



NON-PHARMACOLOGICAL INTERVENTIONS AND EFFECTIVENESS IN MANAGING HYPERTENSION AMONG THE ELDERLY

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ABSTRAK

Hipertensi merupakan salah satu masalah kesehatan utama pada lansia yang berisiko meningkatkan angka morbiditas dan mortalitas. Penanganan hipertensi tidak hanya berfokus pada terapi farmakologis, tetapi juga intervensi non-farmakologis yang terbukti efektif menurunkan tekanan darah serta meningkatkan kualitas hidup. Penelitian ini bertujuan untuk mengidentifikasi dan menganalisis efektivitas berbagai intervensi non-farmakologis dalam mengelola hipertensi pada lansia. Metode penelitian menggunakan Systematic Literature Review dengan penelusuran artikel melalui database PubMed, Scopus, dan DOAJ menggunakan kata kunci “non pharmacological”, “interventions”, “hypertension”, dan “elderly” sehingga didapatkan 248 artikel yang selanjutnya di seleksi menggunakan diagram alur PRISMA dengan kriteria inklusi tahun 2020–2025, sehingga diperoleh 25 artikel untuk dianalisis. Hasil telaah menunjukkan bahwa intervensi non-farmakologis seperti latihan fisik (jalan kaki, yoga, aerobik, latihan kombinasi, dan isometric handgrip), relaksasi Benson, mindfulness, serta pola makan sehat (DASH diet, diet Mediterania) secara konsisten menurunkan tekanan darah sistolik maupun diastolik secara signifikan. Selain itu, intervensi tersebut juga berdampak positif terhadap kualitas tidur, fungsi kognitif, kapasitas fungsional, dan kepatuhan pengelolaan hipertensi. Kesimpulannya, intervensi non-farmakologis merupakan strategi efektif, aman, dan dapat diterapkan secara luas dalam upaya pengendalian hipertensi pada lansia, baik sebagai terapi tunggal maupun pendamping terapi farmakologis.

Kata kunci: gaya hidup; hipertensi; intervensi non-farmakologis; lansia; tekanan darah

NON-PHARMACOLOGICAL INTERVENTIONS AND EFFECTIVENESS IN MANAGING HYPERTENSION AMONG THE ELDERLY

ABSTRACT

Hypertension is one of the major health problems among the elderly, contributing significantly to morbidity and mortality rates. Management of hypertension does not only rely on pharmacological therapy but also includes non-pharmacological interventions that have been proven effective in lowering blood pressure and improving quality of life. This study aims to identify and analyze the effectiveness of various non-pharmacological interventions in managing hypertension among the elderly. The research method used a Systematic Literature Review by searching articles through the PubMed, Scopus, and DOAJ databases using the keywords "non-pharmacological", "interventions", "hypertension", and "elderly" so that 248 articles were obtained which were then selected using the PRISMA flow diagram with inclusion criteria for 2020–2025, so that 25 articles were obtained for analysis. The findings revealed that non-pharmacological interventions such as physical exercise (walking, yoga, aerobic, combined training, and isometric handgrip), Benson relaxation, mindfulness, and healthy dietary patterns (DASH diet, Mediterranean diet) consistently reduced both systolic and diastolic blood pressure significantly. Furthermore, these interventions also showed positive impacts on sleep quality, cognitive function, functional capacity, and adherence to hypertension management. In conclusion, non-pharmacological interventions are effective, safe, and feasible strategies for controlling hypertension in the elderly, either as a stand-alone therapy or as a complement to pharmacological treatment.

Keywords: blood pressure; elderly; hypertension; lifestyle; non-pharmacological interventions

PENDAHULUAN

Hypertension is one of the global health issues whose prevalence continues to rise with increasing age and changes in lifestyle. This condition is a major risk factor for various cardiovascular diseases, strokes, and kidney failure, which can increase morbidity and mortality rates, particularly among the elderly. In Indonesia, hypertension among the elderly remains a dominant health issue requiring comprehensive management strategies, both through pharmacological therapy and non-pharmacological interventions (Cernota et al., 2022). (Damiani & Wulandari, 2021). Efforts to control hypertension have largely relied on pharmacological treatment; however, dependence on medication can lead to long-term side effects and significant costs for patients. Therefore, various studies highlight the importance of implementing non-pharmacological interventions as part of hypertension management strategies. These interventions include physical activity, dietary adjustments, stress management, and healthy lifestyle education, which have been proven effective in lowering blood pressure (Debela et al., 2023).

Physical exercise, such as strength training, has been shown to have a significant impact on lowering blood pressure in hypertensive patients. A meta-analysis indicates that strength training consistently plays a role in reducing both systolic and diastolic blood pressure while improving cardiorespiratory fitness. Additionally, healthy eating patterns such as the DASH diet or the Mediterranean diet are widely recommended in various international guidelines as non-pharmacological strategies for managing hypertension (Correia et al., 2023). Maniero, et al (2023) Moreover, health education approaches based on lifestyle changes have proven effective in increasing patients' awareness of adhering to hypertension management. Educational intervention programs can encourage patients to make lifestyle modifications, such as reducing salt intake, increasing physical activity, and managing stress, which ultimately can significantly lower blood pressure. This is in line with research in Indonesia that emphasizes the importance of non-pharmacological approaches in managing hypertension in the elderly, particularly through simple physical activities, relaxation, and healthy eating patterns.

Based on the above description, the purpose of this study is to identify and analyze the effectiveness of non-pharmacological interventions in managing hypertension in the elderly, as well as to provide an overview of strategies that can be practically implemented in daily life. The method used in this study is a Systematic Literature Review (SLR). Articles will be searched through international databases such as PubMed, Scopus, and DOAJ using the keywords "non-pharmacological," "interventions," "hypertension," and "elderly." Article selection will follow the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart with inclusion criteria from 2020 to 2025. Eligible articles will be analyzed in depth to determine the effectiveness of non-pharmacological interventions used in the management of hypertension in the elderly (Cernota et al., 2022). This study aims to identify and analyze the effectiveness of various non-pharmacological interventions in managing hypertension among the elderly.

METODE

This literature review uses a Systematic Literature Review approach. The research was conducted using the keywords "Non-Pharmacological", "intervention", "hypertension", and "elderly" to search for literature in the Pubmed, Scopus, and DOAJ databases for the years 2020-2025, then 248 articles were obtained. The article selection process used the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram so that 25 articles were obtained for review. The literature review research was carried out by determining the topic, searching and selecting relevant literature, developing arguments, conducting a literature survey, analyzing the literature, and writing a systematic and structured review. Based on the PRISMA diagram, the systematic literature review process resulted in 25 articles that met the inclusion criteria for further analysis.

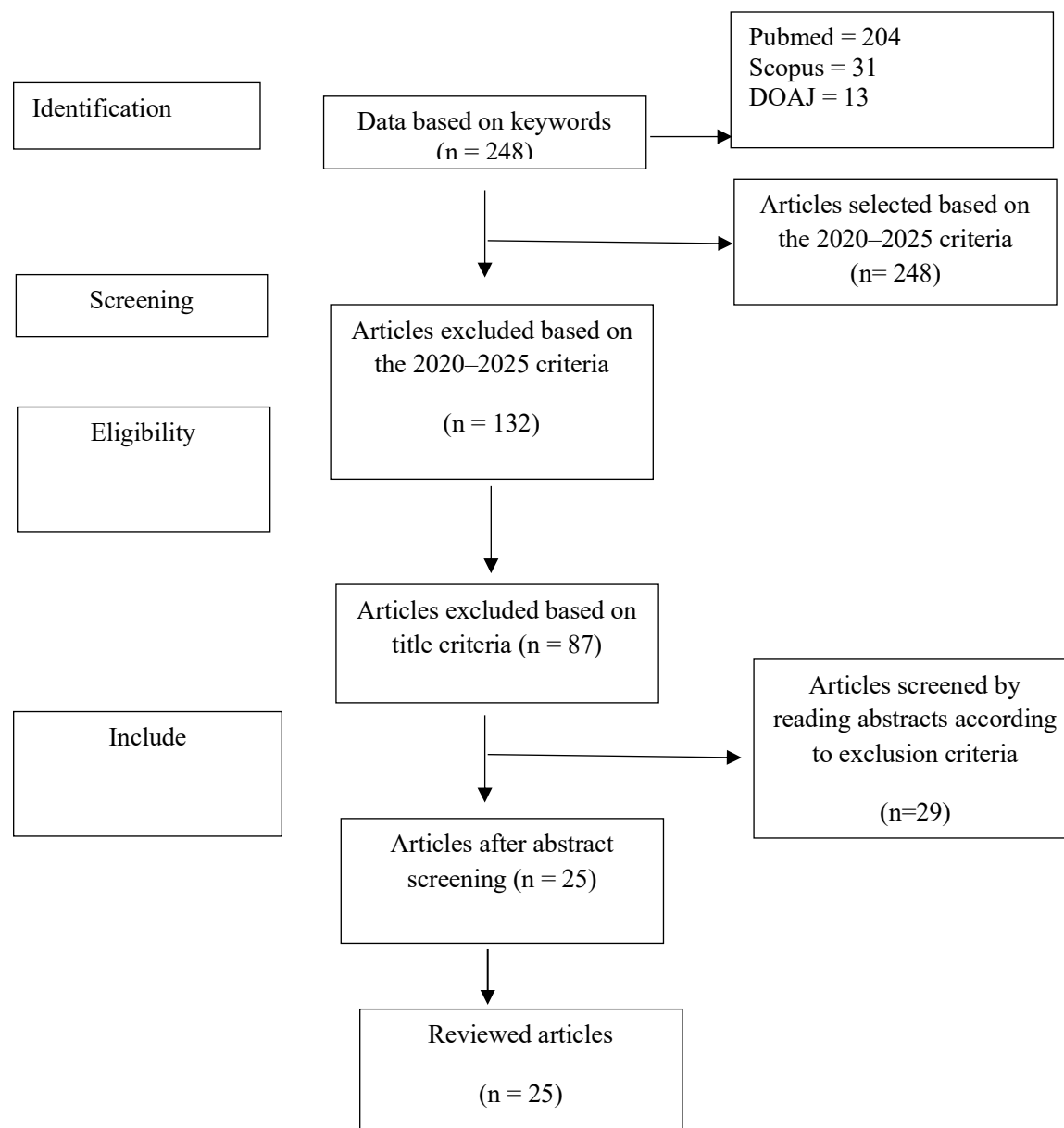


Figure 1. PRISMA Diagram

HASIL DAN PEMBAHASANTabel 1.
Literature review search results

Title / Author / Year	Research Objective	Research Method	Research Findings
The Effect of Walking Exercise on Blood Pressure and Blood Glucose in the Elderly Rizka M, Ambardini RL, Virama LOA, Yudhistira D (2022)	To find out the effect of walking exercise on 3x/week 60 minutes walking exercise for 3 weeks. glucose levels in the elderly.	Experimental, 34 elderly ≥ 60 yrs, 60 minutes walking exercise for 3 weeks.	Significant decreases in systolic ($p < 0.005$), diastolic ($p < 0.018$), and blood glucose ($p < 0.031$) blood pressure.
Handgrip Strength and DASH Eating Behavior is Related to Higher Blood Pressure on Pre-Elderly and Elderly in Yogyakarta Fayasari A, Nilansari AF, Bertorio MJ (2025)	To examine the relationship between hand grip strength (HGS) and DASH diet with blood pressure in pre-elderly and elderly.	Cross-sectional, Hospital, Yogyakarta, July–August 2024, correlation & regression analysis.	Wirosaban 68.8% hypertension, 68.8% low HGS, 81.7% low DASH. HGS & was not significant, but a low DASH diet was significantly associated with high blood pressure in the pre-elderly ($p = 0.031$).

Title / Author / Year	Research Objective	Research Method	Research Findings
The Effect of Yoga Exercise on Reducing Blood Pressure Among Elderly With Hypertension Maharani AR, et al. (2024)	Knowing the effects of yoga on blood pressure in the elderly with hypertension.	One group pre-post test design, 19 elderly people aged 50–70 years were given yoga 2x/week for 4 weeks. Analyze with <i>paired t-test</i> .	Systolic blood pressure decreased significantly from 148.5 → 141.5 mmHg, and diastolic from 93.2 → 87.3 mmHg ($p<0.001$). Yoga effectively lowers blood pressure.
Physical Activity as an Effort to Prevent Hypertension in the Elderly Sasarari ZA, et al. (2024)	Evaluate physical activity for the prevention of hypertension in the elderly.	A case-control quantitative study with 42 elderly respondents. Physical activity was measured using a questionnaire; Chi-Square analysis.	Good physical activity was found at 71%, but analysis showed no significant association ($p=0.634$). Even so, physical activity is still important as a prevention strategy.
The Effect of Benson Relaxation on Decreasing the Degree of Blood Pressure in Older Adults With Hypertension Ayatulloh D, et al. (2024)	Analyze the effectiveness of Benson's relaxation in the elderly with hypertension.	Quasi-experimental pre-post control group design, 40 respondents (20 controls, 20 in interventions). Benson is done 2x/week for 4 weeks.	The intervention group experienced a significant decrease in blood pressure ($p=0.000$), the control group was not significant. Benson therapy is recommended as a nonpharmacological therapy.
Time-Efficient Physical Activity Interventions to Reduce Blood Pressure in Older Adults: RCT Herrod PJ, et al. (2021)	Compare HIIT, IHG, RCT, RIPC, & control in elderly blood pressure.	48 healthy elderly (mean 71 yrs). Intervention 6 weeks, 3x/week. Main outcome: systolic blood pressure/diastolic blood pressure.	HIIT and ihg lowered systolic blood pressure by an average of 9 mmHg (significant), ripc and blood control were ineffective. There was no change in diastolic blood pressure.
Optimization of Cognitive Function and Quality of Life in Elderly With Hypertension Through Chair-Based Exercise Pefbrianti D, et al. (2025)	To assess the effect of chair-based exercise on cognitive function and quality of life in hypertensive elderly.	Quasi-experiment pre-post control group, 32 respondents (16 interventions, 16 controls). Chair training for 6 days. Wilcoxon analysis.	The intervention improved cognitive function ($p=0.005$) and quality of life in the elderly with hypertension ($p=0.000$). The controls are insignificant.
Feasibility and Efficacy of Low-to-Moderate Intensity Aerobic Exercise in Reducing Resting BP in Sedentary Older Adults Alzahrani AA, et al. (2023)	A test of the effectiveness of mild-to-moderate aerobic exercise in hypertensive seniors.	RCT pilot, 27 elderly (12 interventions, 12 controls). Duration 8 weeks, 3 sessions/week, Saudi minutes/session.	There was a significant decrease in systolic blood pressure (-2.75 mmHg, $p=0.005$) and diastolic blood pressure (-0.83 mmHg, $p=0.02$) in the intervention group. The controls are insignificant.
Physiological Characteristics of Blood Pressure Responses After Combined Exercise in Elderly Hypertensive Patients: SR & Meta-Analysis Li Z, et al. (2024)	The effectiveness of combination exercise on blood pressure in the elderly.	Systematic review & meta-analysis (9 studies, 368 participants). Tools: revman 5.3 & stata 15.	Combination exercise lowered systolic blood pressure by an average of -11.2 mmHg and diastolic blood pressure by -5.9 mmHg ($p<0.05$). Effective both in the elderly >70 years old and users of antihypertensive drugs.
The Impact of Aerobic Exercise on Health Management in Older Patients With Hypertension: SR of RCT (2014–2024) Zhang B, et al. (2025)	Evaluating the effects of aerobic exercise on elderly hypertension.	Systematic review & meta-analysis, 9 rcts, 484 patients.	Aerobics significantly lowered systolic blood pressure (smd=-0.93), diastolic blood pressure (smd=-0.48), decreased hr, and improved cardiorespiratory fitness ($p<0.01$).
Lifestyle Modifications and Non-Pharmacological Management in Elderly Hypertension Tsai HY, et al. (2024)	Review of lifestyle modification in elderly hypertension.	Review of previous RCT & meta-analysis based articles.	Aerobic, resistance, tai chi, hiit, and isometric exercises are effective in lowering systolic blood pressure by 4–8 mmHg. The dash & mediterranean diet has also been shown to lower blood pressure in the elderly.

Title / Author / Year	Research Objective	Research Method	Research Findings
DASH-Style Dietary Pattern and 24-H Ambulatory Blood Pressure in Elderly Chinese Na M, et al. (2022)	The relationship of the DASH diet with blood pressure & variability.	Cross-sectional analysis, 324 elderly ≥ 60 yrs (China). 24-hour blood pressure measurement.	Higher dash scores were associated with decreased nighttime blood pressure variability ($p < 0.05$). There was no effect on daytime blood pressure.
Effectiveness of a Self-Management Education Program on Hypertension Control in Older Adults Foroumandi E, et al. (2022)	The effectiveness of self-management education.	Intervention trial in Iran, 227 elderly with hypertension, 12 education sessions for 6 months.	Education significantly lowered systolic blood pressure (-2.6 mmHg), body weight, bmi, fbs, and total cholesterol. Effectively improves compliance & control of metabolic risk factors.
Differential Effects of Exercise Training Protocols on BP and Lipid Profiles in Older Adults With Hypertension: SR & Meta-Analysis Hejazi, et al. (2025)	Effects of various exercises (aerobics, resistance, combination, Tai Chi, IHG).	Systematic review & meta-analysis, examining 92 rcts (n=4988) with the prospero protocol. Variables: systolic blood pressure, diastolic blood pressure, ldl, hdl, tg, tc.	All types of exercises lower systolic blood pressure & significant diastolic blood pressure; Aerobic + resistance combination effectively increases HDL and lowers LDL/TG; Isometric handgrip training has the greatest effect on blood pressure reduction. Effectiveness is influenced by the duration of the program, gender, and bmi.
The Possibility That Long-Term Isometric Handgrip Exercise Contributes to Left Atrial Enlargement Kemi, et al. (2020)	Assessing the long-term safety of IHG in hypertensive older adults.	A prospective, single-center, non-randomized study in Japan, n=15 hypertensive patients; 12-week IHG intervention compared to IHG+walking. Examination: blood pressure, bnp, echocardiography.	There is no significant drop in blood pressure; IHG-only increases BNP and left atrial volume significantly. It was concluded that long-term ihg has the potential to increase the risk of heart remodeling in elderly hypertensive patients.
Effects of Isometric Handgrip Training on Home Blood Pressure in Hypertensive Patients: RCT Nemoto, et al. (2021)	Test the effect of IHG on the blood pressure of hypertensive patients.	Rct crossover, n=53, 8 weeks ihg vs 8 weeks control. Outcome: blood pressure morning & evening at home, grip strength.	Ihg significantly lowers morning and evening systolic blood pressure/diastolic blood pressure (-2-3 mmhg) and improves grip strength. The antihypertensive effect is greater in patients with improved grip strength.
Can Exercise Help Regulate Blood Pressure and Improve Functional Capacity of Older Women With Hypertension? Leitão, et al. (2021)	A 9-month multicomponent exercise program test in elderly hypertensive women.	Longitudinal study, 28 women intervention (9 months of 2x/week training program) vs 17 controls. Evaluation at baseline, post-program, after 3 months of detraining.	The program lowers systolic blood pressure $\sim 5.4\%$, diastolic blood pressure $\sim 5.7\%$, resting hr -7.8% , and significantly increases strength & aerobic capacity. However, 3 months of detraining returned blood pressure to baseline even though functional capacity was partially retained.
Comprehensive Time-Course Effects of Combined Training on Hypertensive Older Adults: RCT Sardeli, et al. (2022)	The effect of 16 weeks of combination training.	16-week RCT, n=52 (23 training, 23 controls). Blood pressure outcomes, vo2max, strength, biochemical markers.	Does not lower blood pressure despite an increase in vo2max (+18%) & strength (+8%). Decreased incidence of metabolic syndrome. Exercise improves fitness, but the antihypertensive effect is not significant $\rightarrow$ may require different durations/intensities.

Title / Author / Year	Research Objective	Research Method	Research Findings
The Effect of Exercise in Older Adults With Hypertension: SR & Meta-Analysis Kazeminia, et al. (2020)	The impact of physical exercise on the blood pressure of the hypertensive elderly.	Systematic review & meta-analysis 69 studies (n≈2272). Variables: systolic blood pressure, diastolic pressure.	Exercise significantly lowers systolic blood pressure (−5 mmhg) & diastolic blood pressure (−4 mmhg). The effects are more pronounced on long-term programs and resistance. The effect is consistent in Asia, Europe, America. Affirming exercise as essential non-pharmacological therapy.
The Effects of Non-Pharmacological Interventions on Sleep in Older Adults: SR & Meta-Analysis Jung, et al. (2022)	Effectiveness of non-drug interventions on sleep in the elderly.	Systematic review & meta-analysis 14 studies (RCT/NRCT). Intervention ≥1–12 weeks. Outcome: sleep quality (kss, psqi).	Non-pharmacological interventions significantly improved sleep quality (smd=1.0). Aromatherapy (smd=0.61) was effective → additional implications for hypertension control through sleep improvement. Group-based & duration >4 weeks is more effective.
Nurse-Led Strategies for Lifestyle Modification in Older Adults With Hypertension: Scoping Review Li, et al. (2025)	Exploration of nurse intervention in hypertension control.	Scoping review (PRISMA-scr), 5 quantitative studies from asia.	Nurse intervention is in the form of education, counseling, routine follow-up, acupressure. → improve medication adherence, self-care, sleep, and lower blood pressure variously. Nurses play a big role in empowerment htn management.
Physical Exercise for Older People With Hypertension in COVID-19 Pandemic: Review Sari, et al. (2022)	Summarize evidence of hypertension elderly exercise in the pandemic era.	Literature review 10 articles (2019–2022).	Types of exercise: elderly gymnastics, morning walks, light aerobics, rom, balance, virtual exergames. Benefits: maintain blood pressure, improve immunity, reduce depression/anxiety. Virtual/online training is effective, even though it is constrained by technology access.
Mindfulness in Motion and DASH in Hypertensive African Americans With MCI Wright, et al. (2021)	Mindfulness + DASH diet feasibility test.	Cluster RCT, pilot study, n=38 (6 random groups: mim+dash, attention-only, true control) for 8 weeks.	A clinically significant decrease in systolic blood pressure −7.2mmhg in the mim dash group. Diet, mindfulness, stress do not change. Interventions are considered feasible and culturally acceptable.
Exercise Reduces Ambulatory Blood Pressure in Hypertensive Patients: SR & Meta-Analysis of RCTs Saco-Ledo, et al. (2020)	Effect of exercise on ambulatory blood pressure (24 hours).	Systematic review & meta-analysis, 15 rct (n=910). Duration of training 8–24 weeks, 3–5 sessions/week.	Aerobic exercise lowers 24 hours of systolic blood pressure −5.4mmhg & diastolic blood pressure −3.0mmhg, as well as daytime and nighttime blood pressure. The main effect in patients who are taking antihypertensive medications. There was no significant effect on untreated patients.

Title / Author / Year	Research Objective	Research Method	Research Findings
The Effect of Mediyoga on Sleep-Quality, Blood Pressure, and Quality of Life: Study Protocol Risom, et al. (2025)	Test yoga online in elderly people with hypertension.	Pragmatic RCT, 3-arm (tau Vs yoga20 vs yoga40), target n=180, 6-month follow-up. Primary outcomes: psqi, hrqol, blood pressure, hads.	Yoga-based mediyyoga has the potential to improve sleep and blood pressure control. It is expected to provide complementary evidence of non-pharmacological alternatives.

A review of the literature shows that non-pharmacological interventions have a significant impact on lowering blood pressure in elderly people with hypertension. A number of studies support the effectiveness of various approaches such as physical activity, diet management, lifestyle education, and relaxation therapy. The study by Rizka et al. (2022) demonstrated that a simple walking program (3x/week, 60 minutes for 3 weeks) significantly reduced both systolic and diastolic blood pressure. This finding is particularly relevant for elderly populations as walking represents a low-impact, accessible form of exercise. The meta-analysis by Zhang et al. (2025) further strengthens this evidence, showing that aerobic exercise produces substantial reductions in systolic blood pressure (SMD=-0.93) and diastolic blood pressure (SMD=-0.48), while also improving cardiorespiratory fitness.

Li et al. (2024) provided robust evidence that combined aerobic and resistance training produces superior outcomes, with average reductions of -11.2 mmHg systolic and -5.9 mmHg diastolic blood pressure. This synergistic effect surpasses single-modality interventions, suggesting that the complementary physiological adaptations from both exercise types create a more comprehensive cardiovascular benefit. The combination addresses both central (cardiac output) and peripheral (vascular resistance) components of blood pressure regulation. The research by Fayasari et al. (2025) revealed concerning dietary patterns among elderly Indonesians, with 81.7% showing low DASH diet scores. This finding is particularly significant as low DASH adherence was significantly associated with higher blood pressure in pre-elderly populations ($p=0.031$). Na et al. (2022) added another dimension by demonstrating that higher DASH scores correlated with reduced nighttime blood pressure variability, an independent predictor of cardiovascular events.

Physical activity has proven to be one of the most consistent non-pharmacological interventions in lowering blood pressure. Strength training, for example, can significantly reduce systolic and diastolic blood pressure and improve cardiovascular fitness. These results are consistent with previous research emphasizing that aerobic exercise, yoga, and combined training (aerobic and resistance) are also effective in controlling blood pressure, particularly in the elderly population (Fu et al., 2020).

In addition to physical activity, diet-based interventions have also been shown to yield positive results. The implementation of healthy diets such as the DASH (Dietary Approaches to Stop Hypertension) diet and the Mediterranean diet has been widely recommended in various international guidelines. These guidelines emphasize that dietary modifications, particularly reducing salt intake, increasing fiber intake, and consuming fruits and vegetables, can lower blood pressure and improve overall cardiovascular health. Studies in Indonesia also support these findings, where a healthy diet and simple physical activity can be effective strategies that are easy to implement in the daily lives of the elderly (Maniero et al., 2023). (Damiani & Wulandari, 2021).

On the other hand, health education and behavior-based programs also make a significant contribution to hypertension management. Health education interventions have been proven to improve patient compliance with hypertension management and encourage healthier lifestyle changes. A study by showed that intensive education on healthy lifestyles significantly improved patient behavior modification, which ultimately led to a decrease in blood pressure. Continuous education can strengthen patients' awareness to maintain a healthy lifestyle consistently. Debela et al. (2023) These findings are reinforced by a broader review, which states that despite various barriers to the implementation of non-

pharmacological interventions, their effectiveness has been proven both clinically and in terms of cost. Barriers such as time constraints, lack of healthcare system support, and socio-cultural factors can influence implementation; however, non-pharmacological strategies are still considered more sustainable compared to long-term pharmacological therapy (Düsseldorf et al., 2022).

Overall, findings from various studies indicate that non-pharmacological interventions are not only effective in lowering blood pressure but also provide additional benefits such as improved quality of life, cognitive function, sleep quality, and functional capacity in the elderly. Combining interventions, such as physical activity, a healthy diet, and health education, is even more effective than implementing a single type of intervention (Rosasyda, et al., 2025). Thus, this discussion confirms that non-pharmacological interventions are a highly relevant and widely applicable strategy in the management of hypertension in the elderly. A holistic approach, integrating physical activity, healthy eating, health education, and stress management, has been shown to have an optimal impact on lowering blood pressure and improving the quality of life of hypertensive patients.

SIMPULAN

Based on the results of the literature review, it can be concluded that non-pharmacological interventions have been proven effective in lowering blood pressure in elderly individuals with hypertension. Various approaches, such as physical activity (yoga, walking, combined exercises, and strength training), healthy eating patterns (DASH and Mediterranean diets), relaxation, and health education, have a positive impact on both systolic and diastolic blood pressure. In addition to lowering blood pressure, non-pharmacological interventions also improve other aspects related to quality of life, such as cognitive function, sleep quality, functional capacity, and patient adherence to hypertension management. These findings indicate that non-pharmacological strategies are not only beneficial as adjunctive therapy to pharmacological treatment but can also serve as a safe, cost-effective, and easily implementable alternative in the daily lives of the elderly. Therefore, the sustained implementation of non-pharmacological interventions, whether through community-based programs or primary healthcare services, is crucial to support hypertension control efforts in the elderly and reduce the risk of future cardiovascular complications.

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