Effectiveness of *Daun Kelor* (*Moringa Oleifera Leaf*) Decoction on Lowering Blood Pressure in the Elderly

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ABSTRACT: *Hypertension is a major health issue among the elderly, significantly impacting quality of life and increasing the risk of cardiovascular diseases. This study aims to examine the effectiveness of moringa oleifera leaf decoction as a non-pharmacological intervention to reduce blood pressure in elderly individuals with mild to moderate hypertension. A pre-experimental design with a one-group pretest-posttest approach was employed, involving 20 elderly participants from the Pleret Community Health Center area. Participants consumed 200 ml of fresh moringa leaf decoction twice daily for seven consecutive days. Blood pressure measurements before and after the intervention were analyzed using the Wilcoxon test. Results showed a statistically significant reduction in both systolic and diastolic blood pressure (ρ=0.000). All participants experienced a decrease in systolic pressure, while 90% showed a decrease in diastolic pressure. The antihypertensive effect is attributed to bioactive compounds in Moringa, such as flavonoids, tannins, saponins, and potassium, which promote vasodilation, diuresis, and inhibition of the angiotensin-converting enzyme (ACE). This study suggests that Moringa leaf decoction is a safe, natural, and cost-effective complementary therapy for managing blood pressure in the elderly.*

Hipertensi merupakan masalah kesehatan utama pada lansia, yang secara signifikan memengaruhi kualitas hidup dan meningkatkan risiko penyakit kardiovaskular. Penelitian ini bertujuan untuk menguji efektivitas rebusan daun kelor (*moringa oleifera*) sebagai intervensi nonfarmakologis untuk menurunkan tekanan darah pada lansia dengan hipertensi ringan hingga sedang. Desain pra-eksperimen dengan pendekatan satu kelompok, yaitu pretes-postes, digunakan, yang melibatkan 20 peserta lansia dari wilayah Puskesmas Pleret. Peserta mengonsumsi 200 ml rebusan daun kelor segar dua kali sehari selama tujuh hari berturut-turut. Pengukuran tekanan darah sebelum dan sesudah intervensi dianalisis menggunakan uji *wilcoxon.* Hasil penelitian menunjukkan penurunan tekanan darah sistolik dan diastolik yang signifikan secara statistik (ρ=0,000). Semua peserta mengalami penurunan tekanan sistolik, sementara 90% menunjukkan penurunan tekanan diastolik. Efek antihipertensi ini disebabkan oleh senyawa bioaktif dalam kelor, seperti *flavonoid, tanin, saponin*, dan *kalium* yang mendorong *vasodilatasi, diuresis*, dan penghambatan enzim pengubah *angiotensin-converting enzyme* (ACE). Studi ini menunjukkan bahwa rebusan daun kelor merupakan terapi komplementer yang aman, alami, dan hemat biaya untuk mengelola tekanan darah pada lansia.

Keywords: *Blood Pressure, Elderly, Moringa Oleifera.*

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I. INTRODUCTION

Hypertension or high blood pressure is one of the major health problems experienced by the elderly in various countries, including Indonesia. Hypertension contributes to around 10 million deaths each year and is a major risk factor for cardiovascular diseases such as stroke, coronary heart disease, and chronic kidney failure (World Health Organization, 2023). In Indonesia itself, data from the 2023 Indonesian Health Survey showed that the prevalence of hypertension in the elderly group reached more than 60%, with a tendency to increase with age and changes in people's lifestyles (Nurillah & Yuniarti, 2023)

Hypertension problems in the elderly not only affect the physical aspects but also reduce the quality of life and increase the economic and social burden, both for individuals and the health care system. Therefore, effective and sustainable management of hypertension is very important. In addition to the pharmacological approach through the administration of antihypertensive drugs, non-pharmacological approaches are now increasingly being considered, including the use of herbal ingredients as complementary therapies that are considered safer and more affordable, especially for long-term use.

One of the herbal plants that has great potential in lowering blood pressure is *daun kelor or* moringa leaf *(moringa oleifera*). This plant has long been known in traditional medicine in various regions and contains bioactive compounds such as flavonoids, alkaloids, tannins, and saponins. These compounds are known to have pharmacological effects such as vasodilation, diuretic effects, and antioxidant activity that support lowering blood pressure (Chis et al., 2024). Moringa leaf extract can lower high blood pressure in experimental rats with hypertension by improving vascular function and reducing oxidative stress (Aekthammarat et al., 2019). This effect is thought to be related to increased production of nitric oxide (NO), which helps dilate blood vessels, as well as inhibition of the activity of the *angiotensin-converting enzyme* (ACE), which plays a role in regulating blood pressure.

In Indonesia, there is a local study that reveals that regular consumption of moringa leaf powder can be an effective additional therapy in helping to control blood pressure (Gondo, 2021). Other advantages are the ease of processing and the accessibility of abundant ingredients, especially in rural areas that have limited access to modern health services.

However, despite the promising results of early studies, further research using more rigorous and specific scientific methodologies is needed to evaluate the effectiveness of moringa leaf decoction in elderly populations. Many previous studies have been limited to the use of extracts or other formulations and have not directly examined the consumption of fresh moringa leaf decoction as a practical intervention at the community level.

This study is here to fill the gap by offering novelty through the application of fresh moringa leaf decoction as a natural intervention based on local wisdom that is applied directly to elderly people with hypertension in the community environment. From a nursing perspective, this intervention is a form of integration between a natural herbal approach and a non-pharmacological chronic disease management strategy. In addition to aiming to lower blood pressure, this intervention also strengthens the role of nurses in empowering the elderly and families as agents of change towards a healthy lifestyle based on local culture.

Furthermore, this study also contributes to enriching the holistic and promotive preventive nursing care model, as well as encouraging the use of local potential as a resource in public health services. Therefore, this study aims to examine in depth the effectiveness of moringa leaf decoction on reducing blood pressure in the elderly, with the hope of providing a scientific and practical basis for its use as a complementary therapy based on local plants.

II. METHOD

This study used a pre-experimental design with a one-group pretest-posttest design approach. The population used was all elderly people with mild to moderate hypertension in the Pleret Health Center working area, namely at the elderly health post in *Bedukan* hamlet. The sample in this study amounted to 20 respondents who were selected by purposive sampling using the paired sample size formula to determine the sample size. The inclusion criteria set were elderly people aged ≥ 60 years who were willing to be research respondents, did not routinely take antihypertensive drugs, and were not allergic to moringa leaves.

During the pretest, the respondents' blood pressure was measured using a sphygmomanometer. After that, the respondents were given 200 ml of moringa leaf decoction twice a day, every morning and evening, for seven consecutive days. The decoction was made from ±10 grams of fresh moringa leaves boiled in 400 ml of water until 200 ml remained. On the eighth day, a posttest was conducted by re-measuring the respondents' blood pressure. During the research process, the researcher also monitored the complaints that arose and compliance with drinking moringa leaf decoction. The data analysis used was univariate and bivariate. The results of the data normality test using Shapiro-Wilk showed that all data were not normally distributed, so the bivariate test used was the wilxocon test.

III. RESULT AND DISCUSSION

Effectiveness of *Daun Kelor (Moringa Oleifera Leaf)* Decoction on Lowering Blood Pressure in the Elderly

Respondent characteristics based on the results of univariate analysis can be seen in table 1 below:

Table 1. Frequency Distribution of Respondents

Variable	Total	Percentage (%)
Age		
60-74 tahun	13	65
75-90 tahun	7	35
Total	**20**	**100**
Gender		
Male	7	35
Female	13	65
Total	**20**	**100**
Hypertension Classification		
Prehypertension	2	10
Grade 1 hypertension	13	65
Grade 2 hypertension	5	25
Total	**20**	**100**

Based on the frequency distribution table of respondents, it was found that respondents included in the elderly category (60-74 years) were more than respondents in the old category (75-90 years). The lowest age of respondents was 60 years, and the highest was 85 years. The fairly wide age range of respondents (60-85 years) is an indicator that high blood pressure is a health problem that cannot be ignored in the elderly group in general. The dominance of respondents in the elderly category reflects that this age group is still active in participating in intervention programs, including the use of traditional medicine such as boiled moringa leaves.

Physiologically, the elderly group generally has a better capacity to adapt to natural therapy compared to the older group, which has experienced a further decline in organ function. This has an impact on the level of effectiveness of more optimal interventions in the elderly age group (Sabara & Falah, 2025). The elderly category is more likely to respond to this herbal therapy because their metabolic and cardiovascular systems have not experienced a greater decline in function like the old group. This is in line with the opinion that the effectiveness of herbal therapy is often higher in the early elderly because there is still adequate organ compensation function (Fitriana & Kurniawati, 2023).

Regarding the classification of hypertension, the majority of respondents in the study were included in the category of grade 1 hypertension. The study showed that consuming boiled moringa leaf water for seven days was able to significantly lower blood pressure in elderly people with grade 1 to grade 2 hypertension. This decrease occurred due to the hypotensive effect of flavonoid compounds, which increase blood vessel relaxation (Yahya et al., 2021).

Table 2 shows that in this data, all respondents (N = 20) showed a decrease in systolic blood pressure, which is indicated by all values being in the negative ranks category (mean rank = 10.50; sum of ranks = 210.00). No respondents experienced an increase or stable blood pressure (positive ranks = 0; ties = 0), indicating that moringa leaf decoction is effective in consistently lowering systolic blood pressure. In measuring diastolic pressure, out of 20 respondents, 18 respondents showed a decrease in diastolic pressure, one respondent experienced an increase, and one respondent experienced no change. The mean rank for negative ranks was 10.31 and positive ranks 4.50 which still showed a dominant decrease in diastolic pressure. These results strengthen the hypothesis that moringa leaf decoction has a significant antihypertensive effect. Moringa leaves are known to contain active compounds such as flavonoids, tannins, and saponins, which can play a role in vasodilation and inhibition of the *angiotensin-converting enzyme* (ACE), thereby helping to lower blood pressure (Kusuma et al., 2020).

Table 2. Wilcoxon Signed Rank Test Results

Blood Pressure		N	Mean Rank	Sum of Ranks
Postsistole-Presistole	Negative ranks	20	10.50	210.00
	Positive ranks	0	0.00	0.00
	Ties	0		
Postdiastole-Prediastole	Negative ranks	18	10.31	185.50
	Positive ranks	1	4.50	4.50
	Ties	1		

The results of the Wilcoxon test, as in Table 3, obtained a value of ρ = 0.000, which indicates a statistically very significant difference between blood pressure values before and after consuming moringa leaf decoction. A ρ value that is smaller than the significance level (α = 0.05) indicates that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted, namely that there is a significant difference in blood pressure in the elderly before and after the intervention.

Table 3. Wilcoxon Statistical Test Results

	Postsistole-Presistole	Postdiastole-Presiastole
Z	-3.939[b]	-3.677[b]
Asymp. Sig. (2-tailed)	0.000	0.000

There are previous studies that support the findings of this study, where giving moringa leaves to elderly hypertensives resulted in an average decrease in systolic blood pressure of 16 mmHg and diastolic blood pressure of 14.33 mmHg, with a value of ρ = 0.000 (Riniasih & Hapsari, 2021). Other studies also show that giving moringa leaf decoction to elderly hypertensive patients resulted in a significant decrease in blood pressure, with a value of ρ = 0.000 (Hasibuan et al., 2020). Likewise, another study found that moringa leaf decoction affected reducing blood pressure in hypertensive patients, with the results of the wilcoxon test showing a value of ρ = 0.000 (Zebua et al., 2021).

Specifically, the results show that moringa leaf decoction has a real effect in lowering blood pressure, both systolic and diastolic pressure, in the elderly group studied. This effect is not caused by chance but is a direct impact of the active ingredients in moringa leaves that work physiologically on the circulatory system. Furthermore, there is research that confirms that the active compounds in moringa leaves can inhibit the Angiotensin Converting Enzyme (ACE) enzyme, thereby reducing the formation of angiotensin II, which plays a role in increasing blood pressure. Moringa leaf decoction works physiologically similar to ACE-inhibitor antihypertensive medicine (Mansyur et al., 2022). Thus, the results of this study are in line with the latest literature showing that moringa leaves have the potential as a safe, natural, and economical additional therapy for managing high blood pressure, especially in the elderly population.

Implications of *Daun Kelor (Moringa Oleifera Leaf)* Decoction for the Elderly

Hypertension is a major health problem experienced by many elderly people, both in Indonesia and globally. This condition can significantly reduce quality of life and increase the risk of cardiovascular complications such as stroke, coronary heart disease, and chronic kidney failure (World Health Organization, 2023). Effective and sustainable management of hypertension is crucial, especially in the elderly, who are often sensitive to the side effects of chemical medications. In this context, Moringa oleifera leaf decoction has emerged as a potential non-pharmacological therapy alternative (Angelina et al., 2021). Moringa leaves have long been used in traditional medicine and are known to contain bioactive compounds such as flavonoids, tannins, saponins, and potassium. These compounds have pharmacological effects that support blood pressure reduction, including through vasodilation, diuretic effects, and angiotensin-converting enzyme (ACE) inhibition (Chiș et al., 2023).

A pre-experimental study conducted at the Pleret Community Health Center demonstrated a statistically significant reduction in systolic and diastolic blood pressure (ρ=0.000), with all participants experiencing a reduction in systolic pressure and 90%

experiencing a reduction in diastolic pressure. The antihypertensive effect of Moringa leaf decoction is strongly suspected to be due to its flavonoid content, which increases *nitric oxide* (NO) production, thus helping relax blood vessels. Furthermore, the potassium in Moringa leaves acts as a natural diuretic, helping reduce blood volume and arterial pressure (Aekthammarat et al., 2019). Saponins and tannins also play a role in inhibiting ACE activity, thereby reducing the formation of angiotensin II, which causes vasoconstriction and increased blood pressure (Mansyur et al., 2022).

In terms of safety, moringa leaf decoction is relatively safe for consumption by the elderly and does not cause serious side effects during short-term use. This makes moringa leaf decoction a cost-effective, accessible, and applicable complementary therapy option, particularly in rural areas with limited access to modern healthcare (Nair D et al., 2021). Physiologically, elderly people aged 60-74 years (the elderly category) tend to have a better capacity to adapt to natural therapies than older age groups. This impacts the effectiveness of interventions in this group, as their organ function has not yet experienced a drastic decline (Fitriana & Kurniawati, 2023)

The consistent reduction in blood pressure across all respondents indicates that Moringa leaf decoction can be an effective intervention in managing hypertension in the elderly. This reduction in blood pressure also positively impacts the quality of life of the elderly, reduces the risk of complications, and reduces the economic and social burden of chronic disease (Rohmawati et al., 2024). The results of this study also align with previous studies showing that regular consumption of Moringa leaf decoction can significantly lower blood pressure in elderly people with hypertension (Hasibuan et al., 2020; Riniasih & Hapsari, 2021). The consistency of these results strengthens the scientific basis for the use of moringa leaves as a complementary therapy in the elderly.

From a health science perspective, a moringa leaf decoction intervention can be part of a holistic nursing care model that emphasizes promotive, preventive, curative, and rehabilitative aspects (Prasetya et al., 2025). Nurses and families can play an active role in educating, monitoring consumption, and motivating older adults to undergo herbal therapy based on local wisdom (Sarifudin et al., 2024). However, it should be noted that although the initial results are very promising, further research with a more robust design and larger sample size is needed to confirm the long-term efficacy and safety of moringa leaf decoction in the elderly population. Standardization of dosage, raw material quality, and processing methods is also necessary to ensure consistent and replicable results across healthcare settings (Irfan et al., 2024).

Furthermore, the use of moringa leaf decoction as an adjuvant therapy with antihypertensive medications should be consulted with a healthcare professional to avoid potential adverse drug interactions. Elderly individuals with kidney disorders or other chronic diseases also require special monitoring during this therapy. Overall, boiled moringa leaves can be an effective, safe, and affordable natural solution for managing blood pressure in the elderly. Utilizing this local potential can also strengthen community health resilience and empower seniors to adopt a healthy lifestyle based on local wisdom.

IV. CONCLUSION

Based on the results of the study and data analysis, it can be concluded that there is a statistically significant difference between systolic and diastolic blood pressure before and after consuming moringa oleifera leaf decoction in the elderly. Moringa leaf decoction is effective in lowering systolic blood pressure, which is an indicator of pressure when the heart pumps blood, and diastolic blood pressure, which is the pressure when the heart relaxes. The effectiveness of moringa leaf decoction in lowering blood pressure is supported by the content of active substances such as flavonoids, polyphenols, potassium, and antioxidants, which play a role in improving blood vessel function, reducing vascular resistance, and reducing blood volume. The results of this study are in line with previous studies, which show the consistency of the effect of lowering blood pressure after consuming moringa leaf decoction in elderly people with hypertension.

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