

# Effect of Aerobic (Low Impact) on Blood Pressure in Hypertension Patients

1<sup>st</sup> Rohmah, R.A.N  
Universitas Duta Bangsa  
Surakarta, Indonesia  
rohmahrisky555@gmail.com

2<sup>nd</sup> Puspita, T.I  
Universitas Duta Bangsa  
Surakarta, Indonesia  
tiraika2661@gmail.com

3<sup>rd</sup> Rahmasari, I.  
Universitas Duta Bangsa  
Surakarta, Indonesia  
ikrima\_rahmasari@udb.ac.id

**Abstract** - Hypertension is known as high blood pressure and is often referred to as a "silent killer" because it occurs without signs and symptoms, so that patients do not know if they are exposed to hypertension. Hypertension attacks more people in middle age, namely in the 55-64 years age group. One way to effectively treat hypertension is by exercise, one type of exercise that is beneficial and does not cause adverse effects is aerobic exercise (low impact). The method in this study is quantitative with a pre-experimental research design with one group pre-test design post-test design. The sample of this study was 18 elderly with hypertension. Aerobic gymnastic instruments use aerobics and music videos. Measurement of blood pressure before and after aerobic exercise (low impact) with a sphygmomanometer. Data analysis using the Wilcoxon test. with results on systolic blood pressure obtained Z values = -4.001 with  $p = 0,000$  ( $p < 0.05$ ) and diastolic blood pressure values  $Z = -3,834$  with  $p = 0,000$ , ( $p < 0.05$ ). The conclusion of this study is the effect of aerobic exercise (low impact) on blood pressure in patients with hypertension.

**Keywords**—low impact aerobics, blood pressure, hypertension, elderly.

## I. INTRODUCTION

Hypertension is a condition where a person's blood pressure is above 140/90 mmHg [1]. Hypertension is an increase in blood pressure which causes the supply of oxygen and nutrients to be circulated throughout the body to be blocked. Systolic and diastolic pressure will continue to increase along with increasing age [2] Hypertension is an increase in abnormal blood pressure in the arteries that continuously in one period because there is a contraction in the arteries of the arteries which makes blood difficult to flow and can increase pressure against the artery walls [3].

According to WHO, the blood pressure limit still considered normal is  $<130/85$  mmHg, while  $>140/90$  mmHg is stated as hypertension. Hypertension is an intermittent or protracted increase in diastolic or systolic blood pressure [4]. According to The International Clinical Epidemiology Network (INCLN) the prevalence of hypertension in Indonesia reaches 23%. According to the Profile of the Health Office of Central Java Province, the incidence of hypertension with a prevalence of around 90% of the total incidence of hypertension, with an incidence of 281,581 cases, then in 2016 increased by 473,603 cases.

Hypertension attacks more people in middle age, namely in the 55-64 years age group, to overcome hypertension in the elderly can be prevented or treated. There are various ways to treat hypertension, among others by consuming blood pressure-lowering drugs, eating patterns, exercising, reducing stress, avoiding alcohol, smoking. One way to effectively treat hypertension is by

exercise, one type of exercise that is beneficial and does not cause adverse effects is aerobic exercise (low impact) is one type of exercise recommended for the elderly with mild-moderate intensity, with a duration of 20 minutes, and frequency 3 times per week. According to Suharjana aerobic exercise is a series of calisthenic movements (reflecting) parts of the body through systematic movements, accompanied by musical rhythms and carried out continuously in a certain time.

Elderly are at greater risk of experiencing hypertension because the elderly are at high risk for degenerative diseases, such as coronary heart disease (CHD), hypertension, diabetes mellitus, gout (rheumatism) and cancer. The results of interviews that have been conducted with 36 elderly people, efforts taken when experiencing high blood pressure are taking medication, sleeping, drinking water, even some are left alone, because they assume that the disease will heal by itself, the 36 elderly said they did not understand how the best treatment to deal with the disease, because in this Posyandu there is no therapy or exercise to reduce blood pressure.

## II. METHOD

### A. Tools and Materials

The instrument in this research is to use aerobics (low impact) video, shanty song music, rocking rice song music Padang. Researchers used a sharia song composed by Yogi RPH and a shake of Padang rice composed by Yanto Sari, and an observation sheet on blood pressure levels. The measuring instrument used in this study was a sphygmomanometer (tension). Sphygmomanometer is used to determine the level of blood pressure experienced by respondents.

### B. Implementation Techniques

The implementation phase is carried out looking for hypertensive patients first. After getting the data and population then continued the process of finding respondents who fit the criteria of aerobic exercise groups (low impact) 6 times for 2 weeks with a time of 20 minutes. Measurement of blood pressure is done after the respondent does aerobics (low impact).

## III. RESULT

### A. Characteristics of Respondents

#### 1. Age of respondents

Table 1. Distribution of Respondents by age

Gender	Amount	Percentage (%)
--------	--------	----------------

Gender	Amount	Percentage (%)
60-62 years	13	72.2
63-65 years	5	27.8
Amount	18	100

Based on the table above, the majority of respondents aged between 60-62 years by 72%, while respondents with ages 63-65 years by 5%.

## 2. Gender

Table 2. Distribution of Respondents by gender

Gender	Amount	Percentage (%)
female	18	100
Amount	18	100

The data table shows that all respondents were women (100%).

## B. Univariate Analysis

1. Respondent's blood pressure before the treatment of low impact aerobics

Table 3. Distribution of Respondents before the treatment of low impact aerobics

Pre test Blood pressure	Amount	Percentage (%)
Normal height	0	0
Mild hypertension	14	77,8
Moderate hypertension	4	22,2
Amount	18	100,0

Table 3 in blood pressure data of respondents before the treatment of low impact aerobic exercise mostly had blood pressure in the category of mild hypertension of 77% and 22.2% had moderate category of hypertension.

2. Respondent's blood pressure prior to low-impact aerobic exercise

Table 4. Distribution of Respondents Based on Blood Pressure after Aerobic Low Impact Gymnastic Treatment

Pre test Blood pressure	Amount	Percentage (%)
Normal height	15	83,3
Mild hypertension	3	16,7
Moderate hypertension	0	0
Amount	18	100,0

Based on the above table, it is known that the respondent's blood pressure after the low impact aerobic exercise mostly became normal high by 83%. Respondents with blood pressure in the category of mild hypertension were 16%.

## C. Bivariate Analysis

Test the effect of low impact aerobics on systolic and diastolic blood pressure using the Wilcoxon test.

Table 5. Test Results of the Effects of Low Impact Aerobic Exercise on Systolic and Diastolic Blood Pressure

Blood pressure	N	Z	p
Sistolik pre test - Sistolik post test	18	-4.001	0,000
Diastolik pre test - Diastolik post test	18	-3.834	0,000

Based on Table 5 shows the value of  $Z = -4.001$  with  $p = 0,000$  ( $p < 0.05$ ) on systolic, and the value of  $Z = -3,834$  with  $p = 0,000$ , ( $p < 0.05$ ) on diastolic, so it can be concluded that there is the effect of gymnastics low impact aerobics on systolic and diastolic blood pressure.

## D. Discussion

### 1. Characteristics of Respondents

#### a. Age

Based on the results of the study most of the age of respondents was 60-62 years Crea [5]. Suggests structural and functional changes in the peripheral vascular system are responsible for changes in blood pressure that occur as a person ages. These changes include atherosclerosis, loss of elasticity of the connective tissue, and a decrease in the relaxation of the smooth muscles of the blood vessels, which in turn decreases the ability to distend and stretch the blood vessels. Consequently the aorta and large arteries decrease their ability to accommodate the volume of blood pumped by the heart (stroke volume), resulting in a decrease in cardiac output, and an increase in peripheral resistance so that the incidence of hypertension increases with age.

#### b. Gender

Distribution of respondents by sex known to all respondents are women. Mansjoer [10] said that hypertension sufferers in women, 16% greater than men who suffer from hypertension by 13%. The incidence in men is higher than in women, but in middle age and later age, the incidence in women begins to increase, so that at the age of 65 years, the incidence in women is higher, this is due to the function of the hormone estrogen in middle age women begin to decrease, where This hormone plays a role in increasing levels of HDL (High Density Lipoprotein), which is a protective factor for atherosclerosis.

Reddy's research suggests the prevalence of hypertension based on different sexes, where women have a higher prevalence of hypertension than men. Hypertension in women can lead to complications such as stroke.

### 2. The respondent's blood pressure before being given low impact aerobic exercise

Based on the results of research on the blood pressure of respondents before the treatment of low impact aerobic exercise mostly experienced blood pressure in the category of mild hypertension (140-159 mmHg). Blood pressure is the power of blood in pressing against the walls of blood vessels. Each time it beats (about 60-70 times per minute in a state of rest), the heart will pump blood through the veins. The greatest pressure occurs when the heart pumps blood (in

a deflating state), and this is called systolic pressure. When the heart is at rest (in an expanded state), blood pressure decreases and is called diastolic pressure.

AHA provides a limit of systolic blood pressure of 140 mmHg and diastolic blood pressure of 90 mmHg included in the classification of mild hypertension. Hypertension in the elderly occurs due to structural and functional changes in the peripheral vascular system that are responsible for changes in blood pressure. These changes include atherosclerosis, loss of elasticity of the connective tissue and a decrease in relaxation of vascular smooth muscle which in turn decreases the ability of blood vessels to stretch and stretch. Consequently the aorta and large arteries lack the ability to accommodate the volume of blood pumped by the heart, resulting in a decrease in cardiac output and an increase in peripheral resistance [6].

### 3. The respondent's blood pressure after being given low impact aerobic exercise

Based on the results of blood pressure studies after being given low impact aerobic exercise treatments are known to be mostly in the high normal category. Blood pressure is influenced by cardiac output and peripheral pressure. Various factors that affect cardiac output and peripheral pressure will affect blood pressure such as high salt intake, genetic factors, stress, obesity, endothelial factors. In addition to cardiac output and peripheral pressure, blood pressure is also affected by the thickness of the right atrium, but does not have much effect. In the body there is a system that serves to prevent changes in blood pressure acutely caused by circulatory disorders that seek to maintain blood pressure stability in the long run.

Increased blood pressure in primary hypertension is influenced by several genetic factors that cause changes in the kidneys and cell membranes, sympathetic nerve activity and renin, angiotensin which affects the hemodynamic state, sodium intake and sodium metabolism in the kidneys as well as obesity and endothelial factors. As a result of hypertension, among others, narrowing of the arteries that carry blood and oxygen to the brain, this is due to lack of oxygen due to brain tissue blockage or rupture of blood vessels of the brain and will cause death in parts of the brain which can then cause a stroke.

### 4. Effect of low impact aerobic exercise on changes in blood pressure

Statistical test results of the effect of low impact aerobic exercise on changes in blood pressure showed by  $p = 0,000$  in systolic, and  $p = 0,000$ , ( $p < 0.05$ ) on diastolic, so it can be concluded that there is an effect of low impact aerobic exercise on respondent's blood pressure.

Exercise such as low impact aerobics gives an effect on the cardiovascular system to improve its ability. More blood vessels (small blood vessels) are formed in active tissue to

improve food and oxygen supply, and exercise burns off excess fat in the system and inhibits the fat content in the vessels, thereby reducing the risk of thrombosis [7].

Low impact aerobic exercise can increase HDL, which in turn helps the metabolic process and decreases LDL levels [8]. Low intensity medium impact aerobics consists of warm-up exercises, core exercises, and cooling exercises in which movements also aim to reduce anxiety, stress, and reduce levels of depression. The reduction will stimulate the work of the peripheral nervous system (autonomic nervous system), especially parasympathetic which causes vasodilation of blood vessel cross section will result in a decrease in blood pressure both systolic and diastolic.

The influence of physical exercise: low impact aerobics to reduce blood pressure is due to low impact aerobics is a systematic process using motion stimulation that aims to improve or maintain the functional quality of the body which includes the quality of endurance of the heart, strength and power muscular resistance, flexibility and body composition [9], so that in practice it uses all large muscles, with continuous, rhythmic, progressive and continuous movements accompanied by music which, among others, are useful for increasing training motivation, training time setting and training speed.

## IV. CONCLUSION

Based on the results of research and discussion of the majority of blood pressure in the elderly before being given low impact aerobic exercise is mild hypertension, while the blood pressure in the elderly after being given low impact aerobic exercise is abnormally high. So it can be concluded there is the effect of aerobic exercise (low impact) on blood pressure in patients with hypertension

## REFERENCES

- [1] Townsend. 2010. *100 tanya jawab mengenai tekanan darah tinggi (hipertensi)*. Indeks. Jakarta.
- [2] Khasanah, N. 2012. *Waspada! Beragam Penyakit Degeneratif Akibat Pola Makan*. Laksana. Jakarta Selatan.
- [3] Udjianti, W. J. 2010. *Keperawatan Kardiovaskuler*. Salemba Medika. Jakarta.
- [4] Williams dan Wilkins. 2011. *Nursing: Memahami Berbagai Macam Penyakit*. Jakarta
- [5] Crea, M. 2013. *Hypertension*. Medya. Jakarta
- [6] Marliani L.S.T. 2017. *100 Questions & Answer Hipertensi*. Elex Media Komputindo. Jakarta
- [7] Harsuki. 2009. *Perkembangan Olahraga Terkini*. PT. Raja Grafindo Persada. Jakarta
- [8] Wade, C. 2016. *Mengatasi Hipertensi*. Nuansa Cendekia. Bandung
- [9] Irianto, K. 2010. *Epidemiologi Penyakit Menular dan Tidak Menular Panduan Klinis*. Alfabeta. Bandung
- [10] Mansjoer, A. 2011. *Kapita Selekta Kedokteran*. Edisi Empat. Media Aesculapius. Jakarta