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Inhibitory Effect of Celery Extract (*Apium Gravolens Linn*) On Blood Pressure Reduction in Hypertension Elderly in Iman Clinic

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Abstract Hypertension is a cardiovascular disease which by definition is a condition where the systolic blood pressure is 130 mmHg or more and the diastolic blood pressure is more than 80mmHg. This disease is one of the risk factors for many diseases that exist in the world such as myocardial infarction, shock, kidney failure, and many more. Celery is a plant that can be used as medicine, its properties lower blood pressure**.** This study aims to analyze the effect of celery extract on lowering blood pressure in the elderly who have hypertension at the faith clinic. This study used an experimental study with pretest and posttest methods where the sample used was 36 samples which were divided into the experimental group and the control group. The sample is the elderly (> 55 years) who follow the chronic disease program at Iman Martubung Clinic. The results of this study indicate that the average decrease in blood pressure is 12.78 mmHg in systolic with an average systolic blood pressure of 141.6 mmHg pretest and posttest 128.8 mmHg, in diastolic there is an average decrease of 7.77 mmHg with the average diastolic blood pressure pretest was 82.7 mmHg and posttest was 75 mmHg in the experimental group, while in the control group there was a significant increase in blood pressure. These results are also supported by non-parametric statistical tests, with a significance value of p value < value with a significance level of = 0.005. The significance value based on the Wilcoxon statistical test was <0.001 on systolic blood pressure and <0.001 on diastolic blood pressure. There is an effect of celery extract (Apium gravolens Linn) on reducing blood pressure in the elderly at Iman clinic.

Keywords: Hypertension, Celery, Blood Pressure

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INTRODUCTION

Hypertension is a cardiovascular disease, which by definition is a condition where the systolic blood pressure is 130 mmHg or more and the diastolic blood pressure is more than 80 mmHg.[1] This disease is one of the risk factors for many diseases in the world, such as myocardial infarction, stock, kidney failure, and many more. The cause of this disease itself is divided into two, namely idiopathic for primary hypertension and secondary hypertension because other diseases that trigger it are called secondary hypertension. [2,3]

Hypertension is called the "silent killer" because this disease has no obvious symptoms. This disease often does not cause specific initial symptoms, but over time it will interfere with the function of the heart, even the worst events, namely stroke, heart attack, chronic heart failure, and other diseases.[4,5]

According to the World Health Organization (WHO) in 2019, the prevalence of hypertension worldwide was 22% of the total world population.[6] The Southeast Asia region itself has a 25% prevalence of hypertension, which is the 3rd largest after the East Mediterranean with 26% and followed by Africa with 27% in the first position. Indonesia itself has a prevalence of 34.11% of the total population, where the elderly aged 65-74 have a prevalence of 63.2%, which means 10 of the elderly, 6 of whom are hypertensive.

According to the 2018 Indonesian health profile, hypertension is the biggest disease problem in Indonesia. There are also risk factors for hypertension related to age, gender, environment, occupation, lifestyle, and education level.[5,6]

In terms of age, the elderly are the age group most affected by this disease, with a prevalence of 63.2% at the age of 65–74.[6] The elderly become a risk factor because of the degenerative process, so the stiffness of the blood vessels in the elderly causes obstacles and increases the blood pressure of the elderly. This is also exacerbated by the lack of compliance of the elderly in taking medication due to decreased cognitive function.[10,11] Treatment is the treatment of choice for the elderly in order to reduce the complications of this disease becoming more progressive.

Treatment of hypertension is done by two methods, namely pharmacological and non-pharmacological. Pharmacological treatment is treatment that is curative and rehabilitative and requires the patient to take medication regularly. Examples of drugs for hypertensive patients are ACE-inhibitors, ARBs, and beta-blockers. Non-pharmacological treatment is a type of treatment that is preventive and rehabilitative. One of the common treatments that people do is take herbal medicines such as celery (*Apium gravolens Linn*), garlic (*Allium sativum*), shallots or onions (*Allium cepa*), tomatoes (*Lyocopercison lycopersicum), and* watermelon (*Citrullus*

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vulgaris). In addition to being easy to obtain and process, herbal plants have fewer side effects compared to drugs prescribed by doctors, and, of course, the expected results are also proven to be good. [8,9]

Celery (*Apium gravolens Linn*) has a number of benefits, from the roots to the leaves. This plant has been studied to have benefits such as anti-cancer, hepatoprotective, anti-oxidant, anti-diabetic, anti-inflammatory, anti-microbial, analgesic, cardiotonic, and anti-hypertensive.[13]

Regarding how effective celery can lower blood pressure, many have proven that this plant is able to lower blood pressure for people with hypertension. Vergara et al. (2018) researched that dichloromethane and ethyl acetate from celery are calcium antagonists that can cause blood vessels to become Vaso relax. [14]

Research by Sohrabi, Farzaneh Niazmand, et al. (2021) on the benefits of celery as a vasodilator in the aorta on the endothelium, calcium, and potassium channel systems. It was stated that celery extract showed relaxation of the aorta so that it could reduce the damage caused by high blood pressure. [15]

METHOD

This type of research is quantitative research using an experimental design. The research design used was a non-equivalent control group design, namely research conducted with a pre-test in both groups, followed by intervention in the experimental group.

The flow of this research is that the group used by the research group (group experiment) was given a pre-test and then continued with the treatment/treatment, namely by giving celery extract after that was given a celery post-test. The control group was given a placebo and blood pressure measurements were taken after and before being given a placebo (pre-test-posttest). The study lasted for 30 days and was followed up.

The samples in this study amounted to 36 samples who were elderly Prolanis patients with hypertension at the Iman Clinic, Medan Labuhan Subdistrict, Medan City 2021, with criteria of age 60 years, blood pressure of 140/90 mmHg or who took hypertension medication, and had no history of allergies to celery.

Blood pressure measurements were taken by the co-assistant in a sitting position and made 2 measurements. Samples will be randomly assigned and divided into experimental and control groups, where the experimental group will be given celery extract and the control group will be given a placebo.

Data processing was carried out by statistical tests, either univariate or bivariate. The test is used to determine whether the distribution of the data is normal or not. The researcher uses the Shapiro-Wilk test because the data is <50. The data is found to have an abnormal distribution after the data normalization test is carried out with the

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Shapiro-Wilk test. The researcher then performs an analysis using the paired t-test, using the Wilcoxon and Mann-Withney alternative test.

RESULT

Table 1. Average Distribution by Age of Respondents

Age	Men	Woman	n	P value
55-65	3	8	11	
66-74	4	15	19	0.727
75-90	2	4	6	
Total	9	27	36	

Based on table 1, it is found that the number of respondents aged 55–65 is 11 people, with the number of men being 3 people and women being 8 people. Furthermore, those aged 66–74 totaled 19 people, with 4 men and 15 women. And the last one is aged 75-90, with a total of 6 people, 2 men and 4 women. The total number of samples was 36 people, with 9 males and 27 females. After statistical testing, it was obtained that a *P* value of 0.727 ($p > 0.005$), which means that there is no difference between the two groups, was obtained.

Table 2. Characteristics of Respondents by Gender

Group	Sex	n	(%)	P value
Experimental Group	Men	3	16.6%	0.157
	Women	15	83.3%	
Control Group	Men	6	33.3%	
	Women	12	66.6%	
Total		36	100%	

Based on table 2, the results obtained are 36 respondents, with the experimental group of 18 respondents consisting of 3 people (16.6%) men and 15 people (83.3%) women. while the control group consisted of 6 people (33.3%) men and 12 people (66.6%) women. After the statistical test was carried out, the p value was 0.157 ($p > 0.005$), which means that there was no difference between the two groups.

Table 3. Characteristics of Respondents Based on Respondent's Genetics

	Gene	n	(%)	P value
Experimental Group	Genetic	10	55.5%	0.83
	Non genetics	8	44.4%	
Control Group	Genetic	13	72.2%	
	Non genetics	5	27.7%	
Total		36	100%	

Based on table 3, the results obtained from the experimental group with genetic

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hypertension were 10 people (55.5%) respondents and not from genetics, 8 people (44.4%) respondents, while in the control group with genetic hypertension there were 13 people (72.2%) respondents and not from genetics, there were 5 people (27.7%) respondents. After the statistical test was carried out, the p value was 0.083 (p > 0.005), which means that there was no difference between the two groups.

Table 4. Characteristics of Respondents Based on the Use of Hypertension Drugs

Group	Hypertension Medication	n	(%)	P value
Experimental Group	ARB	6	61.1%	0.083
	CCB	4		
	Blocker	1		
	Not Taking Drugs	7	38.8%	
Control Group	ARB	5	77.7%	
	CCB	7		
	Blocker	2		
	Not Taking Drugs	4	22.2%	

Based on table 4, the results of the experimental group that took hypertension drugs were 11 (61.1%) people, while those who did not consume as many as 7 (38.8%) people. In the control group, there were 14 (77.7%) respondents who took hypertension drugs and 4 (22.2%) people who did not take hypertension drugs. After the statistical test was carried out, the p value was 0.083 (p > 0.005), which means that there was no difference between the two groups.

Table 5. Characteristics of Respondents Based on Blood Pressure

Variable	Systolic	P value	Diastolic	P value
Experimental Group	12.7	<0.001	7.7	<0.001
Control Group	-1.11		-1.66	

Based on table 5, which shows the average results of pre-test and post-test systolic and diastolic blood pressure in the two groups, The average decrease in systolic blood pressure from the experimental group was 12.7, while in the control group it was -1.11. The decrease in diastolic blood pressure from the experimental group was 7.7, while in the control group it was -1.66. Based on the average *P* value <0.001 in systolic and <0.001 in diastolic, meaning *P* <0.005, it was concluded that there was an effect of celery extract on lowering blood pressure.

DISCUSSION

In general, the older you get, the greater your risk of developing hypertension. Blood pressure will increase exponentially at the age of 40 years and increase even more at the age of 80 years. The Framingham Study said that the greatest risk of hypertension was in the 55-65 age group, with a greater risk of >90%. This is caused by changes in the structure of blood vessels such as narrowing of the lumen, and the walls of blood vessels become stiff and their elasticity decreases, thereby increasing blood pressure. [16]. This is

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in line with the results of this study, which showed that the average age of the respondents was 67.5 years.

There were more female respondents in this study than male respondents. From a total of 36 respondents in the study, 25 people (69.4%) were female and only 11 people (30.5%) were male. Based on the results of the study, it is stated that men have a greater risk of increasing blood pressure than women, but when they are over 60 years old, women have a greater risk than men. This happens because of the assumption that men have an unhealthy lifestyle when compared to women, but the prevalence of hypertension in women has increased after entering menopause. This is caused by the presence of hormones experienced by women who have menopause. [16]

Based on the results of the analysis in table 5. systolic blood pressure using the Wilcoxon test, after giving celery extract to the experimental group, it was found that the average decrease in systolic blood pressure was 12.7 mmHg with a p value of <0.001 (*P*<0.005). showed that there was an effect of celery extract on changes in systolic blood pressure in patients with hypertension. In the diastolic blood pressure in the experimental group after administration of celery extract, an average decrease of 7.77 mmHg with a p value of <0.001 (p<0.005) was obtained. This indicates that there is an effect of celery extract on changes in diastolic blood pressure in patients with diabetes and hypertension.

The results of this study are also supported by the results of research conducted by *Lebanese International University*, in Beirut, which conducted research under the title "*Antihypertensive Indigenous Lebanese Plants: Ethno pharmacology and a Clinical Trial* in 2019, conducted clinical trials on 22 samples to test the effects of various plants that are believed to be able to lower blood pressure, one of which is celery. Statistical data shows that the p value = 0.92 (p>0.005) in the normality test Kolmogorov–Smirnov, which means there is an effect of celery on lowering blood pressure. [17]

CONCLUSION

After conducting research on "The Effect of Celery Extract (*Apium gravolens Linn*) on Lowering Blood Pressure in Elderly Hypertension at Iman Clinic," it was concluded that there was an effect of celery extract on reducing blood pressure in the elderly at Iman Clinic.

REFERENCES

1. Arshad MI, Syed FJ. Essential Hypertension. In: *National Center for Biotechnology Information*. StatPearls Publishing; 2019:1-23.
2. Esh H, Agabiti E, France MA, et al. *2018 ESC / ESH Guidelines for the Management of Arterial Hypertension The Task Force for the Management of Arterial Hypertension of the European Society of Cardiology (ESC) and the European Society Of*.;

BULETIN FARMATERA
E-ISSN: 2528-410X

2018.
3. Rahman S, Anas M Al. Treatment of Adult Intussusception with Non-operative Management: A case report Shahrul. *Bul Farmatera*. 2021;6:2013-2015.
4. Hidayati L. TEKANAN DARAH PADA LANSIA DENGAN HIPERTENSI. *J Holist Tradit Med*. 2018;03:259-264.
5. Rahman S, Pradido R. The anxiety symptoms among chronic kidney disease patients who undergo hemodialysis therapy. *Int J Public Heal Sci*. 2020;9(4):281-285. 0
6. Shen Y, Chang C, Zhang J, Jiang Y, Ni B, Wang Y. Prevalence and risk factors associated with hypertension and prehypertension in a working population at high altitude in China: A cross-sectional study. *Environ Health Prev Med*. 2017;22(1).
7. Riskesdas. Laporan Nasional Riskesdas 2018. In: *Research*. Kemenkes RI; 2018:152-163.
8. Kemenkes RI. *Profil Kesehatan Indonesia 2018*. (Rudy Kurniawan, Yudianto, Boga Hardhana TS, ed.). Kementerian Kesehatan Republik Indonesia; 2018.
9. Kemenkes RI. Hipertensi Si Pembunuh Senyap. In: *Kementrian Kesehatan RI*. ; 2019:1-5.
10. Whelton PK, Carey RM, Aronow WS, et al. *2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults a Report of the American College of Cardiology/American Heart Association Task Force on Clinical Pr*. Vol 71.; 2018.
11. Rahman S, Rejeki AS. The Relationship Between The Level Of Knowledge And Attitude Of Type 2 Diabetes Mellitus Participants On Adherence With The Covid-19 Health Protocol. 2020;32(August):20086-20091.
12. Unger T, Borghi C, Charchar F, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension*. 2020;75(6):1334-1357.
13. Al-Asmari AK, Athar MT, Kadasah SG. An Updated Phytopharmacological Review on Medicinal Plant of Arab Region: Apium graveolens Linn. *Pharmacogn Rev*. 2017;11(21):13—18. https://europepmc.org/articles/PMC5414449
14. Jorge VG, Ángel JRL, Adrián TS, et al. Vasorelaxant activity of extracts obtained from Apium graveolens: Possible source for vasorelaxant molecules isolation with potential antihypertensive effect. *Asian Pac J Trop Biomed*. 2018;3(10):776-779.
15. Sohrabi F, Niazmand S, Mahmoudabady M, Javad M. The vasodilatory effect of Apium graveolens L (celery) seed in isolated rat aorta : The roles of endothelium , calcium and potassium channels. *Avicena J Phtomedicine*. 2021;11(1):44-53.
16. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. *Nat Rev Nephrol*. 2020;16(4):223-

E-ISSN: 2528-410X

237. doi:10.1038/s41581-019-0244-2
17. Samaha AA, Fawaz M, Salami A, Baydoun S, Eid AH. Antihypertensive indigenous lebanese plants: Ethnopharmacology and a clinical trial. *Biomolecules*. 2019;9(7):1-16.