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GIVING CELERY LEAF BOILED WATER TO LOWER BLOOD PRESSURE IN THE ELDERLY

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Abstract

As age increases, the risk of older adults experiencing hypertension increases. Hypertension in the elderly can cause various complications, such as stroke, kidney damage, heart disease, blindness, diabetes, and others. An alternative treatment for hypertension can use celery leaves. The apiin compound from celery leaves is a diuretic and can dilate blood vessels and lower blood pressure. This study aimed to analyze how giving celery leaf boiled water reduces blood pressure in older people. This type of research is quantitative, using a quasi-experimental design method with a non-equivalent control group design. The independent variable is celery leaf boiled water, and the dependent variable is blood pressure in older people. The population of this study was older people at the Posyandu Lansia Karanganyar, Sambungmacan, Sragen, in April 2023. The sampling technique used stratified random sampling, with 46 respondents divided into an intervention group of 23 people and a control group of 23. The intervention group was given celery leaf boiled water every morning 100 cc and evening 100 cc for 14 days. At the same time, the control group was given balanced nutritional health education. The research instrument consisted of a questionnaire on respondent characteristics, a tensimeter, and an observation sheet for measuring blood pressure. Data analysis was conducted using the Wilcoxon test to determine whether there was a difference in average total blood pressure before and after consuming celery leaf-boiled water. The results of the data analysis showed a p-value of the intervention group of 0.000 and a p-value of the control group of 0.145. This study concludes that giving celery leaf boiled water lowers blood pressure, and for older people with high blood pressure, consuming celery leaf boiled water as an alternative therapy to lower blood pressure is recommended.

I. INTRODUCTION

High blood pressure or hypertension has long been known to be an essential risk factor for heart disease and death. Ischemic heart disease is one of the top 5 causes of death worldwide, along with cerebrovascular accidents, lower respiratory tract infection, diarrheal disease, and perinatal morbidity. A study conducted by researchers at the Global Burden of Diseases found that hypertension is the leading cause of heart disease. This study also explains that hypertension is caused by obesity and an inactive lifestyle (Bromfield, 2023).

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An estimated 1.28 billion adults aged 30–79 worldwide have hypertension, the vast majority (two-thirds) of whom live in low- and middle-income countries. An estimated 46% of adults with hypertension are unaware that they have the condition. Less than half of adults (42%) with hypertension are diagnosed and treated. About 1 in 5 adults (21%) with hypertension have it under control. Hypertension is the leading cause of premature death worldwide. One of the global targets for non-communicable diseases is reducing hypertension prevalence by 33% between 2010 and 2030 (Dewi, 2022).

The prevalence of hypertension in Indonesia is very high namely 34.1 percent, or around 70 million Indonesians, suffer from it, based on a national survey in 2018. Based on the health profile of Central Java in 2019, the proportion of hypertension was 68.6%, with a prevalence rate of 8,070,378 beds or 30.4%. Meanwhile, in the Sragen Regency, hypertension increased from a prevalence of 14.5% in 2017 to 25.6% in 2020 (Dinkes Jateng, 2020).

Hypertension often occurs in the elderly, which is associated with the process of decreasing blood pressure. As age increases, the risk of someone experiencing hypertension increases. This happens because decreasing blood pressure causes blood clots and stiffness that cause high blood pressure or hypertension. Uncontrolled hypertension in the elderly can cause various serious complications such as stroke, kidney damage, heart disease, death, diabetes, and other dangerous diseases. The highest non-communicable disease among the elderly is hypertension disease, at 32.5% (Benetos, 2019).

Hypertension treatment can be given pharmacologically and non-pharmacologically. The non-pharmacological treatment uses herbal or traditional ingredients. WHO also supports efforts to improve the safety and efficacy of traditional medicine. This is because the side effects of using traditional medicine are relatively less compared to modern medicine. Non-pharmacological therapy is also called lifestyle modifications that include quitting smoking, reducing excess weight, avoiding alcohol, diet modifications, and those that include the psyche, including reducing stress, exercise, and rest (Fandinata, 2020).

One of the non-pharmacological treatments used to reduce high blood pressure is celery. In society, many still do not know about the content of celery, so many hypertensive patients prefer drugs as antihypertensives, even though celery itself is quite cheap and easy to get at a relatively affordable price (Isnainy, 2021).

The chemical cycle contains much apiin, a diuretic compound capable of causing blood flow. Celery has been widely used in society, and much research has been carried out regarding its pharmacological effects and ability to reduce high blood pressure. The apigenin content in celery has various functions as a blocker, which can slow heartbeats and reduce heart contractions' accuracy so that less blood flow is pumped and blood pressure is reduced. Mannitol and apiin have diuretic properties; that is, they help the kidneys remove excess fluid and salt from the bladder so that reducing fluid in the blood will reduce blood pressure (Simamora, 2021).

Elderly Posyandu is one of the Community-Based Health Efforts (UKBM), which is managed and organized together with the community, including the elderly, in the implementation of health development to empower the community and provide convenience in obtaining health services for the elderly to improve the health and healthy lives of the elderly. Based on data at the Samburngmacan Health Center at the Elderly Posyandu in Karanganyar Village in April 2023, 85 older adults had hypertension.

The study results at the Karanganyar Elderly Posyandu, Samburngmacan, Sragen in April 2023, interviews with six older women obtained data that five older adults often had pursued. After blood pressure measurements were carried out, systolic blood pressure was found to be more than 140 mmHg, and diastolic blood pressure was more than 90 mmHg or experiencing

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hypertension. Meanwhile, one older adult complained that there were no complaints regarding him, the results of his blood pressure examination were expected, and after being interviewed, it turned out that he diligently consumed celery root decoction, namely using eight stalks of celery root and boiling it with 400 ml of water for 10 minutes, then consuming 200 ml in the afternoon.

Based on the previous study above, the researcher is interested in conducting a study on the effect of giving boiled water to the elderly on blood pressure decline. The purpose of this study is to analyze the effect of giving boiled water to the elderly on blood pressure decline in the elderly at the Karanganyar Elderly Health Post, Samburnmacan, Sragen.

II. Research Methods

Analytical research design is a research design that tries to explore the health phenomena that occur. This type of research is a curative study using the Variable Variable Method with a Non-Variable Control Group Design. Variable variable variable research is a study that is used to find the effect of one treatment on another under controlled conditions (Asmadi, 2015). The intended research is to determine whether or not the treatment affects the subjects being studied. The way to find out is to compare one or more experimental groups that were given a treatment with one comparison group that was not given a treatment (Aspiani, 2015).

Data from the Samburngmacan Health Center at the Elderly Health Post in Karanganyar showed that in April 2023, 85 older adults had hypertension. The researcher then determined the number of samples using the Slovin rule, and the number of samples in this study was 46 people. This study began by explaining the study's course to the research subjects and requesting a letter of consent or informed consent to conduct the study. After the respondents consented, the random sampling technique continued the study sample grouping. The 46 older adults with hypertension were divided into two groups, namely, 23 people for the intervention or treatment group, given a 14-day cycle of serum therapy. The control group that was given balanced nutritional health education was 23 people.

The intervention group was given 100 cc of boiled water every morning and 100 cc of boiled water in the afternoon for 14 days. At the same time, the control group was given balanced nutritional health education. The research instruments comprised questionnaires, respondent characteristics, questionnaires, and observation sheets for measuring blood pressure. Data analysis was conducted to determine whether there was a difference in average total blood pressure between the group that consumed boiled water and the group that consumed boiled water using the Wilcoxon test. Meanwhile, data analysis is used to determine whether or not there is a difference in the average blood pressure value in the groups. Then, intervention is provided using the Mann-Whitney test.

III. Results and Discussion

Table 1. Respondent Characteristics

Characteristic	Group	f	%
Age	60-69 tahun	43	93,5
	70-79 tahun	3	6,5
Gender	Laki-laki	7	15,2
	Perempuan	39	84,8
Education	Tidak sekolah	9	19.6
	Dasar (SD, SMP)	32	69.6
	Menengah (SMA, SMK)	5	10.9
Occupation	IRT	17	37.0
	Petani	25	54.3
	Pensiunan	4	8.7
Taking Hypertension	Ya	26	56.5
Medication	Tidak	20	43.5

A. Characteristics Based on Age

The grouping of older adults at Posyandu Lansia Karanganyar, Samburngmacan, and

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Sragen based on age is intended to determine the level of older adults's age. The number of older adults obtained is 46. The older adults who have been grouped will be grouped into two groups, namely 60-69 years and 70-79 years.

Table 1 shows the data obtained from 46 respondents, with the largest age group being 60-69 years old, with a total of 43 people and a participation rate of 93.5%. The previous study by Adam (2019) showed that the proportion of hypertension in the 60-74 age group was compared to the 75-90 age group. The statistical test results using the chi-square test obtained a p-value of 0.0316, meaning there is a significant relationship between age and the incidence of hypertension. This is also by Hidayat research (2021), which shows respondents who suffer from grade 2 hypertension in the age groups 46-55 years and 55-65 years. The results of the Chi-Square statistical test obtained the Fisher's Exact Test value, namely $p = 0.003$ and $\alpha = 0.05$, so it is stated that there is a significant relationship between age and the degree of hypertension.

B. Characteristics Based on Gender

Grouping of the elderly based on gender is intended to know the gender of the elderly. The number of elderly obtained is 46, and those classified will be grouped into male and female groups.

Table 1 shows the data obtained from 46 respondents, with the largest gender group being women, with 39 people and a participation rate of 84.8%. The previous study conducted by Rahayu (2021) found that women are more likely to suffer from hypertension compared to men. Women who have experienced menopause are more likely to experience increased blood pressure, namely at the age of more than 45 years. In line with the research, women tend to be at risk of hypertension because they experience a decrease in the function of the estrogen hormone, which should be a protector of blood circulation. Women tend to experience the risk of hypertension because women will experience an increased risk of high blood pressure and then menopause (Susanty, 2022).

C. Characteristics Based on Education

Grouping of the elderly based on education is intended to know the education of the elderly. The number of elderly obtained is 46. The elderly who have been classified will be grouped into three categories: unschooled, elementary (elementary school, junior high school), and middle (high school, vocational school).

Table 1. shows the amount of data obtained from 46 respondents, with the most significant education group being Elementary Education (S.D., SMP), totaling 32 people with a participation rate of 69.6%. According to Notoatmodjo (2016), the level of individual knowledge affects awareness of behaviors that prevent hypertension, trigger factors, signs and symptoms, and normal and abnormal blood pressure; then, individuals will tend to avoid things such as smoking, drinking coffee, and obesity. In line with Mursakkar (2021), the higher a person's education, the easier it is for them to receive information and, ultimately, the more knowledge they have. Conversely, low education increases the possibility of someone experiencing hypertension, which is caused by a lack of information or knowledge that causes unhealthy behavior and lifestyles, such as not knowing about danger and preventing hypertension.

D. Characteristics Based on Occupation

The grouping of elderly people based on occupation is intended to determine their occupation. The number of older adults obtained is 46. The elderly who have been classified will be grouped into 3, namely IRT, Farmers, and Retirement.

Table 1 shows the data obtained from 46 respondents, with the largest occupation group being farmers, totaling 25 people, with a participation of 54.3%. The previous study conducted by Anuhgera (2020) showed that there was a significant relationship between work and increased blood pressure. The study stated that most respondents had a work status as housewives because housework is one of the causes of reduced

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physical activity and stress. Homemakers tend to have less physical activity. According to Mauldin (2019), the Chi-Squarer test results indicate a significant relationship between work and the occurrence of hypertension (p-value 0.001). The results of the Prevalence Ratio calculation indicate that respondents who work are 1.830 times less likely to experience hypertension than those who do not.

E. Characteristics Based on Taking Hypertension Medication

Grouping of the elderly based on hypertension medication taken by the elderly is based on knowing the anti-hypertension medication taken by the elderly. The elderly are grouped into two groups, namely, Yes and No.

Table 1. shows the amount of data obtained from 46 respondents, with the largest group consuming antihypertensive drugs, totaling 26 people with a participation rate of 56.5%. Drug provision is considered appropriate if the type of drug chosen is based on consideration of the benefits and risks of the treatment. The evaluation of the use of antihypertensive drugs is assessed based on the appropriateness of the selection of the type of drug by considering the diagnosis written in the medical record and compared to the standards used (Tuloli, 2021). The purpose of drug use is always to consider the benefits and risks. The safety of using antihypertensive drugs needs to be considered. You are minimizing the risk of treatment by minimizing the problem of drug administration insecurity. The aim is to improve patients' quality of life with minimal risk. The safety mechanism is in the form of monitoring drugs' effectiveness and side effects. (Adam, 2019).

F. The Effect of Celery Leaf Boiled Water on Elderly Blood Pressure

Table 2. Blood Pressure Intervention Group

Blood Pressure	Category	f	%
Sistole before intervention	Normal tinggi	0	0,0
	Ringan	12	52,2
	Sedang	11	47,8
Sistole after intervention	Normal tinggi	17	73,9
	Ringan	6	26,1
	Sedang	0	0,0
	Berat	0	0,0
Diastole before intervention	Normal tinggi	1	4,3
	Ringan	14	60.9
	Sedang	5	21,7
	Berat	3	13,0
Diastole after intervention	Normal tinggi	17	73,9
	Ringan	6	26,1
	Sedang	0	0,0
	Berat	0	0,0

Table 3. Wilcoxon Test Intervention Group

	Sistole	Diastole
p-value	0,000	0,000

Table 2. shows blood pressure in the elderly before and after the intervention of giving celery leaf boiled water. The data processing results using the Wilcoxon test in Table 3 suggest a p-value of 0.000 (<α 0.05) for systolic and diastolic blood pressure. This suggests a significant difference between systolic and diastolic blood pressure on cervical and intervention examinations. So, it was concluded that there was an influence on the blood pressure of the elderly in the elderly. One of the alternative therapies used to reduce high blood pressure is celery. Celery leaves contain a lot of apiin, a compound that has diuretic properties and is thought to be able to widen blood vessels (Simamora, 2021). Celery leaves contain Apigenin, which can prevent blood vessel constriction, and Phthalides, which can relax arterial muscles or blood vessels. These substances regulate blood flow. Blood so that it allows blood circulation to increase and reduces blood pressure (Wang, 2019).

Table 4. Blood Pressure Control Group

Blood Pressure	Category	f	%
Sistole before intervention	Normal tinggi	0	0,0
	Ringan	3	13,0
	Sedang	20	87,0
	Berat	0	0,0
Sistole after intervention	Normal tinggi	0	0,0
	Ringan	3	13,0
	Sedang	20	87,0
	Berat	0	0,0
Diastole before	Normal tinggi	0	0,0
	Ringan	17	73,9

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Blood Pressure	Category	f	%
intervention	Sedang	4	17,4
	Berat	2	8,7
Diastole after intervention	Normal tinggi	1	4,3
	Ringan	18	78,3
	Sedang	4	17,4
	Berat	0	0,0

Table 5. Wilcoxon Test Control Group

	Sistole	Diastole
p-value	0,01	0,145

Table 4. shows blood pressure in the elderly after and after the intervention of balanced nutrition duration. The data processing results using the Wilcoxon test in Table 5., show a p-value of 0.01 for systolic and a p-value of 0.145 for diastolic. This shows no significant difference between diastolic blood pressure in the examination before and after intervention. So, it is concluded that balanced nutrition duration has no effect on blood pressure in the elderly. In theory, health education is a set of activities that provide and improve community knowledge, attitudes, and practices in maintaining and improving health (Notoatmodjo, 2016). In line with Hidayat's (2021) research on the elderly, the health education results showed a p-value of 0.008, meaning that there was an increase in knowledge, attitudes, and behavior of the elderly after being given counseling about hypertension.

Table 6. Mann-Whitney Test Blood Pressure

Difference between Mean of Intervention and Control Groups	Sistole	Diastole
p-value	0,000	0,000

Table 6. shows the results of the Mann-Whitney blood pressure test in the elderly after the intervention of systolic p value 0.000 and diastolic p value 0.000. So, it can be concluded that intervention puts pressure on the elderly. The decrease in the average value of blood pressure in the elderly in the intervention group was higher than in the control group, thus proving that the administration of boiled water is more effective in reducing blood pressure in the elderly.

The general mechanism of celery plants in controlling blood pressure includes providing a dilating effect on blood vessels and inhibiting angiotensin-converting enzyme (ACE). Inhibition of the renin-angiotensin system can reduce the kidneys' ability to increase blood pressure (Das, 2020). Celery has a good effect on reducing high blood pressure in people with hypertension. Blood pressure began to decrease daily after treatment, followed by improved sensations such as comfortable sleep and increased urine output, which can reduce blood pressure (Al Aboody, 2021).

In this study, the material used was fresh celery leaves. The amount of active substance content in 100 ccs of celery water infusion was less accurate, so further research can provide celery water infusion by looking at the amount of active substance content in it. The instrument used in measuring blood pressure uses a thermometer that must be calibrated periodically, affecting the instrument's accuracy in measuring blood pressure. The place of this study is only one location, the Karanganyar Elderly Posyandu, Samburngmacan, and Sragen, so the generalization is minimal. Further research could increase the number of research sites in several regions.

IV. CONCLUSION

Celery leaf boiled water lowers blood pressure in the elderly. For those with high blood pressure, it is recommended that they consume celery leaf boiled water as an alternative therapy. Further research can increase the number of research locations in several regions to generalize research results.

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REFERENCE

Adam, L. (2019). Determinan Hipertensi Pada Lanjut Usia. *Jambura Health and Sport Journal. 1 (2), Agustus 2019.*

Al Aboody, M.S. (2021). Cytotoxic, antioxidant, and antimicrobial activities of Celery (Apium et al.). *Bioinformation. 17 (1), 147–156.* https://doi.org/DOI:10.6026/97320630017147

Anuhgera, D.E., & et al. (2020). Pengaruh Pemberian Rebusan Daun Seledri (Apium Graveolens L) Terhadap Tekanan Darah Pada Wanita Menopause Dengan Hipertensi. *Jurnal Kebidanan Kestra (JKK), 3(1), 67–74.* https://doi.org/10.35451/jkk.v3i1.502

Asmadi, S. (2015). *Konsep Dasar Keperawatan.* Jakarta: EGC.

Aspiani, R.Y. (2015). *Buku Ajar Asuhan Keperawatan Klien Gangguan Kardiovaskular Aplikasi NIC & NOC.* Jakarta: EGC.

Benetos, A., Petrovic, M., & Strandberg, T. (2019). Manajemen hipertensi pada penderita yang lebih tua dan lemah. *Penelitian sirkulasi, 124 (7), 1045- 1060.*

Bromfield, S., & et al. (2023). The association between hypetensive disorders duing pregnancy and matenal and neonatal outcomes: a retrospective claims analysis. *BMC Pregnancy and Childbirth. 23 (1),* 514.

Das, A.K., & et al. (2020). Review on tannins: extraction processes, applications, and possibilities. *South African Journal of Botany, 135, 58–70.* https://doi.org/10.1016/j.sajb.2020.08.008

Dewi R.M. (2022). Perbedaan Efektivitas Pemberian Air Rebusan Daun Alpukat Dan Daun Seledri Terhadap Penurunan Tekanan Darah Pada Lansia Hipertensi. *Health Sciences Journal. 6 (1), 17–24.*

Dinkes Jateng. (2020). Profil Kesehatan Provinsi Jateng Tahun 2019. *Dinas Kesehatan Provinsi Jawa Tengah.*

Fandinata, S., & Ernawati, I. (2020). *Manajemen terapi pada penyakit degeneratif (diabetes mellitus dan hipertensi): mengenal, mencegah dan mengatasi penyakit degeneratif (diabates mellitus dan hipertensi).* Gresik: Penerbit Graniti.

Hidayat. (2021). Pengaruh Pendidikan Kesehatan Hipertensi Dan Senam Hipertensi Terhadap Tekanan Darah Pada Lansia Di Desa Jenggawah Dan Ajung Kabupaten Jember. *Jurnal Penelitian Ipteks, 6 (1), Januari 2021.*

Isnainy, U.C.A.S., Wahyuni, M.S., & Hermawan, D. (2021). Pemberian Rebusan Daun Seledri Untuk Menurunkantekanan Darah Pada Klien Hipertensi Di Kecamatan Sekampung Mudikdesa Brawijaya. *Jurnal Kreativitas Pengabdian Kepada Masyarakat, 4 (4), 814-818.*

Musakkar, & Djafar, T. (2021). *Promosi Kesehatan: Penyebab Terjadinya. Hipertensi.* Jakarta: CV. Pena Persada.

Notoatmodjo, S. (2016). *Promosi Kesehatan dan Perilaku Kesehatan*. Jakarta: P.T. Rineka Cipta.

Rahayu, & et al. (2021). Hubungan Tingkat Pengetahuan Dengan Kepatuhan Pasien Hipertensi Di Rumah Sakit Anwar Medika Sidoarjo, *JIF Farmasyifa, 4 (1), 87-97.*

Simamora, & et al. (2021). Pengaruh Pemberian Air Rebusan Seledri Terhadap Penurunan Tekanan Darah Pada Lansia Penderita Hipertensi Di Kelurahan Huta Tonga. *Jurnal Kesehatan Ilmiah Indonesia, 6 (2), Desember 2021.*

Susanty, S., Sukurni, S., & Siagian H.J. (2022). Analisis Bibliometrik Penelitian Pengobatan Herbal Penderita Hipertensi di Indonesia Menggunakan VOS-Viewer. *Jurnal Keperawatan Silampari, 5 (2), 764–71.*

Tuloli, T.S., & et al. (2021). Pola Penggunaan Obat Antihipertensi Pada

pISSN 2540-7511, eISSN 2540-7546

Pasien Hipertensi. *Indonesian Journal of Pharmacetical Education. 1 (3), 127-135.*

Wang M., & et al. (2019). A Review on Flavonoid Apigenin: Dietary Intake, ADME, Antimicrobial Effects, and Inteactions with Human Gut Microbiota. *BioMed Research International, 2019 (1), Article ID 7010467, 18 pages*. https://doi.org/10.1155/2019/7010467