

Effectiveness of hypertensive gymnastics physical exercise on lowering blood pressure in hypertensive patients

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ABSTRACT

Introduction: Hypertension is a primary global health concern often referred to as a "silent killer" due to its asymptomatic progression and high risk of cardiovascular complications. Non-pharmacological interventions, such as structured physical exercises, have gained attention as effective alternatives to control blood pressure levels. This study aimed to determine the effectiveness of hypertension exercise in lowering blood pressure among elderly hypertensive patients.

Methods: A descriptive case study design involved two hypertensive patients aged 60–65 at Tamalanrea Health Centre, Makassar. The intervention consisted of a three-day hypertension exercise regimen conducted twice daily. Blood pressure was measured using a digital sphygmomanometer before and after each exercise session. Additional data for the exercise program was collected using questionnaires, observation sheets, interviews, and standard operating procedures (SOPs).

Results: The findings revealed a significant reduction in systolic and diastolic blood pressure. Respondent 1 experienced a decrease from 170/72 mmHg to 130/70 mmHg, while Respondent 2's blood pressure reduced from 194/100 mmHg to 140/75 mmHg after the intervention.

Conclusion: Hypertension-specific physical exercise effectively reduced blood pressure among hypertensive patients. It is recommended as a safe, low-cost, and accessible non-pharmacological therapy, especially for older people.

Keywords: Blood Pressure Reduction, Hypertension, Gymnastics, Non-Pharmacological Therapy, Physical Exercise

INTRODUCTION

Hypertension, commonly known as high blood pressure, is one of the most prevalent public health issues worldwide. It stands as a leading cause of morbidity and mortality, contributing significantly to cardiovascular diseases such as stroke, heart failure, and coronary artery disease [1]. According to the World Health Organization (WHO), over 1.28 billion adults globally suffer from hypertension, with a large portion residing in low- and middle-income countries [2]. Often referred to as the “silent killer,” hypertension typically presents no noticeable symptoms until serious complications arise. Medically, hypertension is defined as a sustained increase in blood pressure, with systolic pressure equal to or exceeding 140 mmHg and/or diastolic pressure equal to or exceeding 90 mmHg, based on multiple measurements over time [3]. Several risk factors contribute to the development of hypertension, including age, genetics, a sedentary lifestyle, excessive salt intake, stress, obesity, smoking, and lack of regular physical activity [4].

Management of hypertension involves not only pharmacological treatment but also comprehensive non-pharmacological strategies [5]. These lifestyle-based interventions are critical in preventing and controlling high blood pressure. Key components of non-drug interventions include dietary modification (e.g., the DASH diet), smoking cessation, alcohol moderation, stress management, weight control, and regular physical exercise [6]. Among the various forms of physical activity, hypertension gymnastics is an efficient approach for hypertensive patients, a structured form of low- to moderate-intensity aerobic exercise explicitly designed to improve cardiovascular health and lower blood pressure [7]. These exercise routines typically involve warm-up stretches, rhythmic aerobic movements, core strengthening, breathing exercises, and cool-down periods. Sessions may last 30 to 60 minutes and are adapted to suit the fitness levels of hypertensive individuals [8].

Numerous studies have confirmed that regular exercise can significantly lower systolic and diastolic blood pressure [9]. Moderate aerobic activities such as brisk walking, cycling, swimming, yoga, or structured gymnastics can reduce systolic blood pressure by approximately 5–10 mmHg and diastolic pressure by 3–7 mmHg. These reductions are attributed to several physiological mechanisms, including improved endothelial function, reduced peripheral vascular resistance, enhanced insulin sensitivity, and reduced circulating stress hormones such as cortisol and adrenaline [10].

In addition to its physical benefits, hypertension gymnastics has notable psychological advantages. Performed often in group settings and accompanied by music, this exercise promotes emotional well-being, reduces anxiety and depression, and fosters community and social support [11]—these psychosocial effects further lower stress levels, significantly contributing to elevated blood pressure. As a non-pharmacological therapy, hypertension gymnastics offers numerous benefits: it is cost-effective, easy to implement, minimally invasive, and adaptable for various age groups, especially elderly populations who are at higher risk. Hypertension gymnastics has been integrated into local public health efforts in Indonesia and other countries with community-based health promotion programs, particularly through primary care centres and elderly support groups. Its adoption aligns with broader preventive strategies to reduce the burden of non-communicable diseases. However, the success of such interventions depends heavily on patient adherence and long-term commitment. Lack of motivation, inadequate education, and absence of supportive environments can hinder individuals from sustaining regular physical activity. Therefore, it is crucial to implement ongoing health education, public campaigns, and personalised coaching to encourage active lifestyles among hypertensive patients. Healthcare providers, families, and communities must collaborate to create an environment that facilitates and motivates behaviour change.

MATERIALS AND METHODS

Study Design

This research employed a case study design with a descriptive approach. The aim was to observe and describe the effect of exercise on blood pressure levels in hypertensive patients in a real-life context. This method allowed an in-depth evaluation of pre- and post-intervention changes resulting from a structured physical exercise program.

Study Subjects

The subjects were two hypertensive patients aged 60 and 65, registered at Tamalanrea Health Centre in Makassar City. Both participants had been previously diagnosed with hypertension, with initial blood pressure readings above the normal range.

Focus of the Study

The central focus was to evaluate the effectiveness of hypertension exercise in lowering blood pressure. Operational definitions included: Hypertension: Blood pressure readings equal to or above 140/90 mmHg. Hypertension exercise: A series of mild aerobic movements designed to improve circulation and heart function.

Data Collection Instruments

Several tools were utilised to obtain quantitative and qualitative data: Knowledge and Attitude Questionnaire: Measured patients' understanding and attitudes toward hypertension and hypertension exercise. Observation Sheets: Assess accuracy and adherence to the hypertension exercise routine. Blood Pressure Measurement Forms: Tracked changes in blood pressure before and after each exercise session. Digital Sphygmomanometer: Used to measure blood pressure accurately. Quality of Life Questionnaire: Assessed changes in well-being and physical functioning post-intervention. In-depth Interviews: Gathered patient experiences and perceptions of hypertension exercise. Standard Operating Procedure (SOP) for Hypertension Exercise: Provided structured movement guidelines, including: On-the-spot marching (2x8 counts). Clapping and finger tapping (8 counts each). Arm and wrist movements (8 counts). Lower body exercises such as squatting and tiptoeing (8 counts each). Cooling down with deep breathing (2x8 counts)

Data Collection Procedure

A digital tensimeter measured Blood pressure before and after every exercise session. The intervention was conducted over three consecutive days, with exercise sessions held twice daily—morning (10–15 minutes) and evening (15–20 minutes). Additional data were collected via observations, questionnaires, and interviews.

Location and Duration

The study was conducted at Tamalanrea Health Centre in Tamalanrea District, Makassar City. The total duration of the intervention was three days, focusing on a high-prevalence hypertension population.

Data Presentation

The collected data were organised in tabular format to demonstrate pre- and post-exercise blood pressure values and identify trends. The tables displayed systolic and diastolic measurements for each day and participant throughout the intervention.

Ethical Considerations

This study followed ethical research principles to protect participants: Informed Consent: Participants were fully informed and gave written, voluntary consent. Confidentiality: Personal data were anonymised and used strictly for research purposes. Nonmaleficence: Exercises were adjusted based on health status to prevent harm. Beneficence: The intervention aimed to offer real benefits in blood pressure reduction and quality of life. Justice: Selection was fair, with no discrimination by age, gender, or background. Research Competence: The researcher was trained and supervised in handling clinical interventions. Ethical Approval: The protocol received clearance from the institutional ethics committee

RESULTS

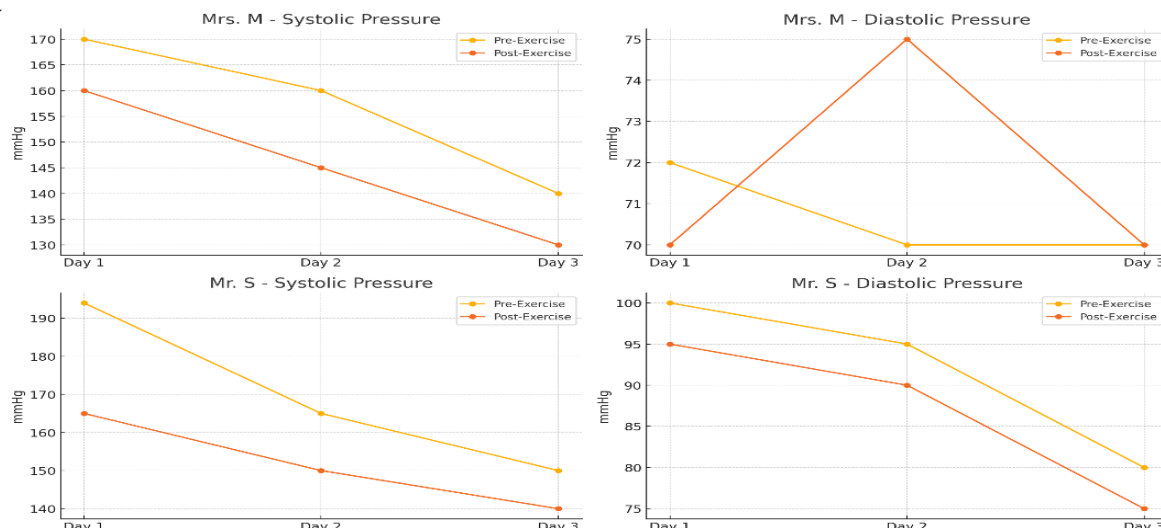
The study involved two hypertensive patients registered at Tamalanrea Health Centre, Makassar City. The demographic data are presented in the following table:

Table 1. General Characteristics of Respondents

Respondent	Age	Gender	Education	Occupation
Mrs. M	65 years	Female	Senior HS	Housewife (IRT)
Mr. S	60 years	Male	Senior HS	Unemployed

Both participants were within the elderly age group and had similar educational backgrounds.

One was female and actively performing daily housework while the other was male and not currently W



Graph 1. The four graphs above illustrate the changes in blood pressure for each respondent before and after participating in hypertension exercise over three days.

Mrs. M: Experienced a gradual and consistent reduction in blood pressure, from 170/72 mmHg down to 130/70 mmHg by the end of Day 3. Mr. S: Also demonstrated significant improvement, reducing from 194/100 mmHg to 140/75 mmHg over the same period. Both participants showed a notable decrease in systolic and diastolic blood pressure after participating in structured hypertension exercise. The reduction was progressive over the three days, indicating a strong correlation between the physical intervention and blood pressure control. Mrs. M's systolic pressure decreased by 40 mmHg, and diastolic pressure decreased by 2 mmHg. Mr. S's systolic pressure decreased by 54 mmHg, and diastolic pressure decreased by 25 mmHg. This result confirms that even short-term implementation of physical exercise, when performed regularly and according to SOPs, can yield significant benefits in managing hypertension.

DISCUSSION

This study evaluated the effectiveness of hypertension exercise (hypertension gymnastics) as a non-pharmacological intervention in lowering blood pressure among elderly hypertensive patients. The intervention was conducted over three consecutive days with two daily sessions, and the results showed a significant reduction in both systolic and diastolic blood pressure for both participants. This section discusses the findings, compares them to previous studies, and analyses possible physiological mechanisms and clinical implications.

Two elderly participants, a 65-year-old woman (Mrs. M) and a 60-year-old man (Mr. S), demonstrated consistent reductions in blood pressure following structured hypertension exercise sessions. Mrs. M's systolic pressure decreased from 170 mmHg to 130 mmHg, and her diastolic pressure remained relatively stable, slightly decreasing from 72 mmHg to 70 mmHg. Mr. S showed a more dramatic reduction in systolic pressure from 194 mmHg to 140 mmHg and diastolic pressure from 100 mmHg to 75 mmHg. These reductions occurred over a short period of only three days, with exercise performed for 10–15 minutes in the morning and 15–20 minutes in the evening. Despite the brief intervention duration, the data indicate a positive impact on blood pressure regulation [12].

The findings align with previous studies that support the role of physical exercise in controlling hypertension. A statistically significant reduction in blood pressure among hypertensive patients at Puskesmas Kayon after participating in hypertension exercise programs, with systolic/diastolic values dropping from 158/96 mmHg to 146.88/88.75 mmHg. Significant reductions in blood pressure were observed among elderly participants in a similar intervention. This study adds to the growing body of

evidence confirming that exercise can effectively lower blood pressure, even in short-term formats. What makes this study unique is the focus on a minimal-sample, case-study approach with an intense observation of pre- and post-exercise responses. Such improvements are consistent with prior studies suggesting that moderate aerobic exercise improves vascular function and cardiac output regulation, reduces systemic vascular resistance, and leads to better blood pressure control. According to the American Heart Association (AHA), even moderate-intensity exercise such as walking or rhythmic gymnastics can reduce systolic blood pressure by 4 to 10 mmHg on average. The reductions observed in this study exceeded that range, possibly due to initial high baseline readings and strict adherence to the exercise program [13].

The primary physiological mechanism that explains the observed reductions lies in the body's adaptive response to physical activity [14]. Exercise increases blood flow, promotes endothelial function, and induces vasodilation due to nitric oxide production in the vascular endothelium. This lowers peripheral vascular resistance and facilitates smoother circulation [15]. Over time, with continued physical activity, the heart becomes more efficient at pumping blood with less effort, thereby reducing both systolic and diastolic pressure [16]. Additionally, physical activity reduces sympathetic nervous system activity and increases parasympathetic tone, leading to lower resting heart rates and blood pressure levels. Regular exercise also helps reduce insulin resistance, abdominal obesity, and inflammatory markers, which are known contributors to hypertension [17].

The effectiveness of the exercise in the present study may also have been enhanced by the individualised and closely monitored format of the intervention, which ensured adherence to the Standard Operating Procedures (SOPs) and proper execution of movements [18]. The present study demonstrates that short-term, structured hypertension exercise significantly reduces blood pressure in elderly hypertensive patients [19]. The intervention is simple, safe, and practical, making it a valuable tool in community-based hypertension care [20]. Although further research is needed, especially with larger samples and longer durations, the findings reinforce the importance of physical activity as a first-line non-pharmacological treatment in the fight against hypertension [21].

Both participants were over the age of 60, placing them in a high-risk group for hypertension. Age-related changes in arterial stiffness and reduced renal function contribute to elevated blood pressure. However, despite their age, both participants responded well to physical exercise, suggesting that age is not a limiting factor in the efficacy of non-pharmacological interventions like exercise. Moreover, lifestyle adjustments such as limiting salt intake, as reported during the interviews, likely acted synergistically with the exercise intervention to enhance blood pressure control. The holistic impact of combined lifestyle modifications underscores the importance of an integrated approach to hypertension management, which includes exercise, diet, and medication adherence when necessary.

Clinical Implications

This study supports integrating hypertension exercise programs into primary care and community health settings. As a low-cost, low-risk, and accessible intervention, structured physical activity like hypertension gymnastics could complement pharmacological treatment. Benefits for clinical practice include: Reduced dependence on medication in early-stage hypertension cases. Empowering patients to take part in their health management. Improved adherence to lifestyle modifications through supervised programs. Decreased healthcare costs by preventing complications such as stroke and kidney failure.

CONCLUSIONS

The findings of this study demonstrate that hypertension gymnastics is a safe, effective, and practical non-pharmacological intervention for managing high blood pressure, particularly among older adults. A structured three-day exercise program resulted in a clinically significant reduction in the participants' systolic and diastolic blood pressure, highlighting that even short-term interventions can have measurable health benefits. Beyond physiological improvements, the program also fostered positive behavioural changes, with participants showing greater awareness and motivation to continue exercising independently. Due to its simplicity, low cost, and adaptability, hypertension gymnastics holds strong potential for integration into community health services, especially in resource-limited settings. Nonetheless, the promising results of this small-scale study underscore the need for further

research with larger and more diverse populations to refine protocols and ensure broader applicability. Overall, hypertension gymnastics should be considered a valuable component in the holistic, non-pharmacological treatment approach for hypertensive patients.

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Authors' contributions

All authors contributed significantly to the development and completion of this research study.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this research. No financial, professional, or personal relationships have influenced the outcomes or interpretations presented in this study.

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