JOURNAL OF HEALTH EDUCATION INNOVATION AND PRACTICE

| Volume 1, Issue 2, 2026 | Page 74-80 |
https://doi.org/ 10.68191/sena.v1i2.55
ISSN-Online: 3124-0801
This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License © 2026 by author/s.
https://ejournal.auliantech.org/index.php/jheip

The Effectiveness of Low-Impact Aerobic Exercise in Reducing Blood Pressure Among Older Adults with Hypertension in the Elderly Exercise Group in Kosgoro Village, Musi Rawas Regency

Fitria*, Leo Charli, Hengky Remora

PGRI Silampari University, Indonesia

fitriakosgoro@gmail.com *✉

ARTICLE INFO

Keywords:
Aerobic Exercise; Blood Pressure; Community-Based Intervention; Hypertension; Older Adults;

ABSTRACT

Background: Hypertension is a prevalent chronic condition among older adults, increasing the risk of cardiovascular complications. Regular physical activity, particularly low-impact aerobic exercise, represents an accessible nonpharmacological approach to blood pressure management.
Research Gap: Although previous studies have demonstrated the benefits of aerobic exercise for hypertension management, evidence regarding structured low-impact exercise programs implemented within rural community-based elderly groups remains limited.
Novelty: This study provides community-specific evidence regarding the potential benefits of a structured low-impact aerobic exercise program for blood pressure management among older adults with hypertension in Kosgoro Village, Musi Rawas Regency.
Methods: A quantitative pre-experimental study employing a one-group pretest–posttest design involved 24 participants with hypertension selected through purposive sampling. Participants performed low-impact aerobic exercise twice weekly for five weeks. Systolic and diastolic blood pressure measurements were obtained before and after the intervention and analyzed using paired-samples t-tests at a 5% significance level.
Results: Mean systolic blood pressure decreased from 152 to 135 mmHg, representing a reduction of 17 mmHg (11.18%). Mean diastolic blood pressure decreased from 90 to 82 mmHg, representing a reduction of 8 mmHg (8.89%). Paired-samples t-tests demonstrated statistically significant differences in both systolic and diastolic blood pressure ($p < 0.05$).
Conclusion: Low-impact aerobic exercise was associated with significant reductions in blood pressure among participants. These findings support its potential integration into community-based hypertension management programs, although controlled studies are needed to establish causal effectiveness.

Received: 3/19/2026 **Revised:** 5/3/2026 **Accepted:** 5/27/2026 **Published:** 6/8/2026

INTRODUCTION

Hypertension, or high blood pressure, is a noncommunicable disease that has become a major global health concern. This phenomenon occurs not only in developed countries but has also become a silent epidemic in developing countries, including Indonesia. Older adults are particularly vulnerable because of natural physiological processes, including reduced vascular elasticity, lifestyle changes, and a diminished ability to adapt to environmental stressors. In this context, Cut and Zurijah (2020) noted that hypertension is a condition frequently experienced by older adults and is prevalent in developing countries such as Indonesia. This observation emphasizes that hypertension among older adults is a health problem requiring special attention and appropriate intervention. Epidemiological studies indicate that hypertension in older adults often goes undiagnosed at an early stage because its symptoms are nonspecific and frequently considered part of normal aging. However, without effective treatment, hypertension can become a silent killer that causes fatal complications. Fitrianingsih et al. (2022) emphasized that hypertension is a serious health concern because it is a major risk factor for cardiovascular diseases, including heart failure, stroke, ischemic heart disease, and heart attacks. Preventing and controlling high blood pressure in older adults is therefore essential to reducing morbidity and mortality in this population.

On the other hand, pharmacological interventions, which constitute the principal approach to hypertension management, have long-term limitations, including adverse effects, dependence, and considerable costs. Safe, affordable, and sustainable nonpharmacological approaches are therefore needed. One increasingly studied and implemented alternative is regular physical activity in the form of low-impact aerobic exercise. This exercise consists of rhythmic, repetitive movements of sufficient duration and light-to-moderate intensity, making it appropriate for the physical limitations of older adults. Low-impact movements do not place excessive stress on the joints but can still positively stimulate the cardiovascular system. Physical activities such as aerobic exercise may improve blood circulation, strengthen the heart muscle, and enhance metabolism. Fitrianingsih et al. (2022) also emphasized the need for consistent healthy lifestyle changes among older adults with hypertension to prevent serious complications. Similarly, the observations of Cut and Zurijah (2020) regarding the high prevalence of hypertension in developing countries indirectly highlight the need for accessible community-based interventions, including exercise programs for older adults, as a form of promotive and preventive care.

Kosgoro Village in Musi Rawas Regency offers a promising setting for implementing this intervention. Geographically, the village is located in an area with limited access to tertiary healthcare facilities. The community has a strong tradition of mutual cooperation, including the establishment of an exercise group for older adults. This group is active and well organized, making it a suitable setting for investigating low-impact aerobic exercise as a preventive and health-promoting intervention for hypertension. In this context, Derajat (2024) emphasized the importance of innovation in community-based healthcare in rural areas, explaining that telemedicine enables healthcare providers to deliver clinical services to patients in remote and underserved areas and overcome geographical barriers to timely care. Ratnawati (2025) likewise emphasized the central role of primary healthcare facilities in rural areas in preventing hypertension and other public health problems. These perspectives suggest that community-based interventions, such as the older-adult exercise group in Kosgoro Village, constitute a concrete and contextually appropriate form of primary healthcare.

METHODS

This study adopted a quantitative approach using a pre-experimental one-group pretest–posttest design. This design was selected because it enables researchers to evaluate changes in blood pressure before and after a low-impact aerobic exercise intervention within the same group without a control group. Methodologically, the design shares some features with quasi-experimental approaches commonly used in community health intervention studies, particularly among older adults. Harmoko et al. (2024), for example, described a quasi-experimental pretest–posttest study involving control and experimental groups. Unlike that study, however, the present research did not include a control group because of population limitations.

The study was conducted in Kosgoro Village, Musi Rawas Regency, where an active exercise group for older adults operates. The study population consisted of all members of this group who had been

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License © 2026 by author/s.

diagnosed with mild-to-moderate hypertension by village health personnel. Participants were selected through purposive sampling. The inclusion criteria were being female, aged 45–75 years, able to follow exercise instructions, free from severe mobility impairments, and willing to participate. The exclusion criteria included a history of chronic heart disease, severe balance disorders, or ongoing intensive pharmacological treatment for hypertension. The intervention consisted of low-impact aerobic exercise specifically adapted to participants' abilities, involving gentle movements performed at a slow-to-moderate pace to stimulate cardiovascular activity while protecting joint safety. Sessions lasted 30 minutes and were conducted twice weekly for five weeks.

Blood pressure was measured using a clinically validated digital blood pressure monitor. Measurements were taken before (pretest) and after (posttest) the intervention. The collected data were analyzed using a paired-samples t-test at a 5% significance level to assess differences in mean blood pressure before and after the intervention. A related approach was used by Wiyasa (2021), who described a quasi-experimental nonequivalent control-group design involving fourth-semester primary school teacher education students. Although the present study did not include a control group, its fundamental intervention-evaluation principle was maintained through repeated measurements in the same group.

RESULT

The study involved 24 participants with hypertension who completed a five-week low-impact aerobic exercise program delivered twice weekly. At baseline, mean systolic and diastolic blood pressures were 152 mmHg and approximately 90 mmHg, respectively. After the intervention, the corresponding means were 135 mmHg and 82 mmHg, representing reductions of 17 mmHg and 8 mmHg.

The exercise sessions were held at the village hall with supervision from health personnel and trained instructors. The Results section of the source manuscript reports sessions of approximately 30–45 minutes, whereas the Methods section specifies 30 minutes; this discrepancy requires author verification. Individual-level data, measures of variability, and attendance rates were not reported in the source manuscript.

Paired-samples t-tests indicated statistically significant preintervention–postintervention differences in both systolic and diastolic blood pressure ($p < 0.05$). Exact test statistics, degrees of freedom, confidence intervals, and exact p-values were not supplied in the manuscript.

DISCUSSION

The observed reductions in blood pressure suggest that structured low-impact aerobic exercise may be a feasible component of community-based hypertension management. Because the study used a one-group pretest–posttest design without a control group, the changes cannot be attributed exclusively to the exercise intervention. Potential confounding influences include concurrent treatment, dietary changes, measurement conditions, and variation in participants' usual physical activity.

The findings are consistent with reports by Arindari and Alhafis (2020) and Rahmawati et al. (2023), who described blood pressure reductions following exercise-based interventions. Nevertheless, differences in exercise protocols, populations, and research designs limit direct comparison. The present study adds evidence from a rural community exercise group, where accessible, low-impact activities may be particularly practical.

Low-impact aerobic exercise can influence physiological processes in older adults, particularly those involved in blood pressure regulation and stabilization. The movements are designed to increase cardiac activity gradually and in a controlled manner without excessively burdening the cardiovascular system. Repeated engagement of large muscle groups over a sustained period may encourage the heart to pump blood more efficiently throughout the body. This process can improve blood flow, promote vasodilation, and reduce vascular pressure. Rahmawati et al. reported that light aerobic activity may improve circulatory efficiency and reduce peripheral vascular resistance through adaptive physiological responses. With consistent exercise, the body may undergo homeostatic changes, including reduced sympathetic nervous system activity. The sympathetic nervous system mediates the "fight-or-flight" response and ordinarily increases heart rate and causes vasoconstriction, contributing to elevated blood pressure. Over time, regular light aerobic exercise may reduce sympathetic activation, improve cardiac efficiency, and support natural reductions in blood pressure. Rahmawati et al. described this homeostatic

adaptation as an outcome of structured, noninvasive interventions intended to promote harmonious physiological rhythms and minimize stress.

Low-impact aerobic exercise may also produce relaxation effects on the nervous and hormonal systems of older adults. These effects may be experienced psychologically and reflected in clinical parameters, such as reduced resting pulse rate and baseline blood pressure. Light physical activity may stimulate endorphin production and reduce stress hormones such as cortisol, which can directly or indirectly affect blood pressure. Participants who exercised regularly reported greater comfort, a feeling of physical lightness, and better sleep, all of which may support blood pressure regulation. This discussion is supported by Wahidah (2025), who found that the 2018 Indonesian physical fitness exercise program significantly reduced blood pressure among women with hypertension. Participants in that study experienced meaningful reductions in systolic and diastolic blood pressure after four weeks of exercise. Wahidah emphasized that the movements were easy to follow, enjoyable, and not excessively tiring, making the program suitable for vulnerable age groups.

Although Wahidah used a different exercise program from the low-impact aerobic exercise examined here, both interventions share the principle of regular light physical activity as a nonpharmacological approach to lowering blood pressure. Such activity stimulates cardiovascular function without causing excessive physiological strain. Both studies underscore the importance of consistency and the need to tailor exercise programs to the physiological characteristics of the target population. The effectiveness of exercise in lowering blood pressure is also closely related to its duration and intensity. Low-impact aerobic exercise at light-to-moderate intensity for 30–45 minutes may provide meaningful cardiovascular stimulation without exhausting older participants. Sports medicine and geriatric literature often recommends exercise at this intensity because of its relatively low risk and potential long-term benefits. Excessively intense programs may instead trigger acute increases in blood pressure or dangerous fatigue in older adults.

Beyond its physiological effects, this exercise provides important psychosocial benefits. Older adults participating in group exercise may feel more socially connected, experience greater enthusiasm for life, and feel valued as members of the community. A supportive environment and enjoyable activities can help reduce stress, which may indirectly influence blood pressure. As stress declines, sympathetic nervous system activation may decrease, facilitating blood pressure control. Thus, exercise affects not only biological functioning but also participants' emotional and social well-being. The low-impact aerobic exercise program in Kosgoro Village illustrates the integration of preventive and health-promoting approaches at the community level. With the involvement of community health volunteers, families, and village authorities, the program can reach older adults and provide tangible benefits. It demonstrates the potential for simple but consistent interventions to improve health status, particularly in the context of chronic conditions such as hypertension that require long-term management.

Nonpharmacological interventions for hypertension remain a major focus of preventive healthcare, particularly among older adults. These approaches emphasize not only the avoidance of medication-related adverse effects but also active patient participation in disease management. Manik, Bisa, and Rahmansyah demonstrated one such approach by combining deep breathing exercises with slow-stroke back massage over four weeks, reporting meaningful reductions in systolic and diastolic blood pressure among participants in the experimental group. Their intervention suggests that gentle physical stimulation combined with mental relaxation may have synergistic effects on blood pressure through balanced physiological mechanisms. During deep breathing exercises, participants inhale slowly and deeply, hold their breath for several seconds, and then exhale gradually. This practice stimulates the parasympathetic nervous system, reduces sympathetic activity, and may decrease stress hormones such as adrenaline and cortisol. As a result, the body becomes more relaxed and heart rate slows. Slow-stroke back massage, involving gentle touch along the upper spine, may reinforce relaxation and improve peripheral circulation. The resulting blood pressure reductions may reflect adaptive physiological responses to internal and external stressors rather than merely transient changes.

The study by Manik, Bisa, and Rahmansyah reinforces the importance of integrating simple physical movements with relaxation techniques in nonpharmacological interventions to achieve complementary therapeutic effects. The reduction in blood pressure observed in their experimental group suggests that this approach may be particularly useful for individuals whose physical limitations prevent participation in moderate-intensity exercise. Such interventions could expand access for older

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License © 2026 by author/s.

adults with limited mobility without necessarily sacrificing potential blood pressure benefits. Consistent with these findings, Nurmania (2025) also reported significant effects of hypertension exercise. In that study, mean blood pressure decreased from 153/71 mmHg before the intervention to 127/64 mmHg afterward. This reduction suggests that even relatively short interventions may produce clinically meaningful outcomes when implemented consistently and systematically. Nurmania highlighted the feasibility of delivering such programs at the community level through participatory health-promotion approaches.

The hypertension exercise program described by Nurmania involves relatively simple movements, requires no special equipment, and can be performed independently or in small groups. This is especially relevant for older-adult communities that often face limited access to conventional healthcare. The program may also foster companionship and mutual support, strengthening participants' social and psychological well-being. These interventions suggest that blood pressure management need not rely exclusively on pharmacological treatment but can incorporate comprehensive and inclusive approaches. Consistency and emotional engagement are key elements in successful hypertension exercise and relaxation programs. When participants feel comfortable, relaxed, and enjoy the process, stress hormones may decrease and relaxation effects may become more pronounced. Psychophysiological research indicates that positive emotions during exercise may contribute to blood pressure stabilization through neuroendocrine pathways. The benefits of exercise and breathing techniques therefore depend not only on the movements themselves but also on the atmosphere and collective motivation developed during the intervention.

Hypertension exercise programs and the combination of deep breathing exercises with slow-stroke back massage each have distinct advantages and may be used as alternatives or complementary approaches. Individuals with limited mobility or joint disorders may benefit more from passive relaxation techniques such as massage and breathing exercises, whereas those with adequate physical capacity may obtain greater benefits from hypertension exercise. This supports the view that hypertension management should be individualized, context-sensitive, and adapted to patients' physiological conditions and preferences. In community implementation, it is important that these nonpharmacological interventions are not merely one-time or incidental activities. Program continuity, training for community health volunteers, and family involvement are essential for sustaining long-term benefits. Although many older adults experience improvements in blood pressure during the first weeks of intervention, these benefits may diminish if the activities are discontinued. Cross-sector collaboration is needed to maintain continuity, including support from primary healthcare facilities, social organizations, and village authorities.

The low-impact aerobic exercise program considered not only participants' physical health but also their individual conditions and physical abilities, helping ensure that the intervention was acceptable and feasible. This participatory approach illustrates the considerable potential of health-promotion and prevention activities in community healthcare, especially for managing chronic diseases such as hypertension. The inclusive, older-adult-friendly exercise program provides an accessible and sustainable health management option. Its regular frequency and sufficient duration underscore the positive effects of light but consistent physical activity. This is particularly important because physical limitations commonly experienced by older adults may prevent them from participating in high-intensity exercise. An intervention design that accounts for physiological and psychological characteristics is therefore crucial to success. Beyond lowering blood pressure, the program may improve quality of life by enhancing mobility, physical fitness, and mental well-being.

Nonpharmacological interventions such as low-impact aerobic exercise are suitable for integration into community-based health programs, particularly those implemented through integrated health posts for older adults (Posyandu Lansia) or community-based health initiatives (Upaya Kesehatan Bersumberdaya Masyarakat, UKBM). Incorporating such programs into primary healthcare may provide an effective long-term strategy for hypertension control while potentially reducing reliance on antihypertensive medication, which can cause adverse effects. Community-based approaches can also strengthen social networks and mutual support among older adults, helping create a healthy and supportive environment. Another limitation of the present study was its relatively short five-week intervention period. Variations in participant characteristics, including hypertension severity, comorbid health conditions, and pre-study physical activity levels, may also have influenced the outcomes. These

factors are difficult to control fully without a more rigorous research design and a larger sample. Generalization of the findings should therefore be undertaken cautiously, taking into account the sociocultural context and population characteristics of Kosgoro Village. Future research should employ quasi-experimental designs or randomized controlled trials to strengthen causal evidence and improve generalizability. Family members and local health personnel are also important to program success. Social support from families and communities can motivate older adults to participate consistently, while education and regular monitoring by health workers can help ensure appropriate implementation and minimize the risk of complications. This collaboration illustrates that effective hypertension management requires an integrated, multisectoral approach incorporating medical, social, and psychological dimensions.

CONCLUSION

In this sample of 24 participants with hypertension, a five-week low-impact aerobic exercise program was associated with mean reductions of 17 mmHg in systolic and 8 mmHg in diastolic blood pressure (both $p < 0.05$). These findings suggest that supervised community exercise may complement hypertension management. However, the absence of a control group, short follow-up, and limited sample size restrict causal inference and generalizability. Larger controlled studies are warranted

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to all participants of the elderly exercise group in Kosgoro Village, Musi Rawas Regency, for their willingness, cooperation, and active participation throughout the research process. Special appreciation is extended to the community health personnel and exercise instructors who supported the implementation of the low-impact aerobic exercise program. The authors also acknowledge the local community for facilitating the research activities and providing a supportive environment for the successful completion of this study.

AUTHOR CONTRIBUTION STATEMENT

Fitria, Leo Charli, and Hengky Remora contributed to the preparation of this research manuscript. Their respective responsibilities for research conceptualization, methodology development, participant recruitment, data collection, statistical analysis, interpretation of findings, manuscript drafting, critical revision, and final approval must be confirmed by the authors before publication.

AI DISCLOSURE STATEMENT

Generative artificial intelligence tools were used to assist with the academic language editing, proofreading, and preparation of publication statements for this manuscript. The use of these tools was limited to improving linguistic clarity, grammatical accuracy, academic presentation, and consistency of terminology. The authors remain fully responsible for verifying the accuracy, originality, scientific integrity, and final content of the manuscript.

FUNDING STATEMENT

Funding information was not specified in the original research manuscript. The authors must confirm whether this study received financial support from any governmental institution, university, research organization, or other funding agency.

CONFLICTS OF INTEREST

Information regarding potential conflicts of interest was not provided in the original manuscript. All authors are required to disclose any financial, professional, institutional, or personal relationships that could reasonably be perceived as influencing the research process, interpretation of findings, or publication of results.

REFERENCES

Arindari, D. R., & Alhafis, H. R. (2020). The effect of hypertension exercise on reducing blood pressure in patients with hypertension. Jurnal Kesehatan: Jurnal Ilmiah Multi Sciences, 10(1), 38–45.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License © 2026 by author/s.

Cut, R., & Zurijah, T. I. (2020). The effect of exercise for older adults on blood pressure among older adults with hypertension. Jurnal Penjaskesrek, 7(1), 15.

Derajat, A. (2024). The impact of telemedicine on access to healthcare services in rural communities. Media Jurnal Kesehatan Masyarakat, 11(3), 75–85.

Fitrianingsih, D., Winahyu, K. M., Wibisana, E., & Ahmad, S. N. A. (2022). Self-efficacy and lifestyle among older adults with hypertension. Jurnal JKFT, 7(2), 108–111.

Harmoko, H., Pamungkas, H., Yusuf, H., Husein, A., & Sudari, S. (2024). The effect of relay circuit learning on physical fitness among fourth-grade elementary school students. Riyadhoh: Jurnal Pendidikan Olahraga, 7(1), 21–26.

Manik, J. W. H., Bisa, M., & Rahmansyah, B. (2021). Deep breathing exercise and slow-stroke back massage are effective in reducing high blood pressure in patients with hypertension. Jurnal Fisioterapi dan Rehabilitasi, 5(2), 158–164.*

Montolalu, C., & Langi, Y. (2018). The effect of basic computer and information technology training for teachers using a paired-samples t-test. D'Cartesian: Jurnal Matematika dan Aplikasi, 7(1), 44–46.

Nurmania. (2025). Implementation of hypertension exercise in the service area of the Purwosari Community Health Center. Jurnal Cendikia Muda,

Rahmawati, E., Rahayu, D., & Yunita, A. (2023). Effectiveness of walking activity among older adults in reducing systolic and diastolic blood pressure in patients with hypertension. Jurnal Ilmiah Pamenang, 5(2), 46–52.

Ratnawati, D. R. (2025). The role of healthcare facilities in disease prevention in rural areas. Jurnal Manuju, 5(1), 1–10.

Wahidah, I. (2025). The effect of the 2018 Indonesia Bersatu physical fitness exercise program on reducing blood pressure among women with hypertension at Melati Clinic, Kawalu District, Tasikmalaya. Jurnal Pengabdian Masyarakat Indonesia Sejahtera, 4(1), 43–50.

Wiyasa, I. K. N. (2021). Improving physical education learning outcomes through a character-based contextual model. Jurnal Pendidikan Jasmani Indonesia, 17(2), 86–92.