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### **A *APIUM GRAVEOLENS L* EXTRACT: Alternative Complementary Therapies to Decrease Hypertension**

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#### **Abstract**

Hypertension is often mentioned as the silent killer because it is deadly without any symptoms. Along with the times, the world of health began to develop complementary therapies. Herbal medicines received considerable attention as complementary medicines in the world because of their cost-effectiveness, low toxicity, and therapeutic potential against various diseases. *Apium graveolens L* and several other plants have been recognized as plants whose pharmacological effects can treat diseases such as hypertension. The purpose of this research was to analyse the effect of *Apium graveolens L* Extract to decrease hypertension. The type of this research used *quasi-experimental* with pre-post test with control group design. The population in this research were all elderly people suffering from hypertension in Tambak Agung Village, Puri District, Mojokerto Regency. The samples were obtained by using *the purposive sampling* technique. With inclusion criteria, including: 1) Hypertensive patients, 2) Age 55 years old, 3) Blood pressure up to 140 mmHg / 90 mmHg, 4) Willing to be a respondent. The processed data was analyzed to determine the effect of *Apium graveolens L* Extract on decreasing hypertension in the elderly. The data were analyzed using a statistical test *Paired sample test T-Test* with *SPSS 23 for windows*. At the significance level  $<0.05$ ,  $H_0$  is rejected or  $H_1$  is accepted, meaning that *Apium graveolens L* extract decreases hypertension in the elderly. *Apium graveolens L* extract effectively decrease blood pressure by regularly consuming it. Because the *Apigenin* content contained in *Apium graveolens L* (celery) can prevent constriction of blood vessels and *Phthalides* which can relax artery muscles or relax blood vessels.

**Keywords:** *Apium Graveolens L* Extract, Complementary Therapy, Hypertension

#### **Introduction**

Hypertension is the medical term for high blood pressure. This condition can lead to various health complications that are life-threatening while increasing the risk of heart disease, stroke, and even death. Hypertension is often mentioned as the silent killer because it is deadly without

any symptoms warning sufferers (Sustrani, 2004). Herbal medicines received considerable attention as complementary medicines in the world because of their cost-effectiveness, low toxicity, and therapeutic potential against various diseases. *Apium graveolens L* and several

other plants have been recognized as plants whose the pharmacological effects can treat diseases like hypertension, diabetes, gout, cholesterol and other vital disorders (Chaudhari et al., 2020).

Globally, World Health Organization (WHO) data show that in 2000 was estimated that nearly one billion people in the world, more than 25% at that time, suffered from hypertension, and this is expected to increase almost 30% in 2025 (Kearney et al., 2005). From 1 billion people with hypertension, 33.3% are in developed countries, and the remaining 66.7% are in developing countries, including Indonesia. (Jatim, 2015). According to Riskesdas data (2020), East Java Province has the highest prevalence of hypertension ranging from 25% to 50%, the lowest prevalence is in Situbondo, East Java, at 25%, while the highest prevalence is in Madiun City, East Java, at 50%. The incidence of hypertension in the last five years was 31.7%. Meanwhile, cases of hypertension that have not been successfully diagnosed are still very high at 76%. People in the age of 50 with systolic blood pressure  $\geq 140$  mmHg has higher risk of suffering from cardiovascular disease than diastolic hypertension. The risk of developing cardiovascular disease begins at a blood pressure of 115/75 mm Hg, increase 2 times for each increasing of 20/10 mm Hg. For someone who has

normal blood pressure at the age of 55, 90% of them are at risk of developing hypertension.

Based on the data obtained during the presurvey that the researcher conducted on June 17, 2021, at the Elderly Posyandu, Tambak Agung Village, Puri District, Mojokerto Regency, data on the number of elderly posyandu members were 107 people, consisting of 20 elderly men and 87 elderly women. Fifty-seven elderly posyandu members have hypertension (53.3%), and fifty are elderly. The field survey was conducted by researchers on 10 peoples who had never received celery therapy.

The factors associated with hypertension are genetic factors, age, gender, obesity, salt intake, smoking habits and physical activity. Individuals with a family history of hypertension have higher risk of suffering from hypertension than people who do not have a family history of hypertension (Kowalski, 2010). Hypertension increases with age, and men have higher risk of developing hypertension early. There are two ways to prevent hypertension, namely pharmacological and non-pharmacological approaches. Non-pharmacological treatment can be done using complementary medicine that has been known among the public. Pharmacologically, chemical drugs are

widely used to treat hypertension but often causes side effects such as bronchospasm, insomnia, worsening peripheral vascular disorders, hypertriglyceridemia, and others (Micozzi, 2014).

Pharmacological treatment is with antihypertensive drugs that are diuretic, sympathetic, beta-blocker and vasodilator. Pharmacological treatment is considered expensive by some people. Besides that, pharmacological treatment often causes negative side effects either directly or accumulated. According to Lumbantobing (2008), Non-pharmacological treatment is by changing a healthy lifestyle, low in fat and salt diet and complementary therapies. There are many types of complementary therapies, one of that is celery herbs (Jannah, 2021).

Celery leaves (*Apium graveolens*) contain a lot of apiin, a compound that is a diuretic and is thought to be able to dilate blood vessels. Celery has been widely used in the community, and many studies have been carried out on its pharmacological effects and have been shown to be able to decrease high blood pressure (Hariana, 2008). The Apigenin content in celery acts as a beta-blocker that can slow down the heart rate and decrease the strength of heart contractions so that less blood is pumped and blood pressure is decreased. Mannitol and apiin are diuretics that help the kidneys remove excess fluid and salt from the body,

so that decreased fluid in the blood will decrease blood pressure (Jannah, 2021). In addition, celery also contains phthalides and magnesium, which are suitable for helping relax the muscles around the arteries, help prevent blood vessel constriction, and decrease stress hormones that can increase blood pressure (Agoes, 2010).

From the description above, the researcher is interested in researching *Apium graveolens L* Extract: Alternative complementary therapy to decrease hypertension in hypertensive elderly in Tambak Agung Village, Puri District, Mojokerto Regency.

## METHOD

The type of this research was *quasi-experimental with pre-post test with control group design*. The population in this research were all elderly hypertension in Tambak Agung Village, Puri District, Mojokerto Regency. The sample of 30 respondents was selected using a *purposive sampling* technique, while the inclusion criteria were as follows: 1) Hypertensive patients, 2) age 55 years old, and 3) Blood pressure up to 140 mmHg / 90 mmHg. The independent variable in this research was the giving of *Apium graveolens L* extract, while the dependent variable was a decrease in hypertension. Here the researchers measured the blood pressure of the elderly who suffered from hypertension

in the last month before giving the *Apium graveolens L* extract, then measured the blood pressure again after giving the *Apium graveolens L* extract. This research was conducted from October to Desember at the auxiliary health center of Tambak Agung Village, Puri District, Mojokerto Regency.

**RESULT**

**Table 1.** Blood pressure before giving *Apium graveolens L* extract

Blood Pressure	Frequency	Percent (%)
Decrease	3	10
Constant	10	33
Increase	17	57
Total	30	100

Source: Primary Data 2021

Based on table 1 shows that more than half of respondents blood pressure before giving *Apium graveolens L* extract increased by 17 respondents (57%).

**Table 2.** Blood pressure after giving *Apium graveolens L* extract

Blood Pressure	Frequency	Percent (%)
Decrease	25	83
Constant	5	17
Increase	0	0
Total	30	100

Source: Primary Data 2021

Based on table 2 shows that most of the respondents blood pressure after giving *Apium graveolens L* extract increased by 25 respondents (83%).

**Table 3.** Cross Tabulation: The giving effect of *Apium graveolens L* extract to decrease blood pressure

Blood Pressure before Intervention	Blood Pressure after Intervention						Total	
	Decrease		Constant		Increase			
	Σ	%	Σ	%	Σ	%	Σ	%
Decrease	1	3	2	7	0	0	3	10
Constant	7	23	3	10	0	0	10	33
Increase	17	57	0	0	0	0	17	57
Total	25	83	5	17	0	0	30	100
T-Test Results					ρ = 0,000			

Source: Primary Data 2021

Based on table 3 shows that most of the respondents blood pressure before giving *Apium graveolens L* extract increased and the blood pressure of the respondents after giving *Apium graveolens L* extract decreased by 17 respondents (57%), sig. (2-tailed) or Value= 0.000 (<0.05).

**DISCUSSION**

**1. Respondent's blood pressure before**

**giving *Apium graveolens L* extract at the auxiliary health center of Tambak Agung Village, Mojokerto Regency**

Based on data in table 1 showed that most of the respondents blood pressure before giving *Apium graveolens L* extract increased by 17 respondents (57%).

Normal blood pressure in the elderly was higher than normal blood pressure in adults. It was because blood vessels tend to harden or stiffen with age. Hardening of the blood vessels made the heart work harder, thus make blood pressure higher in the elderly (Alsarah, Alsara, & Bachauwa, 2019).

Women suffered from hypertension more than men. In old age, a woman will experience menopause. Menopause triggers blood pressure to increase because postmenopausal women experience a decrease in the hormone estrogen, protecting blood vessels from damage. (Association, 2017).

According to researchers, blood pressure in the elderly increased before giving *Apium graveolens L* extract, although there was also a decrease. It is due to various factors, including advanced age. With increasing age, the elasticity of blood vessels becomes reduced and stiff, or the elderly are regular in undergoing treatment.

**2. Respondent's blood pressure after**

**giving *Apium graveolens L* at the auxiliary health center of Tambak Agung Village, Mojokerto Regency**

Based on data in table 2 showed that most of the respondents' blood pressure after giving *Apium graveolens L* extract decreased by 17 respondents (57%).

Celery leaves contained many compounds that are diuretic and thought to be able to dilate blood vessels, helped the kidneys remove excess fluid and salt from the body, so that decreased fluid in the blood will decrease blood pressure and as a beta-blocker that can slow down the heart rate and decrease the strength of heart contractions, so that blood pressure is decreased (Agoes, 2010).

The data above showed that most of the elderly's blood pressure decreased after giving *Apium graveolens L*, which pack in capsules with a dose of 2 capsules a day. Although there were respondents whose blood pressure remains after giving *Apium graveolens L*, this was due to the age of the respondents who are getting older, where the elasticity of the blood vessels was decreasing and stiff so that the administration of extract of *Apium graveolens L* was not working optimally.

**3. The effect of giving *Apium graveolens L* in decreasing blood pressure to patients with hypertension at the**

### auxiliary health center of Tambak Agung village, Mojokerto Regency

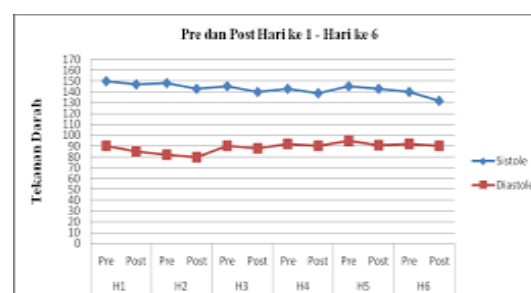
To determine the effect of giving *Apium graveolens L* extract in decreasing blood pressure to patients with hypertension, it carried with a statistical test: *Paired sample test T-Test* with a significance level of  $p \leq 0.05$ .

The cross-tabulation of table 3 showed that most of the respondents blood pressure before giving *Apium graveolens L* extract increased and after giving *Apium graveolens L* extract decreased by 17 people (57%). From the *Paired sample test T-Test* results, the mean MAPI blood pressure of pre and post test respondents was 1.428671. It found that  $p = 0,000$  at the  $p 0.05$  ( $\alpha 0.05$ ). When compared with the level of significance that is  $0.000 < 0.05$ ,  $H_0$  rejected. The data above showed an effect of giving *Apium graveolens L* extract to decrease blood pressure in hypertension sufferers at the auxiliary health center of Tambak Agung village, Mojokerto Regency. So when viewed statistically in this research, there was a significant effect of the intervention of giving *Apium graveolens L* extract, which give to decrease the blood pressure of respondents ranging from mild hypertension to severe hypertension.

This research found that *Apium graveolens L* extract can be used as an

alternative non-pharmacological option to decrease blood pressure in people with hypertension in the community because there are results showed a decrease in blood pressure in respondents at the auxiliary health center of Tambak Agung village, Mojokerto Regency, who regularly give *Apium graveolens L* extract for one week (6 days). The community has practiced giving *Apium graveolens L* (Celery) extract for a long time because celery leaves contain Apigenin which can prevent constriction of blood vessels and Phthalides which can relax artery muscles or relax blood vessels. The blood flow content allows blood vessels to dilate and decrease blood pressure. Therefore, celery can be used as an alternative choice to decrease blood pressure non-pharmacologically.

### CONCLUSION



From the graph above, it can be concluded that *Apium graveolens L* Extract can decrease blood pressure in both systolic and diastolic hypertension. The Apigenin content in *Apium graveolens L* (celery) can prevent constriction of blood vessels and

Phthalides which can relax the arterial muscles or relax the blood vessels. That content regulated blood flow, allowing blood vessels to dilate and decrease blood pressure.

## SUGGESTION

It is recommended that elderly people with hypertension start switching to herbal medicine by consuming *Apium graveolens L* (celery) extract to overcome high blood pressure.

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