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The Effect of Celery Extract on Lowering Blood Pressure in Patients with Hypertension in Sumur Putat, Cipocok Serang Banten

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Abstract---Hypertension is a condition that occurs when the amount of blood pumped by the heart exceeds the ability that the arterial wall can accommodate. One of the herbal therapies that is an alternative choice for sufferers is by consuming celery. Traditional Chinese people have long used celery to lower blood pressure. Celery (*Apium graveolens*) is one of the types of herbal therapy as an alternative to blood pressure-lowering, it has been proven successful in reducing high blood pressure because it contains diuretic potassium which is needed to help the body release water and sodium in order to reduce blood pressure. This study uses Quasi Experiment with the design used is the design of One Group Pretest - posttest Design without a control group but first observation (pretest) has been done which allows researchers to test changes that occur after the experiment (Post test). The population in this study were all hypertensive patients who experienced hypertension according to WHO criteria in Sumur Putat. Sampling techniques were carried out using purposive sampling. The results of the study by Paired T Test showed that there were significant differences in the average decrease in systolic and diastolic blood pressure in patients with hypertension before and after the intervention of celery extract with systole P value 0.000 <0.05 and diastole P value. 0.007 <0.05.

Keywords---blood pressure, celery, hypertension, lowering, patients

Introduction

Hypertension is a condition that occurs when the amount of blood pumped by the heart exceeds the capacity of the artery walls. When the blood count is high, complications can occur depending on the relationship between the blood count and the capacity of the arteries. The more blood that flows and the narrower the artery walls, the higher the blood pressure (Nursalam, 2003; Syahrini, 2012; Tyagi et al., 2013; Umamaheswari et al., 2011). This condition can be dangerous, because the heart is forced to pump blood harder throughout the body, which can lead to various diseases, such as kidney failure, stroke, and heart failure. Hypertension is called the silent killer because the symptoms are often without complaint. Usually, the patient does not know that he has hypertension and is only known after complications occur. The only way to prevent it is to check blood pressure. Hypertension can be prevented by controlling risky behaviors such as smoking, unhealthy diet, less consumption of vegetables and fruits, and consuming excess salt (Kemenkes, 2018). According to 2013 Riskesdas data, the Indonesian population aged 15 years and over, 36.3% smoked, 93.5% consumed less fruit and vegetables, 52.7% consumed salt more than 2 thousand mg/day, 15, 4% are obese, and 26.1% lack physical activity (Lawes et al., 2008; Mancia et al., 1997).

Treatment of blood pressure is divided into two, namely pharmacological and non-pharmacological treatment. Pharmacological treatment consists of administering drugs that are diuretic, sympathetic, beta-blocker, and vasodilator by paying attention to the site, mechanism of action and level of compliance. Pharmacological treatment is considered expensive by the community, but it also has side effects (Nosaria, 2012; Notoatmodjo, 2003;

[Notoatmodjo, 2010](#)). While non-pharmacological treatment is widely used by the public to lower blood pressure because it does not have harmful side effects, which include weight loss, regular exercise, a low-fat and salt diet, and complementary therapies. Non-pharmacological treatment is in great demand by the community because it is very easy to practice and does not cost too much. One of the non-pharmacological treatments for hypertension is complementary therapy. Complementary therapies are natural treatment therapies including herbal therapy, nutritional therapy, progressive relaxation, meditation, laughter therapy, acupuncture, acupressure, aromatherapy, bach flower remedy therapy and reflexology ([Sustrani, 2005](#)).

WHO estimates that 80% of the world's population uses complementary medicine or still relies on medicine. For example, a study related to the use of herbal medicines in Trinidad conducted by [Clement \(2009\)](#), found that 86.8% of herbal users believed that herbs were more effective than conventional medicine. The implementation of complementary medicine in Indonesia has been regulated in the Regulation of the Minister of Health of the Republic of Indonesia Number 1109 of 2007 concerning the implementation of alternative complementary medicine in health care facilities ([Abir et al., 2012](#); [Barnes, 2003](#)). Decree of the Director General of Medical Services, No. HK.03.05/I/199/2010 concerning guidelines for criteria for determining alternative complementary medicine methods that can be integrated in health care facilities. As much as 40% of Indonesia's population uses complementary medicine ([Zulhafni, 2017](#)).

Specifically for herbal medicines, the government issued Decree of the Minister of Health of the Republic of Indonesia Number 121 of 2008 concerning Standards for Herbal Medical Services. Some herbs that have been through research and proven to reduce high blood pressure include celery (*Apium Graveolens*), Kumis kucing (*Orthosiphon Stamineus*), bay leaf (*Syzygiumpolyanthum*), Mangosteen (*Garcinia mangostana*) Valerian (*Valeriana Officinale*). Meanwhile, according to [Sustrani \(2005\)](#), types of herbs that can reduce high blood pressure are Celery (*Apium Graveolens*), garlic (*Allium Sativum*), shallots or onions (*Allium Cepa*), sweet star fruit (*Averrhoa Carambola L*), cucumber (*Cucumis sativus*), lime (*Citrusaurantifolia*), tomato (*Lyocopercison lycopersicum*) and watermelon (*Citrullus vulgaris*). Some herbal medicines that are increasingly popular in the community are garlic and celery ([Zulhafni, 2017](#)).

One of the herbal therapies that is an alternative choice for sufferers is by consuming celery. Traditional Chinese society has long used celery to lower blood pressure. Celery (*Apium graveolens*) is one type of herbal therapy as an alternative to lowering blood pressure, it has been proven successful in reducing high blood pressure because it contains potassium which is a diuretic which is needed to help the body excrete water and sodium in order to lower blood pressure ([Dalimartha, 2005](#)). The content of phtalides and magnesium contained in celery is good to help relax the muscles of the arteries and help normalize the narrowing of the arteries ([Karnia, 2012](#)). Phtalides can reduce stress hormones that can increase blood pressure ([Afifah, 2009](#)). Celery contains apigenin which is very useful for preventing constriction of blood vessels and high blood pressure. In addition to phtalides and apigenin, celery also contains high nutrients, vitamins A, B1, B2, B6 and also vitamin C. Celery is also rich in potassium, folic acid, calcium, magnesium, iron, phosphorus, sodium, and many amino acids essential. Celery is also very easy to find, the price is also very affordable by the community. In addition, celery does not have harmful side effects, therefore celery is very good as a therapy for treating hypertension ([Rizzo & Muratore, 2009](#); [Papamichail et al., 2000](#)).

Research Method

This research used a Quasi Experiment with One Group Pretest - Posttest Design without a control group but the first observation (pretest) has been carried out which allows researchers to test the changes that occur after the experiment (Posttest). One Group Pretest – Posttest Design uses one group of subjects ([Setiawan & Afridah, 2013](#); [Cohen et al., 2014](#)). First the measurement is carried out for a certain period of time, then the measurement is carried out a second time to know the effect of celery extract on lowering blood pressure in patients with hypertension. The form of sampling techniques in this research is purposive sampling. The sampling is based on inclusion and exclusion criteria. In this study, the sample obtained was 15 respondents who met the inclusion criteria. The research took place in Sumur Putat, Cipocok Serang Banten. Respondents are those who are willing to fill in the research questionnaire and the consent form by signing an agreement in the format provided by the researchers. In conducting this study, the researchers paid close attention to research ethics such as informed consent, anonymity, and confidentiality ([Staessen et al., 2003](#); [Kumar, 2013](#)).

The data collected in this study is primary data obtained by asking questions through a questionnaire to be answered by the respondents. The instrument used in the study was a GEA brand Tensimeter and the results were recorded on the observation sheet. The analysis in this study includes univariate analysis and bivariate analysis. Univariate analysis is used to describe the frequency distribution of each of the variables studied. Variables analyzed

using univariate are age, occupation, gender, education, occupation. Bivariate analysis was carried out using a paired T test with the first using the data normality test. The results of the data normality test are the data used in the study are normal (Armstrong & Reilly, 2002; Xie et al., 2016).

Result and Discussion

Table 1.1
Frequency distribution of respondents' characteristics

No	Characteristics	Criteria	Frequency	Percentage
1	Age	26-35 years old	1	6,7 %
		46-55 years old	3	20 %
		56-65 years old	5	33,3 %
		> 65 years old	6	40 %
		Total	15	100%
No	Characteristics	Criteria	Frequency	Percentage
2	Gender	Male	3	20 %
		Female	12	80 %
		Total	15	100%
No	Characteristics	Criteria	Frequency	Percentage
3	Education	not completed in primary school	9	60%
		Primary School	6	40 %
		Total	15	100%
No	Characteristics	Criteria	Frequency	Percentage
4	Occupation	Labourer	5	33,3%
		Housewife	10	66,6%
		Total	15	100%

Table 1.1 shows that the majority of the 15 respondents are age around > 65 years old with 6 people (40 %), gender characteristics is dominated by female is 12 people (80%), the education background characteristics of the respondents is dominated by not completed in primary school is 9 people (60%), and the occupation of the respondents is mostly housewife that reached 10 people (66,6%) (Kowalak et al., 2011; Nakasone et al., 2013).

Table 1.2
Distribution of Respondents with Hypertension before being given celery extract intervention at sumur Putat, Cipocok Serang

Blood pressure	N	Mean	Median	SD	Min	Max
Sistol	15	147.26	140.00	8.010	135.00	162.50
Diastol	15	85.16	82.50	6.973	77.50	97.50

The presented results in Table 1.2 showed that a total of 15 respondents with hypertension before being given the intervention of celery extract had an average systolic blood pressure of 147.26 mmHg with the lowest systolic blood pressure of 135 mmHg and the highest of 162 mmHg. Meanwhile, the diastolic blood pressure before being given the intervention of celery extract had an average of 85.16 mmHg with the lowest diastolic blood pressure 77 mmHg and the highest 97 mmHg (Depkes, 2009; Depkes, 2008).

Table 1.3
Distribution of Respondents with Hypertension after intervention of celery extract iat sumur Putat, Cipocok Serang

Blood pressure	N	Mean	Median	SD	Min	Max
Sistol	15	128.83	128.75	8.444	112.50	145.00
Diastol	15	81.58	80.00	4.965	76.25	93.75

Table 1.3 showed that from a total of 15 respondents with hypertension after being given celery extract intervention had an average systolic blood pressure of 128.83 mmHg with the lowest systolic blood pressure of 112 mmHg and the highest 145 mmHg. Meanwhile, for diastolic blood pressure after the intervention, celery extract had an average of 81.58 mmHg with the lowest diastolic blood pressure 76 mmHg and the highest 93 mmHg (National High Blood Pressure Education Program, 2004; Nkondjock & Bizome, 2010).

Table 1.4
Differences in the average systolic and diastolic blood pressure in respondents with hypertension before and after being given the celery extract intervention

Blood pressure	N	Mean	STD	SE	t	P Value
Sistol Pre - Post	15	14.000	7.664	1.979	7.074	0.000
Diastol Pre - Post	15	3.583	4.352	1.123	3.189	0.007

Table 1.4 shows the results of the Paired T Test to determine the effect of giving celery extract on reducing blood pressure in patients with hypertension that the average decrease in systolic blood pressure in respondents with hypertension before and after the intervention of celery extract is 14,000 mmHg so it can be concluded that there are a significant difference in the average decrease in systolic blood pressure in patients with hypertension before and after the intervention of celery extract with P value $0.000 < 0.05$ (Hall et al., 2010; Hendraswari, 2008). The results of the research diastolic blood pressure in respondents with hypertension before and after being given the celery extract intervention was 3,583 mmHg so it can be concluded that there was a significant difference in the average decrease in diastolic blood pressure in patients with hypertension before and after being given the celery extract intervention with P value $0.007 < 0, 05$. These results are in line with research conducted that of the 6 case groups who were given celery stew all experienced a decrease in blood pressure, while in the control group of 6 people who were not given celery stew, only 1 person experienced a decrease so that it can be concluded that there was an effect of celery stew on the blood pressure of hypertensive patients (AL-Otaibi, 2021; Narolita & Darma, 2020).

Research by Latuconsina et al. (2019) of 25 people with hypertension who received celery intervention as many as 18 people (72%) who experienced a decrease in systolic blood pressure to a normal stage. Meanwhile, 21 people (84%). This shows that celery is effective in lowering high blood pressure. This is in accordance with research conducted by Muzakkar that there was a decrease in blood pressure after being given celery stew for three days. The same thing is also found in the results of research conducted by Irawati (2013), which shows that giving celery for three days can reduce blood pressure. Research conducted by Rahmawati & Lelyana (2010), showed that the difference in the decrease in systolic blood pressure ($p < 0.0001$) and diastolic blood pressure ($p = 0.035$) between the treatment and control groups. Furthermore, these results are also in accordance with research conducted by Sukmawati, 2011). That consumption of 16 stalks of celery for a week can reduce blood pressure 158/96 to 118 mmHg. Celery is one of the herbal plants that are useful in lowering blood pressure. Celery contains apigenin which plays a role in preventing constriction of blood vessels and high blood pressure. In addition, celery also contains pthalides and magnesium which are good for relaxing blood vessel muscles. Celery is known to contain active compounds that can lower blood pressure, namely apiin, which functions as a calcium antagonist to reduce the influx of calcium ions into the cells of the myocardium, cells in the heart and blood vessels. This effect will decrease contraction in the heart and stimulate vasodilating activity, interference with the constriction of smooth muscle of blood vessels. Mannitol acts as a diuretic. Celery contains a lot of apiin and diuretic substances that function to increase the amount of urine (Hajjar et al., 2007; Niederau et al., 1996).

Conclusion

It can be concluded that there was a significant difference in the average decrease in systolic and diastolic blood pressure in hypertension patients before and after the intervention of celery extract with systolic P value $0.000 < 0.05$ and diastolic P value $0.007 < 0, 05$. So that there is an effect of giving celery extract on reducing blood pressure in patients with hypertension in Sumur Putat Village, Cipocok Serang.

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