

HEALTH DISASTER PREVENTION: HYPERTENSION WITH ZINGERBER OFFICINALE AND CURCUMA LONGA

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Abstract

Hypertension is a risk factor for serious diseases. The country's loss due to the cost of this disease is quite a lot and the recovery time is long. Worker productivity due to hypertension becomes low and disrupts the economic function of the family. If it is not resolved, Health Disaster cannot be avoided. Zingerber Officinale and Curcuma Longa have been used traditionally to treat hypertension. The purpose of this study was to scientifically prove the effectiveness of Zingerber Officinale and Curcuma Longa on blood pressure in hypertensive patients. Fifty respondents were selected by Consecutive Sampling. Before the intervention, the respondents had their blood pressure measured. Respondents were given 200 mg of Zingerber Officinale and Curcuma Longa powder mixed into 200 ml of warm water to drink for seven days. After the intervention, respondents measured their blood pressure. Data were analyzed by Wilcoxon Test. After the intervention, systolic blood pressure decreases 10.8 mmHg from 162,4 mmHg to 151.6 mmHg. And diastolic blood pressure also decreases from 94.7 mmHg to 88.3 mmHg. There was a significant difference ($p = 0.000$) between blood pressure (systolic and diastolic) before and after the intervention.

Keywords: Curcuma Longa; Hypertension; Zingerber Officinale

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1. Introduction

In 2018, DIY was the highest province with the highest prevalence of non-communicable diseases (PTM) among other provinces in Indonesia. This figure tends to increase from the previous year. These non-communicable diseases include hypertension, stroke, diabetes mellitus, cancer, kidney failure, heart failure. Even the second-highest national hypertension disease (Kementrian Kesehatan RI, 2018). There is a shift in disease in DIY based on the Integrated Disease Surveillance at Puskesmas and Hospitals, indicating that hypertension is a disease that often occurs. This is a shift from the previous year where infectious diseases were ranked first (Yogyakarta City Health Profile, 2018). Hypertension is defined as an increase in blood pressure continuously so that it exceeds normal limits. Normal blood pressure is 110/90 mmHg. Hypertension is a product of peripheral vascular resistance and cardiac output (Wexler, 2002).

The exact number of hypertension is difficult to count, considering that hypertension is a disease that does not have special symptoms except by examination. Hypertension patients realized when they got organ disorders such as impaired heart function and stroke. Therefore, it is not uncommon

for hypertension to be discovered accidentally during routine health checks or come with other complaints. 76% of the population does not know that they have hypertension (undiagnosed). Hypertension is one of the most influential risk factors for heart and blood vessel disease (Aditama, 2012). The prevalence of hypertension in DIY according to Riskesdas 2018 is 11.01% or higher than the national number (8.8%). DIY placed the 4th with the cases of hypertension (Riskesdas, 2018). Hypertension has always occupied the top 10 diseases and the top 10 causes of death in DIY during the last few years based on STP and STP RS. The 2017 STP Puskesmas report recorded 56,668 cases of hypertension. Meanwhile, the STP reports for outpatient hospitals were 37,173 cases (essential hypertension). At the Ngemplak II Puskesmas, hypertension ranks second out of the top ten diseases (Widiastuti, 2006). 46.7% of people aged 40 years and over experience hypertension in the Village of Wedomartani Ngemplak Sleman (Sari, 2015)

Hypertension is a risk factor for stroke, heart failure, kidney failure, and other serious diseases. Therefore, research in the United States showed that hypertension resulted in an economic loss of US \$ 73.4. State loss due to the big cost of disease and

need long recovery time. Besides, non-communicable diseases cause low productivity of workers and disrupt the economic function of the family. If not handled, then a health disaster. A health disaster is a decrease in the overall health status of the community that cannot be overcome (Saunders, 2003). It is necessary to take actions to prevent health disasters from non-communicable diseases, especially hypertension. To prevent it, the community can increase preparedness by building the capacity of the community in prevention and treatment using alternative treatments to control their conditions so that they are always in normal conditions. Alternative treatment can be done by managing ginger and turmeric processed products and giving therapy. (Bhuiyan, 2015)

Ginger (*Zingiber officinale*) is a rhizome plant that is very popular as a spice and medicinal ingredient. The rhizome is shaped like fingers, that bulge in the middle sections. The dominant taste is spicy is due to a ketone compound called zingerone. Ginger can grow in tropical areas. Ginger can be met in equatorial areas such as Southeast Asia, Brazil, and Africa. It can improve blood circulation and keep blood pressure low (Ojulari, Okesina, Owoyele, 2014). The high mineral content in ginger are magnesium, calcium, phosphorus, and potassium is very beneficial for muscle spasms, nausea, hypertension, and gastrointestinal diseases. Potassium plays a role in blood pressure regulation and beat rate (Ojulari, Okesina, Owoyele, 2014). The compounds contained in ginger such as flavonoids, phenols, and saponins. They play a role in lowering blood pressure (Anthony, 2008). Rafika's research (2019) shows that ginger decoction therapy effectively lowers systolic and diastolic blood pressure.

Turmeric is one of the spices and medicinal plants native to Southeast Asia. This plant then has spread to areas of Malaysia, Indonesia, Australia, and even Africa. The study showed that there was an effect of grated turmeric on reducing systolic and diastolic blood pressure for the elderly with hypertension in the Desa Berkoh, Purwokerto Selatan. Turmeric has beneficial content to the body, such as yellow curcumin, essential oils, high minerals such as potassium, calcium, iron, and magnesium (Anisha, Priwahyuni, Erianti, 2019). Potassium is an important component of cell and body fluids that helps controlling heart rate and blood pressure. Curcumin is an anti-oxidant because turmeric does not contain cholesterol and is rich in fiber. It will control low-density lipoprotein (LDL) in the blood. Turmeric is used to increase appetite, improve digestive function, reduce fat. (Muti, 2017)

Ginger and turmeric are materials that can be cultivated easily. They do not require a large area to plant and difficult materials. It is enough to plant them using a small poly-bag or pot and soil media (with fertilizer). This plant is easy to breed in the

yard around the house (Purwidiyanti, 2014; Juliyanti, Yani, Irawati, 2020). This plant is also easy to find in the community. Ginger and Turmeric can be found in traditional markets or vegetable stalls. So it is not difficult to find ginger and turmeric (Hartati, 2017; Lentera, 2002). There are no studies that combine ginger and turmeric in reducing blood pressure. So that makes it interesting to scientifically prove the effectiveness of *Zinger Officinale* and *Curcuma Longa* on blood pressure in hypertensive patients.

2. Method

Quasi-experiments with pre-test and post-test without control research designs were implemented in October-November 2020 in the working area of Puskesmas Ngemplak II, Sleman Regency, Yogyakarta. The population is all hypertension patients in the working area of Puskesmas Ngemplak II. Fifty respondents were selected using Consecutive Sampling. Respondents have criteria aged 21 years and over, have a systolic blood pressure of 140 mmHg and/or diastolic 90 mmHg, and do not undergo other alternative therapy. Selected respondents were given intervention for seven days. The intervention group is given ginger and turmeric drinking by mixing 200 mg of ginger and turmeric powder mixed into 200 ml of warm water. Ginger and turmeric powder is made by blending 1 kg of ginger and turmeric mixed with 1 kg of sugar and 100 ml water, then heating for 45 minutes to form crystals/powder. Blood pressure's respondent was measured before and after the intervention using the Omron Digital Blood Pressure Monitor. Data analysis was used Wilcoxon test because the data showed not normally distributed

3. Result and Discussion

Table 1. Frequency Distribution of Respondent Characteristics Based on Age and Gender in the Working Area of Puskesmas Ngemplak II, Sleman Regency, Yogyakarta, (November 2020)

Characteristic	(f)	(%)
Age		
30-35 years old	0	0
36-45 years old	16	32
46-55 years old	25	50
56-65 years old	9	18
Gender		
Male	16	32
Female	34	64
Total	50	100,0

Table 1 shows the age of the most respondents aged 36-45 years (middle adult). Age is one of the factors that affect blood pressure. Age is related to high blood pressure (hypertension). The older a person is, the greater the risk of developing

hypertension (Khomsan, 2003). Hasurungan's research in Rahajeng and Tuminah (2009) found that in the elderly, compared to the age of 55- 59 years with the age of 60-64 years, there was an increase in the risk of hypertension by 2.18 times, age 65-69 years 2.45 times and age > 70 years 2, 97 times (Rahajeng & Tuminah, 2009). Other studies also showed that there is a relationship between age and the incidence of hypertension at the Telaga Murni Health Center Cikarang Barat. It found that the incidence of hypertension is more experienced by respondents aged ≥ 40 years than aged <40 years. It occurs because ≥ 40 years old experience the loss of flexibility arteries. Blood vessels become narrower than before. The blood was forced to pass it. It results in a rise in blood pressure. (Sigarlaki, 2006)

The distribution based on sex in Table 1 shows that there are more women than men. Gender is also one of the factors that affect blood pressure (Rosta, 2011). Wahyuni and Eksanoto (2013) said Women tend to suffer from hypertension than men. Its study showed 27.5% of females suffering hypertension, while male 5.8%. Females will experience an increased risk of high blood pressure (hypertension) after menopause, namely over 45 years of age. Post-menopausal females are protected by the estrogen hormone. It plays a role in increasing the levels of High-Density Lipoprotein (HDL). Low HDL cholesterol levels and high LDL cholesterol (Low-Density Lipoprotein) affect the atherosclerosis process and result in high blood pressure (Anggraini, Waren, Situmorang, Asputra & Siahaan, 2009). Hormonal changes at menopause females can increase other biological compound's levels in the body. It can increase salt sensitivity, insulin resistance, sympathetic activity, and body weight. This increase can then trigger hypertension. (Asmarani, 2018)

Table 2. Pre and Post Respondents Blood Pressure in the Working Area of Puskesmas Ngemplak (November 2020)

Blood Pressure	Minimum	Maximum	Mean	Standar Deviasi
Pre Systolic	140	211	162,4	20,45
Post Systolic	110	200	151,6	20,89
Pre Diastolic	80	120	94,7	8,53
Post Diastolic	80	120	88,3	8,18

Table 3. Differences in Pre and Post Respondents Blood Pressure in the Working Area of Puskesmas Ngemplak II (November 2020)

Blood Pressure	Mean	Δ Mean	p-value
Pre Systolic	162,4	10,8	0,000
Post Systolic	151,6		
Pre Diastolic	94,7	6,4	0,000
Post Diastolic	88,3		

Table 2 shows the systolic blood pressure before the intervention of 162.4 mmHg with St Dev 20.4. After the intervention, it became 151.6 mmHg

with St Dev 20.9. Diastolic blood pressure before intervention 94.7 mmHg with St Dev 8.5. After the intervention, it became 88.3 mmHg with St Dev 8.2. Table 3 shows a decrease in systolic blood pressure by 10.8 mmHg and diastolic by 6.4 mmHg. There is a significant difference ($p = 0.000$) between blood pressure (systolic and diastolic) before and after an intervention.

Rafika's research (2019) shows that ginger decoction therapy effectively lowers systolic and diastolic blood pressure. The same results were also shown by Nadia's research (2020), blood pressure decreased after being given ginger. The high mineral content in ginger in the form of magnesium, calcium, phosphorus, and potassium is very beneficial for muscle spasms, nausea, hypertension, and gastrointestinal diseases. Potassium plays a role in blood pressure regulation and heart rate regulation. Consume 100 mg of magnesium every day can reduce the 5% risk of hypertension.

The research found that there is a slightly significant relationship between magnesium concentration in the blood and the risk of hypertension (Ojulari, Okesina, Owoyele, 2014). Increasing potassium intake can reduce systolic and diastolic blood pressure due to decreased vascular resistance. Vascular resistance is due to the dilation of blood vessels, increasing in loss of water, sodium from the body, and sodium-potassium pump activity. (Tulungnen, Sapulete & Pangemanan, 2017)

Ginger contains flavonoids, phenols, and saponins. They play a role in reducing blood pressure (Anthony, 2008). These compounds are known to lower blood pressure systemically and have antioxidant activity. These antioxidants can reduce radicals such as thromboxane A2 that can cause hypertension. Flavonoids have inhibitory activity. It can prevent the activity of the angiotensin-converting enzyme (ACE). ACE can change angiotensin I to angiotensin II. It can cause vasoconstriction of blood vessels (Pahri, 2020). Ginger also stimulates the release of the hormone adrenaline and widens blood vessels, as a result, blood flows faster and smoother and makes the heart work to pump bloodless. Ginger also contains Gingerol in ginger which is an anticoagulant, which prevents blood clots. So preventing blockage of blood vessels, the main cause of strokes and heart attacks. Gingerol is also thought to help lower cholesterol levels. (Koswara, 2006)

Other research shows that there is an effect of grated turmeric on reducing the intensity of blood pressure in hypertension elderly in Desa Berkoh, Purwokerto Selatan (Muti, 2017). The results showed the effect of turmeric juice on reducing blood pressure at age 20-30 who experienced prehypertension with the results of a systolic blood pressure p-value of 0.001 (<0.05) and for diastolic blood pressure p-value of 0.002 (<0.05) (Koswaram

2006). It happens because turmeric contains beneficial substances for the body, such as yellow curcumin, essential oil, high minerals such as potassium, calcium, iron, and magnesium. (Muti, 2017)

Curcumin which is conceived by turmeric is an anti-oxidant because turmeric does not contain cholesterol and is rich in fiber, which will control low-density lipoprotein (LDL) in the blood. Turmeric is used to increase appetite, improve digestive function, reduce fat because turmeric contains many compounds such as essential oils, curcumin, mineral phosphorus, and potassium (Muti, 2017). Potassium is a mineral that contains K + ions which functions as an electrolyte and fluid balance which is useful as a natriuretic and diuretic so that potassium can release sodium which contains Na + ions and fluids in the body. Potassium causes vasodilation of blood vessels, where vasodilation can cause a decrease in peripheral and central resistance so that it can cause blood pressure to decrease. (Koswara, 2006)

The results showed that there was a decrease in blood pressure after being given ginger and turmeric. So that people can know that ginger and turmeric can be used in the prevention of health disasters, especially hypertension. Khambali (2017) states that the disaster management cycle consists of three periods. They are pre-disaster, disaster itself, and post-disaster. Pre-disaster is an activity that is more focused on prevention. Prevention is an effort made to prevent a disaster (if possible by eliminating the danger). By giving ginger and turmeric, hypertension patients are an effort to minimize the dangers that arise due to hypertension.

4. CONCLUSIONS

The administration of Zinger Officinale and Curcuma Longa are scientifically proven to reduce blood pressure in hypertensive patients so that health disasters due to hypertension can be prevented.

5. RECCOMENDATIONS

This study recommends the public be able to apply the use of ginger and turmeric for the prevention and management of hypertension. Ginger and turmeric are expected to be planted as family medicinal plants. For nurses, ginger and turmeric can be used in the treatment of patients with hypertension. For future researchers can compare ginger and turmeric to find which is more effective.

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6. COMPETING INTEREST

None

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