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Hypertension gymnastics as a non-pharmacological intervention in lowering blood pressure

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ABSTRACT
Hypertension is a global health issue with a high prevalence, including in Indonesia. South Kalimantan has the highest rate at 44.1% among adults aged ≥18 and above. Most individuals with hypertension remain undiagnosed and untreated. Non-pharmacological interventions, such as hypertension exercise (senam hipertensi), effectively reduce blood pressure through relaxation and improved circulation. This community service program aimed to raise awareness and lower blood pressure among Anjir Serapat Muara 1 Village residents through health screening and hypertension exercise. The methods included an initial health survey, blood pressure measurements before and after the intervention, and several sessions of hypertension exercise. A total of 22 female participants were involved in this activity. Results showed that most participants experienced decreased blood pressure after the intervention. For instance, Mrs. S's blood pressure decreased from 159/103 mmHg to 148/100 mmHg, and Mrs. A's from 149/96 mmHg to 126/81 mmHg. Participants also showed high enthusiasm for the activity. In conclusion, the community well-accepted hypertension exercise as a non-pharmacological approach and effectively helps reduce blood pressure, demonstrating potential for sustainable implementation at the community level.

Keywords: Hypertension, Lowering Blood Pressure, Hypertension Exercise.

INTRODUCTION

Hypertension or high blood pressure is characterized by increased systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg. The World Health Organization (WHO) says that the number of people with hypertension will continue to increase with the increase in the population. It is estimated that by 2025, around 29% of people worldwide will develop hypertension. The prevalence of hypertension in Indonesia was stated to be 34.1% hypertension based on the results of measurements in the population aged ≥18 years was 34.1%, which was the highest in South Kalimantan (44.1%). At the same time, the lowest was in Papua (22.2%). The estimated number of hypertension cases in Indonesia is 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths. Hypertension occurs in the age group of 31-44 years (31.6%), age 45-54 years (45.3%), and age 55-64 years (55.2%). From the prevalence of hypertension of 34.1%, it is known that 8.8% are diagnosed with hypertension, 13.3% of people diagnosed with hypertension do not take medication, and 32.3% do not regularly take medication. This shows that most people with hypertension do not know that they have hypertension, so they do not get treatment [1].

Hypertension can lead to serious complications, such as heart disease, stroke, kidney failure, and decreased hearing ability. In the human auditory system, hypertension can reduce blood circulation to the cochlea, leading to tissue hypoxia and decreased hearing ability. Several factors can contribute to reduced hearing ability, such as prolonged headset use, aging, noise exposure, ototoxic agents, genetic susceptibility, metabolic and lifestyle diseases, and high blood pressure or hypertension [2]. Uncontrolled hypertension can lead to serious complications and even death. Based on a literature review by [3], uncontrolled hypertension has a higher risk of causing end-stage kidney failure than controlled hypertension. This occurs because high blood pressure constantly damages the blood vessels of the kidneys, disrupts the balance of body fluids, and accelerates the deterioration of kidney function.

Hypertensive patients' efforts to lower blood pressure are made with a non-pharmacological approach. The non-pharmacological approach includes various steps such as overcoming excess weight by losing weight, increasing potassium intake through foods such as fruits and vegetables, reducing salt and saturated fat consumption, quitting smoking, reducing alcohol consumption, creating relaxation conditions, and exercising regularly [4]. Exercise, such as hypertension gymnastics, can optimize heart function by increasing the energy needs of the body's cells, tissues, and organs. This results in increased venous backflow, which increases the volume of blood pumped by the heart and ultimately increases arterial blood pressure. When arterial blood pressure rises, there will be a decrease in respiratory activity and skeletal muscle, resulting in a reduction of sympathetic nerve activity [5]. This then leads to a reduction in heart rate, a decrease in the volume of blood pumped by the heart, and vasodilation of arteries and veins. This decrease reduces heart rate and total peripheral resistance, decreasing blood pressure [6].

Hypertension exercises are part of efforts to reduce weight and manage stress, which are two factors that increase the risk of hypertension. Significant difference in the measurement of systolic blood pressure of subjects before treatment, with the third week after the treatment of fitness gymnastics for older people [7]. Hypertension exercises were chosen as non-pharmacological interventions because they lower systolic and diastolic blood pressure. Results of a review of 10 journals showed that hypertensive exercise

lowered systolic blood pressure from 160 mmHg to 145 mmHg and diastolic from 90 mmHg to 85 mmHg, with a p-value of 0.001 indicating statistical significance. In addition, physical activities such as hypertension exercises can increase endorphins and reduce the stress hormone cortisol, which helps lower blood pressure, according to research by [8]. This gymnastics is also easy to do, does not require special tools, and is suitable for various age groups, especially older people.

METHOD

This service activity aims to provide health checks regarding hypertension in Anjir Serapat Muara 1 Village. The method applied in this program involves several systematic and measurable stages. The following is a description of the method of carrying out the activity:

Surveys and Observations

The initial stage of service involves surveys and observations in Anjir Serapat Muara 1 Village to identify health problems faced by the local community. This activity includes interviews with village officials and residents to understand health conditions, influencing factors, and the community's needs. The data collected during this phase is the basis for planning the next activity.

Initial Health Screening

An initial health examination is carried out to assess the prevalence of hypertension. These tests include: Blood pressure measurements to diagnose hypertension. The measuring device used is a sphygmomanometer for blood pressure. The examination results provide an initial overview of the health status of the participants.

Advanced Health Check-Up

The second health examination was carried out after the initial examination and the implementation of hypertension exercises. The aim is to evaluate the effects of hypertensive gymnastics on changes in participants' health. Comparing the results of blood pressure checks before and after hypertensive exercises. The measurement method used is the same as in the initial examination. The data obtained from the second examination were used to assess the impact of hypertension gymnastics and the program's effectiveness.

RESULT

The service activity in Anjir Serapat Muara 1 Village, Anjir Muara District, Barito Kuala Regency, began with blood pressure. A total of 22 people, all women, were followed with enthusiasm. Blood pressure checks are carried out before and after doing hypertension exercises, as shown in Figure 1.

Figure 1. Health Check-Up and Hypertension Gymnastics

Hypertension gymnastics activities are carried out in the morning in an open space for approximately 30 minutes. The gymnastics movements were light intensity, which aimed to maintain blood pressure stability while improving tubun fitness. The activity went smoothly, participants followed the gymnastics movements well according to the instructions of the nurse students, as shown in Figure 2.

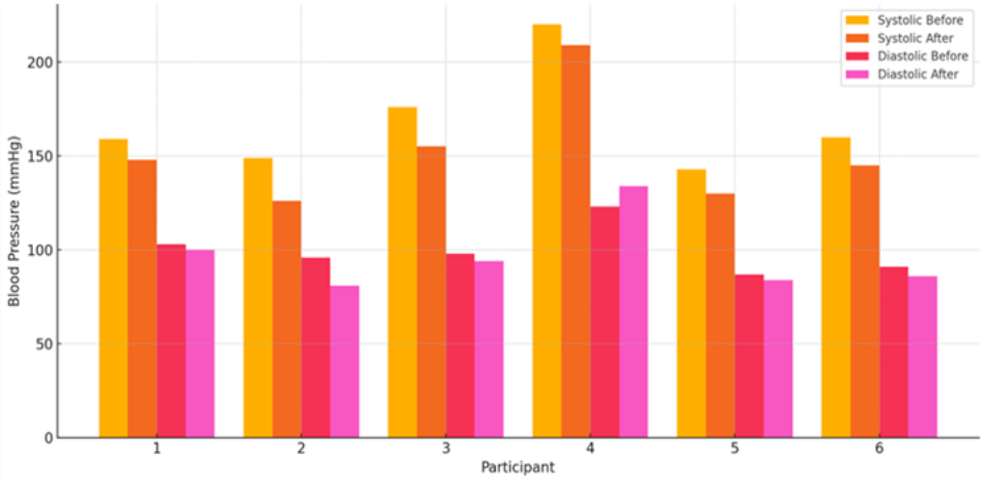

Diagram 1. Blood Pressure Test Results

Based on diagram 1, changes in blood pressure before and after the intervention were obtained. There was a consistent trend of blood pressure decline in most participants, especially in the group with relatively high initial blood pressure. This community service activity aims to increase knowledge and lower blood pressure in individuals at risk of hypertension through structured hypertension training and practice. 22 respondents were involved in this activity, measuring blood pressure before and after the intervention. The measurement results showed that most respondents experienced decreased systolic and diastolic blood pressure. Systolic blood pressure before the intervention ranged from 121 to 220 mmHg, and diastolic pressure ranged from 74 to 123 mmHg. After the intervention in the form of hypertensive exercises for several sessions, the value of systolic blood pressure decreased to 120 to 209 mmHg.

In comparison, the diastolic pressure was in the range of 75 to 134 mmHg. Individually, most respondents showed a significant decrease in blood pressure. For

example, in the 2nd respondent, blood pressure decreased from 149/96 mmHg to 126/81 mmHg. Similarly, in the 5th respondent, there was a decrease from 176/98 mmHg to 155/94 mmHg. However, some respondents showed mild improvements, which may be due to external factors such as physical activity before measurements, emotional stress, or lack of consistency in following gymnastics sessions.

DISCUSSION

This community service project demonstrated that hypertension exercise, as a non-pharmacological intervention, can significantly reduce blood pressure among adult women in Anjir Serapat Muara 1 Village. The results are consistent with previous studies that advocate for physical exercise, particularly targeted activities such as hypertension gymnastics, in managing blood pressure levels.

Hypertension gymnastics is one of the exercises that aims to increase blood flow and oxygen to active muscles and skeletal muscles, especially the heart muscle. Gymnastics or exercise can supply the need for oxygen in the cells, increasing energy, heart rate, heart output, and blood pressure. After rest, the blood vessels dilate or stretch, decreasing blood flow temporarily. About 30-120 minutes later, it will return to the blood pressure before the snail. If exercise is done regularly, blood loss will last longer, and blood vessels are more elastic [9]. The mechanism of lowering blood pressure after exercise is that exercise can relax the blood vessels, so that the blood pressure will decrease with the dilation of the blood vessels [10]. The physiological mechanisms through which hypertension exercises affect blood pressure are well documented [11]. Regular low- to moderate-intensity physical activity improves vascular elasticity and endothelial function. It also promotes vasodilation and reduces peripheral vascular resistance [12]. During exercise, increased cardiac output temporarily raises blood pressure. However, following exercise, a relaxation phase ensues where blood vessels dilate, and blood pressure decreases, a phenomenon known as post-exercise hypotension [13].

There are several ways to lower blood pressure, including pharmacological and non-pharmacological methods. One of the non-pharmacological ways is by doing gymnastics. The benefits of gymnastics are that they can stimulate the heart and provide benefits for people who suffer from hypertension. One of the goals of hypertension gymnastics is to widen blood vessels to lower high blood pressure [14]. Hypertension gymnastics is one of the sports that has the benefit of increasing the flow of oxygen to the muscles and parts active in the heart muscle activity [15]. Where this hypertension gymnastics can improve the performance of oxygen in cells, so that it can form the formation of energy in the body of living beings, where when energy increases the body will experience an increase in heart rate and will fill the blood vessels in the heart to increase blood pressure and when the heart rests [16], then the blood vessels will widen and the blood flow will turn down. Meanwhile, if people regularly do hypertension gymnastics, blood loss will occur [17].

Exercise such as hypertension gymnastics can encourage the heart to work optimally, where exercise can increase the need for energy by cells, tissues, and organs of the body, which as a result can increase venous backflow to cause the volume of the heart to increase the heart output to increase directly, and arterial blood pressure to increase [18]. Arterial blood pressure increases will first, the impact of this phase can reduce respiratory activity and skeletal muscles that causes sympathetic nerve activity to

decrease, after that it will cause the heart rate to decrease, the volume of the concubine decreases, vasodilation of the venous arterioles, since this decrease results in a reduction of cardiac output and a decrease in total peripheral resistance, thus a decrease in blood pressure [19].

CONCLUSIONS

In conclusion, hypertension gymnastics is an effective and well-accepted non-pharmacological strategy for reducing blood pressure. It offers benefits for physiological, psychological, and community engagement and presents a viable intervention for improving public health in resource-limited settings. This initiative serves as a model for other rural areas grappling with high hypertension prevalence and limited access to pharmacological treatments.

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