Original Article

The Effect of Barefoot Morning Walking on Blood Pressure in Adults with Hypertension

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ARTICLE INFO

Article History
Submit : December 7, 2025
Accepted : February 28, 2026
Published : March 21, 2026

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Citation:
Novitayanti, E., & Proborini, C. A. . (2026). The Effect of Barefoot Morning Walking on Blood Pressure in Adults with Hypertension. Journal of Applied Nursing and Health, 8(1), 438–447. https://doi.org/10.55018/janh.v8i1.500

ABSTRACT

Background: Hypertension is a health problem that affects many people and carries the risk of serious complications if not properly treated. Walking barefoot in the morning is a non-pharmacological method believed to help lower blood pressure by stimulating nerve endings and increasing body relaxation. In low- and middle-income countries, walking barefoot is common. The public felt more productive rather than having to use. This study was conducted to analyze the effect of barefoot morning walking on blood pressure in hypertensive patients.
Methods: This study used a one-group pre-experimental design with a one-group pretest-posttest approach. Technique collection sample, namely purposive, n 31, which meets the inclusion criteria, namely history of hypertension, willing given barefoot morning walk intervention according to established procedures, and criteria for respondents who cannot walk. Blood pressure was measured before and after the intervention using a validated digital blood pressure monitor. Data were analyzed using the Wilcoxon test.
Results: The results of the study showed that before the intervention, most respondents were in the stage I hypertension category (64.5%), while after the intervention, the majority were in the prehypertension category (67.7%). Statistical tests showed a significant decrease in blood pressure in both systolic ($p < 0.00\ 1$) and diastolic ($p < 0.00\ 1$) blood pressure, thus indicating a significant effect of barefoot morning walking on reducing blood pressure.
Conclusion: Barefoot morning walking intervention can reduce blood pressure in hypertensive patients, which can be applied to help control blood pressure.

Keywords: Hypertension; Walking Exercise; Non-pharmacological Therapy.

Implications for Practice:

- The findings indicate that barefoot morning walking may serve as a simple non-pharmacological intervention to help reduce blood pressure in patients with hypertension.
- Health workers, particularly cardiovascular nurses, can recommend barefoot morning walks as part of healthy lifestyle education to support sustainable self-management of hypertension.
- These findings may inform the development of community health programs and local policies that promote low-cost, easily

Implications for Practice:

implementable nursing interventions for the prevention and management of hypertension among high-risk populations.

Introduction

Hypertension is one of the most prevalent diseases, affecting 30-45% of adults. Hypertension is a risk factor for cardiovascular disease. Cardiovascular disease accounts for one-third of all deaths

in Malaysia, with hypertension contributing the most, coupled with low levels of awareness and control of hypertension. Hypertension has been a deadly disease in both developing and developed countries for over eight decades. Hypertension is also known as the "silent killer" because people with hypertension often do not experience any symptoms for years.

Hypertension is a leading risk factor for death and disability worldwide, currently affecting 30% of adults in Sub-Saharan Africa. This prevalence has increased rapidly in recent years, with 1,359 of 3,961 adult emergency room visits having hypertension (Hertz et al., 2019). An estimated 77.9 million adults in the United States have high blood pressure, with a projected increase of 8.4% by 2030. Hypertension costs the nation $46.4 billion annually and can lead to various health complications. Uncontrolled hypertension is a major risk factor for the development of cardiovascular complications (Prendergast et al., 2022).

The results of the Basic Health Research (Rikesdas) show a trend of increasing prevalence of STDs such as diabetes, hypertension, stroke, and joint/rheumatic/gout diseases, with hypertension ranking second for the third consecutive year (Ministry of Health of the Republic of Indonesia, 2021). Hypertension in Central Java ranks first, with 76.5% of the population in Sukoharjo City, with a prevalence of hypertension in 2021, with 115,801 people (Rikesdas Central Java, 2021). Interviews with eight residents of Mojorejo Village revealed that five of them had hypertension.

The lifetime risk of death from cardiovascular disease is associated with a moderate systolic blood pressure elevation above 115 mmHg, while a recent international review of hypertension diagnosis lowered the threshold for stage 1 from 140 mmHg systolic or 90 mmHg diastolic to 130 mmHg systolic and 80 mmHg diastolic. A hypertensive crisis is characterized by a sudden, severe increase in blood pressure, usually defined by a diastolic blood pressure value above 120 mmHg. These crises are classified as hypertensive urgency when there is no end-organ damage, and as hypertensive emergency when there is a risk of death, as evidenced by end-organ damage. Hypertensive urgency and hypertensive emergency must be distinguished from hypertensive pseudocrisis, which is characterized by a transient increase in blood pressure during a painful or emotional event, such as headache, dizziness, anxiety, or panic disorder (Pierin et al., 2019).

Hypertension causes the heart's inability to pump blood back to the heart quickly, resulting in fluid buildup in the lungs, legs, and other tissues, often called edema. Stroke can occur in chronic hypertension if the arteries that supply blood to the brain experience hypertrophy and thickening, reducing blood flow to the area where the bleeding occurred, which can affect oxygen saturation values (Pranata, 2017). Blood pressure depends on heart rate, cup volume, and TPR (Total Peripheral Resistance), so an uncompensated increase in any of these three variables can cause hypertension (Price, 2013).

Hypertension is the most common cardiovascular risk factor for acute cardiovascular events, including acute coronary syndrome (ACS), stroke, chronic kidney disease, and congestive heart failure, particularly in the elderly. Awareness remains relatively low, with approximately one-third of patients living with undiagnosed hypertension at high risk of acute cardiovascular events. Pharmacological and non-pharmacological therapies are used for its management (Citoni et al., 2022). Non-pharmacological

therapies should be implemented to lower blood pressure without causing side effects.

Non-pharmacological hypertension management is an effective modification to lower blood pressure through physical activity, weight loss, alcohol restriction, yoga relaxation techniques, acupuncture, tai chi, mindfulness-based stress reduction programs, and Transcendental Meditation (Verma et al., 2021). While non-pharmacological measures are effective in reducing hypertension, they are still underutilized in primary care (Dhungana et al., 2022).

Hypertension can be treated in two ways: pharmacological and non-pharmacological. Pharmacological treatment, or the use of antihypertensive drugs such as captopril, amlodipine, and others, can be an option. The second type of hypertension treatment is non-pharmacological, involving lifestyle modifications, including weight loss, which can lower blood pressure by 5-20 mmHg per 10 kg weight loss by reducing calorie intake and increasing physical activity, such as walking. This is due to several mechanisms within the body. physiological vasodilation vessels blood release oxide nitrates decrease sympathetic nervous system activity, decrease total peripheral vascular resistance, decrease cardiac output, increase barometric reflex sensitivity and decrease plasma volume, flexing vessels blood that can launch circulation, making vessels blood relax so that lower pressure blood (Rohimah & Dewi, 2022). Walking barefoot can lower the hormone cortisol in the blood give calm.

Based on the above background, researchers want to conduct a study on the effect of barefoot morning walks on blood pressure in hypertensive patients. The purpose of this study is to analyze the effect of barefoot morning walks on blood pressure in hypertensive patients, including identifying blood pressure conditions that influence blood pressure in hypertensive patients.

Methods

Study Design

This study uses a pre-experience single-group pretest-posttest design. Due to until No multiple groups, where one group of subjects is measured before and after an intervention without a control group. This design allows researchers to see changes in blood pressure that occur after the barefoot morning walking treatment is given to respondents. completed. Before the intervention, an initial measurement (pretest) was carried out, and after the intervention finished At the end, a repeat measurement (posttest) was carried out.

Participants

Participants in this study were all hypertension sufferers in Mojorejo Village, Sukoharjo, with purposive technique where The sample was selected based on inclusion criteria, namely hypertensive patients who were willing to be respondents, as well as exclusion criteria such as inability to walk, respondents who did not fulfil criteria inclusion, exclusion and not follow procedure study from beginning until end of release after confirmation researchers that of course No Can continue Because of course intervention This truly must be controlled Researchers. This research was conducted in August-September 2024 in the village area as the research location.

Instruments

The main instrument used in this study was a digital sphygmomanometer to measure systolic and diastolic blood pressure. Calibrated. Blood pressure data were grouped into ordinal categories according to hypertension classification standards. Additionally, observation sheets were used to record blood pressure values before and after treatment.

Intervention

The intervention given was barefoot morning walking, namely, a barefoot morning walking activity carried out on the ground for 30 minutes every morning for 1 month. Procedure monitored walking that is ensure place, land or sand soft free from sharp objects, take off your shoes, walk leisurely and calmly, feel the enjoyment touch land, swing your hand in a way to experience for 30 minutes, then rest. Blood pressure measurement is done the day before instructions start walk then measure return after 1 month. Respondents were given the intervention. There were 32 respondents, of whom 31 followed the interventions provided by researchers in a way complete, and 1 respondent No finish series intervention until the end.

Data Collection

Data collection was carried out through primary data and secondary data by researchers. direct every day up to 1 month measurement pressure blood done finished walk after respondents 10 minute break respondents in condition relax Rest and relax. Primary data were obtained from the results of pretest and posttest blood pressure measurements using a sphygmomanometer. Standard is done by researchers alone, while secondary data is obtained through literature such as journals, books, and related articles. The data processing process includes editing, coding, transferring, and tabulating.

Data Analysis

Data analysis included univariate analysis to describe respondent characteristics and blood pressure distribution, as well as bivariate analysis to test the effects of the intervention. With SPSS 22. The Shapiro–Wilk normality test was performed first; because the results showed an abnormal distribution ($p < 0.05$), the analysis of pretest–posttest blood pressure differences used the Wilcoxon test in accordance with the characteristics of nonparametric data. with a 95% confidence interval.

Ethical Considerations

Study This ethics in nursing research includes informed consent, (approval) of research This No force respondents, anonymity, and confidentiality study this is guarded confidentiality respondents. Ethical testing was carried out at EC MHK with Number 05-7/ KEPK_STIKes MHK/EC/VII/2024, which is declared worthy of ethics

Results

Respondent characteristics in this study describe the basic profile of the participants in the sample, including gender, age, occupation, and education level. This information is important for understanding the demographic context of respondents, which can influence health conditions, including blood pressure, and for helping researchers interpret the study results more comprehensively. The following is a detailed description of the respondent characteristics in tabular form.

Table 1. Respondent Characteristics

Respondent Characteristics	Frequency	Percentage
Gender		
Man	4	12.9
Woman	27	87.1
Age		
30-59 Years	10	32.3
>60 years	21	67.7
Work		
civil servant	2	6.5
Personal	7	22.6
Agriculture	11	35.5
housewife	11	35.5
Education		
There is no school	5	16.1
Elementary School	12	38.7

Respondent Characteristics	Frequency	Percentage
Junior high school	7	22.6
Senior High School	4	12.9
Bachelor	3	9.7

Table 1 illustrates that the characteristics of the respondents were that the majority were women with 27 respondents (87.7%), elderly with 21 respondents (67.7%), agricultural workers and homemakers with 11 respondents (35.5%), and basic education with 12 respondents (38.7%).

The distribution of blood pressure before the intervention provides a baseline picture of the hypertension experienced by respondents before receiving barefoot morning walking treatment. This data is important for determining the severity of hypertension in the study group, both based on systolic and diastolic blood pressure, so that it can be compared with the results after the intervention. The following shows the distribution of blood pressure in respondents before the intervention.

Table 2. Distribution of Blood Pressure Before Intervention

Blood pressure	Frequency	Percentage
Systolic		
Stage I Hypertension	20	64.5
Stage II Hypertension	11	35.5
Diastolic		
Stage I Hypertension	20	64.5
Stage II Hypertension	11	35.5
Total	31	100

Table 2 illustrates that blood pressure before the intervention was given, most respondents had stage I hypertension, as many as 20 respondents (64.5%). The distribution of blood pressure after the intervention shows changes in the respondents' hypertension after participating in the barefoot morning walk. This data is important to assess the intervention's effectiveness in lowering both systolic and diastolic blood pressure levels and to demonstrate a shift in hypertension toward milder or normal levels. The following shows the distribution of respondents' blood pressure after the intervention.

Table 3. Distribution of blood pressure after intervention

Blood pressure	Frequency	Percentage
Systolic		
Stage I Hypertension	6	12.9
Pre-Hypertension	21	67.7
Normal	4	19.4
Diastolic		
Stage I Hypertension	6	12.9
Pre-Hypertension	21	67.7
Normal	4	19.4
Total	31	100

Table 3 illustrates that, after being given the intervention, the majority of respondents experienced prehypertension, namely 21 respondents (67.7%).

A normality test was conducted to determine whether the blood pressure data before and after the intervention were normally distributed, as a basis for selecting the appropriate statistical test. This test was conducted using the Shapiro-Wilk test because the sample size was less than 50 respondents. The results of this normality test serve as an important reference for determining whether further analysis should use parametric or nonparametric tests. The following are the results of the data normality test (**Table 4**).

Table 4. Normality Test

Before and after	Statistics	Signature
Pre-BP Systolic Pressure	0.884	0.001
Pre-BP Diastolic Pressure.	0.725	0,000
Post-BP Systolic Pressure	0.873	0.002
Post-BP Diastolic	0.658	0,000

Table 4 illustrates that, the results of the normality test are as follows: p-value < 0.05, that the distribution is not normal, so the next statistical test will use a nonparametric test. A test of effect was conducted to determine the difference in blood pressure before and after a barefoot morning walking intervention in hypertensive patients. The Wilcoxon test was chosen because the data were not normally distributed based on the previous normality test. The results of this analysis provide an overview of the intervention's effectiveness in reducing respondents' systolic and diastolic blood pressure. The results of the intervention effect test are as follows.

Table 5. Effect of barefoot morning walks on blood pressure in hypertension sufferers

Before and after	Z	*P value*
Pre Post Systolic BP	-4,879	0.000
Pre Post Diastolic BP	-4,898	0.000

Table 5 illustrates that the results of the Wilcoxon test show that there is an effect of barefoot morning walking on blood pressure. with a p-value < 0.001.

Discussion

The prevalence of hypertension is predominantly in women, and gender influences the incidence of hypertension. Women are at higher risk of hypertension after menopause due to the hormone estrogen, which is a predisposing factor. increase blood pressure because of menopause, estrogen decrease trigger decrease in nitrate oxides that can help vasodilate blood vessels. In men, there is an increase in blood pressure, which is thought to be caused by smoking. Nicotine in cigarettes triggers the release of stress hormones (adrenaline/epinephrine), which constrict blood vessels and increase heart rate (Ekarini et al., 2020)

Respondent characteristics based on the majority being elderly were 21 respondents (67.7%). Age is associated with physiological changes. Aging causes an increase in systolic blood pressure, an increase in mean arterial pressure, an increase in pulse pressure, and a decreased ability to respond to sudden hemodynamic changes. The aging process causes vascular changes that result in narrowing of the blood vessel lumen and decreased venous elasticity (Yunus et al., 2021).

The majority of respondents, 12 people (38.7%), had a primary education. Education Level Affects Hypertension. Lack of Education and Knowledge makes someone more susceptible to hypertension because it can cause someone to lack knowledge to maintain good health and difficulty in obtaining health information (Nugroho & Sari, 2019).

The majority of respondents worked as agricultural workers and homemakers, representing 11 respondents (35.5%). The busy lives of homemakers taking care of their households and farming activities, make them less aware of their health. Busyness and hard work can lead to stress, which can lead to increased blood pressure. Busyness can lead to a lack of time for exercise, which can lead to fat accumulation that impedes blood flow, leading to increased blood pressure (Setiandari, 2022).

Blood Pressure Distribution Before Intervention

Before the intervention, most respondents (20 respondents) had stage I hypertension. The causes of hypertension in respondents were poor stress management, salty foods, fried foods, and infrequent exercise, as well as smoking in men. This is consistent with research (Martini & Sena, 2022), which states that non-modifiable risk factors for hypertension are age, gender, and genetics. Modifiable risk factors include limited physical activity, obesity, smoking, salty foods, dyslipidemia, alcohol consumption, and stress.

Based on information collected from respondents, most of them frequently consume fried foods, rarely exercise, and have poor stress management. In contrast, men have a history of smoking as a causal factor of hypertension.

The Effect of Barefoot Morning Walking on Blood Pressure in Hypertension Patients in Mojorejo Village, Bendosari, Sukoharjo

The Wilcoxon test results after the intervention showed an effect of barefoot morning walking on blood pressure, with a p-value < 0.001. This is consistent with the results of research (Rohimah & Dewi, 2022), which showed an effect of physical activity walking on blood pressure in older people. Walking is a very simple exercise but has many benefits, especially for the elderly with hypertension, particularly in improving blood circulation function. Walking 2 or 3 times a week for at least 30 minutes is a very simple type of exercise, easy to do by people who are physically and mentally healthy, and safe for all ages, can be done anywhere and anytime without taking up much time.

Walking has many benefits, including strengthening the heart muscle, which allows it to pump blood back to the heart and normalize blood pressure, which can occur when blood pressure is high. Exercise lowers blood pressure, and conversely, if blood pressure is low, exercise raises it. Walking is also a safe exercise option for older people, as they experience decreased body function, and walking is a safe and non-fatiguing form of exercise (Harahap et al., 2023).

Structured walking is a form of exercise that can help control blood pressure under normal conditions. Walking offers numerous benefits, including improved muscle tone and circulation, increased blood vessel elasticity, increased heart pumping efficiency, reduced blood fat levels, reduced blood clotting, increased stress resistance, lower blood sugar levels, and reduced obesity and high blood pressure (Sari & Wulandari, 2022). During walking, skeletal muscles activate sensory receptors (mechanoreceptors and proprioceptors) that send signals to the central nervous system. This activation may contribute to decreased sympathetic nervous system activity. a sustained decrease in cardiac output and vascular resistance due to relaxation of blood vessels, facilitated by reduced sympathetic activity and increased parasympathetic activity.

Walking exercise can cause several mechanisms, including decreased sympathetic nervous system activity, decreased circulating catecholamines and cortisol, increased baroreflex sensitivity, improved kidney function, reduced impact of atherosclerosis, and increased capillary capacity. Walking is very easy to do but has many benefits, especially in the elderly with hypertension, particularly in improving blood circulation. (MRizky, 2020).

According to researchers, morning walking as an alternative to lowering blood pressure is a light activity that can be done daily by adolescents, adults, and older people without disabilities. Walking is easy and inexpensive, so this physical activity is recommended for all seniors, as it can help

prevent or reduce the effects and complications of hypertension.

Implications and limitations

The results of this study indicate that barefoot morning walking has a significant effect on lowering systolic and diastolic blood pressure in hypertensive patients. These findings provide an important contribution to the development of theory and research in the health sector, particularly nurse cardiovascular health related to non-pharmacological interventions in the management of hypertension. This study by practitioners nursing can implement therapy and education to patient. For controlling blood pressure, simple physical activity performed regularly, especially involving sensory stimulation through barefoot walking, can support the regulation of the cardiovascular system.

This study has several limitations that should be considered when interpreting its results. The relatively small sample size and its limitation to a single village make generalizing these findings to a broader population less than optimal. Furthermore, the use of a single-group pretest-posttest design without a control group introduces potential bias, as changes in blood pressure may also be influenced by factors other than the intervention. Therefore, further research is recommended using a larger sample size and an experimental design with a control group.

Relevance to Practice

Nursing practitioners may recommend barefoot morning walks as part of lifestyle-based hypertension management education, especially for individuals with limited access to exercise facilities or other therapies. Cardiovascular nurses can incorporate this intervention into the patient's discharge planning to go home for control hypertension.

Conclusion

Based on the research results, it can be concluded that before the barefoot morning walking intervention, the majority of respondents were in the stage I hypertension category, both in systolic and diastolic blood pressure measurements. After the intervention, there was a decrease in blood pressure, with most respondents being prehypertensive. The statistical test results showed that there was a decrease in blood pressure. The effect of barefoot morning walks on the decrease in blood pressure

Funding

This research received no external funding.

CrediT Authorship Contributions Statement

Eka Novitayanti: Conceptualization, Methodology, Supervision, Writing - Original Draft, Investigation, Resources, Funding Acquisition.

Christiana Arin Proborini: Software, Validation, Formal Analysis, Writing - Review & Editing, Data Curation, Project Administration

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

Acknowledgments

The authors would like to express their sincere gratitude to all people suffering from hypertension in Mojorejo Village, Bendosari, Sukoharjo, who participated in this study and supported the data collection process. The authors also appreciate the contributions of colleagues who provided

valuable insights and encouragement throughout the research process.

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