in adult patients in Kepuh Village, Palimanan District, Cirebon Regency.

**Conclusion:** The combination of aerobic and ergonomic exercise has an effect on systolic and diastolic blood pressure in adult hypertensive patients in Kepuh Village, Cirebon. Therefore, a combination of aerobic and ergonomic exercise can be an alternative to regulating blood pressure in adult hypertensive patients.

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## 1. INTRODUCTION

Indonesia is currently in a quite difficult situation in handling health problems, experiencing a shift in epidemiology (Epidemiological Transition), namely a shift in the causes of death from non-communicable diseases which have increased in the past few decades, from 1990-2014. One of the NCDs that is still a problem today is Hypertension, the prevalence rate of hypertension in Indonesia based on the results of measurements in the population aged  $\geq 18$  years by province in 2018 showed an increase compared to the 2013 Riskesdas of 25.8% up to 34.1%(RI Ministry of Health 2018). Based on data from the UPTD Kepuh Health Center, hypertension ranks 5th in 2018 with a

total of 3226 sufferers, while in 2019 the number of sufferers was 3042 in the Kepuh Health Center area. According to research, gymnastics is an alternative non-pharmacological therapy for people with hypertension. Ergonomic exercise in relation to hypertension is proven to have an effect on blood pressure as in research.(Alifaton 2019, Hanik 2018, Syahrani 2017, Thei 2018, Safri 2015)In addition to blood pressure, it is also proven in dealing with pain(Solar 2018), this is because ergonomic exercises are cheap, easy to do, and can be modified according to one's personal wishes(Wratsongko 2014). Aerobic exercise in relation to hypertension has an effect on blood pressure as in research(Rismayanthi 2015, Roza 2015, Indrawati 2017)This exercise is an

Table 1. Distribution of the characteristics of the respondents

Characteristics of Respondents	Respondents	
	n	%
Age		
25 - 35 years	0	0.0
36 - 45 years	25	100.0
Gender		
Man	0	0.0
Woman	25	100.0
Smoking history		
Smoke	0	0.0
Do not smoke	25	100.0
Eat foods high in salt		
Yes		
No	4	16.0
	21	84.0
Family history of hypertension		
There is	8	32.0
There isn't any	17	68.0
Consumption of hypertension drugs		
Yes	5	20

exercise that has light movements and can be done by anyone, from the age of children, adults and even the elderly, and is beneficial for the lungs.(Pomatahu 2015). Based on this, this study will discuss the combination of aerobic and ergonomic exercise as a non-pharmacological intervention and without eliminating pharmacological therapy in the management of hypertension in adults in the work area of the UPTD Kepuh Health Center, Cirebon Regency.

**2. METHODS**

The research design used in this study was the Pre-Experiment with one group pre-post test design, namely revealing causal relationships by involving one group of subjects.(Nursalam 2015).(Nursalam 2015). The sample size in this study was adults with. There are 25 adult patients with primary hypertension in Kepuh village. The inclusion criteria are individuals aged 25-45 years, systolic blood pressure > 130 mmHg and diastolic blood pressure < 110 mmHg, able to communicate, focus and follow the instructor's movements well. This study used a non-probability sampling technique with a purposive sampling type. The location of this research is in Kepuh Village, the working area of the Kepuh Health Center, Cirebon Regency and was carried out on January 31 2021 – February 13 2021.

**3. RESULTS**

The characteristics of the respondents based on the age range of 36-45 years were 25 respondents (100%) which indicated that all respondents were aged 36-45 years. Characteristics of respondents

Table 2. Respondents' systolic blood pressure data before and after doing exercise in Kepuh Village on 31 January 2021 – 13 February 2021

	Respondent's Systolic Blood Pressure	
	Systolic Blood Pressure Pre	Systolic Blood Pressure Post
Means	140.36mmHg	123.88mmHg
Maximum Value	177 mm Hg	136 mm Hg
Min Value	130mmHg	112 mm Hg
Standard Deviation	10,140	6,200

based on female gender, namely as many as 25 respondents (100%) indicating all respondents were female. Characteristics of respondents based on history of smoking habits, that is, all of them do not have smoking habits, namely 25 respondents (100%). Characteristics of respondents based on the consumption of foods high in salt, namely most of them did not consume foods high in salt, namely as many as 21 respondents (84%) and the remaining 4 respondents (16%) consumed foods high in salt. Characteristics of respondents based on history of hypertension in the family, namely most did not have a history of hypertension in the family, namely as many as 17 respondents (68%) and the remaining 8 respondents (32%) had a history of hypertension in the family. Based on the characteristics of respondents taking hypertension medication, the majority did not take hypertension medication, namely 20 respondents (80%).

The average systolic blood pressure of the respondents decreased by 16.48 mmHg. Based on the Wilcoxon Rank Test for the pre and post systolic blood pressure, the respondent group showed a value of  $p = 0.000$  ( $p < 0.05$ ).

The average diastolic blood pressure of the respondents decreased by 5.32 mmHg. Based on the Wilcoxon Rank Test for the pre and post systolic blood pressure, the respondent group showed a value of  $p = 0.001$  ( $p < 0.05$ ).

Measuring blood pressure before the intervention showed that most of the respondents were in the pre-

Table 3. Diastolic blood pressure data for respondents after doing gymnastics in Kepuh Village on 31 January 2021 – 13 February 2021

	Diastolic Blood Pressure Pre	Diastolic Blood Pressure Post
Means	85.56mmHg	80.24mmHg
Maximum Value	98 mm Hg	88 mm Hg
Min Value	77 mm Hg	72 mm Hg
Standard Deviation	6,455	4,176

hypertension and stage I hypertension categories, with 13 and 11 respondents. Blood pressure measurements after the intervention showed that most of the respondents were in the normal category, namely 15 respondents.

#### 4. DISCUSSION

##### **Systolic blood pressure before and after doing a combination of aerobic and ergonomic exercises in adult patients in the UPTD area of the Kepuh Health Center, Cirebon Regency**

Research finds research that is in line with these conditions, namely research according to (Arifin, Weta, and Ratnawati 2016) who say that for women (especially aged 45-55 years) is a pre-menopausal period so that blood pressure increases. The characteristic condition of high blood pressure can also be caused by a lack of routine activities such as gymnastics, during the Covid 19 pandemic as it is now, most of the respondents very rarely did light physical activities such as gymnastics. In line with research conducted by (Katuk 2018) which states that there is a significant relationship between physical activity and the degree of hypertension, the higher the intensity of the activity carried out the less the risk of developing hypertension. In research conducted by (Refor Arniati Baeha et al. 2020) also revealed that there was a decrease in systolic blood pressure after doing hypertension exercises. blood pressure stability (Wratsongko 2014). In addition, this exercise is carried out in the morning, namely 07:30 - 09:00 WIB, this is done because it is based on research conducted by (Rofiq, Kinanti, and Andiana 2018) states that a good exercise is at 7 am to 9 am. Because at that hour the body produces the hormone serotonin which can improve mood, besides that there is sunlight which is good for the body, because the main biological effect of active vitamin D3 is to maintain serum calcium concentrations within the normal range. good for facilitating active vitamin D3 is maintaining serum calcium concentrations within the normal range related to blood pressure regulation.

##### **Diastolic blood pressure before and after doing a combination of aerobic and ergonomic exercises in adult patients in the UPTD area of the Kepuh Health Center, Cirebon Regency.**

This combination of aerobic and ergonomic exercise causes blood pressure to increase for a short time and will return to normal when you stop exercising (Manembu, Rumampuk, and Danes 2015). Gymnastic exercises can encourage the release of NO which is a factor in blood vessels which in turn helps produce vasorelaxation (Mayani Syahfitri, Safri 2015). Exercise training has also been shown to increase the function of vasodilation which will reduce peripheral resistance and lower blood pressure (Schuler, Adams, and Goto 2013). Aerobic exercise can help improve

Table 4. Data on the blood pressure categories of respondents before and after exercising in Kepuh Village on 31 January 2021 - 13 February 2021

Blood pressure category before exercise			Blood pressure category after exercise		
Category	n	(%)	Category	n	(%)
Pre Hypertension	13	52 %	Optimal	4	16 %
Stage I hypertension	11	44 %	Normal	15	60 %
Stage II hypertension	1	4 %	Pre-Hypertension	6	24 %

blood fat profiles, reduce total cholesterol, Low Density Lipoprotein (LDL), triglycerides and increase High Density Lipoprotein (HDL) as well as improve the hemostatic system and blood pressure (Ali 2013).

#### CONCLUSION

Based on the results of research that was conducted in Kepuh Village, Palimanan District, Cirebon Regency in Cirebon from January 31 to February 13, 2021, it can be concluded that there is the effect of combination aerobic and ergonomic exercise on systolic blood pressure in adult patients in Kepuh Village, Palimanan District, Cirebon Regency via. Also, there is the effect of a combination of aerobic and ergonomic gymnastics on diastolic blood pressure in adult patients in Kepuh Village, Palimanan District, Cirebon Regency.

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