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The Effect of Cucumber Infused Water on Blood Pressure among Pre-Elderly Individuals with Hypertension in the Working Area of Babakan Sari Community Health Center, Bandung City

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Abstract. The World Health Organization reports that approximately 1.13 billion people worldwide are living with hypertension, meaning that one in three individuals globally is diagnosed with this condition. In 2022, the number of people with hypertension in Bandung reached 706,051 cases. Hypertension management can be carried out through various non-pharmacological therapies, including bay leaf decoction, celery juice, ginger decoction, date infused water, lemon and watermelon infused water, and cucumber infused water. Cucumber infused water contains high levels of magnesium, calcium, potassium, and flavonoids, which may help reduce blood pressure. This study aimed to determine the effect of cucumber infused water on blood pressure among patients with hypertension at Babakan Sari Community Health Center. The study employed a pre-experimental (quasi-experimental) design using a one-group pretest–posttest approach. A total of 36 participants were included. The analysis showed a significant reduction in blood pressure after the administration of cucumber infused water, with a p-value less than $\alpha = 0.05$. A significant difference was observed in systolic blood pressure before and after the intervention ($Z = -5.324$, $p = 0.000$), as well as in diastolic blood pressure ($Z = -5.362$, $p = 0.001$). These results indicate that cucumber infused water has a significant effect on lowering blood pressure among pre-elderly patients with hypertension at Babakan Sari Community Health Center. This intervention is expected to be applied in daily life as an alternative non-pharmacological approach for hypertension management.

Keywords: Hypertension, Cucumber Infused Water, Blood Pressure, Pre-Elderly, Non-Pharmacological Therapy

1. INTRODUCTION

The World Health Organization (WHO, 2021) states that hypertension, or high blood pressure, is a serious medical condition that significantly increases the risk of heart, brain, kidney, and other diseases. In 2021, it was estimated that 1.28 billion adults aged 30–79 years worldwide were living with hypertension, with the majority (approximately two-thirds) residing in low- and middle-income countries. Furthermore, WHO data (2022) indicate that around 1.13 billion people globally suffer from hypertension, meaning that one in three individuals worldwide is diagnosed with this condition. In Indonesia, data from the 2018 Basic Health Research (Riskesdas) show that hypertension prevalence occurs across age groups, including 31–44 years (31.6%), 45–54 years (45.3%), and 55–64 years (55.2%). Uncontrolled hypertension may lead to serious complications such as heart disease, stroke, kidney disease, retinopathy, peripheral vascular disease, and neurological disorders, which significantly affect survival, particularly due to damage to major organs such as the heart, brain, and kidneys (Suratri, 2020).

The 2018 Riskesdas reported that 34.1% of Indonesians aged over 18 years suffer from hypertension. The highest prevalence was found in South Kalimantan Province (44.1%), while the lowest was in Papua (22.2%). According to the Ministry of Health of the Republic of Indonesia (2021), the national prevalence of hypertension increased from 25.8% in 2013 to 34.1% in 2018. In West Java Province, hypertension prevalence rose from 34.5% to 39.6% based on Riskesdas 2018 data (West Java Provincial Health Office, 2020). Hypertension is often referred to as the *silent killer* because most sufferers experience no noticeable symptoms and are unaware of their condition (Simbolon, 2020). Mortality data from the National Institute of Health Research and Development revealed that stroke and ischemic heart disease were the leading causes of death among older adults aged 55–64 years and ≥65 years (Ministry of Health RI, 2018; Pebrianti & Anggraini, 2023).

Hypertension can be prevented by identifying individual risk factors, which are classified into non-modifiable factors (genetics and age) and modifiable factors (obesity, lack of physical activity, stress, smoking, oral contraceptive use, and unhealthy dietary patterns such as excessive salt, caffeine, fatty foods, and alcohol consumption) (Septiyawati et al., 2021). However, public awareness of these risk factors remains low, highlighting the need for basic health education to prevent hypertension and its complications (Ainni et al., 2023).

According to WHO, middle age is defined as 45–59 years, a period commonly referred to as the pre-elderly stage, during which individuals are more vulnerable to physical and mental health problems. The Indonesian Ministry of Health (2013) classifies older adults into several categories, including pre-elderly (45–59 years), elderly (≥60 years), high-risk elderly, potentially active elderly, and dependent elderly.

While antihypertensive medications are widely recognized for their effectiveness, concerns related to side effects, long-term use, and economic burden have led many people to seek herbal and natural therapies as alternative approaches for managing hypertension (Elliya et al., 2016). One such approach is infused water, also known as spa water, which consists of water infused with fruits or vegetables and has been recommended as part of the DASH diet for patients with hypertension (Katimenta et al., 2018, cited in Astuti et al., 2021).

Hypertension management can be conducted through both pharmacological and non-pharmacological approaches. Non-pharmacological complementary therapies include ginger decoction, bay leaf decoction, celery juice, lemongrass decoction, basil infusion, cardamom, cinnamon, and cucumber infused water. As an alternative non-pharmacological therapy, cucumber (*Cucumis sativus Linn.*) is considered effective due to its beneficial nutritional content, including potassium, calcium, and magnesium. Moreover, cucumbers are affordable,

widely available, and economically feasible compared to pharmacological treatments (Kharisna et al., 2012, cited in Maulidah et al., 2022). Compared to lemon and date infused water, cucumber infused water offers similar nutritional benefits but is safer for patients with a history of gastric acid disorders.

Infused water is a beverage made by infusing water with fruits, vegetables, or herbs, allowing natural flavors, nutrients, and bioactive compounds to dissolve into the water without added sugar or chemicals. It serves as a refreshing, low-calorie beverage that promotes hydration and supports a healthy lifestyle (Setyowati et al., 2023, cited in Nutrisia et al., 2023). Cucumbers are rich in water and electrolytes, which help maintain normal blood pressure. Their high water content supports fluid balance, while potassium plays a role in blood pressure regulation (Marvia et al., 2020). Additionally, magnesium in cucumber infused water facilitates blood flow, and dietary fiber contributes to blood pressure reduction (Alina, 2020). Potassium also helps reduce angiotensin II levels, leading to decreased antidiuretic hormone (ADH) secretion, increased urine output, reduced sodium concentration in the blood, and ultimately lower blood pressure (Katimenta et al., 2018; Pebrianti & Anggraini, 2023).

A preliminary study conducted at Babakan Sari Community Health Center revealed 5,151 cases of hypertension, ranking it as the highest among health centers in the area, followed by Babakan Surabaya Health Center. Current interventions at Babakan Sari Health Center are limited to health education through the CERDIK program. Therefore, this study aims to examine the effect of cucumber infused water on blood pressure among patients with hypertension at Babakan Sari Community Health Center.

2. METHODE

This study employed a quantitative approach with a pre-experimental design using a quasi-experimental one-group pretest–posttest design to examine the effect of cucumber infused water on blood pressure reduction among pre-elderly individuals with hypertension. The study was conducted from May to June 2024 at Babakan Sari Primary Health Center, Kiaracondong District, Bandung City. The study population consisted of all pre-elderly patients with hypertension in the service area, totaling 57 individuals, of whom 36 respondents were selected as the sample using the Slovin formula with a 10% margin of error and purposive sampling technique. Inclusion criteria were pre-elderly individuals aged 45–59 years with compos mentis consciousness, willingness to participate, and not currently undergoing antihypertensive medication, while exclusion criteria included communication disorders, a history of severe heart disease (such as stent placement or bypass surgery), and severe

complications including stroke, chronic heart failure, renal failure, and diabetes mellitus. The independent variable was the administration of cucumber infused water, and the dependent variable was the reduction in blood pressure. The intervention consisted of cucumber infused water prepared from 5–10 cucumber slices with a thickness of approximately ±0.5 cm soaked in 250 ml of drinking water and administered once daily in the morning (07:00–08:00). Blood pressure measurements were taken before and after the intervention using a calibrated sphygmomanometer and stethoscope. Data collection began with an explanation of the study objectives, benefits, and procedures to the respondents, followed by the signing of informed consent, with implementation assisted by trained research assistants. The collected data were processed through editing, coding, tabulating, and cleaning stages and analyzed using SPSS software. Data analysis included univariate analysis to describe respondent characteristics and blood pressure values, as well as bivariate analysis to assess the effect of the intervention. Data normality was tested using the Shapiro–Wilk test; a paired t-test was applied for normally distributed data, while the Wilcoxon test was used for non-normally distributed data, with a significance level set at $\alpha = 0.05$

3. RESULT AND DISCUSSION

a. Result

1) Distribution of Respondents' Blood Pressure Before the Administration of Cucumber Infused Water

The pretest data on the administration of cucumber infused water and its effect on reducing high blood pressure among patients with hypertension are presented in Table 1 below.

Table 1. Descriptive Statistics of Respondents' Blood Pressure Before the Administration of Cucumber Infused Water

Variable	Systolic	Diastolic
N	36	36
Minimum	130	70
Maximum	160	100
Mean	146.13	90.91

Based on Table 1, it can be seen that the mean systolic blood pressure before the administration of cucumber infused water was 146.13 mmHg, with a median value of 140.00 mmHg. The mean diastolic blood pressure before the intervention was 90.91 mmHg, with a median of 90.00 mmHg. The maximum systolic blood pressure prior to

the administration of cucumber infused water was 160 mmHg, while the minimum was 130 mmHg. Meanwhile, the maximum diastolic blood pressure was 100 mmHg, and the minimum was 70 mmHg.

2) Distribution of Respondents' Blood Pressure After the Administration of Cucumber Infused Water

The posttest data on the administration of cucumber infused water and its effect on reducing high blood pressure among patients with hypertension are presented in Table 2 below.

Table 2. Descriptive Statistics of Respondents' Blood Pressure After the Administration of Cucumber Infused Water

Variable	Systolic	Diastolic
N	36	36
Minimum	120	60
Maximum	160	90
Mean	134,17	80,69

Based on Table 2, the mean systolic blood pressure after the administration of cucumber infused water was 134.17 mmHg, with a median value of 130.00 mmHg. The mean diastolic blood pressure was 80.69 mmHg, with a median of 80.00 mmHg. The maximum systolic blood pressure recorded after the intervention was 160 mmHg, while the minimum was 120 mmHg. For diastolic blood pressure, the maximum value was 90 mmHg and the minimum value was 60 mmHg.

3) Wilcoxon Signed-Rank Non-Parametric Test

After it was determined that the data did not follow a normal distribution based on the normality test results, hypothesis testing was continued using the non-parametric Wilcoxon signed-rank test. This test was employed to determine whether there was an effect of cucumber infused water administration on the reduction of blood pressure among pre-elderly individuals with hypertension. The results of the Wilcoxon signed-rank non-parametric test before and after the intervention are presented in Table 3.

Table 3. Results of the Wilcoxon Signed-Rank Non-Parametric Test Before and After the Intervention

Group	Z	p-value
Pretest–Posttest Systolic Blood Pressure (Cucumber Infused Water)	−5.324[b]	0.000

Pretest–Posttest Diastolic Blood Pressure (Cucumber Infused Water)	−3.362[b]	0.001

Based on Table 3, the significance values are less than α = 0.05, indicating statistically significant differences. This is evidenced by a significant reduction in systolic blood pressure before and after the administration of cucumber infused water (Z = −5.324[b]; p-value = 0.000). Similarly, a significant difference was observed in diastolic blood pressure before and after the intervention (Z = −3.362[b]; p-value = 0.001). Since the obtained significance values are smaller than α, the null hypothesis (H_0) is rejected. These results indicate that the administration of cucumber infused water has a significant effect on reducing blood pressure among pre-elderly individuals with hypertension in the working area of Babakan Sari Public Health Center, as determined using the non-parametric Wilcoxon signed-rank test

b. Discussion

Based on the results of the study and blood pressure measurements conducted over one week among 36 respondents who received cucumber infused water, a reduction in both systolic and diastolic blood pressure was observed. The mean systolic blood pressure after the intervention was 134.17 mmHg, while the mean diastolic blood pressure was 80.69 mmHg. This reduction is presumed to be associated with the bioactive components contained in cucumbers, such as magnesium, potassium, calcium, vitamin C, and flavonoids, which are known to contribute to blood pressure regulation.

According to Alina (2020) cited in Heriyanti et al. (2023), magnesium plays an important role in improving blood circulation, thereby contributing to the reduction of blood pressure. Magnesium helps lower high blood pressure by binding sodium in the body and facilitating its excretion through urine. In addition, the potassium content in cucumber infused water is beneficial in reducing levels of angiotensin II, which subsequently decreases antidiuretic hormone (ADH) levels. When ADH levels decrease, the kidneys increase urine secretion, leading to a shift of extracellular fluid, particularly sodium, into the intracellular compartment. This process reduces sodium concentration in the blood and ultimately lowers blood pressure (Pebrianti & Anggraini, 2023).

Vitamin C, another important component of cucumber, acts as an antioxidant that can reduce blood pressure by approximately 5 mmHg through its role in repairing arterial damage caused by hypertension. Vitamin C helps maintain normal blood pressure by enhancing the excretion of lead from the body, and its removal contributes to blood

pressure reduction. Furthermore, vitamin C supports the restoration of vascular elasticity, which is essential for maintaining optimal blood flow.

Cucumbers also contain flavonoids, which according to Ellwood et al. (2019), play a role in preventing degenerative diseases and supporting lipid metabolism. One of the beneficial flavonoids found in cucumbers is quercetin, which functions as an antioxidant by donating hydrogen ions to stabilize peroxide free radicals. This mechanism inhibits the oxidation of low-density lipoprotein (LDL) cholesterol, preventing blood thickening and lipid deposition on arterial walls.

Additionally, cucumbers exhibit diuretic properties due to their high water content, which further contributes to lowering blood pressure. The presence of phosphorus, folic acid, and vitamin C in cucumbers has also been reported to help relieve tension and stress (Wijaya, 2000, cited in Ivana et al., 2021). These findings indicate that despite the presence of hypertension, blood pressure can be effectively reduced through non-pharmacological therapy such as cucumber infused water, which contains various nutrients that support blood pressure normalization.

Based on the researcher's analysis, the observed decrease in blood pressure before and after the administration of cucumber infused water for seven consecutive days among 36 respondents can be attributed to the nutritional content of cucumbers, including calcium, potassium, magnesium, vitamin C, and flavonoids. These compounds are believed to function as angiotensin-converting enzyme (ACE) inhibitors, preventing vasoconstriction of arterial walls, thereby maintaining smooth blood flow and reducing blood pressure. Therefore, this study provides evidence that cucumber infused water has a significant effect in lowering blood pressure among pre-elderly individuals with hypertension

4. CONCLUSION

Based on the results of the study examining the effect of cucumber infused water on pre-elderly individuals with hypertension in the working area of Babakan Sari Public Health Center, Bandung City, it can be concluded that the mean blood pressure before the intervention showed systolic and diastolic values of 146.13 mmHg and 90.91 mmHg, respectively. After the administration of cucumber infused water, a reduction in blood pressure was observed, with the mean systolic pressure decreasing to 134.17 mmHg and the mean diastolic pressure to 80.68 mmHg. Statistical analysis revealed a p-value of 0.000 ($p < 0.05$), indicating a significant effect

of cucumber infused water on reducing blood pressure among pre-elderly individuals with hypertension in the working area of Babakan Sari Public Health Center, Bandung City

REFERENCES

Ainni, A. N., Azizah, N., & Raharjo, R. B. (2023). Peningkatan pengetahuan tentang hipertensi dan alternatif pengobatan herbal dengan infused water mentimun. *Pengabdian dan Bakti, 4*(2), 121–127.

Astuti, A. P., Damayanti, D., & Ngadiarti, I. (2021). Penerapan anjuran diet DASH dibandingkan diet rendah garam berdasarkan konseling gizi terhadap penurunan tekanan darah pada pasien hipertensi di Puskesmas Larangan Utara. *Gizi Indonesia, 44*(1), 109–120. https://doi.org/10.36457/gizindo.v44i1.559

City, B. (2023). Stress affects quality of life in hypertension patients. *Jurnal Keperawatan Ilmiah Fakultas Nursing, 3*(1), 17–25. https://doi.org/10.34011/jkifn.v3i1.1352

Darah, T., Ibu, P., & Dengan, H. (2023). Faktor yang berhubungan dengan tekanan darah pada ibu dengan hipertensi. *Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal, 13*, 981–990.

Febriani, D. A., Darmawati, A., & Program Studi Agroekoteknologi. (2021). Pengaruh kandang ayam terhadap pertumbuhan dan produksi mentimun (*Cucumis sativus* L.). *Jurnal Ilmiah Pertanian, 21*(1), 1–10.

Iqbal, M. F., & Handayani, S. (2022). Terapi nonfarmakologi pada hipertensi. *Jurnal Keperawatan, 6*(1), 1–8.

Ivakdalam, L. M. (2019). Pengaruh rendaman jeruk nipis (*Citrus aurantifolia*) terhadap kandungan vitamin C dan pH minuman infused water. *Jurnal Gizi dan Pangan, 12*(2), 344–349.

Kamarudin, A. P., Susanti, Z., Harahap, V. S., Yuniara, R., & Putih, U. G. (2023). Pelatihan pembuatan infused water sebagai upaya mengatasi dehidrasi dan detoksifikasi tubuh. *Jurnal Pengabdian Masyarakat, 3*(2), 193–206.

Maulidah, K., Neni, N., & Maywati, S. (2022). Hubungan pengetahuan, sikap, dan dukungan keluarga dengan upaya pengendalian hipertensi pada lansia di wilayah kerja Puskesmas Cikampek Kabupaten Karawang. *Jurnal Kesehatan Komunitas Indonesia, 18*(2), 484–494. https://doi.org/10.37058/jkki.v18i2.5613

Nutrisia, J., Jamil, M. D., Lestari, P. A., & Kurniawati, Y. (2023). Infused water kurma dan mentimun sebagai minuman alternatif penurun tekanan darah. *Jurnal Nutrisi, 25*(1), 45–52. https://doi.org/10.29238/jnutri.v25i1.278

Pebrianti, U., & Anggraini, N. (2023). Efektivitas infused water mentimun terhadap penurunan tekanan darah pada lansia hipertensi di Desa Urug Kecamatan Sukajaya Kabupaten Bogor.

Jurnal Ilmu Kesehatan Bhakti Husada, 14(2), 412–417. https://doi.org/10.34305/jikbh.v14i02.819

Putri, S. B., & Anggreini, Y. D. (2021). Studi kasus pemberian infused water mentimun pada klien hipertensi dengan nyeri akut di wilayah Tanjung Hulu Pontianak Timur. *Jurnal Mahasiswa Keperawatan, 1*(1), 7–17.

Rahayu, S. M., Hayati, N. I., & Asih, S. L. (2018). Pengaruh teknik relaksasi otot progresif terhadap tekanan darah lansia dengan hipertensi. *Jurnal Keperawatan, 3*(1), 91–98.

Rahayu, S. S., Aulya, Y., & Widiowati, R. (2022). Pengaruh kombinasi jus belimbing wuluh dan mentimun terhadap penurunan tekanan darah pada wanita dewasa penderita hipertensi rawat jalan di Kabupaten Bekasi. *Jurnal Kesehatan Masyarakat, 11*(1), 142–151.

Sinensis, C., & Kusnan, A. (2022). Pengaruh teh hijau dalam menurunkan tekanan darah: A systematic review. *Jurnal Kesehatan, 5*(3), 226–233.

Suratri, M. A. L. (2020). Pengaruh hipertensi terhadap kejadian penyakit jaringan periodontal (periodontitis) pada masyarakat Indonesia (Data Riskesdas 2018). *Buletin Penelitian Kesehatan, 48*(4), 227–234. https://doi.org/10.22435/bpk.v48i4.3516