

Foot Hydrotherapy with Red Ginger (*Zingiber officinale*) and Warm Salt Water Against Changes in Blood Pressure in Hypertensive Elderly

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Abstract

Introduction: The WHO data for the 2015-2020 period showed that about 1.13 billion people in this world have hypertension, it means one of three people in the world is diagnosed with hypertension. One of non-pharmacological therapy which is able to be applied to the elderly hypertensive patient is foot hydrotherapy (foot soak) with red ginger and warm salt water.

Objective: Its objective is to find out the changes in blood pressure in hypertensive patients who are given foot hydrotherapy with red ginger (*Zingiber Officinale*) and warm salt water to the changes in blood pressure in elderly hypertensive patients.

Method: The design of this study was pre-experimental with a one group pretest posttest. The sampling technique used was simple random sampling which involved 60 respondents. Foot hydrotherapy was given at 39° above the ankle for 15 minutes and covered by a towel when foot hydrotherapy treatment.

Results: The result of this study showed that there was a drop in blood pressure after foot hydrotherapy treatment. The result of the statistical analysis by using a paired sample t-test showed p-value of 0,000. It means there was a change in blood pressure before and after treatment of foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water in an elderly hypertensive patient. The changes occurred throughout the whole subject, with an average decrease of 15.66 mmHg systolic and 8.58 mmHg diastolic. The effects of red ginger and warm water produce heat energy which dilates blood vessels, launches blood circulation, and stimulates the nerves in the foot in order to activate parasympathetic nerves, resulting in the changes in blood pressure.

Conclusion: Foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water has an effect on the drop in blood pressure in elderly hypertensive patient.

Keywords: elderly hypertension, foot hydrotherapy, red ginger, warm salt water

INTRODUCTION

Hypertension is the biggest challenge in Indonesia. Hypertension is the disease that often occurs in primary care, where the morbidity and mortality risk increase along with the increasing of systolic and diastolic pressure, which is the main cause of heart failure, stroke, and kidney failure (Kartika, 2021).

Hypertension is the situation where the increasing of systolic blood pressure is more than equal to 140 mmHg and diastolic is more than equal to 90 mmHg after twice measurement for 5 minutes to 10 minutes. Hypertension mostly suffered by elderly man and woman. The hypertension disease which is not handled properly is able to cause the more serious disease. The hypertension consistently causes the damage on blood

vessels of heart, kidney, brain, and eye. Hypertension is the common cause of stroke and heart attack. This disease is very sensitive on elderly, so that they are recommended to control the blood pressure regularly in order not to get worse (Helvetia, 2020).

The prevalence of hypertension globally was 22% of the total world population. The highest prevalence of hypertension there was in the African continent with as many as 27%, and the lowest prevalence there was in the American continent with as many as 18%, while Asia Tenggara there was in the highest prevalence with as many as 25% (Cheng *et al.*, 2019). WHO data in the period of 2015-2020 showed about 1.13 billion people in the world had hypertension. It means 1 of 3 people in the world is

diagnosed hypertension (Biswas *et al.*, 2016).

The number of hypertension patient always increasing every year. The number of hypertensive patient continues to increase every year. It estimated there will be 1.5 billion people affected by hypertensive in 2021, and it is estimated there will be 9.4 million people will died because of hypertensive and complication. In Indonesia, there was 63.2% hypertensive patient aged 65-74 years old, and 69,5% patient over 75 years old Kemenkes RI (2018). The prevalence in East Java was 36% in 2020.

Prevalence increase along with age. Compared to Riskesdas 2018 (26,4%), the prevalence of hypertensive get increase significantly enough Riskesdas 2018 (26,4%) the prevalence of hypertensive get increase significantly enough (Kemenkes, 2020). The prevalence in East Java was 45,4% male and 52,3% female in 2021 (Salmon, 2021). Based on the data of periode 2020, the number of hypertensive prevalence in Bondowoso was 6,62% (Suryaningsih *et al.*, 2022). Based on the study background of the author on 16th February, 2023, the number of elderly in Technical Implimentation Unit of Trisna Werdha Social Service in Bondowoso, there was 100 people and 70% or 70 people of hypertensive patient in 2023.

The causative factor of hypertensive in addition to age, gender, family background, and food factors, most of the elderly are at risk of get hypertension, which is related to the decrease of body organ function because of the aging process. One of the causes of hypertension in the elderly is the reduced elasticity of blood vessels and the reduced heart's ability to pump blood. Another causative factor of hypertension in

the elderly is lifestyle habits such as eating junk food (high in calories, fat, salt, and low fiber), smoking, drinking alcohol, and a lack of exercise. Hypertension is a uncureable diseases, but it can be controlled by the symptoms. The treatment of hypertensive patients is in order to prevent the condition and complications from getting worse and increase the life expectancy and life quality of patient.

The treatment can be done by farmachology or non-farmachology therapy. According to (Siti Utami Dewi *et al*, 2019) one of the responsibilities of a nurse is in the complementer field. The existence of a nurse is to show a better and more humane way of caring for patients, and a nurse is not only know the kind of drugs for patients but also needs to know and explain the kinds of therapies that have been taught in nursing programs and have been practiced by nurses, such as meditation, yoga, music therapy, prayer, and herbal medicines. One of the non-pharmacology therapies that could be done for the elderly hypertension patient is foot hydrotherapy (foot soak) by using red ginger and warm salt water. Food hydrotherapy by using red ginger and warm salt water has various benefits, such as increasing blood circulation, muscle relaxation, and capillary permeability (Silfiyani, 2021).

In the elderly, this therapy produces heat energy that dilates blood vessels, so that the oxygen perfusion to the tissue becomes adequate. Water as a medium of therapy is useful for the body to increase the blood flow to the part of the injured body, increase muscle relaxation, relieve pain due to spasm or stiffness, and provide warmth. Salt is group of chemical compounds where the biggest compound is sodium chloride (NaCl), sodium maintains the body's acid-base balance by balancing the acid-forming

substance, it is also involved in nerve transmission and muscle contraction (Fitrina *et al.*, 2021).

Foot soak therapy by using warm salt water and red ginger, naturally increases the blood circulation, reduces swelling, increases muscle relaxation, nourishes the heart, relaxes muscles, relieves stress, muscle pain, pain, increase capillary permeability, and provides nutrients to the body, so that is very useful to decrease blood pressure in hypertensive treatment. The working principle of this treatment is warmth. The warm water is rushed into the body in such a way, so that it can dilate blood vessels to relieve muscle tension (Silfiyani *et al.*, 2021).

Hydrotherapy treatment is usually combined with some natural plants, one of them is red ginger (*Zingiber officinale*). Chemical compounds in red ginger include gingerols, oleoresins, and essential oils. The essential oil in red ginger was 2.58–3.90%, and it was the highest of any other kind of ginger (Bagastri, 2018). The immersion time of the soak foot is carried out for 15 minutes for 5 days, because based on the study of Hartinah *et al.*, (2019) it is carried out for 15 minutes for 5 days because the blood vessels of the hypertension patient are stiff. Because of that, it is needed for 5 consecutive days to keep the fascular flexibility so that the blood pressure does not increase, and it is supported by Silfiyani, (2021) namely that soak foot is carried out 6 times for 2 weeks.

Based on the analysis above, the author is interested in studying about foot hydrotherapy with red ginger (*Zingiber Officinale*) and warm salt water on the changes in blood pressure in elderly people with hypertension. Foot hydrotherapy with red ginger and warm salt water has some

benefits, namely increasing blood circulation, muscle relaxation, and capillary permeability.

METHOD

This study used pra-experimental design method of *one-group pretest posttest* with nurse care, namely foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water. The case subject was the elderly people with primer hypertension in the Technical Implimentation Unit of Trisna Werdha Social Service in Bondowoso, it is located at Jendral Sucipto Yudodiharjo street, Tegal Ampel, Bondowoso Regency, with a total of 60 clients, which is obtained by random sampling. Case study start from 4th-8th May 2023.

The used instrument was a sphygnomanometer digital and termometer (measure the water temperature), 50 grams of crushed red ginger, 3 tea spoons of salt, and boiling water at 39°C mixed with 3 liters of water in a basin. Food hydrotherapy is carried out for 15 minutes, along with checking the patient's blood pressure, which is carried out before and after foot hydrotherapy treatment for 5 days. Foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water is given to cover the ankles, In order to maintain the stability of the water temperature, the basin is covered by a towel. After intervention, dry the foot with a towel (Silfiyani, Luthfina & Khayati, 2021a). Foot hydrithrapy with red ginger (*Zingiber officinale*) and warm salt water is carried out five times in a row for five days.

Before intervention, the subject of the case study is given knowledge about the objective and the benefits of foot hydrotherapy for hypertension patients. In order to keep the biodata private, this study did not show the name on the report or publish texts. The data collection was obtained from the results of the nursing care approach by carrying out assessments

through the interview with respondents and direct observation. Data was collected from nursing care observation sheets.

Ethical Test No. 116/KEPK/UDS/III/ 2023 was carried out at the the ethics commission at the Universitas dr. Soebandi.

RESULTS

Demographic data in this study included general and specific data, namely age, sex and blood pressure before and after foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water. The study result of respondent data based on age, sex and blood pressure before and after foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water are as follows:

Table 1
Frequency Distribution of Elderly Hypertension Respondents based on Age at UPT PSTW Bondowoso in May 2023

No.	Age (years)	Frequency	percentage (%)
1.	60-69	29	48,3
2.	70-79	20	33,3
3.	80-89	9	15
4.	90-100	2	3,3
Total		60	100

Based on table 1, from 60 respondents, the majority were aged 60-69 years as many as 29 respondents (48.3%) of the total number of respondents and a small number were aged 90-100 years as many as 2 respondents (3.3%).

Table 2
Frequency Distribution of Elderly Hypertension Respondents Based on Gender at UPT PSTW Bondowoso in May 2023

No.	Gender	Frequency	Percentage (%)
1.	Male	20	33,3
2.	Female	40	66,7
Total		60	100

Based on table 2, from 60 respondents, the majority were female, namely 40 respondents (66.7%) and a small portion were male, namely 20 respondents (33.3%).

Table 3.

Average Blood Pressure Examination Results Before (Pretest) Foothydrotherapy With Red Ginger (*Zingiber officinale*) and Warm Salt Water at UPT PSTW Bondowoso May 2023

Average	Sistolic : 164 mmHg Diastolic : 92,38 mmHg
Std. Deviation	Sistolic : 8,69 mmHg Diastolic : 6,92 mmHg

Based on table 3 the average value of systolic blood pressure before foot hydrotherapy (Pretest) was carried out from 60 respondents was 164 mmHg while the diastolic pressure was 92.38 mmHg.

Table 4.

Average Blood Pressure Examination Results After (Posttest) Foot hydrotherapy with Red Ginger (*Zingiber officinale*) and Warm Salt Water at UPT PSTW Bondowoso in May 2023

Average	Sistolic : 148,85 mmHg Diastolic : 83,8 mmHg
Std. Deviation	Sistolic : 6,93 mmHg Diastolic : 5,85 mmHg

Based on table 4, the average value of systolic blood pressure after foot hydrotherapy (Posttest) from 60 respondents was 148.85 mmHg while the diastolic pressure was 83.8 mmHg lower than the pretest average value.

Table 5.

Comparison of Blood Pressure Before and After Foot Hydrotherapy with Red Ginger (*Zingiber officinale*) and Warm Salt Water at UPT PSTW Bondowoso in May 2023

Average (mmHg)	Sistolic Pretest: 164 Sistolic Posttest : 148,85 Diastolic Pretest :92,38 Diastolic Posttest : 83,8
Std Deviation (mmHg)	Sistolic Pretest: 7,32 Sistolic Posttest : 6,92 Diastolic Pretest :6,93 Diastolic Posttest : 5,85

Based on table 5 above, it can be seen that the application of foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water which is carried out 5 times is able to reduce blood pressure both *systolic* and *diastolic*.

Table 6.
The result of Pretest-Posttest t-test at UPT PSTW
Bondowoso in May 2023

Test Result <i>t</i> -test	
	<i>Sig.(2-tailed)</i>
Sistolic Pretest- Sistolic Posttest	0,000
Diastolic Pretest- Diastolic Posttest	0,000

Based on table 6, the results of the paired sample *t*-test show a value of $P = 0.000$ ($\alpha < 0.05$). This shows that there were significant changes before foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water and after foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water on systolic and diastolic blood pressure in elderly hypertension.

DISCUSSION

The respondents of this study were 60 elderly people, which is over 60 years old. In the elderly, many things occur apart from physiological decline, including age, gender, family background, and food factors, as said by Riamah (2019). Generally, the elderly will have high blood pressure, which is related to the decline of body organ function due to the aging process, the reduced elasticity of the blood vessels, and the reduced ability of the heart to pump blood. Hypertension before foot hydrotherapy in the elderly was caused by the reduced elasticity of blood vessels, physiological decline, age, and gender in the elderly group in Technical Implimentation Unit of Trisna Werdha Social Service in Bondowoso, 2023.

Based on the theory above, the reduced elasticity of blood vessels in the elderly is caused by the reduced amount of regular physical activity that is able to cause a changes, such as cardiac smooth muscle being weak, so that the capacity is small, and the pulse is weak and irregular, and a higher heart rate so that the heart muscle has to work harder to pump during contraction.

The harder the heart muscles pump, the greater the pressure on the arteries. This is able to happen because it is influenced by the age factor.

According to the research in the Technical Implimentation Unit of Trisna Werdha Social Service in Bondowoso, the average of the blood pressure based on age is the highest for people 90–100 years old, at 187 mmHg *systolic* and 103 mmHg *diastolic*. The increase in blood pressure is also affected by the aging process.

According to Kartika *et al.*, (2021) hypertension in men increases in the late 30s, while in women increase after menopause. The *systolic* blood pressure in women increases with age. After 55 years old, women are at higher risk of having hypertension. The blood pressure increases with age and gender and woman is at higer risk than a man after menopause.

Along with Hasan (2018) study, about age and gender correlations to hypertension, people over 60 years old have a relationship between age and hypertension. This study in line with fakhrudin (2021). Known that respondents with hypertension over 60 years old, namely 60–74 years old was 23 respondents (54,7%). Based on the result and the theory, the researcher thinks that increasing age is able to increase the risk of high blood pressure. It is caused by decreased organ function along with increasing age.

Getting older, the changes in the arteri to get wider and stiffer, so that cause the reduced of blood rechol and capacity, which is accommodated through blood vessels. This decrease causes an increase in systolic pressure. Getting older is also cause the interfere with neurohormonal mechanisms such as the reninangiotensin-aldosterone sytem, the increased peripheral plasma concentration and also the presence of glomerilosclerosis because the aging, and the intestinal fibrosis which is able to

cause the increased vasoconstriction and vascular resistance, with the result that cause the increased of blood pressure. In addition to age, hypertension is also affected by genetic factors, food, and unlearnable alcohol history in this study. Aside from that, gender is the top causal factor in high blood pressure. In this study, most of the respondents were women (66,7%) with a blood pressure average of 166 mmHg, and men (33,3%) with a blood pressure average of 160 mmHg.

According to Hasan (2018), hypertension tends to occur in males, but when over 55 years old, hypertension tends to occur in females. Based on Nuraeni's study (2019), at risk gender was women ≥ 45 years old and men ≤ 45 years old, while at non-risk gender was men ≥ 45 years old and women ≤ 45 years old. Women are protected from cardiovascular disease before menopause, unmenopausal women are protected by estrogen hormones, which play a role in increasing levels of high-density lipoprotein (HDL).

This study is appropriate with Fakhruddin (2021) study, which found that most of the hypertension patients were women, as many as 21 respondents (52.5%). This study also appropriate with the study of Tomayahu *et al.*, (2023) that hypertension most occur on woman elderly as many 27 of 34 elderly. Gender is a factor of hypertension. It showed that women after menopause is more at risk of experiencing hypertension than men. Smoking men who tend to have many activities can increase blood pressure. In woman of ≤ 45 years old are less common because estrogen hormone make blood vessels become elastic. If the blood vessels become elastic, blood pressure will decrease. But, when menopause occurs, estrogen production decreases, so blood pressure will increase.

The result of the blood pressure test after food hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water

(*posttest*), which was conducted on 60 respondents showed that the average of *systolic* was 148,85 mmHg and the average *diastolic* was 83,8 mmHg, lower than the average pretest where *systolic* was 165,05% and *diastolic* was 93,05%.

According to Pratiwi (2018), non-farmacology treatments for hypertension were diet, stopping alcohol and smoking, regular exercise, avoiding stress, cupping therapy, and hydrotherapy. Hydrotherapy is very simple and natural, because it has an easy and transparent treatment method, safety, and there is no worrying side effects. There are no additives, no need for modern drugs, and it is easy to do as long as there is water. It promotes refreshing natural sleep and relaxes the body and brain, not painful but can prevent disease in a very fast tempo. Foot soak therapy with warm water has a physiological impact on the body, especially on blood vessels, so that blood circulation runs smoothly if warm water therapy is applied. Water has a positive impact on heart muscle (Malibel *et al.*, 2020).

This study is appropriate with Wulandari (2016), in which it is said that foot soak therapy using warm water is one of the treatments and helps to switch to a healthy lifestyle. Foot hydrotherapy applied makes a changes on blood pressure of the respondent. It was shown by the result of blood pressure test after foot therapy treatment (*posttest*). This study is also appropriate with the study of Irawan *et al* (2022), about the effect of foot hydrotherapy using salt water on the decrease of blood pressure in hypertensive elderly people, which showed that there was a decrease after foot soak treatment. It was 156/93 mmHg before foot soak treatment and 140/86 mmHg after foot soak treatment. This study is also appropriate with Silfiyani (2021), about foot hydrotherapy using red ginger (*Zingiber officinale* var. *rubrum*) to decrease hypertension in the elderly, which showed

that there was a decrease of blood vessels before and after foot hydrotherapy treatment using red ginger.

In this study, respondents were given foot hydrotherapy management by foot soak using red ginger and warm salt water. It uses 50 grams of red ginger, 3 spoons of salt, and 3 liters of warm water on 39, which is carried out for 15 minutes every morning for 5 days. The technic of foot soak with red ginger and warm water on this study was applied by use crushed red ginger.

This study is in line with the study of Mayani *et al* (2014) that crushing red ginger is the best way to get the chemical and organoleptic properties of ginger, especially its aroma. The aroma of crushed red ginger is sharper than that of uncrushed red ginger. This study is appropriate with Silfiyani, (2021) about foot hydrotherapy using red ginger(*Zingiber officinale var rubrum*) to decrease hypertension in the elderly. Foot soaks are carried out in the morning, because it is the best time when the body and nerves are in good shape, the nerves on the soles of the feet are more sensitive. The study needs 5 days for 15 minutes, because the blood vessels of the hypertension patients are stiff. Because of that, it needs 5 days in a row to maintain the elasticity of the blood vessels so that the blood pressure does not increase.

Most of the respondents said it was warm when hydrotherapy was carried out. The effect of foot soaks using warm water is to produce energy, which dilates blood vessels, launches blood circulation, and stimulates the foot nerves to activate parasympathetic nerves, so that it cause the changes of blood pressure. The heat of foot hydrotherapy with red ginger and warm water has the benefit of increasing skin blood flow by dilating blood vessels, which can increase oxygen and nutrition supply to the tissue.

Respondent also recommended to limit sodium intake when therapy is carried out, because the principle of hydrotherapy is conduction, where heat transfer occurs from the warm water to the body, so that it causes dilation of blood vessels and reduces muscle tension, so that it can stimulate endorphine hormone, push adrenaline hormone, and reduce blood pressure if it is carried out with awareness and discipline.

The average value of blood vessels before foot hydrotherapy was 165,05 mmHg of *systolic* and 93,05 mmHg of *diastolic*. After foot hydrotherapy, the result showed 148,85 mmHg of *systolic* and 83,8 mmHg of *diastolic*. The result of the *paired sample t-test* showed that there were changes in blood vessels between before and after foot hydrotherapy.

According to Agung (2015), foot hydrotherapy is recommended for patients with hypertension or mild hypertension to prevent severe hypertension, which is able to cause stroke. Foot hydrotherapy uses warm water to give a warm sensation to the body and can dilate blood vessels, reduce muscle tension, and increase blood circulation. Arterial pressure is affected by baroreceptors located in the cortex and aortic arch. Baroreceptors transmit impulses, which are carried by nerve fibers, and carry signals from all parts of the body to convey the needs of the body to the sympathetic nerve center. Medulla cotranction stimulates systolic pressure, ventricular muscle relaxation (Ilkafah, 2016). Soaking can stimulate foot nerves and stimulate baroreceptors. The baroreceptor is the most important reflex in regulating heart rate and blood pressure. Baroreceptors are stimulated by stretching the aortic arch and carotic sinuses. When arterial pressure increases and stretches, this receptor activates the vasomotor center rapidly, so that it cause arterial and venous vasodilation and changes in blood pressure (Ilkafah, 2016)

The same study also carried out by Silfiyani, (2021) about foot hydrotherapy with red ginger to reduce hypertension in elderly people showed that there was a difference between systolic blood pressure and diastolic blood pressure after foot hydrotherapy. This study also appropriate with Fakhruddin (2021), that foot soaks with boiled red ginger water have an impact on the reduce of blood pressure in elderly people with hypertension. Beside that, Sari & Aisah (2022) state that foot soaks with warm water can be used as independent handling to reduce blood pressure in hypertension patients besides farmachology treatment.

According to Silfiyani (2021) on the topic of foot hydrotherapy with red ginger to reduce hypertension in the elderly by carried out interventions for 15 minutes for 2 weeks. While in this study, the author is carried out intervene 15 minutes for 5 days to reduce blood pressure. In conclusion, it more effective to use foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water than foot hydrotherapy with red ginger only.

Foot hydrotherapy can be combined with salt and herbal ingredients, one of which is red ginger. Red ginger is ginger that is often used as medicine, because it has a higher essential oil content, namely 2,58-2,72% than other ginger. If viewed from the content of the chemical compound, red ginger is more widely used as a raw material of medicine. Red ginger has a sharp aroma and a very spicy taste. Essential oil content is higher than that of other gingers (Setyaningrum & Saparinto, 2013). In this study, beside red ginger, foot soaks were also combined with salt. According to Giri Udani (2022) the effect of sodium on blood pressure plays an important role in the prevention of cardiovascular disease. Sodium plays a role in process regulation of blood pressure. The effect of magnesium on blood pressure is very small, but it plays a very important role

in preventing cardiovascular disease. Sodium plays an important role in efforts to control blood pressure by strengthening endothelial tissue. According to Fitriana *et al* (2021), there are two kinds of substances in salt that can reduce high blood pressure, namely Na and Cl, which play an important role in extracellular space.

This study is in line with Tomayahu *et al* (2023) that foot soaks with warm water and salt to expedite blood vessels, reduce edema, increase muscle relaxation, nourish the heart, relax the muscles, relieve stress, muscles pain, relieve pain, increase capillary permeability, and provide warmth to the body, so that it very useful to reduce blood pressure in hypertension.

Besides using salt and ginger, foot hydrotherapy in this study also used warm water with a temperature of 39°C. According to Nurin & Adi (2017), Using water therapy with a temperature above normal (37°C) could expedite blood vessels so that blood flows smoothly. Temperatures of 37,7°C - < 40,5°C were considered tolerable heat for soak therapy for 15-25 minutes, while temperatures of 40,5° - < 43,3°C was very hot and recommended for 5-15 minutes. Scientifically, warm water has a physiological impact to the body. Hydrostatic pressure of water in the body causes dilation of the blood vessels from the legs to the chest cavity, and blood will collect in the blood vessels of the heart.

This study is in line with the study of Sari & Aisah (2022), about foot soak therapy with warm water on hypertension, which claims that warm water will cause vasodilation on blood vessels, reduce muscle tension, increase tissue metabolism and permeability, overcome sleep deprivation, smooth blood vessels, and remove toxins and infection. At an advanced age, organ function has decreased, one of which is the nervous system, so there is a decrease in sensory

response, in this case feeling a sensation of heat.

According to Sriyatna & Rahayu (2022), the mechanism to reduce blood pressure is the influence of warm water and the content of essential oils in red ginger, which also has a hot sensation that will affect the skin on the soles of the feet to the ankles, a conduction process that occurs between the warm red ginger water and the skin causes vasodilation. Dilation of blood vessels will stimulate baroreceptors in several parts of the body, one of which is the carotid sinus and aortic arch, and will send impulses to the medulla oblongata and activate the parasympathetic nerves. Sympathetic nerves will dilate blood vessels and smooth the flow from the feet to the heart. This smooth blood flow in the heart can reduce the tension on the walls of the heart's blood vessels so that the pumping pressure decreases, as evidenced by a decrease in the value of systolic pressure, and when the heart relaxes, there will be a decrease in the value of diastolic pressure. Red ginger foot soaking therapy with warm salt water aims to improve blood circulation because it is very effective in reducing blood pressure (Ali & Yuwanto, 2018). The effectiveness of red ginger foot soak therapy with warm salt water on reducing blood pressure is because foot hydrotherapy can relax the muscles and limbs, widen the blood vessels from the feet to flow into the heart arteries, and soak the feet with warm salt water and red ginger.

CONCLUSION

The study result showed that foot hydrotherapy with red ginger (*Zingiber officinale*) and warm salt water can reduce blood pressure in hypertensive elderly people.

Suggestion

The study result showed that foot hydrotherapy with red ginger (*Zingiber*

officinale) and warm salt water can reduce blood pressure in hypertensive elderly people.

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