



THE EFFECT OF GINGER WATER SOAKING IN THE FEET ON BLOOD PRESSURE REDUCTION IN THE ELDERLY WITH HYPERTENSION

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Abstract

One of the main causes of death worldwide and a risk factor for conditions like heart attack, stroke, diabetes, and renal disease is hypertension, a noncommunicable disease. The purpose of this study was to find out how warm red ginger water foot soaks affected blood pressure in senior people with hypertension at Puskesmas Pasar Ikan in Bengkulu City in 2021. The study used a control group design, pre- and post-tests, and a quasi-experimental methodology. The method of successive sampling was employed to gather the data, and a sample of 30 people was split into two groups, each of which was further subdivided into 15 individuals. The control group had a warm water foot bath, whereas the intervention group received a 15-minute foot bath with warm red ginger water over three days. T-test analysis was performed with a significance threshold of 0.05. Prior to the heated red ginger water foot bath, the intervention group's average systolic and diastolic blood pressure readings were 159.80/94.73 mmHg and fell to 140.33/84.67 mmHg. The average systolic and diastolic blood pressure in the control group. The results indicated statistically significant variations in systolic and diastolic blood pressure, both with p-values of 0.000. According to the study, senior hypertension patients benefit from a warm red ginger foot soak because it lowers blood pressure.

Keywords: Warm Ginger Water, Hypertension, Elderly, Foot Bath, Blood Pressure

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INTRODUCTION

One of the main causes of death worldwide and a risk factor for conditions like heart attack, stroke, diabetes, and renal disease is hypertension, a non-communicable disease. Because it typically causes no symptoms and makes people unaware they have hypertension until difficulties emerge, hypertension is known as a "silent killer." (WHO, 2018)

Based on data from the World Health Organization (WHO), hypertension impacts 22% of the global population. With 27% of the population diseased, Africa has the highest frequency, followed by Southeast Asia with 25% (WHO, 2018, 2019). Asiatic nation of China discovered that 244.5 million people, or 23.3% of the population over the age of 18, have hypertension (China Hypertension Survey Results 2012-2015).

One of Indonesia's major health issues and main causes of death is hypertension. According to Basic Health Research (Riskesdas), in 2018, there were 63,309,620 cases of hypertension in Indonesia, and there were 427,218 cases of hypertension-related deaths. According to data from 2017 provided by the Institute for Health Metrics and Evaluation (IHME), 23.7% of deaths in Indonesia were attributed to hypertension. This number was bigger than those for other illnesses like cancer (9.7%), diabetes (9.3%), endocrine diseases (9.3%), and tuberculosis (5.9%). These statistics demonstrate that the leading cause of death each year is hypertension (Ministry of Health of the Republic of Indonesia, 2018).

The findings of Riskesdas (2018) also show that there is a significant prevalence of hypertension in numerous Indonesian regions, with South Kalimantan having the greatest prevalence (44.13%), West Java having the second-highest prevalence (39.6%), and East Kalimantan having the third-highest prevalence (39.3%). The older age group is the one that suffers from hypertension the most. Data from Riskesdas (2018) show that the age group of 55–64 years has the highest percentage of hypertension patients (55.2%), followed by that of 45–54 years (45.3%), and that of 31–44 years (31.6%). According to these statistics, elderly people experience hypertension the most (Ministry of Health of the Republic of Indonesia, 2018). A total of 17,146 people were diagnosed with hypertension in 2019, with 8,804 men and 8,342 women being diagnosed (Bengkulu et al. Office, 2019). The prevalence of hypertension in Bengkulu is also relatively high, at 343,210 people, particularly in the Bengkulu City area.

Puskesmas Pasar Ikan is one of the health centers with a high incidence of hypertension, with as many as 3,341 cases in men and women over the age of >15 years, according to the preliminary survey data. Additionally, it was discovered that 593 old persons suffer from hypertension, while 1,172 elderly people are enrolled in Pasar Ikan Health Center (Bengkulu et al. Office, 2019).

Blood artery calcification, which will prevent blood flow in specific areas of the heart muscle, is the primary cause of hypertension. The muscles will have to work even harder to pump blood throughout the body when there is high blood pressure. As a result, the heart muscle thickens, decreasing its ability to pump blood, leading to heart failure, blood vessel damage, and kidney failure. The victim of

this situation will have some problems. People with hypertension frequently experience headaches, anxiety, a reddened face, soreness in the nape of the neck, irritability, buzzing in the ears, trouble falling asleep, shortness of breath, and fatigue easily. Let's say the impact that hypertension individuals experience is not well managed. A myocardial infarction, heart failure, stroke, transient ischemic attack, diabetes, dyslipidemia, chronic kidney disease (CKD), and hypercholesterolemia could occur in the situation (Unger et al., 2020; Anisa et al. et al., 2016).

The following indications and symptoms of hypertension are frequently felt by those who have it: headache, anxiety, reddened face, soreness in the nape of the neck, irritability, buzzing in the ears, trouble falling asleep, shortness of breath, and easily becoming exhausted. Let's get started assume the impact experienced by patients with hypertension is not properly addressed. The patient could then develop conditions such myocardial infarction, heart failure, stroke, transient ischemic attack, diabetes, dyslipidemia, chronic kidney disease (CKD), and hypercholesterolemia (Unger et al., 2020; Anisa et al. et al., v2016). According to Nurahmandani's (2016) research, the use of ginger in a warm water foot bath therapy will promote the dilatation of blood vessels. This is brought on by the spicy flavor and warming scent of ginger, which is made up of volatile essential oils and oleoresin chemicals (gingerol). The brain will react to the warm taste of ginger, which will cause the afferent nerves to send acetylcholine and histamine to the central nervous system. Acetylcholine will be released, which will lessen sympathetic nerve activity, increasing vasodilation of veins and arterioles to smooth out blood vessels. According to Nurahmandani et al. (2016), the release of histamine causes an increase in parasympathetic nerve activity, which lowers the heart rate and pulse rate and lowers blood pressure. Because Pasar Ikan Health Center in Bengkulu City has never interfered, researchers are interested in examining the effects of soaking feet in warm water and mixing it with ginger in older people who have hypertension.

MATERIALS AND METHODS

The research is quantitative with a quasi-experiment by using a pre-post-test design with control group research design, which reveals cause and effect by involving two groups of subjects.

Table 1: Chart of Research Design

K1	O1	Intervention	O1a
K2	O2	Control	O2a

Description:

- K1 = intervention group respondents
- K2 = control group
- O1 = measurement of blood pressure before doing water Foot Soak Warm Red Ginger in the intervention group
- O2 = blood pressure measurement before doing water Foot Soak Warm up in the control group
- O1a = measurement of blood pressure after a foot bath Warm Red Ginger in the intervention group
- O2a = measurement of blood pressure after a foot bath Warm up in the control group

This research was carried out in the Pasar Ikan Health Center, Teluk Segara District, Bengkulu City, working area from December 2020 to April 2021. The reason for the research (Puskesmas Pasar Ikan) is because it is one of the most significant numbers of hypertensive patients in Bengkulu City. The population in this study were all elderly with hypertension who took treatment at Pasar Ikan Health Center, Teluk Segara District, Bengkulu City, in 2020. The number of elderly who experience hypertension in the Fish Market Health Center area is 593 (Bengkulu et al. Office, 2019). Samples in this study are some elderly with hypertension who meet the criteria that have been determined previously and perform treatment at Pasar Ikan Health Center of Teluk Segara Bengkulu. The sample in this study using the Consecutive Sampling technique is sampling with predetermined criteria. Based on the calculation of the minimum number of samples in each intervention group, as many as 15 people and a control group of 15 people, the total number of minimum samples of research is 30 people.

Collecting data using measuring instruments directly to research respondents to find changes or things to be studied. Data on the characteristics of respondents, including age, education, and occupation, were collected through the filling of observation sheets with direct interviews (door to door). Data on the blood pressure characteristics of respondents before and after the intervention were collected through direct measurement during the interview. The measuring instrument used in this study is a tensimeter (sphygmomanometer), a mechanical device for measuring blood pressure.

Secondary Data obtained from Puskesmas Pasar Ikan Kota Bengkulu include the number of elderly with hypertension, as many as 593 people.

The instruments used in this study are an observation sheet, digital tension meter, water thermometer and stopwatch, warm water, and Red Ginger. The warm water used in the study was measured before the temperature was given for therapy, that is (40°C) as much as 2 liters and as much as 20 grams of red ginger (in powder form) as a mixture of warm water. Duration of therapy: Soak warm red ginger water for 15 minutes.

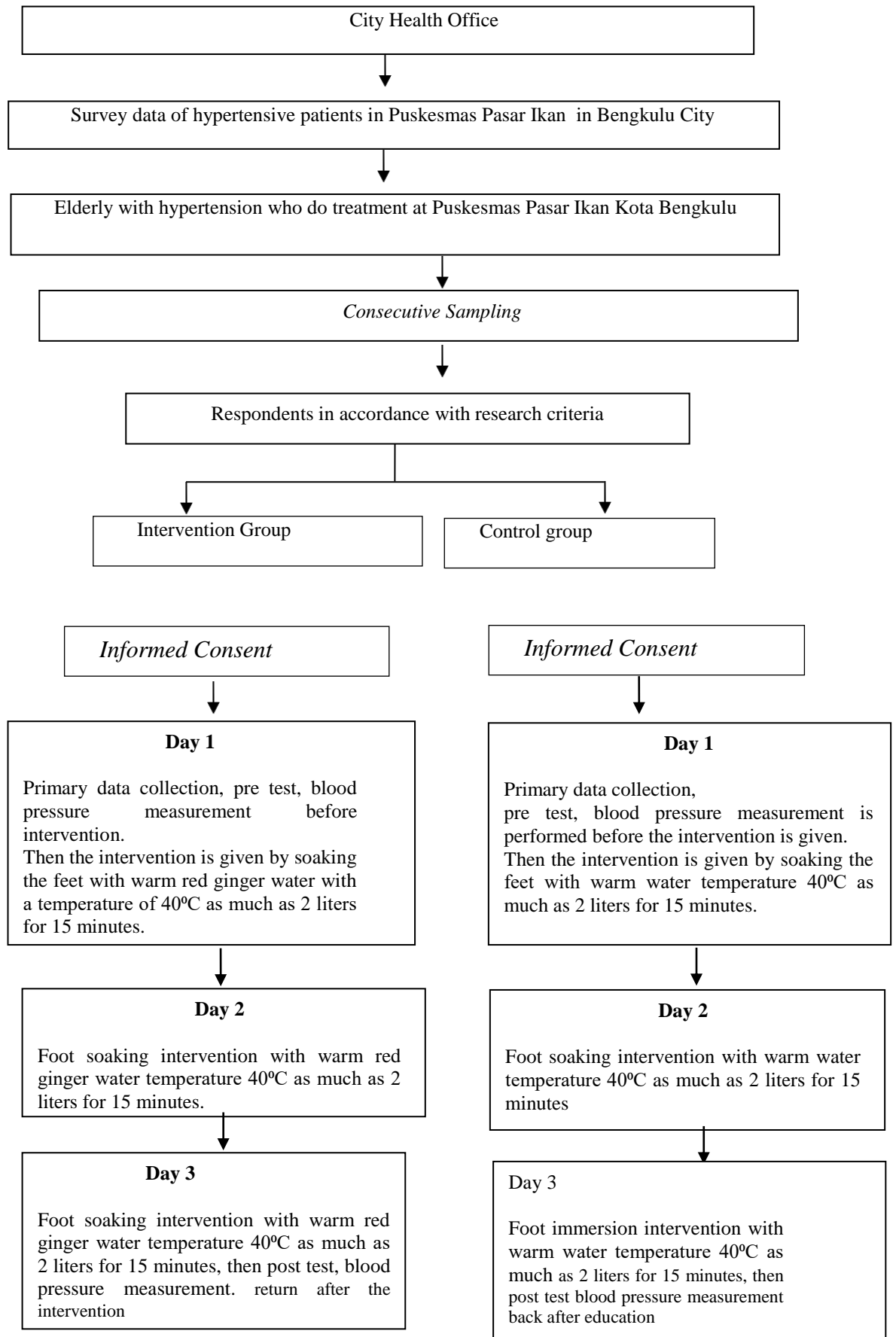
A univariate analysis was conducted to describe the respondent's characteristic variables and blood pressure before and after the intervention. The characteristic variables, including employment and education of respondents, were analyzed using frequency distribution and percentage. The age and blood pressure variables before and after the intervention were analyzed with the central tendency mean, median, standard deviation, and minimum and maximum values at a 95% confidence interval (CI). Data from each variable is presented using tables and interpreted based on the results obtained.

Bivariate analysis is a data analysis that talks about the relationship between two variables, then interpreted based on the test results. Before being analyzed, the data will be tested for normality by using the skewness/kurtosis value method divided by std. Error. The following types of data analysis will be used:

Table 2: Tests used in research

No	Variabel	Test
1.	Pre-post blood pressure in intervention and control group	<i>Paired T Test</i>
2.	Blood pressure between groups intervention and control	<i>Independent T Test</i>

Table 3: Research Flow



Ethical Approvals

This investigation has been conducted, and conducted an examination of the ethics officer by the Bengkulu Ministry of Health Polytechnic KPK based on the Ethics Officer Certificate No.KEPK.M/465/01/2021. Ethical clearance stipulates the following: Self-Determination, Anonymous, Confidentiality (Secret), Justice, The Principle Of Benefit, and Maleneficience.

RESULTS AND DISCUSSION

Characteristics of Respondents

Table 4: Characteristic of Respondent,

Characteristics	Intervention		Control	
	n	%	n	%
Education				
Primary School	7	46,7%	8	53.3%
Secondary School	5	33,3%	1	6.7%
High School	1	6,7%	4	26.7%
University/College	2	13,3%	2	13.3%
Occupation				
Not Working	-	-	1	6,7%
Housewife	8	53,3%	8	53,3%
Self-employed	4	26,7%	3	20%
Civil servants / pensionary	3	20%	3	20%
Total (N)	15		15	

The average age of respondents in the intervention group was in the range of 60-65 years with a percentage (86.7%) and in the control group as much (66.7%), according to the results of the frequency distribution of respondents based on the age of hypertensive patients at the Fish Market Health Center in Bengkulu city. The findings support studies by Nurahmandani et al. (2016), which found that the average age of hypertension patients was 60 years old or older in 70.6% of cases. Additionally, study by Solechah et al. (2016) supports this, with the findings of the study showing that 47.1% of hypertension patients are older than 60. Blood pressure will rise as we become older. The blood vessels increasingly narrow and stiffen around the age of 45 as a result of the thickening of the artery walls brought on by the buildup of collagen in the muscle layer (Kumar V, Abbas AK & Fausto N, 2005). Systolic blood pressure rises until the age of 80, but diastolic blood pressure rises till the age of 55 to 60 and then declines gradually or even sharply after that. The results of this study are also supported by research conducted by Tri Arni Mutmaidah (2019), with research results showing that most respondents who suffer from hypertension are aged above 60 years, 45%

The average level of education of respondents in the intervention group was SD at 46.7%, and the average level of education of respondents in the control group was SD at 53.3%, according to the results of the frequency distribution of respondents based on the education of elderly people with hypertension at the Fish Market Health Center in Bengkulu City. The findings of the researchers' study concur with those of Tri Arni Mutmaidah's (2019) research., revealed a 60% increased risk of hypertension is associated with elementary schooling. Blood pressure is also indirectly influenced by education level. The degree of education can have an impact on lifestyle choices including drinking, smoking, and engaging in physical activities like sports. A person with low health literacy is at a high risk of getting hypertension and may find it challenging or difficult to take in the information (counseling) given by the officer so that the impact on behavior/lifestyle (Anggara & Prayitno, 2013).

The findings were validated by Tri Arni Mutmaidah's (2019) study, "The effect of warm ginger hydrotherapy on blood pressure in hypertensive patients," which included 20 participants. Of those, 60% (12 respondents) had only completed primary school. This is corroborated by research findings by Fitria et al. (2010), who found that respondents who were included in the study sample had an average of 51% primary education background. The findings of this survey are similarly consistent with Ningsih's (2017) research, which found that the majority of respondents had only received elementary education (76.6%). Arafah's research (2019), which claims that the majority of the features of respondents are largely elementary school educated, i.e., as many as 10 persons (66.6%), supports the findings of this study.

In general, the frequency distribution of respondents based on the work of the elderly patients with hypertension in Puskesmas Pasar Ikan Kota Bengkulu revealed that the average work of respondents in the intervention group is a housewife by 53.3% and in the control group by 53.3%, according to research that was conducted on 30 respondents, including 15 intervention groups and 15 control groups. This is consistent with research by Lusi Apriliani (2018), who found that housewives' jobs carry an 87.5% higher risk of developing hypertension.

The findings indicated that the majority of respondents are housewives. Women who are solely housewives or who do not work have a higher risk of developing hypertension than do women who work. The inactivity of the housewives is a contributing factor in this. Housewives are becoming more and more busy, which leaves them with little time for exercise. This lack of physical activity raises the chance of developing hypertension since it raises the risk of being overweight. Less physical activity leads to a greater heart rate frequency, which forces the heart muscle to contract more forcefully each time. The pressure placed on the arteries increases in proportion to how stiffly and frequently the heart muscle must pump blood.

Blood pressure problems brought on by decreased activity might result in issues such coronary heart disease, renal damage, and stroke (Anggara & Prayitno, 2013). The study's findings are corroborated by a study by Karim et al. (2018) titled "The Relationship of Physical Activity with the Degree of Hypertension in Outpatients in the Working Area of the Tagulandang Health Center in Sitaro Regency" with 40 respondents, the majority of whom have the status of housewives with a percentage of 45% (18 people). The findings of this study are also corroborated by Nugroho et al. (2019), who polled 40 respondents and found that 16 people (40% of them) claimed that working as a housewife is a high-risk factor for developing hypertension. This is also consistent with a study by Fildayanti (2020) titled "The Effect of Giving Foot Baths with Warm Water Mixed with Salt on Lowering Blood Pressure in Hypertensive Patients" with 32 respondents, the majority of them were housewives in as many as 20 cases (or 60%) of the respondents.

Effect of Warm Red Ginger water foot bath on blood pressure in the elderly with hypertension in the intervention and control groups.

Table 5. Distribution of the average blood pressure of respondents before and after being given the intervention in the intervention group and control group at the Puskesmas Pasar Ikan, Bengkulu Cityin 2021

Variabel	Intervention	Control
Pre Mean systolic blood pressure		
MedianSD	159,80	154
Min-Maks	162	156
CI for Mean 95%	4,739	8,289
	152-165	140-164
	157,18-162,42	149,41-158,59
Post Mean systolic blood pressure		
MedianSD	140,33	146,53
Min-Maks	142	148
CI for Mean 95%	5,615	7,472
	130-148	136-160
	137,22-143,44	142,40-150,67
Pre Mean diastolic blood pressure		
Median SD	94,73	93,53
Min-Maks	95	94
CI for Mean 95%	1,831	3,204
	91-97	87-97
	93,72-95,75	91,76-95,31
Post Mean diastolic blood pressure		
MedianSD	84,67	88,07
Min-Maks	85	86,00
CI for Mean 95%	3,352	4,698
	80-90	82-96
	82,81-86,52	85,47-90,67

Table 6: Distribution of differences in mean systolic and diastolic blood pressure before and after the intervention in the intervention group and control group at Puskesmas Pasar Ikan Bengkulu

Variabel	Mean	Median	SD	Min-Maks	CI for Mean 95%	p value
Interventions Groups						
Pre post systolic blood pressure	159,80	162	4,739	152-165	157,18-162,42	0,000
	140,33	142	5,615	130-148	137,22-143,44	
Pre post dyastolic blood pressure	94,73	95	1,831	91-97	93,72-95,75	0,000
	84,67	85	3,353	80-90	82,81-86,52	
Control Groups						
Pre post systolic blood pressure	154	156	8,289	140-164	149,41-158,59	0,018
	146,53	148	7,472	87-97	91,76-95,31	
Pre post dyastolic blood pressure	93,53	94	3,204	87-97	91,76-95,31	0,000
	88,07	86	4,698	82-96	85,47-90,67	

In this study, Bengkulu City's Fish Market Health Center's elderly hypertensive patients' blood pressure was discovered to be affected by a warm red ginger water foot soak. The analysis's findings in the intervention group have a p-value of 0.000, indicating that there was a difference in the intervention group's blood pressure before and after receiving a warm red ginger water foot soak. With a p-value of 0.000, the warm water foot bath administered to the control group indicates that there was a difference in blood pressure between before and after the foot bath. With a p-value of 0.000, this study discovered variations in systolic and diastolic blood pressure between the intervention and control groups. According to the study's findings, delivering a warm water foot bath along with red ginger to the intervention group reduces blood pressure much more than giving a warm water foot bath to the control group. This was demonstrated by the intervention group's lower systolic blood pressure of 19.46 mmHg and diastolic blood pressure of 10.06 mmHg. Systolic and diastolic blood pressure in the control group dropped by 7.46 and 5.46 mmHg, respectively.

According to a study by Lalage (2015), soaking your feet in warm water that is between 37 and 39 degrees Celsius can help treat cold and flu symptoms, increase muscle and connective tissue flexibility, stabilize the work of the heart and blood flow, and have an impact on the vascular system so that blood flow is smooth. High blood pressure is declining (Lalage, 2015).

Red ginger, which dilates blood vessels, contributes significantly to a variation in blood pressure. This is a result of the spicy aroma and warm flavor of ginger, which is made up of oleoresin components (gingerols) and volatile essential oils (volatiles). As a result, it can significantly drop blood pressure when compared to simply soaking your feet in warm water. The study's findings are corroborated by

research by Nurahmandani et al. (2016), which found that ginger water foot bath therapy significantly decreases blood pressure in hypertension patients with a p-value of 0.000. We can infer that H_a is approved. Giving warm ginger water foot baths to senior people with hypertension in the Pucang Gading nursing home in Semarang has the effect of reducing blood pressure, therefore H_0 is refused.

The dilatation of blood vessels is induced by ginger when warm water foot bath therapy is used, according to research by Nurahmandani, et al. (2016). This is brought on by the spicy flavor and warming scent of ginger, which is made up of volatile essential oils and oleoresin chemicals (gingerol). The brain will react to the warming taste of ginger and send signals to the afferent nerves and central nerves to produce acetylcholine and histamine. The release of acetylcholine can increase dilatation of veins and arterioles, where the blood vessels will widen and become smooth, by decreasing sympathetic nerve activity. so that there will be a reduction in diastolic blood pressure. Histamine will also cause an increase in parasympathetic nerve activity, which will lower heart and pulse rates. The cardiac pressure used to pump blood throughout the body will drop as the heart rate and pulse drop. This is what causes the systolic blood pressure to drop. Blood pressure is dropping as a result of the impacts (Nurahmandani et al., 2016).

With a total of 19 respondents, the findings of this study are also consistent with those of Muhammad Bayu Sucipto (2018). For three days straight, for a total of 15 minutes, participants in the study received foot bath therapy using warm ginger water. With a p-value of 0.000, it is possible to draw the conclusion from this study that there is a significant relationship between mean blood pressure systole and diastole before and after receiving a foot bath. The study's findings concur with those of Yahya Prananda and Rita Hafizah's (2017) study, "The Effect of Giving Warm Water Foot Bath on Lowering Blood Pressure in the Elderly with Hypertension in the Working Area of Puskesmas Rasau Jaya Kubu Raya regency," which involved 28 participants. The first week of therapy involved 14 persons, and the second week involved 14. Therapy was delivered seven times in a row for 14 days. According to the study's findings, providing older people a warm water foot bath can lower their blood pressure, with a p-value of 0.003 (0.05) for systolic blood pressure and 0.004 (0.05) for diastolic blood pressure. The study "The Effectiveness of Warm Water Foot Baths against Blood Pressure in Hypertensive Patients" by Nopriani (2018), which included 56 participants, provides more support for this. The study's findings indicate a warm water foot bath's effectiveness in lowering blood pressure in hypertensive patients with a p-value of 0.000.

CONCLUSION

A p-value of 0.001 to 0.050 was assigned to the mean difference in systolic blood pressure between the intervention group and the control group. In contrast, the mean difference between the intervention

and control groups' diastolic blood pressure had a p-value of 0.003 0.05. Therefore, the intervention and control groups' mean systolic and diastolic blood pressures differ from one another.

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