

# THE EFFECT OF AEROBICS NANGUN SAT KERTHI LOKA BALI ON BLOOD PRESSURE IN PRE-ELDERLY PEOPLE WITH HYPERTENSION IN THE WORK AREA OF UPTD PUSKESMAS BLAHBATUH I GIANYAR REGENCY

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*Hypertension is a non-communicable disease that is a major concern in the health sector. One of the ways to lower blood pressure is to exercise. Aerobics nangun sat kerthi loka bali aerobic is a light exercise that can be done by elderly people with hypertension, which can help improve blood vessel circulation and prevent blood vessel dilation. The purpose of this study was to determine the effect of aerobics nangun sat kerthi loka bali on blood pressure in the elderly with hypertension at UPTD Puskesmas Blahbatuh I Gianyar Regency. Quasy-experimental research design with the type of research used pre-test-posttest with control group and by using purposive sampling method with 34 respondents. The results obtained the average systole blood pressure before treatment 140.06 mmHg, diastole before treatment 85.88mmHg and systole blood pressure after treatment 135.53 mmHg, diastole after treatment 81.06 mmHg. Hypothesis testing using paired t-test and obtained systolic p value = 0.000 and diastolic p value = 0.001, it can be concluded that there is an effect of aerobic gymnastics Nangun Sat Kerthi Loka Bali on blood pressure in the elderly with hypertension at UPTD Puskesmas Blahbatuh I Gianyar Regency. Based on this, it is hoped that aerobics nangun sat kerthi loka bali can be applied as a non-pharmacological treatment to lower blood pressure.*

**Key words:** *Aerobic, blood pressure, hypertension*

## INTRODUCTION

Non-communicable diseases (NCDs) are diseases that are not transmitted and are not transmitted to others through any form of contact, which can cause death and kill around 35 million people each year or around 60% of all deaths globally, with a prevalence of 80% in developing countries. Non-communicable diseases, especially cardiovascular disease, hypertension, cancer, chronic respiratory disease, and diabetes mellitus are major threats to human health and development today. Non-communicable diseases that are currently receiving attention among the Indonesian people are hypertension (Sudayasa *et al.*, 2020).

Based on the 2018 Riskesdas report, the prevalence of hypertension based on measurement results in the population  $\geq 18$  years was 34.1%, the highest in South Kalimantan, while the lowest was in Papua at 22.2%, Bali was in the middle at 29.9%, namely the population suffering from hypertension was 63 million, while the death rate in Indonesia due to hypertension was 400 thousand deaths (Kemenkes RI, 2018).

Based on the Bali health profile data in 2021, it was reported that the number of hypertension sufferers aged  $\geq 15$  years in Bali Province was 555,184 people. Denpasar City is ranked first with the number of hypertension sufferers as many as 126,830 people, then in second place is Karangasem Regency as many as 86,791 people, Gianyar as many as 77,998 people, Tabanan as many as 58,233 people, Bangli 58,013 people, Jembrana 54,876 people, Buleleng 42,611 people, Klungkung 41,327 people, and the lowest is Badung Regency 8,504 people.

Based on data from the Gianyar Regency Health Office, there is an increase in the number of hypertension cases every year. In 2022, the Gianyar Regency Office estimates that there are 51,353 male hypertension sufferers over the age of 15 and 51,984 female patients. From this data, the estimated number of hypertension patients over the age of 15 is 103,338, of which 42,677 patients receive health services according to standards. There are gaps in services at 13 health centers in Gianyar Regency.

Lack of physical activity will trigger the loss of energy needed to produce fat, which in turn causes excess weight. Resulting in the heart muscle having to work harder to send blood throughout the body in the same amount. Therefore, physical activity is needed for the elderly with hypertension to maintain blood pressure (Sumiyarsi *et al.*, 2021).

Based on the results of the preliminary study, it was found that there was a lack of public awareness in dealing with hypertension, especially the importance of physical activity, so this study aims to determine the effect of aerobics *nangun sat kerthi loka bali* on blood pressure in pre-elderly people with hypertension.

## **METHOD**

This study uses a quantitative research type with a quasi-experimental pre-test post-test with control group design. This study was conducted at the Cucukan Village, the working area of the Blahbatuh I Health Center UPTD, located at Jl. Maruti Keramas, Blahbatuh and was conducted

for 2 weeks starting from March 28, 2024 – April 4, 2024. The sampling technique used non-probability sampling with purposive sampling type and a sample size of 34 people. The inclusion criteria include pre-elderly with hypertension who are willing to be respondents, aged 45-59 years, pre-elderly who rarely do physical activity and aerobics nangun sat kerthi loka bali, and blood pressure  $\leq 140/80$  mmHg. Exclusion criteria include hypertensive patients who have a history of chronic stroke, hypertensive patients who take medication irregularly and hypertensive patients without clinical symptoms and receive recommendations from the treating doctor.

Data collection was conducted using a digital tensiometer and master table. Primary data in this study were obtained using a digital tensiometer instrument. Respondent characteristic data including age, gender, education and occupation were analyzed using univariate analysis. Bivariate analysis used the dependent t test to analyze the effect of exercise on blood pressure in the treatment and control groups and the independent t test to analyze the differences between the treatment and control groups.

## RESULTS

The results of the study on the effect of Aerobics Nangun Sat Kerthi Loka Bali on blood pressure in pre-elderly with hypertension in the working area of the Blahbatuh I Health Center UPTD, Gianyar Regency in 2024 are as follows:

Table 1  
Frequency Distribution of Respondents Based on Age, Gender and Education  
in the Work Area of the UPTD Health Center Blahbatuh I Year 2024

No.	Respondent Characteristics	Treatment Group		Control Group	
		n	%	n	%
<b>1</b>	<b>Age</b>				
	45 – 49 years old	8	47.05	8	47.05
	50 – 54 years	8	47.05	3	17.64
	55 – 59 years	1	5.90	6	35.31
<b>2</b>	<b>Gender</b>				
	Man	7	41.18	3	17.64
	Woman	10	58.82	14	82.36
<b>3</b>	<b>Education</b>				
	Elementary School	9	52.95	8	47.05
	JUNIOR HIGH SCHOOL	3	17.64	3	17.64
	SENIOR HIGH SCHOOL	2	11.77	4	23.51
	D1	0	0	1	5.90
	D2	0	0	1	5.90
	S1	3	17.64	0	0
	<b>TOTAL</b>	<b>17</b>	<b>100</b>	<b>17</b>	<b>100</b>

Based on the interpretation results of table 1, it shows that the majority of respondents in the treatment group were aged 45-59 years, female gender and elementary school education. In the control group, the majority of respondents were aged 45-59 years, female gender and elementary school education.

Table 2  
Blood Pressure Overview Before and After Exercise in the Treatment Group and Control Group  
(n1=n2=17)

Variables	Treatment Group				Control Group			
	Min	Max	Mean	SD	Min	Max	Mean	SD
Systolic pressure before intervention	135	144	140.06	2,585	134	142	138.82	1,879
Systolic pressure after intervention	130	140	135.53	3,064	130	137	134.00	2,264
Diastolic pressure before intervention	80	90	85.88	2,977	84	90	87.59	1,938
Diastolic pressure after intervention	72	87	81.06	4,190	80	87	83.71	1,687

Based on the results of the interpretation of table 2, blood pressure in the treatment group before the intervention was 140/85 mmHg after the intervention was 135/81 mmHg. In the control group, blood pressure before the intervention was 138/87 mmHg after the intervention was 134/83 mmHg.

Table 3  
Results of the Normality Test of Data for the Treatment Group and Control Group

Treatment Group			Control Group		
Statistics	df	Sig.	Statistics	df	Sig.
.245	17	.008	.255	17	.005

Based on the results of the interpretation of table 3, the normality test shows that the data is normally distributed as seen from the p value  $\geq 0.05$ .

Table 4

Results of T-Test Blood Pressure Before Exercise Between Treatment Group and Control Group

Variables		Mean	SD	P Value
Systolic Blood Pressure before intervention	Treatment group	140.06	2,585	0.152
	Control group	138.82	1,879	
Diastolic Blood Pressure before intervention	Treatment group	85.88	2,977	0.023
	Control group	87.59	1,938	

Based on table 4, the T-test results obtained a p value = 0.152. This shows that a p value > 0.152 means that there is no difference in systolic blood pressure data between the intervention group and the control group. The test results showed that the intervention group and the control group had relatively the same systolic blood pressure start points. The T-test results obtained a p value = 0.023. This shows that a p value > 0.023 means that there is no difference in diastolic blood pressure data after treatment between the intervention group and the control group. The test results showed that the intervention group and the control group had relatively the same diastolic blood pressure start points.

Table 5

Results of Dependent T-Test of Blood Pressure Before and After Exercise in the Treatment Group

Variables		Mean	Std. Deviation	Mean difference	P Value
Systolic BP	Before	140.06	2,585	4.53	0.000
	After	135.53	3,064		
Diastolic BP	Before	85.88	2,977	4.82	0.001
	After	81.06	4,190		

Based on the results of the interpretation of table 5, it shows that the results of the t dependent test (paired sample t test) obtained a p value = 0.000 (p value <0.05), then Ho is rejected, meaning that there is a significant difference in the average systolic blood pressure before and after aerobic exercise. The average decrease in systolic blood pressure given exercise was 4.53 mmHg from 140.06 mmHg to 135.53 mmHg. Table 8 shows that the results of the t dependent test (paired sample t test) obtained a p value of 0.001 <0.05, then Ho is rejected, meaning that there is a significant difference in the average diastolic blood pressure after being given aerobic exercise Nangun Sat Kerthi Loka Bali. The average decrease in diastolic blood pressure after being given aerobic Nangun Sat Kerthi Loka Bali was 4.82 mmHg from 85.88 mmHg to 81.06 mmHg.

Table 6

Results of Dependent T-Test of Blood Pressure Before and After Exercise in the Control Group

Variables	Mean	SD	Mean Difference	P Value
Systolic BP Before	138.82	1,879	4.82	0,000
Systolic BP after	134.00	2,264		
Diastolic BP before	87.59	1,938	3.88	0,000
Diastolic BP after	83.71	1,687		

Based on the interpretation of table 6, it shows that the results of the t dependent test (paired sample t test) obtained a p value of  $0.000 < 0.05$ , which means that there is a significant difference in the average systolic blood pressure before and after poco-poco gymnastics of 4.82 mmHg from 138.82 mmHg to 134.00 mmHg. Table 9 shows that the results of the t dependent test (paired sample t test) obtained a p value of  $0.000 < 0.05$ , which means that there is a significant difference in the average diastolic blood pressure before and after poco-poco gymnastics of 3.88 mmHg from 87.59 mmHg to 83.71 mmHg.

Table 7

Results of the Difference in Systolic Blood Pressure Test After Treatment Between the Intervention Group and the Control Group

Variables	Mean	SD	P Value
Systolic BP after treatment treatment group	135.53	3,064	0.158
Systolic BP after treatment Control group	134.00	2,264	
Diastolic BP after treatment treatment group	81.06	4,190	0.024
Diastolic BP after treatment Control group	83.71	1,687	

Based on the results of the interpretation of table 7 shows the results of the independent t test obtained a p value of  $0.158 > 0.05$ , which means there is no significant difference in the average systolic blood pressure after the intervention between the treatment group and the control group doing gymnastics. Table 7 shows the results of the dependent t test obtained a p value of  $0.024 < 0.05$ , which means there is a significant difference in the average diastolic blood pressure after the intervention between the treatment group and the control group doing gymnastics.

## DISCUSSION

This research is in line with research Hasbi (2023) entitled The Effectiveness of Aerobic Exercise on Blood Pressure in Hypertension Patients shows the results of blood pressure measurements in the pre-test showing that the average patient experienced grade 1 hypertension. The pre-test results showed that 1 participant experienced pre-hypertension, grade 1 hypertension as many as 17 people and grade 2 hypertension as many as 12 people. This shows that many participants had high blood pressure before being given aerobic exercise intervention.

Many factors influence the increase in blood pressure, especially with age. This is because in the elderly stage there will be changes, especially in physiological changes, because as age increases, the function of body organs will decrease. One of the most common health disorders experienced by the elderly is attacking the cardiovascular system which can cause a decrease in the elasticity of the aortic wall, the heart valve thickens and becomes stiff and the heart's ability to pump blood decreases. This causes a decrease in contraction and blood volume that loses the elasticity of blood vessels, a lack of effectiveness of peripheral blood vessels for oxygenation ((Hernawan, 2017)

This is in line with research conducted by (Sari, 2016) which states that poco-poco gymnastics in the elderly can be presented as follows in cycle 1 of the first meeting, systole decreased by 1.52% and diastole decreased by 2.25%, cycle 1 of the second meeting recorded a systole decrease of 0.44% and diastole decreased by 0.53%, cycle 2 of the first meeting recorded a systole decrease of 0.27% and diastole decreased by 0.7%, cycle 2 of the second meeting recorded a systole decrease of 0.6% and diastole decreased by 0.7%.

In the control group, there was a decrease in systolic and diastolic blood pressure after being given poco-poco gymnastics because the poco-poco gymnastics movements have standard movements and are lighter than aerobic gymnastics in general. If poco-poco gymnastics is done with the right frequency, it will affect changes in physical conditions, especially in cardiovascular respiration changes, these changes will increase oxygen capacity (Soekarman, 2015).

This research is also supported by research conducted by (Ramadhani, 2022) entitled The Effect of Elderly Gymnastics on Blood Pressure of Hypertension Patients. The results of this study indicate that there is a significant difference between the diastolic blood pressure of the treatment group and the control group. Based on the results of the dependent t test, a significance value of 0.01 ( $p < 0.05$ ) was obtained, which means that there is a significant difference.

There is a difference in diastolic blood pressure between the treatment and control groups caused by the movements of the low-impact aerobics nangun sat kerthi loka bali, which are different from poco-poco gymnastics, which are rhythmic gymnastics with simple movements. Apart from the intensity of the movements, there are differences in movements and music that show the characteristics of the gymnastics from the region. Aerobics nangun sat kerthi loka bali emphasizes the typical Balinese movements, while poco-poco gymnastics emphasizes the typical Manado swing movements. This causes a difference in diastolic blood pressure between the treatment and control groups.

## **CONCLUSION**

Aerobics Nangun Sat Kerthi Loka Bali affects systolic and diastolic blood pressure in pre-elderly with hypertension in the treatment group with significant differences. Poco-poco gymnastics affects systolic and diastolic blood pressure in the control group. There is a significant difference in diastolic blood pressure between the treatment group and the control group.

## **Conflict of Interest :**

This research was not contained any conflict of interest from anywhere

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## **REFERENCES**

- Aliya Ika Ramadhani, Y.D.P.S. (2022) 'Pengaruh Senam Lansia Terhadap Tekanan Darah Penderita Hipertensi', *Indonesian Journal of Public Health and Nutrition*, 2, pp. 1–6.
- Andri D. Hernawan, Dedi Alamsyah, M.M.S. (2017) 'Efektivitas kombinasi senam aerobik low impact dan terapi murottal quran terhadap perubahan tekanan darah pada lansia hipertensi di upt panti sosial tresna werdha mulia dharma kabupaten kubu raya', *Jurnal Mahasiswa dan Penelitian Kesehatan*, pp. 1–15.
- Hasbi, H. Al, Ulfah, H.R. and Widyasari, I. (2023) 'Efektifitas Senam Aerobik Terhadap Tekanan darah Pada Penderita Hipertensi', *Indonesian Journal of Nursing and Health Sciences*, 1(1), pp. 37–48.

- Kemenkes RI (2018) 'Hasil Riset Kesehatan Dasar Tahun 2018', *Kementrian Kesehatan RI*, 53(9), pp. 1689–1699.
- Sari (2016) 'Pengaruh Senam Poco Poco Terhadap Tekanan Darah Pada Lansia', *Jurnal Kesehatan*
- Soekarman, R. (2015) 'Senam Poco Poco Bagi Lansia Dengan Hipertensi', *Jurnal keperawatan*
- Sudayasa, I.P. *et al.* (2020) 'Deteksi Dini Faktor Risiko Penyakit Tidak Menular Pada Masyarakat Desa Andepali Kecamatan Sampara Kabupaten Konawe', *Journal of Community Engagement in Health*, 3(1), pp. 60–66. Available at: <https://doi.org/10.30994/jceh.v3i1.37>.
- Sumiyarsi, I. *et al.* (2021) 'Pengaruh tekanan darah terhadap aktivitas fisik lansia Effects of Blood Pressure on Physical Activity of the Elderyl', *PLACENTUM Jurnal Ilmiah Kesehatan dan Aplikasinya*, 9(1), p. 2021.