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## Implementation of the Hypertension Prevention Program Through Hypertension Exercise for the Elderly at Wisma Cempaka UPT PSTW Puger Jember Regency

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### A B S T R A C T

Hypertension is increased blood pressure in the arteries continuously over a period, where the symptoms of hypertension are very diverse in each individual. Hypertension is a systolic and diastolic pressure of more than 160mmHg and 90mmHg, which is also common in the elderly. Objective: This study aims to determine the impact of providing health education related to hypertension and anti-hypertensive exercise on blood pressure in the elderly at Wisma Cempaka UPT PSTW Jember. This research used a quasi-experimental pre-test and post-test one-group design. The sampling technique used is a total sampling of 16 respondents. Data collection techniques were simple interviews, questionnaires and measuring blood pressure using a sphygmomanometer. Data were analyzed using the T-Test. The implementation includes health education, and blood pressure measurement, hypertension exercise. The results of statistical tests showed that there was an effect on blood pressure results before and after the Hypertension exercise. The respondent's blood pressure in the pre-test obtained average systolic 128.75 mmHg, and average diastolic pre-test 80.94 mmHg. The average post-test systolic value is 119.38 mmHg, and the average post-test diastolic is 77.19 mmHg. The level of knowledge of the elderly at Wisma Cempaka has increased with changes in post-test scores. This result proves the importance of health education and hypertension exercise in controlling blood pressure. There is a difference in systolic blood pressure before and after anti-hypertensive exercise. Anti-hypertensive exercise can be used as an alternative modification to lower blood pressure in the elderly with hypertension and provide health education for knowledge of controlling blood pressure.

## INTRODUCTION

High blood pressure or hypertension is an abnormal increase in blood pressure in the arteries continuously over time. According to WHO, the limit of blood pressure still considered normal is 140/90 mmHg, while blood pressure exceeding 160/95 mmHg is declared hypertension. Blood pressure between normotension and hypertension is called borderline hypertension. The WHO limits do not differentiate between age and gender (Adam, 2019). Hypertension is a systolic and diastolic pressure of more than 160mmHg and 90mmHg, which is also common in the elderly. Increasing age and the decline in organs' function trigger the occurrence of various degenerative diseases. One of which is hypertension, which is not only a high risk of suffering from heart disease but also other diseases such as nerves, kidneys, and blood vessels. The higher the blood pressure, the greater the risk (Anwari et al., 2018). Hypertension is a silent killer where the symptoms vary widely in each individual and are almost the same as other diseases. These symptoms are headaches or a feeling of heaviness in the neck. Vertigo, palpitations, fatigue, blurred vision, ringing in the ears, tinnitus, and nosebleeds.

According to the World Health Organization (WHO), an estimated 1.13 billion people worldwide suffer from hypertension, most of whom live in low and middle-income countries. Kementerian Kesehatan Republik Indonesia (2018), stated that hypertension ranked 2nd out of the ten most common diseases among outpatients in hospitals in Indonesia, with a prevalence of 4.67%. East Java is in sixth place with the highest number of hypertension patients in East Java in the city of Surabaya, which is as many as 313,960 residents. Hypertension occurs in the age group 31-44 years (31.6%), age 45-54 years (45.3%), age 55-64 years (55.2%). From the prevalence of hypertension of 34.1%, it was known that 8.8% were diagnosed with hypertension and 13.3% of people diagnosed with hypertension did not take medication, and 32.3% did not take medication regularly. The prevalence of hypertension with a doctor's diagnosis is 62.63% of aged 55-75 years and over.

Management for hypertension is pharmacological and non-pharmacological. Non-pharmacologically, one is exercise. The recommended exercise for hypertensive patients is carried out precisely, namely exercise that is carried out gradually and should not be too forced namely anti-hypertensive exercise. This exercise is shown for people with hypertension and the elderly to reduce weight and manage stress, increase blood flow and oxygen supply to active muscles and skeleton, especially the heart muscle, so it can lower blood pressure. The exercise impacts the blood vessel dilatation or stretches and decreases blood flow temporarily. The heart muscle in people who exercise regularly is robust, so the heart muscle in these individual contracts less than in those who rarely exercise (Sumartini et al., 2019). Suppose the exercise is carried out regularly and continuously. In that case, the blood vessels will be more elastic and impact decreasing heart rate and cardiac output, which can lower blood pressure. Ideally, this anti-hypertensive exercise is carried out at least two times a week with a span of about 10 to 30 minutes (Hernawan & Rosyid, 2017).

The results of the health screening that was carried out at Wisma Cempaka UPT PSTW Jember Regency showed that the number of older people who had hypertension (blood pressure more than 120/80 mmHg) reached 10 out of a total of 16 older adults. This study found that nursing problems at Wisma Cempaka were ineffective health management. This problem arises because of several complaints, such as neck pain, rheumatism, dizziness, and the daily habits of the elderly lifestyle. The habits which became a triggering factor for hypertension, namely there were 12 elderly who are active smokers and eight older people who like to eat salty food. Six elderlies have a family history of hypertension. Aristi et al. (2020) found that the frequency of consumption high sodium food is associated with the incidence of hypertension in the subjects studied. Older adults who are getting older tend to have difficulty in carrying out daily activities; this is caused by the decrease in cognitive function of the elderly (Wijayanti et al., 2019). The elderly at Wisma Cempaka does not take hypertension medicine regularly because the

guesthouse is far from where they ask for medicine. When they ask for medicine, they are only given medicine for 2 to 4 days, and sometimes they also must buy their own medicine at a pharmacy outside the PSTW.

Based on the above problems, to overcome this problem, we need to provide health education about hypertension to increase the understanding of elderly hypertension. Health education also provides information about things that can worsen hypertension, medication adherence, and physical activity, namely anti-hypertensive exercise, to create a better quality of life for the elderly with hypertension.

## **METHOD**

In order to get maximum results, the researchers used two interventions, namely health education and continued anti-hypertensive exercise. This research was quantitative with a quasi-experimental approach using a one-group pretest-posttest. This data collection was conducted at PSTW Puger Jember, Jember Regency, in May 2022. The population used in this study were the elderly at Wisma Cempaka at UPT PSTW Puger Jember, Jember Regency, with 16 older males collected, which were chosen by total sampling technique. The categorical data shown in the frequency table and numerical data are analyzed by dependent T-test.

In implementing health education in the early stages, respondents will do pre and post to fill out questionnaires related to knowledge. Pre and post using a hypertension knowledge level questionnaire comprising 25 questions accompanied by "yes/no" answers. The purpose of filling out the pre- and post-questionnaires on hypertension knowledge level is to measure how far respondents know about hypertension. This implementation is carried out in Wisma Cempaka once on the third day after conducting the assessment.

The second implementation followed hypertension exercise, carried out three times in front of the homestead page with pre- and post-blood pressure measurements using a t of the homestead page with pre and post blood pressure measurements using a sphygmomanometer before and after hypertension exercise with 18 exercises. The 18 movements include: clapping hands, clapping fingers, intertwining hands, crossing thumbs, fingering crosses, indexing crosses, tapping wrists, tapping pulses, pressing thumbs, opening and clenching fists, patting the backs of hands, patting arms and shoulders, patting on the waist, patted the thigh, patted the side of the calf, squatted-standing, patted the stomach and tiptoe. The purpose of pre- and post- measurements before and after doing hypertension exercise is to determine the impact on research interventions. Researchers collect, analyze, and process all data obtained using SPSS 20.

## RESULT AND DISCUSSION

### Characteristics of Elderly Respondents

Table 1. Characteristics of respondents by age

Variable	Frequency	(%)
Age (years)		
55-60	4	25
60-65	8	50
65-70	4	25
Total	16	100
Gender		
Man	16	100
Woman	0	0
Total	16	100
Complaint		
Pain (back/joint/stomach)	3	18,75
Dizzy	5	31,25
Itchy rash	1	6,5
cough	2	12,5
Social isolation	1	6,5
Diarrhea	1	6,5
Fever	1	6,5
No complaints	2	12,5
Total	16	100

Source: Primary data 21 Mei 2022

Table 1 shows the age range of the elderly at Wisma Cempaka, which is included in the range of 60-65 years, as many as eight people (50%) and shows that all the elderly in Wisma Cempaka is male (100%). Based on the complaints, Table 1 shows that the most complaints are dizziness (31.25%) and other complaints, namely pain (18.75%). the elderly are individuals who have reached the age of 60; with increasing age, it will also be accompanied by cumulative changes where there is a decrease in body resistance in dealing with stimuli from inside and outside the body (Susanto et al., 2021). The age group of respondents in Wisma Cempaka is 55-69 years. The respondents who entered the elderly age were 12, and 4 belonged to the late adult age group. Age is a risk factor for hypertension. With increasing age, the body's function decreases. There is a decrease in the elasticity of blood vessels, because of which the blood vessels become stiff so that the heart's burden becomes heavier in pumping so that many elderlies have a risk of hypertension.

This study is in line with research by Winoto & Bistara (2019), entitled the relationship between age and physical activity with the degree of hypertension in Bitung City, North Sulawesi, obtained results based on the chi-square test that there is a relationship between age and degree of hypertension (p-value = 0.003). Respondents in Wisma Cempaka are all male. Gender is a factor that cannot be modified in the incidence of hypertension. The study's results could not distinguish the number or incidence of

hypertension in male or female sex; this was because all respondents in Wisma Cempaka were male. However, some studies explain that gender is one-factor affecting blood pressure that cannot be changed. Research conducted by Susanti & Bistara (2021) shows that men have a higher level of hypertension than women but have a lower level of awareness of hypertension than women. The Ministry of Health (2019) explains that men have a 2.3x more risk of experiencing an increase in systolic blood pressure than women.

The results of the study that has been carried out have obtained data regarding the health of the elderly in Wisma Cempaka PSTW Puger; namely, there are 16 respondents, and 11 people have hypertension health problems. Five respondents have hypertension complaints, dizziness, or headache. Headaches in patients with hypertension are caused by vascular disorders or impaired blood vessel flow. This complaint has much to do with stressors or emotions, known as psychosomatic headaches. Headaches in hypertensive patients arise due to increased blood pressure, but not all headaches are a sign of hypertension. Patients with hypertension usually experience headaches in the back accompanied by heaviness in the neck. This pain usually appears in the morning after waking up and reappears spontaneously a few hours later (Hernawan & Rosyid, 2017).

In addition to the problem of hypertension, the elderly at Wisma Cempaka also have another problem, namely, pain joint. This disease makes the elderly limit their physical activity while in PSTW and only do activities such as washing clothes, cleaning, and exercising that have been scheduled by the PSTW. Other health problems that also arise are itching on the body, cough, and fever, and some respondents also experience digestive problems, namely diarrhea. During illness, usually, the elderly will ask the nurse on duty for medicine. However, there is no further examination for the elderly health condition by the nurse in charge. The elderly will receive treatment if they come to the care service, which is open every Monday to Friday.

#### The Respondent's Lifestyle/Lifestyle at Wisma Cempaka

##### a. Smoke

The study's results on the lifestyle of the respondents at Wisma Cempaka were 12 people who had a smoking habit. Respondents who smoked were also respondents who had hypertension. They did not know that smoking was one of the factors that caused higher blood pressure. In a day, an average of 12 respondents spent approximately six cigarettes.

Smoking can cause hypertension due to the chemicals contained in tobacco that can damage the inner lining of the artery walls, making the arteries more susceptible to plaque buildup (atherosclerosis). Nicotine can stimulate the sympathetic nerves so that it stimulates the heart to work harder and causes constriction of blood vessels, as well as the role of carbon monoxide, which can replace oxygen in the

blood and force the heart to fulfil the body's oxygen needs (Setyanda et al., 2015). Smoking 2 cigarettes, can increase blood pressure by up to 10 mmHg (Uguy et al., 2019). The results of research from Kayame & Mallongi (2018) explained the results of their research; namely, the results of the bivariate analysis showed that there was a significant relationship between smoking behavior and the incidence of hypertension  $p(0.000) < 0.05$ . Meanwhile, the correlation coefficient analysis results obtained 0.481. This result means that this study has a reasonably close relationship between smoking behaviour and the incidence of hypertension due to many factors that can increase the incidence of hypertension in addition to smoking behaviour in older adults in Muktiharjo Village, Margorejo District, Pati Regency.

#### b. Salt consumption

The factor that is part of the lifestyle is salt consumption. After the assessment, respondents with systolic blood pressure of 140-150 mmHg and diastolic 80-90 mmHg had a habit of consuming salt  $> 5$  grams/daily. The respondent said that they always had salt ready on the table to add to dishes they got from PSTW kitchen. Respondents also did not know that salt consumption exceeding typical requirements could increase the incidence of hypertension. The respondents with salt consumption  $> 5$  grams/day are as many as 8 out of 16 respondents.

Sodium levels in the food consumed are one of the causes of hypertension. Sodium is absorbed into the blood vessels from high salt consumption resulting in water retention, so blood volume increases. High sodium intake will cause excessive release of the natriuretic hormone, indirectly increasing blood pressure (Mihardja et al., 2018). This result is supported by prior research, which results of the chi-square test and statistical test  $P$  value = 0.010 is less than ( $0.010 < 0.05$ ), then  $H_0$  is rejected.  $H_a$  is accepted. There is a significant relationship between salt consumption patterns and hypertension in the elderly at the Gadingrejo Health Center in 2019, with an odd ratio value ( $OR = 5,704$ ). This finding means that respondents who consume high salt have a 5,704 times greater risk of developing hypertension than those who consume low salt.

The data above concludes that respondents with high salt consumption habits tend to have higher blood pressure; this is because sodium that works in the body can cause water retention, so blood volume increases. High sodium intake will cause excessive release of the natriuretic hormone, indirectly increasing blood pressure.

#### c. Physical Activity

The next factor is the lack of physical activity. Four respondents have low physical activity with blood pressure values classified as hypertension. Respondents said that there was a change in physical activity due to the COVID-19 pandemic. Hence, PSTW Puger implemented a new regulation in which the elderly in PSTW were not allowed to go out during the pandemic. This prohibition was done to reduce or prevent

the transmission of COVID-19. So many elder who used to walk outside are now spending more time in PSTW by sleeping and sitting back.

Factors that can affect blood pressure are physical activity. People who do less physical activity also tend to have a higher heart rate, so the heart muscle must work harder with each contraction. The more challenging the heart muscle must pump, the greater the pressure placed on the arteries. Increased blood pressure caused by lack of activity will cause complications such as coronary heart disease, impaired kidney function, and stroke. Based on research by Effendi, et al (2021), in general, the elderly who do not do physical activity is associated with the incidence of HST (Isolated Systolic Hypertension) with an incidence rate of 2,336 times the risk of developing hypertension. Isolated systolic hypertension occurs when the systolic pressure reaches 140 mmHg or more, but the diastolic pressure is less than 90 mmHg. So, the diastolic pressure is still in the normal range, while the systolic pressure tends to be high. Herawati et al., (2020) explained that as many as 27 (96.4%) respondents who did light activities suffered from hypertension, while respondents who carried out moderate activities suffered from hypertension as many as 19 (73.1%). The  $p$ -value = 0.042 indicates a significant relationship between low physical activity and the incidence of hypertension.

The conclusion is that physical activity can cause hypertension, and people with moderate or reasonable physical activity have a low risk of developing hypertension. In contrast to people with less physical activity, the risk of developing hypertension increases because people with less physical activity have a higher heart rate, so the heart muscle must work harder with each contraction. The more challenging the heart muscle must pump, the greater the pressure placed on the arteries.

#### d. Family History

Six respondents have hypertension problems because of a history of parents with hypertension problems. Based on research from Rotua (2021) explaining the results of the Chi-Square test obtained  $p$ -value = 0.001 where ( $p$ -value)  $< 0.05$ , which means there is a relationship between a family history of hypertension and the incidence of hypertension at the Talang Ratu Health Center in 2021. Based on study results, it can be concluded that some respondents do not have a family history of hypertension. A family history of hypertension also increases the risk, especially primary hypertension. Of course, environmental factors play a role.

#### e. Religion followed

The results of the study that have been completed show that all respondents in Wisma Cempak are Muslim. Each respondent has different characteristics even though they are of the same religion. From the observations and observations for one week, some respondents practice religious values well, carry out worship activities, namely praying together in the prayer room in PSTW, and keeping themselves busy

with recitation activities. However, three respondents do not carry out their obligations as Muslims and withdraw when other respondents perform worship. Besides, two respondents cannot perform worship due to their health conditions and complaints of pain that hinder mobility when they want to pray.

#### Knowledge Level Before and After Being Given Health Education

Table 2. Pretest and Posttest Values Knowledge Level

	Mean	SD	Min	Max
Pre-test	60,63	9,639	45	80
Post-test	75,94	10,680	55	95

Source: Primary data 21 May 2022

Based on Table 2. The pre-test score before health education was 60.62, and after health education was 77.19. With an SD value of  $9,639 \pm 10,680$ . The knowledge of the elderly about hypertension at Wisma Cempaka is quite good. The implementation of the pre-test evidence this. The results showed that one respondent had a score  $< 50$ , 4 respondents had a score of 50, 6 respondents had a score of 60, and 5 respondents had a score of  $> 60$ . It can be concluded that 11 respondents can answer questions correctly above the average value. After completing the pre-test, students were provided intervention through health education regarding hypertension. Health education was conducted using the lecture and discussion method, which was held for 30 minutes on Tuesday, June 17, 2022, in the Gazebo.

The media used during the implementation of health education were leaflets given to all respondents at Wisma Cempaka. After the counseling was finished, the students again gave post-test sheets to 16 respondents to assess the level of understanding of the respondents to the material presented by students as evaluation material. There is a change in the post-test score and an increase in the score. One respondent obtained the lowest score of 55, and 15 others received a score of 65. Respondents can understand the factors that cause hypertension, as well as ways that can be done to lower blood pressure. Suaib et al., (2019) conducted a study that explained that the results of statistical analysis obtained a p-value =  $0.002 < = 0.05$ , meaning  $H_0$  was rejected, and  $H_a$  was accepted, so there was a relationship between knowledge and the incidence of hypertension in the elderly. Differences in Systolic Blood Pressure Before and After Anti-Hypertension Gymnastics Intervention.

Table 3. Systolic Blood Pressure Value before and after hypertension exercise

	Mean	SD	Min	Max
Before	128.75	15,864	100	150
After	119,38	11,815	100	140

Source: Primary data 21 Mei 2022

Based on Table 3. The average systolic blood pressure value before exercise was 128.75, and the blood pressure after exercise was 119.38. With an SD value of  $15,864 \pm 11,815$ .



Table 4. Diastolic BP values before and after hypertension exercise

	Mean	SD	Min	Max
Before	80,94	5,836	70	90
After	77,19	4,460	70	85

Source: Primary data 21 Mei 2022

Based on Table 4. The average diastolic blood pressure value before exercise was 80.94 and the diastolic blood pressure after exercise was 77.19. With an SD value of  $5.836 \pm 4.460$ .

Table 5. T-test analysis dependent on systolic and diastolic blood pressure in the elderly before and after anti-hypertensive exercise

	<i>P-value</i>
Systolic before and after	0,002
Diastolic before and after	0,003

Source: Primary data 21 Mei 2022

Based on table 5. Showing the results of the analysis test using the dependent t-test, the results of the systolic blood pressure before and after the intervention were 0.002 ( $p < 0.05$ ), thus  $H_0$  was rejected, and  $H_a$  was accepted, which means there was a difference in systolic blood pressure in patients with hypertension before and after doing anti-hypertensive exercise at Wisma Cempaka UPT PSTW Jember Regency and the diastolic blood pressure indicator there was a significant difference with a significance of 0.003 ( $p < 0.05$ ).

The test results using a dependent t-test on systolic blood pressure after and before the intervention showed a value of 0.000 ( $p < 0.005$ ), which indicated a decrease in blood pressure in systole and diastolic after the hypertension exercise intervention was given. The average systolic blood pressure before the intervention was 134.38 mmHg, while after the intervention was 98.75. Furthermore, the average diastolic blood pressure before the intervention was 116.25 mmHg and after the intervention was 82.81 mmHg.

Hypertension exercise is done to increase blood flow and oxygen to the heart muscles (Susanti et al., 2021). Antihypertensive exercise has been proven to increase the levels of endorphins fourfold in the blood; increasing endorphins can increase comfort, reduce pain, and lower blood pressure. After doing antihypertensive exercise, the heart will contract to pump blood throughout the body, then cause heart contraction and cause pressure in the systolic artery. This pressure is called systolic blood pressure (Mahbubah, 2018).

Teaching movements do hypertension exercise. The movement includes walking in place, clapping hands, clapping fingers, intertwining hands, crossing thumbs, fingering crosses, indexing crosses, tapping wrists, tapping pulses, pressing thumbs, opening, and clenching fists, patting the backs of hands, patting arms and shoulders, patting on the waist, patted the thigh, patted the side of the calf, squatted-standing, patted the stomach and tiptoe. The exercise can relax the blood vessels because it can reduce peripheral

resistance. People who exercise regularly have strong heart muscles. The muscle contracts less than the heart muscles of individuals who rarely exercise. Exercise can cause a decrease in heart rate, and exercise will also reduce cardiac output, which in turn can lower blood pressure (Neng et al., 2020).



Fig 1. Empowerment activities for the elderly with hypertension at Wisma Cempaka UPT PSTW Jember. (a) Screening for problems and initial blood pressure measurement (b) Health education activities for the elderly (c) Implementation of anti-hypertensive exercise with the elderly.

Source: Primary data 21 Mei 2022

## CONCLUSION

In line with increasing age, it must be accompanied by a decrease in organ function that has the potential to trigger various degenerative diseases or health problems that occur, especially in the elderly group with hypertension problems. Smoking habits, lack of physical activity, excessive salt consumption, and genetic factors trigger hypertension in the elderly. In addition, to increase the elderly's knowledge regarding hypertension, action is also needed to make blood pressure controllable. One is anti-hypertensive exercise because lowering blood pressure after exercise can relax blood vessels. So that by dilating blood vessels, blood pressure will decrease. In this study, there was a change in systolic blood pressure after and before the intervention, showing a value of 0.000 ( $p < 0.005$ ), which indicates a decrease in blood pressure in systole and diastolic after the hypertension exercise intervention was given.

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Thanks to UPT PSTW Jember, Jember Regency. According to theory, the UPT can reschedule anti-hypertensive exercise activities for the elderly. The exercise can be done 2 to 3 times in 1 week to get optimal results and is supported by regular blood pressure checks and optimising pharmacological therapy or treatment programs to reduce blood pressure in the elderly but still pay attention to other accompanying diseases.

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