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The Intervention of Isometric Exercise and Yoga Breathing on Hypertension

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Abstract. Hypertension is the most common disease suffered by Sungai Rangas Ulu Village people. The majority of people who are living in the village are fishermen. The fish obtained are preserved in salted fish and consumed by them. The patient in this case report is a smoker and one of the residents who often consume salted fish. Local culture is one of the factors that cause hypertension. One of hypertension management is complementary therapy such as isometric exercise and yoga breathing. This study described the results of nursing care on hypertension patients through isometric exercise interventions and yoga breathing. This study used a case study method on one of the hypertension sufferers. A client in Sungai Rangas Ulu Village was chosen randomly or accidentally for the case report. A client was given isometric exercise and yoga breathing intervention and observed their blood pressure using a sphygmomanometer every day for six days. The assessment results on the client can establish a nursing diagnosis: risk of the ineffectiveness of peripheral tissue perfusion associated with hypertension. The client was given an isometric exercise and yoga breathing intervention to achieve the outcome. The intervention result was decreased blood pressure (before = 180/120 mmHg, and after = 153/100 mmHg). Isometric exercise and yoga breathing can make the client more relaxed and increase blood circulation, decreasing blood pressure. There is an effect when given isometric exercise intervention and yoga breathing on reducing blood pressure in a client with hypertension.

Keyword: case report; hypertension; isometric exercise; yoga breathing

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1. Introduction

Hypertension can be defined as a chronic disease that increases blood pressure, whose systolic pressure is above 140 mmHg and its diastolic pressure is above 90 mmHg. A person with hypertension will experience headaches, blurred vision, frequent urination, and sometimes even swelling due to capillary pressure (Damanik & Sitompul, 2020). According to WHO (WHO, 2015), in 2015 it shows about 1.13 billion people worldwide suffered from hypertension. Hypertension is the first ranked, with the number of cases reaching 185,857 people in Indonesia. The prevalence of hypertension in Indonesia, according to blood pressure measurements in the population older than 18 years, was 25.8% in 2013, and in 2018 it was 34.1%. In South Kalimantan Province, it is ranked the most in Indonesia with 44.1% (Riskesdas RI, 2018).

One of the independent nursing interventions to decrease blood pressure is a complementary therapy. It includes foot massage, honey, foot spa, watermelon, cucumber, and many others. In addition, isometric exercise and yoga breathing interventions can be alternative solutions to deal with hypertension problems. Based on the previous study, there is an influence on blood pressure reduction when isometric exercise is combined with yoga breathing (Anjarsari et al., 2021). The isometric exercise increases the oxygen supply in the tissues and controls the heart in pumping blood flow. In addition, this intervention was chosen because of its easy and low costs.

According to an interview on May 21, 2022, a client was Mr. R, 63, who had hypertension five years ago. He was a fisherman and smoker and consumed the salted fish as his culture in the village. Local culture is one of the factors that cause hypertension. This culture happened in this village, and one of the hypertension clients connected to the culture is Mr. R. The physical examination result were headache, dizziness, and tension in his neck. The average blood pressure result was 180/120 mmHg. The client said he routinely took captopril 25 mg 2 times a day and took medication regularly to control his blood pressure. The reason why the client is made a managed patient is that the client's blood pressure is categorized as hypertension level 2 – 3. The intervention given to the client is expected to lower the client's blood pressure and prevent further complications. Comprehensive nursing care with complementary treatment is needed to reduce high blood pressure. Based on the description above, it is imperative to conduct comprehensive nursing care to help hypertension clients. The purpose of this study was to apply nursing care with isometric exercise and yoga breathing to Mr. R in Sungai Rangas Ulu village, West Martapura District.

2. Case Illustrations

This research used a case study design through a comprehensive nursing care approach method which includes assessment, formulating nursing diagnoses, planning (nursing ourcomes and nursing intervention), nursing implementation, and nursing evaluation. Nursing care is better if it

starts from the nurse's understanding of nursing concepts, theories, and sciences (Agianto, 2018). Good data collection will undoubtedly be beneficial in identifying nursing problems or nursing diagnoses that arise in a client. This continues to the next step, which is to determine nursing outcomes and also nursing interventions. Nursing care uses NANDA-I, Nursing Outcomes Classification (NOC), and Nursing Intervention Classification (NIC) as the standard language of nursing in the world (Agianto, 2018).

The case study was conducted in Sungai Batang Ilir Village, West Martapura District, Banjar Regency, South Kalimantan. Mr. R is 63 years old, with a hypertension medical diagnosis. A client stays in the wetland area on the outskirts of the Martapura River. He works as a fisherman. The fish obtained are preserved in salted fish and consumed by the client and family. This is a cultural factor related to this village's high blood pressure. It impacts the client's health condition and those living in the Martapura river. The study was implemented for seven days, from 21 to 27 May 2022. Day 1 was for data gathering. Day 2 – 7 was for nursing implementations and evaluation. Researchers obtained the patient data through interviews, observations, and physical examinations. Researchers have obtained permission from patients and families to undertake the nursing care.

Complementary therapy such as isometric exercise and yoga breathing was implemented for the client within six days. It means the client got interventions at 14.00 pm daily for isometric exercise and yoga breathing (Table 1). The interventions were implemented as a guideline (Anjarsari et al., 2021). Researchers started with blood pressure measurement using a sphygmomanometer, then continued with isometric exercise for 10 minutes and yoga breathing for 10 minutes. Furthermore, the client rested for 15 minutes before blood pressure was measured post-intervention. These interventions were the same from day 1 to day 6. Researchers taught the client on day one how to do an isometric exercise and yoga breathing and demonstrated to the client, then implemented those interventions in 10 minutes for each. On days 2 – 6, researchers encouraged and motivated the client to do the interventions and follow the guidelines. The family was also involved in these activities, especially to monitor, help, and evaluate the client when doing the interventions. Researchers made a book guideline for isometric exercise and yoga breathing for client and family if researchers were done for the study. This study got ethical approval from IRB of the Faculty of Medicine, Universitas Lambung Mangkurat.

3. Research Results and Discussion

The client said there was a history of hypertension since approximately five years ago. The nursing assessment was measured on day one before implementing the nursing intervention (complementary therapy). The results were that he felt a headache, pain in the back of the neck, blood pressure: 180/120 mmHg, the Pulse rate: 77 times/ min, respiration rate: 18 times/min, SPO2: 96%. Clients routinely consumed captopril 25 mg 2 times a day. He said difficult to sleep

and already limited the salted fish consumption—the client like to drink coffee and has a smoking history. According to the nursing assessment, the nursing diagnosis was that the client characterized ineffective peripheral tissue perfusion related to hypertension, felt dizzy, and had a headache and tension in the back neck. The nursing diagnosis outcome was hypertension severity with indicators systolic and diastolic within normal. Researchers arranged the nursing interventions to achieve the outcomes, including teaching isometric exercise and yoga breathing. Before giving the teaching, assessing the client's knowledge is necessary to implement. Furthermore, the researcher provides a guideline for isometric exercise and yoga breathing, teaches the client and family, demonstrates the interventions, evaluates the goal of the programs.

A client is 63 years old and has a high risk for hypertension. Men or women can be at risk of hypertension, especially in pre-elderly >45 years of age. Lifestyle is an important factor that affects people's lives. An unhealthy lifestyle can cause hypertension (Kemenkes RI, 2018). The client has a smoking history and coffee and salted fish consumption, which is related to his culture and job as a fisherman. The chemicals in tobacco can damage the inner lining of arterial walls, making arteries more susceptible to plaque buildup. The nicotine in tobacco can make the heart work harder because of a temporary narrowing of the blood vessels. In addition, it can increase the frequency of heart rate and blood pressure. This situation occurs due to the increased production of hormones, including epinephrine hormone, during tobacco use. In addition, tobacco's carbon monoxide (CO) will replace the oxygen in the blood. As a result, blood pressure will rise as the heart is forced to work harder to supply oxygen to all organs and tissues of the body (Depkes RI, 2006). A high intake of salt, such as salted fish, is one of the factors for hypertension (Kemenkes RI, 2018).

The nursing intervention for nursing diagnosis is isometric exercise and yoga breathing for six consecutive days (Anjarsari et al., 2021). After complete implementation within six days, there was a decrease in blood pressure.

Table 1 Blood pressure measurement results

Day, Date	Time	Blood pressure (Before) in mmHg	Blood pressure (After) in mmHg
Saturday, 21 May 2022	11.00 am	180/120	-
Sunday, 22 May 2022	14.00 pm	190/120	182/120
Monday, 23 May 2022	14.00 pm	175/110	171/105
Tuesday, 24 May 2022	14.00 pm	160/115	158/110
Wednesday, 25 May 2022	14.00 pm	163/110	155/105
Thursday, 26 May 2022	14.00 pm	155/105	150/98
Friday, 27 May 2022	14.00 pm	156/110	153/100

A study conducted by Anjarsari (2021) explained that isometric exercise interventions and yoga breathing could reduce the blood pressure of people with hypertension. This can occur when doing isometric exercise shear stress mechanism and the release of Nitrite Oxide-endothelium derivatives as vasodilators of blood vessels that prevent the dilation of blood vessels, which will make blood flow smoothly. Then, hypertensive patients can prevent increasing blood pressure and keep blood pressure within normal. Significant changes in blood pressure reduction in systolic and diastolic blood pressure in the group given isometric exercise. The change in blood pressure after isometric exercise occurs because during isometric exercise, the need for oxygen in the tissues increases and controls the heart pumping blood to meet oxygen needs (Anjarsari et al., 2021). This leads to an increase in blood supply to active muscles to meet the need for oxygen. Regarding isometric exercise, Susiladewi (2017) stated that isometric exercise for less than an hour per week can significantly reduce blood pressure. It is recommended that isometric exercise be used as daily habits (Susiladewi et al., 2017). Neurologically isometric exercise can improve the body's control of the neurocardiac system that affects the sympathetic nerves. This causes a vagal response which results in a decrease in cardiac contractility. A decrease in peripheral resistance and a decrease in cardiac contractility lead to a decrease in blood pressure. In Andri's research (2018), the administration of isometric exercise was given for five days with a frequency of 1 time a day. The results showed a significant in decreasing of blood pressure among hypertensive patients (Andri et al., 2018).

Anjarsari (2021) also explained that breathing yoga could stimulate the production of endorphin hormones. Endorphins are neuro peptides produced by the body when the body is relaxed and calm. One of the functions of this hormone is as a natural sedative produced by the body, mainly produced by the brain, which can stimulate a sense of comfort and increase endorphin levels in the body to reduce blood pressure. When breathing slowly and regularly stimulates the circulatory system, the oxygen in the brain can be fulfilled, and the work of the autonomic system becomes more optimal. A client can relax. Breathing in yoga can stimulate the medulla oblongata in the brain, which has a respiratory center and a vasomotor center that regulates blood pressure (Anjarsari et al., 2021). Rapid breathing in stressful situations tends to be something that is poured out an electrical signal above the vasomotor center so that it will increase blood pressure. Yoga can regulate breathing to reduce the pressure that can cause high blood pressure. This is also supported by Ovianasari's research (2015), who explained that the decrease in blood pressure is due to relaxation in yoga. The principle of yoga is a body position in a calm state. It will experience relaxation and eventually experience a state of balance. Thus, relaxation in yoga is intrinsic for breathing, increasing oxygen circulation to the muscles. The impact is muscle relaxation and a decrease of blood pressure (Ovianasari, 2015).

5. Conclusion and Future Research

The conclusion of this study was client felt his body was more relaxed and comfortable after doing isometric exercise and yoga breathing for six consecutive days. This intervention can help to reduce high blood pressure (180/120 mmHg on day 1 and 153/100 mmHg on day 6). It concludes that isometric exercise and yoga breathing influence and help to decrease the blood pressure.

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