Research Article

# THE EFFECT OF ERGONOMIC EXERCISES ON REDUCING BLOOD PRESSURE IN HYPERTENSION SUFFERERS IN AWANG BANGKAL BARAT VILLAGE, THE WORKING AREA OF KARANG INTAN 2 COMMUNITY HEALTH CENTER

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**ABSTRACT**
Hypertension is a cardiovascular problem characterized by systolic blood pressure >140 mmHg and diastolic >90 mmHg. The prevalence of hypertension increased from 25.8% in 2013 to 34.1% in 2018, with the highest majority in South Kalimantan Province at 44.3%. One non-pharmacological therapy in the form of exercise that can be done is ergonomic exercise. This study aims to determine the effect of ergonomic exercise on reducing blood pressure in hypertension sufferers in Awang Bangkal Barat Village, the working area of Karang Intan 2 Community Health Center. The research method was a case study focused on one hypertension sufferer in Awang Bangkal Barat Village, carried out for 3 consecutive days. Join in. Ergonomic exercise reduced systolic blood pressure for 60 minutes from an average of 140 to 130 mmHg. Ergonomic practices also decreased diastolic blood pressure and pulse 30 minutes after implementation. The ergonomic approach influenced the lowering of blood pressure in hypertension sufferers.

Keywords: hypertension, ergonomic exercise, blood pressure

## INTRODUCTION

Hypertension is a cardiovascular problem characterized by systolic blood pressure exceeding 140 mmHg and diastolic blood pressure exceeding 90 mmHg (Ministry of Health of the Republic of Indonesia, 2019). This disease is a dangerous and deadly non-communicable disease, otherwise known as the silent killer disease. Hypertension sufferers may not be aware of their illness if they do not measure their blood pressure (Mutmainnah et al., 2021). This disease can cause severe complications if not appropriately controlled, such as heart disease, stroke, kidney failure, and vision problems (Anshari, 2020).

The World Health Organization said that hypertension sufferers reached around 1.13 billion in the world in 2015 and are predicted to increase to 1.5 billion in 2025, especially in developing countries (Muharni & Wardhani, 2018). Meanwhile, the incidence of hypertension in Southeast Asia reached 36% (Khamid & Fauzi, 2022), with 1.5 million deaths due to hypertension every year (Indonesian Ministry of Health, 2019). Based on data from Riskesdas (2018), it shows that the prevalence of hypertension increased from 25.8% in 2013 to 34.1% in 2018, with the highest prevalence in South Kalimantan Province at 44.3% and the lowest prevalence in Papua Province at 22.2%. Based on data on the 10 most common diseases at Karang Intan 2 Community Health Center in September 2023, primary hypertension was the number 3 disease with the highest number of 54 people (13.70%). The results of the assessment (physical examination) in Awang Bangkal Barat Village in 2023 showed that the majority of hypertension sufferers were dominated by the adult age group (19–59 years) with 450 people (98%) and the elderly age group (>59 years) with 10 people (2%). This is caused by genetic factors and a lifestyle that has become a habit for the people of Awang Bangkal Barat Village.

Awang Bangkal Barat Village is one of the villages located in the working area of Karang Intan 2 Community Health Center,

Banjar Regency, South Kalimantan, which borders the Karang Intan River and the mountainous regions. Many people live unhealthy lifestyles, such as consuming salted or wadi fish from cultivated products, consuming foods high in fat (fried foods), consuming excessive coffee, smoking, and rarely exercising. These habits put the people of Awang Bangkal Barat Village at risk of developing hypertension. Hypertension can occur due to a destructive lifestyle, for example, a diet high in sodium or salt, excessive consumption of fatty foods, a lack of physical activity or exercise, coffee drinking, and smoking habits (Aulia & Ananto, 2018). To overcome this problem, there is a need for hypertension management strategies, both pharmacological therapy through drugs and non-pharmacological treatment, by modifying lifestyle by maintaining an ideal body weight, a diet low in sodium and fat, not smoking or consuming alcohol, managing stress, and exercising regularly. Exercise also plays a role in controlling body weight in obese individuals. Someone who is categorized as obese has a BMI above 30 (Anggraini et al., 2018). The research results of Anggraini et al. (2018) show that obesity and physical activity/exercise are closely related to hypertension.

One non-pharmacological therapy that can be done to lower blood pressure is ergonomic exercise (Jumari & Putri, 2021). Ergonomic exercise is a simple method for maintaining body health. The movements are almost the same as prayer movements but have been adapted to the human anatomy and physiology (Andari et al., 2020). Ergonomic exercise can improve body fitness by maintaining heart function, eliminating negative energy, relieving stress, burning calories, and controlling ideal body weight (Prima & Oktaini, 2020). This exercise can also maintain the position and flexibility of blood vessels, prevent the hardening of blood vessels, thereby optimizing blood supply to the brain, and improve oxygen circulation to reduce blood pressure (Nurfitri et al., 2019).

Several previous studies have proven that ergonomic exercise can reduce blood pressure in hypertension sufferers, both adults and elderly groups (Ayatullah & Wahidah, 2023) (Suwanti et al., 2019), (Prima & Oktaini, 2020), (Jumari & Putri, 2021), (Manik et al., 2023) (Fernalia et al., 2021), and (Yanti et al., 2021). One study by Wahyuni et al. (2020) showed that ergonomic exercise reduced blood pressure in adults with hypertension. Therefore, this study aims to see the effect of ergonomic exercise on lowering blood pressure in hypertension sufferers in Awang Bangkal Barat Village, the working area of Karang Intan 2 Community Health Center.

## METHOD

The research method was a case study focusing on one hypertension sufferer in Awang Bangkal Barat Village. The assessment was conducted using interviews, observations, and physical examinations on November 15, 2023. Ergonomic exercise lasted 3 consecutive days from November 17–19, 2023. Ergonomic practice was taught on the first day, and health education regarding hypertension, especially healthy lifestyles for hypertension sufferers, was carried out on the second day. The client's blood pressure and pulse are measured for 30 minutes before carrying out ergonomic exercises. The ergonomics exercise lasts 25 minutes, starting with a warm-up, then 5 core movements (open-chested movements, grateful bowing movements, mighty sitting movements, burning sitting activities, and surrendering lying actions), and ending with a cool-down. Blood pressure and pulse measurements (post-test) were conducted 30 minutes and 60 minutes after the exercise. Besides that, the client was asked about physical complaints, psychological problems, activities 1 hour after training, and ensuring compliance with taking medication regularly every day.

## RESULTS

### Case Illustrations

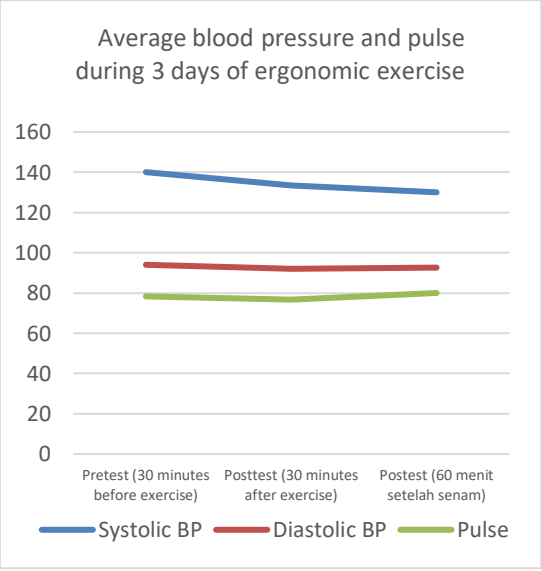
Mrs. M, 43 years old, had a history of hypertension with genetic factors. The client has had hypertension since two years ago. The client is married and has three children. The client's last education was in elementary school. Currently, the client

works as a housewife. The client had an unhealthy lifestyle, especially regarding eating and exercise patterns. The client's physical examination showed a weight of 75 kg, a height of 157 cm, and a BMI of 30.4 (obese). The results of the vital signs examination consisted of a blood pressure of 142/92 mmHg, a pulse rate of 81 x/min, a breathing rate of 20 x/min, a SpO2 of 99%, and a body temperature of 36.6°C.

**Patient Condition**

Currently, the client has no complaints, neither headaches nor sleep disturbances. The client already understands the disease, including how to treat hypertension. The client routinely takes 10 mg of Amlodipine every morning after eating. However, the client sometimes still has difficulty restraining themselves from maintaining their lifestyle, especially eating. The client does not limit their use of salt, so they usually always include salt or flavoring in their food. The client likes salty and fatty foods, such as fried foods, offal, salted fish, and vegetables with coconut milk. The client said he rarely and only occasionally consumed fruit. The client never exercises and only takes care of the house. The client's free-time activities are watching TV or talking with her husband.

Table of average blood pressure and pulse during 3 days of ergonomic exercise




In the table above, the initial measurements (pre-test) results during the 3 days of ergonomic exercise show that the average systolic pressure was 140 mmHg and the diastolic pressure was 94 mmHg. In the final measurement results posttest 30 minutes after exercise), the moderate systolic pressure was 133.3 mmHg, and the diastolic pressure was 92 mmHg. In comparison, in the posttest, 60 minutes after training, the medium systolic pressure was 130 mmHg, and the diastolic pressure was 92.7 mmHg. The average pulse rate in the pre-test was 78.3x/minute and 76.7x/minute in the post-test 30 minutes after exercise. Meanwhile, in the post-test, 60 minutes after training, the pulse rate was 80x/minute.

**DISCUSSION**

The results showed a decrease in systolic blood pressure between 30 and 60 minutes after ergonomic exercises. This aligns with research by Wahyuni et al. (2020), which shows that ergonomic exercise carried out for 3 consecutive days can reduce systolic blood pressure up to 60 minutes after the training. The body releases endorphine hormones to relax and reduce stress when doing ergonomic exercises. This situation stimulates the parasympathetic nerves to dilate blood vessels, improving circulation and lowering blood pressure (Dewi et al., 2019).

The difference between the decrease in diastolic blood pressure after 30 and 60 minutes of exercise is caused by the client's physical activity. A decrease in systolic blood pressure shows that the heart works optimally and efficiently. Meanwhile, a decrease in diastolic blood pressure is indicated by a decrease in peripheral blood pressure (Prima & Oktaini, 2020). During ergonomic exercise, the resistance of peripheral blood vessels decreases due to changes in sympathetic nerve vasodilation, so blood pressure decreases (Nurfitri et al., 2019). After 60 minutes of exercise, the resistance of peripheral blood vessels returns to its original state. This is influenced by the diameter of the blood vessels, which have not widened completely. To increase blood vessel diameter, optimal peripheral blood pressure reduction is required with long and regular exercise durations (Fitria et al., 2019).

Exercising regularly for a suitable duration can reduce blood pressure optimally. Research by Fernalia et al. (2021) shows that ergonomic practice effectively lowers blood pressure twice weekly for 20 minutes in hypertension sufferers. Other research by Suwanti et al. (2019), Prima & Oktaini (2020), and Yanti et al. (2021) by doing ergonomic exercises three times a week also showed a decrease in blood pressure in hypertension sufferers.

Ergonomic exercise is a simple method for maintaining body health. The movements are almost the same as prayer movements but have been adapted to the human anatomy and physiology (Andari et al., 2020). Ergonomic exercise can restore body position and improve body fitness by maintaining heart function and burning body calories (Prima & Oktaini, 2020).

Ergonomic exercise movements carried out by clients provide various benefits so that they can reduce blood pressure. This is in line with theory, where the broad indication of the chest when rotating the arms at the shoulders and tiptoeing causes nerve sensor stimulation to optimize the function of the lungs, heart, liver, kidneys, stomach, and intestines so that metabolism is optimal (Wardaningsih, 2021). Then, the bowing movement of gratitude aims to strengthen the anatomical-functional structure of the spine and increase the blood supply to the brain optimally. At the same time, the mighty sitting position can provide a relaxing effect by suppressing sympathetic nerve fibers and releasing negative energy in the body (Suwanti et al., 2019).

Furthermore, the burning sitting movement with five toes bent and pressing the base or floor is a stimulator for the vital functions of the body's organ systems: mind function, respiratory function, metabolic process, detoxification of materials in the body, liver function, and the immune system. Then, the position of the back of the hand resting on the thigh will press the abdominal wall parallel to the kidney organ inside, thereby helping to optimize kidney function. Some people may have difficulty executing the lying-down surrender movement because the legs are bent, and the body is lying on the floor. However, this position can be done with the legs straight. The surrender lying movement aims to relax the spine and optimize the function of internal organs and other body systems (Purba, 2022).

## CONCLUSION

Ergonomic exercise influences reducing blood pressure in hypertension sufferers. Ergonomic activities performed once a day for 3 consecutive days can reduce systolic blood pressure for 30–60 minutes. Ergonomic exercises can also reduce diastolic blood pressure and pulse for 30 minutes after implementation. Ergonomic training can be one of the nursing interventions in non-pharmacological therapy to lower blood pressure in hypertension sufferers.

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