



Health education and exercise improve hypertension knowledge and skills among Jimbung Village residents

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ABSTRACT Hypertension remains a major public health problem in Indonesia, and community-based exercise interventions are considered an effective strategy for its control. This community service program aimed to improve community knowledge and skills in hypertension exercise as an effort to control hypertension in Jimbung Village, Kalikotes Subdistrict, Klaten Regency. The program was implemented using an educational-participatory approach, comprising health education on hypertension, blood pressure screening, demonstration and practice of hypertension exercise, health cadre empowerment, family education, and evaluation of participants' knowledge and skills. A total of 40 community members and 8 health cadres participated. Knowledge was assessed using a 15-item questionnaire before and after education, while exercise skills were evaluated using a seven-component checklist. The results showed that the mean knowledge score increased from 62.3 (pre-test) to 81.5 (post-test), a relative increase of 30.8%, exceeding the minimum target of 20%. In terms of skills, 35 participants (87.5%) met at least six of the seven exercise components, surpassing the 80% target. Blood pressure screening revealed a mean of 142.5/86.8 mmHg, with 8 participants (20.0%) requiring further follow-up. All cadres completed the training, with 87.5% able to convey key hypertension messages and 100% able to assist in mobilizing the exercise sessions. Participant satisfaction reached 97.5%, and 95.0% expressed willingness to continue routine exercise. These findings indicate that the educational-participatory approach effectively improved community knowledge and exercise skills related to hypertension control, with a sustainability plan established through routine exercise sessions led by trained health cadres.

KEYWORDS

hypertension; community exercise; health education; knowledge and skills; health cadre

INTRODUCTION

Hypertension remains one of the most significant public health problems worldwide because of its close association with cardiovascular disease, stroke, kidney disease, and premature death (World Health Organization [WHO], 2025), and it is widely recognized as a sufficient risk factor for major cardiovascular events on its own (Khan et al., 2021). Globally, hypertension affects a substantial proportion of adults, and a large share of those

affected are unaware of their condition due to the largely asymptomatic nature of the disease, making regular blood pressure screening essential for early detection (WHO, 2025). In Indonesia, hypertension continues to be a major non-communicable disease burden, with district-level analyses showing considerable variation in prevalence and risk factors across the country (Mugi Wahidin, 2025), and national survey data underscoring the need to strengthen early detection, risk-factor control, education, and community-based hypertension management (Kementerian Kesehatan Republik Indonesia, 2024). Beyond pharmacological therapy, lifestyle intervention—particularly regular physical activity—plays a central role in blood pressure control, with international guidelines recommending consistent moderate- or vigorous-intensity aerobic activity for adults (WHO, 2020).

Previous studies have provided strong evidence for the role of exercise in hypertension management. A large-scale meta-analysis of randomized controlled trials demonstrated that structured exercise training produces clinically meaningful reductions in resting blood pressure across various populations (Edwards et al., 2023). Similarly, a dose-response meta-analysis of randomized trials found that aerobic exercise significantly lowers both systolic and diastolic blood pressure among individuals with hypertension, with greater benefits associated with higher exercise doses (Ganjeh et al., 2024). Leisure-time physical activity has similarly been associated with meaningful reductions in blood pressure among people with hypertension (Islam et al., 2023), and a network meta-analysis comparing different exercise modalities confirmed that structured aerobic and combined exercise produce the most consistent antihypertensive effects among middle-aged and older adults (Gao et al., 2023). Resistance-based modalities, including isometric resistance and handgrip training, have also been shown to lower blood pressure, although a single session appears insufficient and repeated training is required to achieve clinically meaningful effects (Baffour-Awuah et al., 2023; Oliveira et al., 2023). These findings confirm that structured physical activity is an effective non-pharmacological strategy for hypertension control. However, most existing evidence originates from clinical or controlled trial settings, while community-based, cadre-led implementation models—particularly those combining structured hypertension exercise with health education, blood pressure screening, and family involvement in rural village settings—remain comparatively underexplored, especially within the Indonesian context.

This gap is important because hypertension control at the community level cannot rely solely on efficacy data from controlled trials; it requires locally feasible, low-cost, and sustainable implementation strategies that can be maintained by community members themselves once formal intervention ends. The novelty of the present study lies in its integration of health education, hypertension exercise practice, health cadre empowerment, and family education within a single educational-participatory program specifically designed for a rural village population in Klaten Regency, Central Java—an approach that not only aims to improve short-term knowledge and skills but also establishes a concrete sustainability mechanism led by trained health cadres. Based on this background, the present community service program was designed to improve community knowledge and skills in hypertension exercise as an effort to control hypertension among residents of Jimbung Village, Kalikotes Subdistrict, Klaten Regency.

MATERIALS AND METHOD

Research Design

This community service program used an educational-participatory design, in which participants were actively involved in health screening, discussion, exercise demonstration, hands-on practice, and evaluation, rather than receiving information passively. The program consisted of preparation, implementation, monitoring-evaluation, and follow-up stages.

Population and Sample

The program was conducted in Jimbung Village, Kalikotes Subdistrict, Klaten Regency, Central Java, Indonesia. The primary participants were 40 community members residing in the target area, selected based on coordination with the village government and health cadres. Eight health cadres of Jimbung Village participated as supporting subjects who received additional training to support program sustainability. Participants' family members also received education as a supporting target group.

Materials and Research Instruments

The main instruments used were a knowledge questionnaire consisting of 15 items administered before and after the education session, a seven-component observational checklist for assessing hypertension exercise skills, a sphygmomanometer for blood pressure measurement, an attendance list, and a simple satisfaction questionnaire administered at the end of the activity. Educational media (leaflets/visual materials) were used to support the health education session.

Data Collection Procedure

The activity began with participant registration, basic data collection, and blood pressure measurement, followed by completion of the pre-test knowledge questionnaire. Health education was then delivered through interactive lectures, discussion, question-and-answer sessions, and visual media, covering the definition, risk factors, complications, blood pressure monitoring, healthy diet, physical activity, and stress management related to hypertension. Hypertension exercise was introduced through instructor demonstration of warm-up, core movements, and cool-down, followed by guided practice; exercise skills were observed and scored using the checklist, with technique correction provided as needed. Health cadres received additional training on key hypertension messages, monitoring procedures, documentation, exercise mobilization, and referral pathways, without involvement in diagnosis or treatment modification. Family members were given supplementary education on dietary support, health monitoring, medication adherence, and physical activity support. At the end of the session, participants completed the post-test knowledge questionnaire and the satisfaction questionnaire.

Data Analysis

Data were analyzed descriptively. Pre-test and post-test knowledge scores were compared to determine the mean score change and relative percentage increase. Exercise skill achievement was summarized as the proportion of participants meeting the minimum

competency criterion (≥ 6 of 7 components). Blood pressure screening results, cadre training outcomes, attendance, and satisfaction responses were presented as frequencies and percentages.

Ethical Consideration

Prior to participation, all participants and cadres received an explanation of the program's procedures and potential risks of physical activity, and participation was voluntary. Individuals with acute complaints or conditions requiring medical evaluation were not required to participate in the exercise session, and a referral mechanism to health facilities was made available throughout the activity.

RESULTS

Table 1 presents the characteristics of participants based on sex, age, and hypertension status.

Table 1. Characteristics of Participants (n = 40)

Characteristic	Category	n	%
Sex	Male	12	30.0
	Female	28	70.0
Age	<45 years	5	12.5
	45–59 years	17	42.5
	≥ 60 years	18	45.0
Hypertension status	History/recorded hypertension	26	65.0
	Unconfirmed/no data	14	35.0

Table 1 shows that most participants were female (28 people, 70.0%), and the largest age group was ≥ 60 years (18 people, 45.0%). Based on hypertension status, 26 participants (65.0%) had a history of or recorded hypertension.

Table 2 shows the comparison of participants' knowledge scores before and after the health education session.

Table 2. Pre-test and Post-test Knowledge Scores

Indicator	Pre-test	Post-test	Change
Number of participants	40	40	—
Mean score	62.3	81.5	+19.2
Minimum score	40	60	+20
Maximum score	80	100	+20
Mean score increase (%)	—	—	30.8%

The mean knowledge score increased from 62.3 at pre-test to 81.5 at post-test, corresponding to a relative increase of 30.8% (Table 2). This result exceeded the minimum target of a 20% increase in mean knowledge score.

Table 3 presents the results of the hypertension exercise skill evaluation.

Table 3. Hypertension Exercise Skill Evaluation

Indicator	n	%
Participants assessed	40	100
Met criteria (≥ 6 of 7 components)	35	87.5
Did not meet criteria	5	12.5

As shown in Table 3, 35 participants (87.5%) were able to correctly and safely perform at least six of the seven hypertension exercise components, exceeding the minimum target of 80%.

Blood pressure screening results are summarized in Table 4.

Table 4. Blood Pressure Screening Results

Parameter	Result
Participants examined	40 people
Mean blood pressure	142.5/86.8 mmHg
Participants requiring follow-up	8 people (20.0%)

Table 4 indicates that all 40 participants underwent blood pressure screening, with a mean result of 142.5/86.8 mmHg, and eight participants (20.0%) required further follow-up. Participants with results or complaints requiring evaluation were referred to health workers or health service facilities.

Table 5 presents the outcomes of the health cadre training.

Table 5. Health Cadre Training Outcomes

Indicator	Target	Achievement
Cadres attending training	$\geq 80\%$	8 people (100%)
Able to convey key hypertension messages	$\geq 80\%$	7 people (87.5%)
Able to assist in mobilizing exercise	$\geq 80\%$	8 people (100%)
Documentation/follow-up mechanism	Available	Available

All eight cadres completed the training, and all achievement indicators met or exceeded the 80% target (Table 5).

Participant satisfaction results are presented in Table 6.

Table 6. Participant Satisfaction

Indicator	Yes (n)	Yes (%)
Material easy to understand	38	95.0
Demonstration easy to follow	37	92.5
Activity considered beneficial	39	97.5
Understand how to support hypertension control	37	92.5
Willing to join routine exercise	38	95.0

Table 6 shows that 39 participants (97.5%) considered the activity beneficial, exceeding the minimum satisfaction target of 80%.

The program's sustainability plan is summarized in Table 7.

Table 7. Program Sustainability Plan

Component	Realization
Routine exercise schedule	Sunday, 07:00–08:00 WIB
Venue	Village hall/community activity area, Jimbung Village
Frequency	Twice per month
Person in charge (PIC)	Health cadres
Documentation mechanism	Attendance list and activity monitoring book
Follow-up for at-risk participants	Cadre coordination and referral to health workers

As presented in Table 7, the program established a concrete sustainability mechanism, including a routine schedule, designated venue, monitoring documentation, and a referral pathway coordinated by health cadres.



(a)



(b)

Figure 1. Documentation of the community service activity: (a) guided practice of hypertension exercise with technique correction; (b) the implementation team and community participants at Balai Desa Jimbung.

Improvement in Participants' Knowledge

The mean knowledge score increased by 30.8% following the health education session, exceeding the targeted 20% increase (Table 2). This finding supports the premise that structured, interactive health education—covering the definition, risk factors, complications, and control measures of hypertension—can meaningfully improve community understanding within a single educational-participatory session. This result is consistent with the broader body of evidence indicating that physical activity and lifestyle-based interventions, when delivered alongside adequate health education, contribute to better hypertension awareness and control (Ganjeh et al., 2024). The magnitude of improvement observed in this program suggests that combining lecture-based education with interactive discussion and visual media was effective in a rural community setting, where prior exposure to structured hypertension information may have been limited.

Improvement in Hypertension Exercise Skills

The high proportion of participants (87.5%) meeting the minimum exercise competency criterion (Table 3) indicates that demonstration-based learning, followed by supervised practice and individualized technique correction, is an effective method for skill transfer in a community setting. This finding aligns with meta-analytic evidence showing that structured aerobic exercise interventions produce measurable physiological and behavioral benefits for individuals with hypertension (Edwards et al., 2023) and is consistent with community-based findings showing that structured hypertension exercise can measurably lower blood pressure among older adults (Abdurakhman et al., 2022). However, the fact that five participants (12.5%) did not meet the minimum criterion suggests that a single demonstration-and-practice session may be insufficient for all participants, particularly older adults or those with physical limitations, and points to the need for repeated practice sessions to consolidate motor skill acquisition.

Blood Pressure Screening Findings

The mean blood pressure of 142.5/86.8 mmHg recorded during screening (Table 4) reflects a population with a considerable burden of elevated blood pressure, consistent with national data indicating those non-communicable diseases such as hypertension remain a significant health concern in Indonesian communities (Kementerian Kesehatan Republik Indonesia, 2024). It is important to note that this measurement represents a single screening occasion and should not be interpreted as a clinical diagnosis, in line with WHO's diagnostic criteria requiring confirmation across separate measurement days (WHO, 2025). The identification of eight participants (20.0%) requiring further follow-up demonstrates the practical value of integrating screening into community exercise programs as an entry point for early detection and referral, rather than relying solely on curative services. This is consistent with evidence from a multi-district study in Indonesia showing that access to community-based screening programs such as POSBINDU is associated with better hypertension-related knowledge, attitudes, and practices (Mashuri

et al., 2024), reinforcing the value of embedding routine screening within community activities.

Role of Health Cadres and Sustainability

All eight health cadres completed training, and the majority demonstrated competence in conveying key hypertension messages and mobilizing community participation (Table 5). This outcome supports the strategic role of trained lay health workers in extending the reach and sustainability of community health interventions beyond the formal intervention period. The establishment of a concrete sustainability plan—comprising a defined schedule, venue, and documentation mechanism led by cadres (Table 7)—addresses a common limitation of one-time health promotion activities, namely the lack of continuity once external facilitators withdraw. Similar cadre-empowerment strategies combining hypertension training with structured exercise have been reported to significantly improve cadres' knowledge and their ability to lead community screening and exercise activities (Purwanta et al., 2023), while other community-based programs have shown that empowered cadres can meaningfully influence participants' blood pressure control behavior (Nabila et al., 2024) and reduce hypertension-related complications such as stroke through routine hypertension exercise sessions led by trained cadres (Prasetyo et al., 2026; Purnawan et al., 2026).

Participant Satisfaction and Acceptability

High satisfaction levels (97.5% reporting the activity as beneficial; Table 6) indicate strong acceptability of the educational-participatory approach among community members, which is an important precondition for sustained behavior change and continued participation in routine exercise sessions.

Theoretical and Practical Implications

Theoretically, these findings reinforce the understanding that knowledge and skill acquisition in hypertension self-management are amenable to short-term, community-based educational-participatory interventions. Practically, the results suggest that integrating education, skills training, screening, and cadre empowerment into a single program offers a feasible and replicable model for hypertension control that primary health care services and village governments can adopt or scale in similar rural settings.

Limitations

This program has several limitations. First, the absence of a control group and the short evaluation period limit the ability to attribute observed changes solely to the intervention or to determine their durability over time. Second, blood pressure measurement was conducted only once and cannot be used to establish a formal hypertension diagnosis. Third, knowledge and satisfaction were assessed using self-administered questionnaires, which may be subject to social desirability bias. Future evaluation involving medium- to long-term follow-up—covering exercise adherence, behavioral change, and repeated blood pressure monitoring—is needed to determine the sustained impact of this program. Future programs may also consider mobile-based reinforcement, such as WhatsApp-

delivered educational content, which has been shown to support sustained self-management behavior among people with hypertension (Akhyar et al., 2025).

CONCLUSION

This community service program successfully improved community knowledge and hypertension exercise skills in Jimbung Village, Kalikotes Subdistrict, Klaten Regency, with the mean knowledge score increasing by 30.8% and 87.5% of participants achieving the minimum exercise skill competency, both exceeding the predetermined targets. Blood pressure screening enabled early identification of participants requiring further evaluation, while health cadre training and high participant satisfaction indicate that the educational-participatory approach was both effective and well accepted by the community.

Based on these findings, it is suggested that trained health cadres continue to coordinate routine hypertension exercise sessions supported by periodic blood pressure monitoring and prompt referral of at-risk individuals to health facilities, and that similar cadre-led, educational-participatory models be considered by primary health care services and village governments as a sustainable, low-cost strategy for community-based hypertension control in other rural areas.

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