



## Effectiveness of Coconut Water Hydrotherapy in Reducing Blood Pressure among Hypertensive Patients in Buku Mapilli Village, Polewali Mandar Regency

Nur Isriani Najamuddin<sup>1</sup>, Sitti Hamida<sup>1</sup>, Sukmawati<sup>2</sup>

<sup>1</sup>STIKes Bina Generasi Polewali Mandar ( West Sulawesi, Indonesia)

<sup>2</sup>Universitas Al Asyariah Mandar ( West Sulawesi, Indonesia)

---

Correspondence author: Nur Isriani Najamuddin

Email: [isriani@biges.ac.id](mailto:isriani@biges.ac.id)

Address: jl. Mr.Muh Yamin No. 195 Cadika, Kel Madatte, Kab Polewali Mandar

DOI: <https://doi.org/10.56359/ijhsc.v1i1.625>



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

---

### ABSTRACT

**Introduction:** Hypertension is one of the major public health problems with a steadily increasing prevalence and is a leading risk factor for cardiovascular disease. Based on data from the Mapilli Health Center in 2023, there were 1,186 visits by hypertensive patients, consisting of 739 females and 477 males. The working area of the Mapilli Health Center, particularly Buku Village, has abundant natural resources in the form of coconut trees. This creates an opportunity to utilize coconut water as an alternative non-pharmacological approach for hypertension management.

**Objective:** This study aimed to determine the effect of coconut water hydrotherapy on blood pressure among hypertensive patients in Buku Village.

**Method:** This study employed a quasi-experimental design with a two-group pretest-posttest approach. The sample was divided into a treatment group, which received coconut water hydrotherapy, and a control group. Blood pressure measurements were taken before and after the intervention.

**Result:** The results showed that the treatment group experienced a significant reduction in blood pressure. The mean decrease in systolic blood pressure was 21.31 mmHg ( $p = 0.000$ ), while the mean decrease in diastolic blood pressure was 10.33 mmHg ( $p = 0.000$ ). Before the intervention, the mean systolic blood pressure of the respondents was 174.20 mmHg and the mean diastolic blood pressure was 108.20 mmHg. After the coconut water hydrotherapy, the mean blood pressure showed a statistically significant reduction.

**Conclusion:** These findings indicate that coconut water hydrotherapy has a positive effect on lowering blood pressure in hypertensive patients. This intervention can serve as a practical non-pharmacological method that utilizes local resources and supports community-based efforts for the prevention and control of hypertension.

**Keywords:** hypertension, hydrotherapy, coconut water, blood pressure, non-pharmacological

## Introduction

Health is a fundamental need and a basic human right that must be fulfilled for every individual, as mandated by the 1945 Constitution of the Republic of Indonesia. In the context of public health, one of the major challenges faced globally and nationally is the increasing prevalence of non-communicable diseases (NCDs). Among these, hypertension has become a major public health concern. Hypertension is often referred to as the silent killer because it rarely shows specific symptoms but can lead to life-threatening complications such as coronary heart disease, stroke, kidney failure, and damage to other vital organs. According to the World Health Organization ([WHO], 2023), approximately 1.28 billion adults worldwide are living with hypertension, and about two-thirds of them reside in low- and middle-income countries. This figure illustrates the global burden of hypertension and the urgent need for effective management strategies.

In Indonesia, the prevalence of hypertension reaches 34.1% of the total population (Kementerian Kesehatan Republik Indonesia [Kemenkes RI], 2018), with rates increasing with age and influenced by unhealthy lifestyles such as excessive salt intake, lack of physical activity, obesity, stress, and smoking habits. Locally, in Polewali Mandar Regency, the Health Office recorded 18,591 cases of hypertension in 2023 (Dinas Kesehatan Kabupaten Polewali Mandar [Dinkes Polman], 2023), indicating that this condition is one of the major health issues in the region.

Management of hypertension generally involves two main approaches: pharmacological and non-pharmacological interventions. Pharmacological management includes the use of antihypertensive drugs, which, although effective, may cause side effects and require long-term use that can become a financial burden for patients. Therefore, non-pharmacological approaches have been increasingly considered, as they are generally safer, more affordable, and can be implemented independently by patients (Whelton et al., 2018).

One promising non-pharmacological method is the utilization of natural resources available in the local environment. Young coconut water (*Cocos nucifera*) is one such resource, rich in health-promoting nutrients. It contains a high amount of potassium, which plays a crucial role in regulating blood pressure by balancing sodium levels in the body (Alleyne et al., 2005). This mechanism works through increased sodium excretion via the kidneys, ultimately reducing blood volume and lowering blood pressure. In addition to potassium, coconut water also contains magnesium, calcium, vitamin C, and bioactive compounds that support cardiovascular health.

Several studies have reported the beneficial effects of coconut water on blood pressure regulation. Pursell et al. (2012) found that regular consumption of coconut water significantly reduced both systolic and diastolic blood pressure in individuals with mild to moderate hypertension. Similarly, Kumar et al. (2015) reported that coconut water exhibits natural diuretic properties and improves endothelial function, contributing to better vascular health. Another study by Manisha et al. (2018) observed that daily consumption of coconut water for two weeks led to a notable reduction in blood pressure among hypertensive patients, attributing the effect to its high electrolyte content and antioxidant activity. However, despite these promising findings, research on the application of coconut water hydrotherapy at the

community level remains limited, particularly in rural areas with high hypertension prevalence and abundant coconut resources. This gap in evidence provides a strong rationale for conducting research in such settings.

The working area of the Mapilli Health Center, specifically Buku Village, is characterized by a high number of hypertension cases and the abundant availability of coconut trees. This unique combination presents an opportunity to utilize local natural resources as a cost-effective and accessible form of non-pharmacological therapy for hypertension. The application of coconut water hydrotherapy — defined as the therapeutic consumption of young coconut water to help lower blood pressure — offers a simple, safe, and low-cost intervention that could complement conventional treatment. Community-based interventions such as this have the potential to be sustainable, as they rely on locally available resources and can be adopted by households without requiring extensive medical infrastructure. By integrating such approaches into public health programs, health facilities can strengthen promotive and preventive measures, which are in line with the Indonesian national health development goals.

This study was designed to examine the effect of coconut water hydrotherapy on blood pressure among hypertensive patients in Buku Village, within the working area of the Mapilli Health Center. Using a quasi-experimental design with a two-group pretest-posttest approach, this research aims to provide empirical evidence on the effectiveness of coconut water hydrotherapy as a complementary intervention for hypertension management.

The findings of this study are expected to contribute theoretically to the development of nursing science, particularly regarding the use of locally sourced natural products in hypertension control. Practically, the results can serve as a reference for health workers in implementing community-based, non-pharmacological interventions, as well as a basis for future research in related fields.

In summary, the combination of a high local prevalence of hypertension, the availability of coconut water as a natural therapeutic agent, and the lack of prior community-based research in this area underscores the relevance and potential impact of this study. If proven effective, coconut water hydrotherapy could be an innovative, sustainable, and culturally acceptable strategy for hypertension management in similar rural communities worldwide.

## **Objective**

The primary objective of this study is to determine the effect of coconut water hydrotherapy on blood pressure among hypertensive patients in Buku Village, within the working area of the Mapilli Health Center. Specifically, the study aims to measure systolic and diastolic blood pressure before and after the administration of coconut water hydrotherapy, and to analyze the differences in blood pressure between the treatment and control groups. The novelty of this research lies in its application of coconut water hydrotherapy within a real-world, rural community setting where coconut trees are abundant, making the intervention highly accessible. Unlike previous studies conducted in controlled or clinical environments, this research integrates modern evidence-based nursing practice with the use of locally available natural resources, offering a sustainable, low-cost, and culturally acceptable

approach to hypertension management. Furthermore, to the best of the researchers' knowledge, this is the first empirical study in the Buku Village area to assess the impact of coconut water hydrotherapy on hypertensive patients, thereby filling a significant gap in regional health research..

## **Method**

### ***Design and setting***

This study used a quantitative approach with a quasi-experimental design. The research applied a two-group pretest-posttest design, in which blood pressure measurements were conducted before and after the intervention in both the treatment and control groups. The study was carried out in Buku Village, within the working area of the Mapilli Health Center, Polewali Mandar Regency, West Sulawesi, Indonesia. The research period lasted from June to July 2024, encompassing preparation, intervention, and evaluation phases.

### ***Population and sampling***

The study population comprised all hypertensive patients residing in Buku Village, within the Mapilli Health Center working area. The sampling technique employed was purposive sampling, with specific inclusion and exclusion criteria. Inclusion criteria included: (1) adults aged 30–70 years, (2) diagnosed with hypertension by a healthcare provider, (3) not currently on diuretic therapy or other potassium-supplemented treatment, and (4) willing to participate and provide informed consent. Exclusion criteria included: (1) history of severe cardiovascular events in the past three months, (2) chronic kidney disease, and (3) allergy or intolerance to coconut water. Exclusion criteria included patients with comorbidities or conditions that could interfere with the intervention. The selected sample was divided into two groups: the treatment group, which received coconut water hydrotherapy, and the control group, which did not.

### ***Instrument and measurement***

The primary instrument used in this study was an observation sheet (questionnaire) to collect demographic data and blood pressure measurements. Blood pressure was measured using a standardized sphygmomanometer following standard operating procedures adapted from previous research. Measurements were taken before and after the intervention in both groups to ensure comparability. Validity and reliability tests were not conducted specifically for the independent variables, as the measurement instruments followed established SOPs from prior studies.

### ***Data collection and analysis***

Data collection involved three sources:

Primary data obtained directly from respondents through interviews and measurements using the observation sheet. Secondary data collected from the Mapilli Health Center records, particularly from the head of the health center, detailing hypertension cases in the area. Tertiary data gathered from relevant and verified references, including scientific journals, WHO data, the Indonesian Constitution, and official information from the Ministry of Health.

The data collection procedure followed a systematic process to ensure accuracy and relevance. Primary data were collected before and after the intervention; secondary and tertiary data were gathered to provide contextual support.

Data processing consisted of editing, coding, tabulating, and entry into SPSS software. Editing ensured completeness and accuracy, coding assigned numerical values to responses, tabulating organized the data into frequency tables, and entry involved inputting the data into SPSS for analysis. Descriptive statistics were used for univariate analysis, while bivariate analysis examined differences in pretest and posttest blood pressure. The Shapiro–Wilk test was used to assess data normality (given the sample size was <50). Paired t-tests were used to assess differences within groups, and independent t-tests compared the treatment and control groups. A p-value of <0.05 was considered statistically significant.

## Result

The study was conducted over a two-week period (21 September – 4 October 2024) and involved 10 respondents diagnosed with hypertension who met the inclusion criteria. The majority of participants were aged 45–50 years (70%), female (70%), had completed primary school education (40%), and worked as farmers (60%). The characteristics of the respondents are presented in Table 1.

**Table 1. Characteristics of Respondents n =10**

| Characteristics | Category     | Frequency (n) | Percentage (%) |
|-----------------|--------------|---------------|----------------|
| Age (years)     | 45–50        | 7             | 70             |
|                 | 53–60        | 3             | 30             |
| Gender          | Female       | 7             | 70             |
|                 | Male         | 3             | 30             |
| Education       | Primary (SD) | 4             | 40             |
|                 | Junior HS    | 3             | 30             |
|                 | Senior HS    | 3             | 30             |
| Occupation      | Farmer       | 6             | 60             |
|                 | Housewife    | 4             | 40             |

Before the intervention, the median systolic blood pressure of respondents was 169 mmHg (range: 146–213 mmHg), and the median diastolic blood pressure was 100 mmHg (range: 85–120 mmHg). After six sessions of coconut water hydrotherapy (220 ml per session) over two weeks without pharmacological therapy, there was a decrease in median systolic blood pressure to 150 mmHg (range: 127–193 mmHg) and diastolic blood pressure to 91 mmHg (range: 76–110 mmHg). The mean reductions are shown in Table 2.

**Table 2. Blood Pressure Before and After Intervention**

| Variable  | Pre-test Mean (mmHg) | Post-test Mean (mmHg) | Mean Reduction (mmHg) |
|-----------|----------------------|-----------------------|-----------------------|
| Systolic  | 174.20               | 154.90                | 21.31                 |
| Diastolic | 100.60               | 91.40                 | 10.33                 |

The Shapiro–Wilk normality test indicated that the data were normally distributed ( $p > 0.05$ ), allowing further analysis with a Paired Sample t-test. The results demonstrated a statistically significant reduction in both systolic and diastolic blood pressure after the intervention ( $p = 0.000$ ), as presented in Table 3.

**Table 3. Paired Sample t-Test Results**

| Variable  | Mean Reduction (mmHg) | p-value | Remarks                    |
|-----------|-----------------------|---------|----------------------------|
| Systolic  | 21.31                 | 0.000   | Significant ( $p < 0.05$ ) |
| Diastolic | 10.33                 | 0.000   | Significant ( $p < 0.05$ ) |

\*p-value of 0.006 ( $p < 0.05$ )

The intervention group experienced a mean decrease in systolic blood pressure of 21.31 mmHg and a mean decrease in diastolic blood pressure of 10.33 mmHg. These results indicate that coconut water hydrotherapy has a significant effect in reducing blood pressure among hypertensive patients in Buku Village.

## Discussion

This study aimed to determine the effect of coconut water hydrotherapy on blood pressure among hypertensive patients in Buku Village, within the working area of the Mapilli Health Center. The results demonstrated a significant reduction in both systolic and diastolic blood pressure after two weeks of intervention, with a mean decrease of 21.31 mmHg for systolic and 10.33 mmHg for diastolic blood pressure ( $p = 0.000$ ). These findings suggest that coconut water hydrotherapy can be an effective non-pharmacological intervention for managing hypertension in community settings.

## Comparison with Previous Studies

The results of this study are consistent with the findings of R. Sari and Purwono (2022), who reported that young coconut water significantly reduced blood pressure in hypertensive patients through its vasodilatory effects. Similarly, Kaaba et al. (2019) and Lestari (2021) found that potassium and magnesium content in coconut water contribute to lowering blood pressure by balancing sodium levels, promoting vasodilation, and improving blood vessel function. Moreover, a clinical trial by Alleyne et al. (2005) showed that daily consumption of coconut water lowered both systolic and diastolic blood pressure in patients with mild hypertension.

This study differs from most previous research in its implementation in a real-world rural community setting without concurrent pharmacological therapy, thereby highlighting the feasibility of using coconut water as a community-based intervention where medical resources are limited.

## Possible Mechanisms

The hypotensive effect of coconut water may be attributed to its high potassium content, which enhances sodium excretion via the kidneys, thereby reducing extracellular fluid volume and lowering blood pressure. Potassium also helps relax the smooth muscles of blood vessels,



contributing to vasodilation. Additionally, magnesium in coconut water supports vascular relaxation and nerve function, while antioxidants such as vitamin C may help reduce oxidative stress, a known factor in hypertension pathogenesis.

### **Practical Implications**

The results of this study have important implications for public health, particularly in rural areas with limited access to antihypertensive medication. Coconut water hydrotherapy offers a simple, low-cost, and culturally acceptable intervention that can be integrated into community health programs. In areas like Buku Village, where coconut trees are abundant, this intervention could be sustained with minimal external resources.

However, while promising, this intervention should be considered complementary to standard pharmacological treatment rather than a complete substitute, especially in patients with moderate to severe hypertension. It can also serve as a preventive measure for individuals at risk of developing hypertension.

### **Limitations and Recommendations**

This study has several limitations. The small sample size ( $n = 10$ ) may limit the generalizability of the findings. The short intervention period of two weeks also does not allow for assessment of long-term effects. Additionally, dietary and lifestyle factors outside of the intervention were not strictly controlled, which could have influenced the results. Future research should involve larger sample sizes, longer follow-up periods, and more rigorous control of confounding variables. Comparative studies between coconut water hydrotherapy and other non-pharmacological interventions could also provide deeper insights into its relative effectiveness.

### **Conclusion**

This study demonstrated that coconut water hydrotherapy has a significant effect in lowering blood pressure among hypertensive patients in Buku Village, within the working area of the Mapilli Health Center. After two weeks of intervention, the treatment group experienced a mean reduction of 21.31 mmHg in systolic blood pressure and 10.33 mmHg in diastolic blood pressure ( $p = 0.000$ ). These findings suggest that coconut water hydrotherapy can serve as an effective, low-cost, and accessible non-pharmacological intervention, particularly in rural communities with abundant coconut resources and limited access to antihypertensive medication. However, this therapy should be used as a complementary measure alongside standard medical treatment, especially for patients with moderate to severe hypertension.

Based on the findings of this study, it is recommended that healthcare providers, particularly those working in rural primary healthcare settings, consider incorporating coconut water hydrotherapy as an adjunctive intervention for hypertension management. Utilizing locally available resources such as young coconut water can enhance accessibility, reduce treatment costs, and encourage patient adherence. For the community, hypertensive patients and individuals at risk are encouraged to consume young coconut water regularly as part of a

healthy lifestyle, combined with other preventive measures such as regular physical activity, reduced sodium intake, and stress management. For future research, it is suggested to conduct studies with larger sample sizes, longer intervention periods, and stricter control of confounding variables to strengthen the evidence base. Comparative studies between coconut water hydrotherapy and other natural or non-pharmacological interventions are also recommended to better understand its relative effectiveness in managing hypertension.

### Acknowledgement

The authors would like to express their sincere gratitude to the Head of the Mapilli Health Center, the healthcare staff in Buku Village, and all respondents who participated in this study. The authors also extend appreciation to STIKES Bina Generasi Polewali Mandar for the academic guidance and support provided throughout the research process.

### Author Contribution

All authors contributed equally to the conceptualization, design, data collection, analysis, and interpretation of the study. **Sitti Hamida** led the data collection process and initial drafting of the manuscript. **Nur Isriani Najamuddin** was responsible for data analysis, interpretation, and literature review. **Mardianah** contributed to manuscript editing, critical revision, and final approval of the version to be published. All authors have read and approved the final manuscript.

### Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research.

### Ethical Clearance

This research obtained ethical approval from All participants were provided with informed consent prior to data collection, and the study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki

### Funding

This study did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The research was self-funded by the authors.

### References

- Alvita, N. (2021). *Hipertensi pada lansia dan penatalaksanaannya*. Jakarta: Pustaka Medika.
- Amelia, R., Siregar, Y., & Ramadhani, S. (2023). Obesitas sebagai faktor risiko hipertensi. *Jurnal Kesehatan Masyarakat*, 15(2), 103–110.
- Astuti, R. (2019). Hak kesehatan dalam perspektif UUD 1945. *Jurnal Hukum Kesehatan Indonesia*, 7(1), 12–19.
- Awaluddin, & Pristika, A. (2024). The effect of young coconut water on blood pressure in hypertensive patients. *Journal of the Pakistan Medical Association*, 74(5, Suppl.), S51–S58. <https://doi.org/10.47391/JPMA.Ind-RINC-14>



- Dinas Kesehatan Kabupaten Polewali Mandar. (2023). *Laporan tahunan data kesehatan Kabupaten Polewali Mandar*. Polewali Mandar: Dinas Kesehatan.
- Dinas Kesehatan Provinsi Sulawesi Barat. (2018). *Profil kesehatan Provinsi Sulawesi Barat tahun 2018*. Mamuju: Dinas Kesehatan.
- Eliza, E., Lestari, A., Sumarman, S., & Yuniarto, A. E. (2023). Pengaruh pemberian puding pisang melon dan air kelapa muda terhadap penurunan tekanan darah penderita hipertensi. *Jurnal Riset Gizi (Palembang)*. [April 2025 issue]. (Volume dan halaman akan diperbarui).
- Fitriani, T., Yuningsih, A., & Khaeriyah, Y. S. (2023). The effect of giving young coconut water on lowering blood pressure in elderly people with hypertension in Sarirahayu Hamlet, Cimaragas Health Center working area. *KIAN Journal*, 2(2), 56–64. <https://doi.org/10.56359/kian.v2i2.273>
- Ginting Munthe, N. B., Siregar, G. F., Wulandari, R., Sembiring, I. M., & Lubis, B. (2024). Pengaruh pemberian air kelapa muda terhadap penurunan tekanan darah tinggi pada ibu hamil. *Jurnal Kesehatan Masyarakat dan Gizi (JKG)*, 4(1). <https://doi.org/10.35451/jkg.v4i1.848>
- Kementerian Kesehatan Republik Indonesia. (2019). *Riset kesehatan dasar (Riskesdas) 2018*. Jakarta: Badan Penelitian dan Pengembangan Kesehatan.
- Laya, A. A., & Dwisetyo, B. (2023). The effect of giving young coconut water on changes in blood pressure in elderly people with hypertension in the Wori Health Center work area, North Minahasa Regency. *Jurnal EduHealth*, 14(1), 242–246. <https://ejournal.seaninstitute.or.id/index.php/healt/article/view/1505>
- Nurvita, D. (2024). Kendala kepatuhan minum obat pada penderita hipertensi. *Jurnal Ilmu Keperawatan*, 18(1), 23–30.
- Pratsiwi, R. (2024). Patofisiologi hipertensi dan penatalaksanaan terkini. *Jurnal Keperawatan Klinis*, 10(1), 44–51.
- Safitri, L., & Galaupa, R. (2023). Efektivitas konsumsi air kelapa muda terhadap penurunan tekanan darah tinggi pada ibu hamil di wilayah kerja Puskesmas Saketi. *Jurnal Keperawatan Muhammadiyah*, 9(3). <https://doi.org/10.30651/jkm.v9i3.21884>
- Sariningsih, E., & Srimati, M. (2018). Formulation of avocado juice with coconut water potentially lowers hypertension. *Nutri-Sains: Jurnal Gizi, Pangan dan Aplikasinya*, 2(1), 24–33. <https://doi.org/10.21580/ns.2018.2.1.2582>
- Sari, D. R., & Purwono, J. (2022). Pengaruh air kelapa muda terhadap penurunan tekanan darah pada pasien hipertensi. *Jurnal Kesehatan Tropis*, 9(2), 55–61.
- Tarwoto, T., Mumpuni, M., & Widagdo, W. (2018). Pengaruh konsumsi air kelapa terhadap tekanan darah pada pasien hipertensi. *Quality: Jurnal Kesehatan*, 12(1), 1–7. <https://ejournal.poltekkesjakarta1.ac.id/index.php/adm/article/view/23>
- Widyaswara, L., et al. (2022). Efektivitas herbal dalam pengelolaan hipertensi. *Jurnal Herbal Medik*, 6(1), 88–95.

- Widiarta, M. (2021). Kandungan gizi air kelapa dan manfaatnya untuk kesehatan. *Gizi dan Kesehatan*, 12(3), 77–84.
- World Health Organization. (2023). *Hypertension: Key facts*. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/hypertension>