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The Implementation of Hypertension Exercise as an Independent Solution for the Elderly in Controlling Blood Pressure

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Abstract

Hypertension is one of the leading causes of death in the world. Farmer groups are at risk of developing hypertension. Several contributing factors include exposure to pesticides, unhealthy lifestyles (such as lack of exercise, smoking, consumption of high-sodium foods, stress, and alcoholic beverages), and heavy work that can cause fatigue. Lifestyle modifications that are known to prevent hypertension are physical activities that are carried out regularly, such as hypertension gymnastics. The implementation of hypertension gymnastics has been carried out in the community in Pajarakan Village to help prevent hypertension using the field survey approach method and hypertension gymnastics training. A total of 26 participants participated in hypertension gymnastics which ended with the provision of hypertension gymnastics videos to representatives of the residents. Pre- and post-test screening was also carried out after 3 days of intervention to determine the decrease in blood pressure in the farmer group. The results obtained on the first, second and third days were 0.000 (<0.05), meaning that there was an effect of hypertension gymnastics on reducing blood pressure. The community is expected to be able to hold hypertension gymnastics independently and regularly.

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INTRODUCTION

Hypertension or high blood pressure is one of the diseases that is a major problem in public health in Indonesia and in the world. It is estimated that the increase in hypertension cases, especially in developing countries, will increase by 80% in 2025, from 639 million cases to 1.15 billion cases. This prediction is based on the number of hypertension sufferers and the current population growth. At least, one third of people with hypertension are not treated properly. This is further compounded by the absence of complaints from most sufferers (Astutiatmaja et al., 2024).

The total number of hypertension cases in Indonesia shows that in rural areas there are still many hypertension sufferers who have not been reached by health services, ranging from 6% to 15%. But there is also a region in Central Java with a low number (1.8%), the Institute for Health Metrics and Evaluation (IHME) in 2017, stated that of the 53.3 million deaths in the world, the cause of death was cardiovascular disease by 33.1%, cancer by 16.7%, DM and endocrine disorders 6% and lower respiratory tract infections by 4.8% (Tobing, 2023). Based on data from the Indonesian Health Survey (Survei Kesehatan Indonesia/SKI) 2023, non-communicable diseases (NCDs) remain the leading cause of death in Indonesia, accounting for approximately 73% of total national mortality. The prevalence of several major NCDs has shown a significant increase. Hypertension rose to 34.1% in 2023, while the prevalence of diabetes mellitus increased to 10.9%. Similarly, stroke cases reached 12.1%, and coronary heart disease rose to 13.4%. Risk factors for non-communicable diseases (NCDs) include unhealthy lifestyle habits such as high consumption of sugar, salt, and fats, lack of physical activity, and smoking, all of which significantly contribute to the rising prevalence of NCDs. According to the 2023 Indonesian Health Survey (SKI), the consumption of sweet foods increased by 6.5%, from 59.8% to 66.3%, while the intake of fatty, cholesterol-rich, and fried foods rose by 4.5%, from 58.2% to 62.7%. NCDs are also a leading cause of disability in Indonesia. Data shows that 59.1% of disabilities related to vision, hearing, and mobility among people aged 15 and above are due to acquired diseases, with 53.5% of these being NCDs, particularly hypertension, which accounts for 22.2% of cases (Kemenkes RI, 2023).

One effective therapy for managing hypertension is engaging in regular hypertension exercises. These exercises are a form of physical activity specifically aimed at improving blood circulation and increasing the oxygen supply to active muscles and skeletal tissues, particularly the heart muscle. By enhancing cardiovascular function, hypertension exercises can help reduce blood pressure and support overall heart health (Martani et al., 2022).

Hypertension is the most common disease found in people in agricultural areas and is increasing every year (Maksuk, 2025). Prevention and control of hypertension is still limited to blood pressure checks and screening carried out at the elderly health post in Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency. The current problem is that the community has not had routine interventions to lower blood pressure. Therefore, to anticipate an increase in hypertension cases in farmer groups, it is important to carry out interventions that involve the active participation of farmers. The purpose of this community service activity is to increase the active role and ability of the community in preventing hypertension.

METHOD

Field Survey

At this stage, the community service team conducted a site survey in in Kapasan Hall, Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency, observing activity targets, namely: Women Farmers Group (KWT), facilities and infrastructure for implementing activities. The community service team also coordinated with health workers (regional nurses) to implement hypertension exercise.

Hypertension Exercise Activities

This activity was announced with an online invitation, sent through the head of the KWT (Women Farmers Group), then disseminated through the WhatsApp group by the head of the KWT (Women Farmers Group). The activity is carried out with a frequency of three times a week. The activity begins at 08.00 WIB, starting with blood pressure measurement and continuing with hypertension exercise, including warm-up stage, core movement stage, and cooling or relaxation stage. The blood pressure measurement activity before hypertension exercise is intended to control

blood pressure and see the changes that occur after routine hypertension exercise are carried out. Evaluation of post-test blood pressure examination is conducted after the hypertension exercise activities.

Hypertension exercise activities include:
Warm-up Stage

The warm-up stage is a stage that contains movements that are useful for preparing the body to face heavier activities, such as exercise. This stage includes muscle stretching, which aims to minimise injury. This warm-up stage consists of several movements: turning the head slowly, rotating the arms, rotating the shoulders and wrists, rotating the waist, lifting the legs, rotating the legs and jumping lightly.

The core training stage

The core training stage is the primary movement stage taught or demonstrated according to the desired goal: controlling blood pressure and making the body healthier, fresher and fitter. This stage contains movements with a moderate rhythm. In this activity, there are three stages in the implementation of exercise: the warm-up stage, the training stage, and the cooling or relaxation stage. The explanation of the three stages of exercise implementation is as follows:

1) Warm-up Stage

The warm-up stage is a stage that contains movements that are useful for preparing the body to face heavier activities, such as exercise. This stage includes stretching the muscles (stretching), which aims to minimise the occurrence of injury. In this warm-up stage, there are several movements, namely turning the head slowly, rotating the arms, rotating the shoulders and wrists, rotating the waist, lifting the legs, rotating the feet, and jumping lightly.

2) Core Exercise Phase

The core exercise phase is the primary movement phase taught or demonstrated according to the desired goal: controlling blood pressure and making the body healthier, fresher and fitter. This phase contains movements with a moderate rhythm.

3) Cooling and Relaxation

Phase The cooling or relaxation phase in sports/exercise aims to slowly restore the body's condition and heart rate to normal. This phase is usually done for 3-5 minutes after the core exercise. The movements performed in the cooling phase are low-intensity movements with a slow rhythm while taking a deep breath and then exhaling again.

RESULTS.

The Data Hypertension

Table 1. The Data of Hypertension in Kapasan Hall, Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency.

			Day-1		Day-2		Day-3	
No	**Name**	**RT/RW (local community)**	**Pre test (mmHg)**	**Post test (mmHg)**	**Pre test**	**Post test**	**Before (mm/Hg)**	**After (mm/Hg)**
1.	Mrs. S	02/01	160/90	140/80	160/90	150/80	140/90	130/80
2.	Mrs. I	02/01	150/90	150/80	130/90	130/90	130/90	130/90
3.	Mr. S	02/01	170/90	160/100	160/90	160/100	160/90	170/100
4.	Mr. Su	02/01	150/80	130/80	140/90	140/80	150/80	130/80
5.	Mrs. M	02/01	160/90	160/90	150/80	150/90	140/70	170/80
6.	Mrs. Id	03/01	150/90	130/80	150/90	145/80	140/90	130/80
7.	Mrs. Si	03/01	140/70	130/10	150/70	140/10	130/70	130/10
8.	Mrs. Dj	03/01	150/100	130/80	140/100	130/80	140/80	140/70
9.	Mr. Ba	03/01	180/90	170/90	180/90	170/90	170/90	150/90
10.	Mrs. R	03/01	140/90	130/80	140/90	130/80	140/90	130/70
11.	Mr. Ab	05/01	190/110	180/100	190/110	180/100	180/90	170/70
12.	Mrs. W	05/01	190/110	180/100	160/90	140/80	160/90	140/80
13.	Mr. S	05/01	190/110	180/100	160/90	140/80	180/90	170/90

14.	Mr. J	05/01	200/110	190/110	190/100	180/80	180/110	170/90
15.	Mrs. Wa	05/01	150/100	150/90	140/80	130/80	140/90	130/80
16.	Mrs. T	05/01	150/90	140/80	170/90	160/80	150/80	180/80
17.	Mrs. A	05/01	140/80	140/70	140/80	140/80	140/90	130/70
18.	Mrs. T	05/01	160/90	150/80	190/90	140/90	150/80	140/80
19.	Mrs. S	05/01	140/90	130/90	140/90	130/90	150/80	130/90
20	Mrs. H	06/01	150/90	140/90	150/80	180/80	140/80	130/80
21	Mr. Sa	06/01	170/90	160/80	190/110	170/100	170/90	160/80
22	Mrs. L	06/01	140/100	130/80	150/80	130/80	140/80	140/70
23	Mrs. N	06/01	150/80	140/90	150/90	130/80	160/80	140/90
24	Mrs. S	06/01	140/100	140/90	140/80	130/70	140/80	120/80
25	Mrs. S	07/01	130/80	140/90	150/80	130/90	150/90	140/80
26	Mrs. Hus	07/01	200/100	190/100	190/90	180/90	180/90	170/90

Based on Table 1, it can be seen that the maximum blood pressure pre-test day-1 showed 200/110 mmHg and the minimum 130/80 mmHg. The maximum blood pressure on day 3 post-test showed 180/80 mmHg, and the minimum was 120/80 mmHg.

Table 2. Statistical Results of the Wilcoxon Test of the Effect of Exercise on Hypertension on the First Day in Kapasan Hall, Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency.

Variable	Mean±SD	Median	Min- Max	95%CI	N	*p-value*	Difference Mean
Pre test Systolic	156,85±12,783	152,00	140-180	150,87-162,83	26	0,000	11,35
Post test Systolic	145,50±13,702	140,00	128-174	139,09-151,91	26		
Pre test Diastolic	98,35±6,385	96,00	90-110	95,36-101,34	26	0,000	5,8
Post test Diastolic	92,55±6,770	90,00	84-107	89,38-95,72	26		

The average systolic blood pressure before hypertension exercise on the first day was 156.85, and the average diastolic blood pressure before hypertension exercise was 98.35. While the average systolic blood pressure after hypertension exercise was 1.45.50, and the average diastolic blood pressure after hypertension exercise was 92.55. The Wilcoxon systolic statistical test results showed that the p-value was 0.000. Because the p-value <0.05, the exercise for hypertension has significant effectiveness. The Wilcoxon diastolic statistical test results showed that the p-value was 0.000 because the p-value <0.05, the exercise for hypertension has considerable effectiveness.

Table 3. Statistical Results of the Wilcoxon Test of the Effect of Exercise on Hypertension on the Second Day in Kapasan Hall, Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency.

Variable	Mean±SD	Median	Min-Max	95%CI	N	*p-value*	Difference Mean
Pre test Systolic	145,50±13,702	140,00	128-174	139,09-151,91	26	0,000	8,5
Post test Systolic	137,00±13,310	132,00	120-165	130,77-143,23	26		
Pre test Diastolic	92,55±6,770	90,00	84-107	89,38-95,72	26	0,000	4,1
Post test Diastolic	88,45±6,565	86,00	80-102	85,38-91,52	26		

The average systolic blood pressure before hypertension exercise on the second day was 145.50, and the average diastolic blood pressure before hypertension exercise was 92.55. While the average systolic blood pressure after hypertension exercise was 137.00, the average diastolic blood pressure after hypertension exercise was 88.45. The Wilcoxon systolic statistical test results showed that the p-value was 0.000. Because the p-value <0.05, the exercise for hypertension has significant effectiveness. The Wilcoxon diastolic statistical test results showed that the p-value was 0.000 because the p-value <0.05, the exercise for hypertension has considerable effectiveness.

Table 4. Statistical Results of the Wilcoxon Test of the Effect of Exercise on Hypertension on the Third Day in Kapasan Hall, Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency.

Variable	Mean±SD	Median	Min-Max	95%CI	N	*p-value*	Difference Mean
Pre test Systolic	145,50±13,702	140,00	128-174	139,09-151,91	26	0,000	18,25
Post test Systolic	127,25±10,818	120,00	118-153	122,19-132,31	26		
Pre test Diastolic	92,55±6,770	90,00	84-107	89,38-95,72	26	0,000	9
Post test Diastolic	83,55±5,266	80,00	79-65	81,09-86,01	26		

The average systolic blood pressure before hypertension exercise on the third day was 145.50, and the average diastolic blood pressure before hypertension exercise was 92.55. While the average systolic blood pressure after hypertension exercise was 127.25, the average diastolic blood pressure after being given hypertension exercise was 83.55. The Wilcoxon systolic statistical test results showed that the p-value was 0.000. Because the p-value <0.05, the exercise for hypertension has significant effectiveness. The Wilcoxon diastolic statistical test results showed that the p-value was 0.000 because the p-value <0.05, the exercise for hypertension has considerable effectiveness.

Documentation of Community Service Activities

Below are presented some pictures of the activities:

Picture 1. Pre and Post Test Blood Pressure

Picture 2. Photo of Hypertension Exercise

DISCUSSION

Hypertension is a condition of increased blood pressure above normal limits, where systolic pressure is more than 140 mmHg and diastolic pressure is more than 90 mmHg. Hypertension exercise is an exercise to lose weight and monitor stress, which is a factor causing high blood pressure in hypertensive patients and the elderly, and is done twice a week for 30 minutes. Hypertension exercise

is very effective in accelerating the process of lowering blood pressure in the elderly who experience hypertension. Based on the analysis of several journals, exercise for hypertension is one of the non-pharmacological therapies that has been proven effective in lowering blood pressure in older adults with hypertension. By doing regular hypertension exercise, blood pressure in the elderly can be decreased (Ilaiha & Yuniartika, 2025). Other researchers found a two mmHg decrease in systolic blood pressure and a decrease in diastolic blood pressure by one mmHg. This proves that antihypertensive exercise can lower blood pressure in the community. A hypertension exercise intervention for three days a week can reduce blood pressure (Syahrir et al., 2023).

Hypertensive patients who consistently and actively do hypertension exercise show significant reductions in blood pressure. Evidence shows that regular physical activity, especially exercises specifically designed for people with high blood pressure, has significant benefits. This activity can improve blood circulation and oxygen supply to the heart muscle. In addition, this exercise also plays a role in relaxing blood vessels, which in turn helps control hypertension (Hartati et al., 2023). The body experiences positive adaptations that support cardiovascular health by doing hypertension exercises consistently. The relaxation effect on the blood vessels decreases blood pressure, allowing for more effective hypertension management. The integration of regular exercise, especially hypertension exercise, was the strategy to control blood pressure (Khomsah & Milindasari, 2023; Moonti et al., 2022; Restawan et al., 2024).

With the movement and time stages, the blood vessels will widen, which can also reduce fat in the body. In addition to decreasing blood pressure, it can also reduce fat in the body, which, if done routinely and not excessively, will make the body more ideal and healthy. In addition, someone who wants to lower their blood pressure relies on exercise and must also pay attention to diet and avoid stress that can trigger high blood pressure and needs enough rest. After resting, the blood vessels will experience a dilation or stretching process that has an impact on the emergence of a decrease in blood pressure, because if exercise is done routinely, then it will make the blood vessels elastic (Afkan et al., 2024). Consistently performing hypertension exercises can help stimulate cardiac activity, leading to positive physiological changes in individuals with hypertension. These exercises encourage the heart to function more efficiently, contributing to the reduction and stabilization of blood pressure within normal levels (Oktavia et al., 2023).

After the exercise, there is a change in addition to the benefits of the exercise itself and other factors such as good stressors, supportive environmental conditions of the respondents, also because the respondents are cooperative during the exercise, which is proven by the difference in blood pressure before and after the exercise, which affects the decrease in blood pressure. By doing this exercise, it is also one of the efforts of hypertension sufferers to prevent complications that can occur if there is no early treatment for blood pressure that is getting higher with age, in addition, according to the respondents, this exercise is one of the efficient and easy hypertension management procedures to do in between their activities, in addition to keeping the body fit and relaxed, it also decreases blood pressure (Sakinah et al., 2022). Based on the results of other studies, physical activity affects the cardiovascular system (blood circulation) to improve its ability. More blood vessels (small blood vessels) are formed in active tissues to enhance the supply of food and oxygen, and exercise burns off excess fat in the system and inhibits fat content in the vessels, thereby reducing the risk of thrombosis (Al Khasanah et al., 2024).

CONCLUSION

Providing a hypertension exercise intervention for three days a week can reduce blood pressure. Hypertension exercise activities can lower blood pressure in hypertension sufferers in Kapasan Hall, Pajarakan Kulon Village, Pajarakan Community Health Center Working Area, Probolinggo Regency.

SUGGESTION

Implementing hypertension exercise as a self-managed intervention for the elderly requires active participation from patients, supportive guidance from nurses, and structured program management from the health center. By promoting regular physical activity, lifestyle changes, and community-based care, blood pressure control among elderly populations in Pajarakan can be significantly improved.

This program also has the potential to be adopted by other public health centers as a strategic

initiative to maintain and control blood pressure within the normal range among the elderly population. By integrating hypertension exercise into routine health services, other community health centers can replicate its benefits in promoting cardiovascular health, preventing complications, and improving the overall well-being of older adults.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest. Other funders than the authors had no role in the data collection, data analysis, and also in the writing of the manuscript.

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