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## EFFECTS OF GOLOBE (*Hornstedtia alliacea*) FRUIT EXTRACTS ON THE CHANGES OF BLOOD PRESSURE IN PATIENTS WITH HYPERTENSION

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### ABSTRACT

Hypertension is a public health problem that is common in developing countries and is the second highest cause of death in Indonesia. High blood pressure is also a major risk factor for coronary heart disease. Golobe (*Hornstedtia alliacea*) is a plant that grows in tropical areas, including in Halmahera. Halmahera people have been using this plant for energy booster during hunting, treatments for injuries and infections, and herbal medicine for indigestion. The purpose of this study is to determine the effects of Golobe (*Hornstedtia alliacea*) fruit extracts on the decrease of blood pressure in patients with hypertension. This study is Quasi-Experimental Design Control Group with pretest and posttest control group. Simple random sampling is used to collect a sample of 20 respondents. Data analysis technique used is the paired t-test with significance value of = 0.05.

The results of the study by comparing the value of p, t-test and t-table using a two-tailed test produce a p-value of 0.001 (> 0.05) and t-value of 4,583 (> 2,262) for the blood pressure in the experimental group. Meanwhile, the test

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in the control group results in p-value of 0.380 ( $>0.05$ ) and t-value of 0.923 ( $<2.262$ ). Thus, it can be concluded that there is an effect of Golube fruit to changes in blood pressure, as evidenced by the significant value in the experimental group.

## INTRODUCTION

Hypertension as a non-contagious disease is has become a crucial and serious problem, because its prevalence is high and likely to increase. Hypertension often has no symptoms so it becomes a silent killer, and a major cause of heart disease, stroke and kidney (Sutanto, 2010; Suiroaka, 2012).

Several risk factors can lead to hypertension, such as family history, genetics, smoking, consumption of salt, saturated fat intake, alcohol consumption habits, obesity, and stress (Sugiarto, 2010).

According Constantanides, aging is a process of gradual disappearance of the body tissues' ability to self-repair or replace and maintain their normal

function so that they cannot survive infection and repair the damage suffered. (Bandiyah, 2010).

A person aged 50 years with systolic blood pressure of  $>140$  mmHg is more at risk of suffering from cardiovascular disease. The risk of cardiovascular disease begins at blood pressure of 115/75 mmHg, and this risk doubles for each increase of 20/10 mmHg. Approximately 90% people with normal blood pressure at age 55 years will be at risk of becoming hypertensive (Badiyah, 2010).

Until now, according to the records of the World Health Organization (WHO), in 2011, one billion people in the world suffered from hypertension and about two thirds of them are in developing countries with low to moderate incomes. If the effort is not properly executed, this number will continue to rise, and it is predicted that by 2025 about 29% of world's total population or 1.6 billion people will suffer from hypertension. In Indonesia, the incidence of hypertension is relatively high.

According to the American Heart Association (AHA), in the United States, it is found that one out of three people or 65 million people suffer from hypertension. Only one third of that reaches their goals of optimal or normal blood pressure. As many as one billion people worldwide, or one in four adults suffer from hypertension. It is estimated that the number of people with hypertension will increase to 1.6 billion by 2025 (Wahdah, 2011).

Developing countries currently dominate the proportion of hypertensive patients. Data from *Global Status Report 2010* of WHO's *Noncommunicable Diseases* show that 40% of developing economies have hypertensive patients, while the developed countries only hold 35%. Africa holds the top position with 46% of hypertensive patients, while the American regions

contribute as much as 35%, in 36% of which in adults (Chandra, 2013).

In Asia, the disease has killed 1.5 million people annually. This indicates that one in three people suffer from high blood pressure. According Khancit, in 2011, WHO noted that one billion people are affected by hypertension. The prevalence of hypertension in Indonesia obtained through measurements at the age of 18 years and above is estimated at 25.8%, with the highest prevalence in Bangka Belitung (30.9%), followed by South Kalimantan (30.8%), East Kalimantan (29.6%) and West Java (29.4%). In the province of North Maluku, in 2013, the number of hypertension cases was ranked 28 out of 33 provinces in Indonesia with 12 202 cases (Source: RISKESDAS, 2013).

According to the data from the Health Department of North Maluku province, the number of hypertensive patients in North Maluku province was 25.2%, compared with other infectious diseases. This increase in the cases of non-communicable diseases is largely influenced by lifestyle and environmental quality, as well as genes (Source: Sector P2PL North Maluku Provincial Health Office 2012).

Based on the data from Health Department of Morotai Island Regency, in 2015, hypertensive disease was ranked first. By 2015, the prevalence of hypertension in Morotai Island had reached 16.3 %. (Source: Department of Health Morotai Island, 2012).

Data from Puskesmas (Public Health Center) Posi-Posi Rao, South Western Morotai, states that in the period of January to April 2016, of the top ten cases of the disease, hypertension ranked second with a percentage of 19.1% after ISPA with a percentage of 22.3% (Source: PHC Posi-Posi Rao, 2016).

Hypertension can be controlled by always taking anti-hypertensive medication and blood pressure control management. Patients with high blood pressure can also control blood pressure by avoiding foods that are high in cholesterol and fat. Treatment of hypertension is generally combined with a variety of complex diuretics such as *hydrochlorothiazide* and *Lasix*. These drugs greatly stimulate the body through the urine discharge. Beta-carotene and potassium serve to neutralize blood pressure. In addition to regular treatment with anti-hypertensive drugs, high blood pressure can also be treated with traditional medicine or herbs. (Arturo, 2012, in Nasir, 2012).

## METHODS

This study is *Quasi-Experiment Design Control Group* with *pretest* and *posttest control group*. The first group received the treatment while the second group did

not. The first group is called the experimental group and the second group the control group.

One measurement was made at the start of the research (*pre-test*) in both groups. Then, the first group (*experimental group*) received the treatment and the second group (*control group*) did not. After that, another measurement was made at the end of the research (*post-test*) in both groups. It aims to see the comparison between the experimental group and the control group.

## POPULATION AND SAMPLE

The population in this study was all 43 people with hypertension in the village of Posi-Posi Rao. Researchers took samples from the population size by using the *Slovin's formula* with an error margin of 10% and an accuracy of 90%. The calculation was  $n = N / (1 + N \times e^2) = 43 / (1 + 43 \times 0.10 \times 0.10) = 30.06$ , rounded to 30. The number is then divided into two groups: an experimental group of 15 respondents and a control group of 15 respondents.

## RESULTS AND DISCUSSION

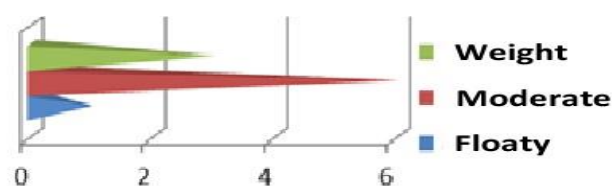
This research was conducted at the Posi-Posi Rao, South West Morotai Regency. The data collection begins with the screening of hypertensive patients who have been chosen to obtain results that correspond to the inclusion criteria for the research sample. Then, the patients were divided into two groups (the experimental group and the control group). The patients' blood pressure was initially measured (blood pressure measurement *pre-test*). Then, the experimental group received treatment, which is eight Golobe fruits consumed each day in the morning and evening for ten days in a row.

Patients who do not comply with the treatment procedure for whatever reason cannot be further included in this study. On the eleventh day, blood pressure was re-checked in both groups (*post-test* blood pressure measurements).

Analyses of the data used in this study were univariate and bivariate using SPSS. The univariate analysis in this study is the characteristics of the respondents such as age, gender, and education. Out of 20 respondents, five people (25%) aged 30-50 years, 11 people (55%) aged 51-70 years, and four people (20%) aged >70 years; in terms of gender, five respondents (25%) are men and 15 respondents (75%) are women; in terms of educational level, three respondents (15%) do not finish school, 15 respondents (75%) finished primary school, and 2 (10%) finished junior high school.

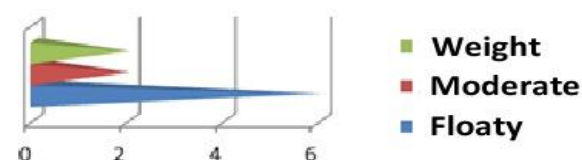
The bivariate analysis was conducted with *Paired Sample T - Test*. *Pre-test* and *post-test* were performed in the control group, and the measurements before and after consuming Golobe fruits in the intervention/experiment group. This test was conducted to identify the effect of the Golobe fruit extract on the decrease of blood pressure in hypertensive patients by

comparing the values before and after the treatment. The significance of test results is determined by the value of  $P < 0.05$ .



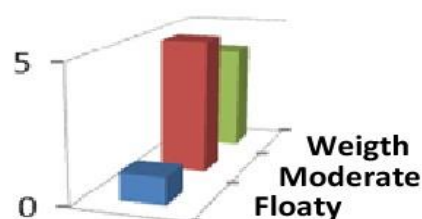
**Figure 1.** Respondents Frequency Distribution (pre test) (Experimental Group)

Of the 10 respondents in the experimental group (Pre Test), 1 (10%) was classified as hypertension stage 1 (mild hypertension), 6 (60%) as hypertension stage 2 (moderate hypertension), and 3 (30%) as hypertension stage 3 (severe hypertension).



**Figure 2.** Respondents Frequency Distribution (post test) (Experimental Group)

Of the 10 respondents in the experimental group (Post Test), 6 (60%) was classified as hypertension stage 1 (mild hypertension), 2 (20%) as hypertension stage 2 (moderate hypertension), and 2 (20%) as hypertension stage 3 (severe hypertension).

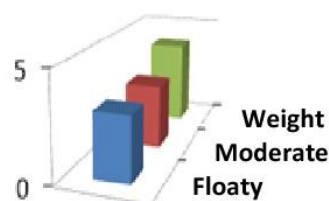


**Figure 3.** Respondents Frequency Distribution (pre test) (Control Group)

Of the 10 respondents in the control group (*Pre Test*), 1 (10%) was classified as hypertension stage 1 (mild hypertension), 5 (50%) as hypertension stage 2 (moderate hypertension), and 4 (40%) as hypertension stage 3 (severe hypertension).

Of the 10 respondents in the control group (*Post Test*), 3 (30%) was classified as hypertension stage 1 (mild hypertension), 3 (30%) as hypertension stage 2

(moderate hypertension), and 4 (40%) as hypertension stage 3 (severe hypertension).



**Figure 4.** Respondents Frequency Distribution (*post test*) (Control Group)

**Table 1.** Paired Samples Test on Blood Pressure Experimental Group

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			
Pair 1	pre - post	7.089	20.911	4.583	9	.001

**Table 2.** Paired Samples Test on Blood Pressure Control Group

		95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
		Lower	Upper			
Pair 1	pre - post	-11.605	27.605	.923	9	.380

#### Decision-making based on the comparison of the value of $\alpha$ , the value of T-value and T-table

a. If the value of  $\alpha > 0.05$  and t-value is smaller than t-table,  $H_0$  is accepted and  $H_a$  rejected (No effect)

b. If the  $\alpha$  value of  $< 0.05$  and t-value is larger than t-table,  $H_0$  is rejected and  $H_a$  accepted (There is an effect)

The results obtained in the experimental group was p-value = 0.001 and t-value = 4,583. Thus, it can be concluded that  $H_0$  is rejected and  $H_a$  accepted, because p-value = 0.001 < 0.05 and t-value 4,583 > of 2,262. It can be concluded that there is an effect of Golube fruits on blood pressure changes.

Meanwhile, the results obtained from the test results in the control group is p-value = 0.380 and t-value = 0.923. Thus, it can be explained that  $H_0$  is accepted and  $H_a$  rejected, because p-value = 0.380 > 0.05 and t-value = 0.923 < 2,262. It can be

concluded that the blood pressure in the control group is relatively the same.

#### DISCUSSION

Basic Health Research (Risesdas) of 2013 states that the prevalence of hypertension in Indonesia was 25.8%. The prevalence of hypertension diagnosis by health professionals and measurement increases with age. Hypertension in women tends to be higher than that in men. (Prihandana, 2012) suggests that hypertension is more widely experienced by women compared with men because of the presence of estrogen hormones in women.

The high risk of hypertension in lower education may be due to patients' lack of knowledge about health f and the difficulty or slowness of information (dissemination) given by health officers, so it impacts on the behavior/healthy lifestyle (Anggara, 2012).

Rahajeng (2013) states that there is a significant relationship between work and hypertension. Kristansi (2013) states that types of work affect a person's physical activity. Unemployed people, who are less active, can have increased risk of hypertension.

*World Health Organization* (WHO) in 2012 states that hypertension affects more than one in three adults aged 25 years and older, or about one billion people worldwide. Hypertension is closely related to age; the older the person, the greater the risk of hypertension (Sugiarto, 2007).

Based on the analysis of this research, the consumption of Golobe Halmahera fruits accompanied by lifestyle and diet modification, and avoiding risk factors that can increase blood pressure, was very influential in lowering the blood pressure. Therefore, patients with hypertension should be more aware of the importance of health and have their blood pressure checked and controlled regularly to the nearest health services such as public health centers.

This study found that eating Golobe fruits regularly can lower blood pressure gradually without side effects. The public must be given more knowledge about the usefulness and benefits of Golobe fruits to reduce hypertension.

## CONCLUSION

Increased blood pressure (hypertension) may be offset by a healthy lifestyle such as nutritious food diet, adequate rest, positive stress management, and regular exercise. Those who are less active and fit are at the risk of increased high blood pressure by 20% - 50% compared with those who are active and fit (MOH, 2010).

For the treatment of hypertension, people are already using herbal plants, such as cucumbers, garlic, squash, celery, watermelon, star fruit, leaves and fruits or vegetables that can be used for herbal medicine. (Arturo, 2011). One fruit being studied by Arend L Mapanawang is Golobe. Golobe can lower blood pressure because Golobe contains beta-caryophyllene compounds known as antioxidants, thus protecting cells from damage. (Sulaksono, 2015).

Dihydropyridine is an antibacterial compound (Darussalam, 2015). Vitamin E is an antioxidant that is strong enough to boost the immune system, protects red blood cells that carries oxygen to all body tissues from damage, helps overcome stress, and minimizes risks of cancer and cardiovascular disorders such as coronary heart disease and hypertension.

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