



Ergonomic Exercise-Based Nursing Care for Addressing Community Health Deficits in Rural Areas

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ABSTRACT

Uncontrolled hypertension due to a lifestyle that lacks healthy physical activity caused complications in the form of a stroke. The study aimed to describe the effect of ergonomic exercise in community nursing care on the blood pressure in rural areas. The research design uses a case study of a community with hypertension. There are 34 respondents in the aggregate of adults and older people. Data analysis uses nursing care with the Indonesian Nursing Diagnosis, Outcome, and Interventions Standard. Thirty-two respondents showed a significant decrease in systolic blood pressure (p-value <0.001), and 16 respondents indicated a substantial reduction in diastolic blood pressure (p-value 0.005). Thirty-three respondents experienced increased scores from pre-test to post-test (p-value <0.001). Public health development interventions can improve community health status through ergonomic exercise. Ergonomic exercise provides complementary benefits in managing hypertension among adults and older people by decreasing blood pressure and minimizing stroke risk.

KEYWORDS

Hypertension, Ergonomic exercise, Adults, Older people, Community nursing care

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1. BACKGROUND

The World Health Organization (WHO) defines adults as those aged 20 to 59, while older people are those aged ≥ 60 and above. According to the United Nations Trade and Development (UNCTAD), in 2020, the global population comprised 25% children (<15 years), 65% of the population aged 20–64, and a small additional 9% in the 65–74 age group (ESCAP, 2024). The 2020 Indonesian

population census, based on BPS data, showed that 65.32% of the population was in the 20–74 age group. East Java Province had a prevalence of 60% in the 20–74 age range (Indonesia Statistics, 2020). Data from the Jember BPS in 2024 showed that the prevalence of the 20–74 age group was 62–65% of the total population (2.61 million in 2024) (Statistics Jember Regency, 2024).

Hypertension (High Blood Pressure) is one of the most common public health problems and a leading cause of morbidity and mortality worldwide. According to the WHO, Southeast Asia ranks third with a hypertension prevalence of 25% (Cheng et al., 2020). This is estimated to result in 9.4 million deaths annually caused by hypertension. The prevalence of hypertension increases with age, reaching >50% in older people aged ≥ 65 years in Indonesia. According to data from the 2023 Indonesian Health Survey, the prevalence of hypertension in East Java, based on measurements of the population aged ≥ 18 years, was 34.3%. The incidence of hypertension tends to increase in the older people over 75 years reaching 64%, the 65-74 age group reaching 57.8%, the 55-64 age group reaching 49.5%, the 45-64 age group reaching 39.1%, the 35-44 age group reaching 27.2%, and the 25-34 age group reaching 17.4% (BKPK, 2023). According to the East Java Health Office in 2023, Jember Regency had a hypertension prevalence of 30.5% (Dinkes Jatim, 2024). Based on Community health center of Sukorambi data, the incidence of hypertension in rural areas reached 782 residents in 2024, while it reached 459 residents in 2025. Factors contributing to the increase in hypertension

include low awareness of hypertension, unhealthy lifestyles, and lack of physical activity (Dai et al., 2022). The global prevalence of inadequate physical activity in 2022 indicated that women reached 33.8% compared to men at 28.7% (Strain, 2024). The older population in Indonesia exhibits a high sedentary lifestyle, for example, in one community study, as high as 21.1% (Setiati et al., 2023).

Interviews with community health volunteers indicated the absence of structured programs to support physical activity among the population with hypertension in rural areas. This gap reflects a community health deficit in nursing diagnosis. Health education, community participation, and monitoring of individuals with non-communicable diseases are critical strategies to minimize the risk of complications (Istifada et al., 2021). Through the community health deficit diagnostic, community nursing care highlights a comprehensive assessment of health concerns, considering the environment, local resources, and active participation of the community. Interventions based on the community's needs are developed through a participatory approach, including health education, blood pressure detection, health worker training, and counseling in

appropriate diet and physical activity for adults and older people. The selection of interventions based on community health development effectively addresses community health deficits and refers to the Indonesian Nursing Intervention Standards. This approach aligns with the Community as Partner (CAP) principle, where the community is positioned as an active partner in assessing, planning, implementing, and evaluating health programs, ensuring more targeted, sustainable, and empowering interventions (Li, 2025).

A healthy lifestyle can be achieved by implementing ergonomic exercises, a combination of light exercise, joint mobilization, and breathing exercises that are beneficial in lowering blood pressure without the risk of excessive fatigue in adults and older people. The reduction in blood pressure with a p-value of $0.000 < 0.05$, indicating an effect of ergonomic exercise on blood pressure in pre-elderly individuals (45-59 years old) with hypertension in the Pisangan Community Health Center in East Ciputat, Indonesia (Veri & Amelia, 2020). Another study by Astuti (2021) also demonstrated a pre-post-intervention effect of ergonomic exercise on hypertensive elderly individuals with a p-value of $0.001 < 0.05$. Light ergonomic

exercise movements, inspired by prayer movements, are effective in increasing vasodilation and oxygen flow, and stimulating nitric oxide production, equivalent to the effects of light weight training in older people (Setiati et al., 2023).

2. METHODS

Case Presentation

Based on the results of the study in the rural area obtained from interviews with nurses of the health center, the cadres obtained results according to the latest data in April 2025, there were 34 respondents of the aggregate of hypertensive adults-older people in the rural area. Through 34 research respondents with hypertension, it was found that the percentage of women was 64.7% more than the percentage of men, 35.3% and 1 resident had a stroke. The area cadres said no health education program was routinely implemented in rural areas. Based on the background, a prospective nursing health worker will carry out community nursing care with community health deficits and provide interventions and implementations to the aggregate of hypertensive adults-older people in rural areas.

Intervention or Clinical Examination

This study uses a single case design that provides community nursing care to a group of adults and older people with hypertension. The intervention provided is community health development. The implementation provided was one week of ergonomic exercises, performed thrice weekly for 30 minutes. This activity was carried out by gathering 34 adults and older people. Data analysis used nursing care with the Indonesian Nursing Diagnosis, Outcome, and Interventions Standard.

Assessment

150 adults (61.9%) had hypertension. There were 64 older people residents, and one resident had suffered a stroke. Among the older people, 38 (59.3%) had hypertension. All study respondents had a family history of hypertension (100%). Community health workers reported no routine health education programs in rural areas.

Diagnosis

Based on the assessment data analysis, a community health deficit diagnosis was obtained related to the program's lack of or insufficient community support.

1. Intervention: Community Health Development

- 1) Identify health problems or issues and their priorities in rural area
- 2) Identify potential assets within the community related to issues faced, regarding potential community members who can become ergonomic exercise instructors
- 3) Identify strengths and partners in health development in rural areas
- 4) Identify community leaders/figures, regarding potential community members who can invite others to participate in ergonomic exercise
- 5) Provide opportunities for every community member to participate, according to their assets, during the first meeting to get to know the community and discuss priority health issues
- 6) Involve community members to raise awareness of health issues and problems faced
- 7) Involve the community in deliberations to define health issues and develop a work plan
- 8) Involve the community in the planning, implementation, and revision process
- 9) Involve community members in developing a health network
- 10) Maintain open communication with community members and stakeholders

- 11) Unite community members with shared community goals to decrease high blood pressure and prevent stroke
- 12) Build commitment among community members

Implementation

Phase 1: Preparation and Recruitment

- 1) Conducting meetings with regional cadres and the community regarding health issues
- 2) Conducting deliberations regarding health issues
- 3) Conducting deliberations with regional cadres and the community to address health issues
- 4) Discussing planned activities for hypertension health issues through ergonomic exercises
- 5) Determining community members willing to participate in the research based on initial blood pressure measurements, and those with hypertension
- 6) Discussing the community's willingness to implement the planned activities
- 7) Determining the composition of community roles during the ergonomic

exercises, including exercise coordinators, exercise instructors, and providers of facilities and infrastructure

- 8) Distribute invitations to ergonomic exercise sessions

Phase 2: Baseline Assessment and Education

- 1) Conduct blood pressure checks before the intervention with cadres
- 2) Distribute a questionnaire containing 15 true or false statements before the health education session, which respondents will complete for 30 minutes.

Phase 3: Intervention Delivery

- 1) Provide health education related to hypertension, ergonomic exercise steps, and stroke prevention
- 2) Conduct ergonomic exercise sessions together

Phase 4: Post-Intervention Assessment

- 1) Conduct blood pressure checks after the intervention with the cadres
- 2) Post-test questionnaires were distributed containing 15 true or false statements with the same content as the pre-test, which respondents would complete within 30 minutes.

3. RESULTS

Table 1. Results of Analysis of Ergonomic Exercise on Systolic Blood Pressure

Negative Ranks	Positive Ranks	Ties	Asymp. Sig (2-tailed)	Z
32	0	2	< 0,001	-5,216

p-value < 0,05

Negative Ranks = decrease in Blood Pressure; Positive Ranks = increase in Blood Pressure; Ties = no change

There were 32 respondents who showed a decrease in systolic blood pressure, from 146 mmHg to 140 mmHg, and 16 respondents experienced a decrease in diastolic blood pressure, namely from 81

mmHg to 71 mmHg. This shows that there is an effect of providing ergonomic exercises to respondents on changes in systolic blood pressure, as evidenced by the Asymp. Sig (2-tailed) value < 0.001.

Table 2. Results of Analysis of Ergonomic Exercise on Diastolic Blood Pressure

Negative Ranks	Positive Ranks	Ties	Asymp. Sig (2-tailed)	Z
16	4	14	0,005	-2,826

p-value < 0,05

Negative Ranks = decrease in Blood Pressure; Positive Ranks = increase in Blood Pressure; Ties = no change

There were 16 respondents who experienced a decrease in diastolic blood pressure, thus indicating that there was an effect of providing ergonomic exercises to

respondents on changes in diastolic blood pressure, as evidenced by the Asymp. Sig (2-tailed) value of 0.005.

Table 3. Results of Analysis of Stroke Prevention Knowledge Before and After Ergonomic Exercise

Negative Ranks	Positive Ranks	Ties	Asymp. Sig (2-tailed)	Z
1	33	0	< 0,001	-5,026

p-value < 0,05

Positive Ranks = increase in knowledge score; Negative Ranks = decrease in knowledge score; Ties = no change

The results of the respondents' knowledge measurement showed that there was an effect of providing health education regarding stroke prevention to respondents, as evidenced by the Asymp. Sig (2-tailed) value < 0.001. The average pre-test score was 7.9, while the average post-test score was 11. Thus, the percentage increase in knowledge was 39%.

Evaluation

Action Evaluation

- 1) Establishment of an adult-elderly exercise group
- 2) Implementation of health education related to stroke prevention

Diagnostic Evaluation

- 1) Availability of ergonomic exercise health promotion programs increased

from 3 (moderate) to 4 (moderately improved)

2) Participation in ergonomic exercise community health programs increased from 3 (moderate) to 5 (improved)

3) Compliance with environmental health standards in ergonomic exercise increased from 3 (moderate) to 5 (improved)

Quality Evaluation

Community health development actions in addressing community health deficits were quite effective. The enthusiasm of the 34 study respondents was 100% consistent with attendance at each exercise meeting, and the formation of a community role structure during the implementation of ergonomic exercise, including exercise coordinators, instructors, and facility and infrastructure providers. Coordination with community leaders and the gymnastics leader in the rural area was carried out well so that the activity could run according to the allocated time. Three community members who were willing to be responsible carried out their roles on the intervention days 2 and 3. The selection of the ergonomic gymnastics time was adjusted to the residents' free schedules, so

it was held in the evening because many residents were still working in the morning.

4. DISCUSSION

Based on a study conducted by nursing students, there were 34 respondents consisting of 22 women and 12 men. This is consistent with research (Paudel et al., 2020), which also showed that the prevalence of hypertension in women is higher than in men, at 53.6%. Gender is a factor that influences blood pressure. Research (Connelly et al., 2022) shows that a better anti-inflammatory immune profile in women can act as a compensatory mechanism to limit blood pressure increases compared to men with a more pro-inflammatory immune profile. Women have a greater risk of developing hypertension after menopause. Women who have not entered menopause are protected by the hormone estrogen, which plays a role in increasing high-density lipoprotein (HDL). Low HDL cholesterol and high LDL cholesterol (low-density lipoprotein) affect the process of atherosclerosis and cause high blood pressure. In premenopausal women, estrogen gradually loses the hormone that protects blood vessels from damage. This process continues, with estrogen levels naturally changing with age,

typically occurring between 45 and 55. Therefore, women who reach menopause are at equal risk of developing hypertension (Cífková & Strilchuk, 2022).

Research by Puspitasari et al. (2024), found that 105 out of 172 respondents had hypertension, with the diagnosis being a community health deficit. The analysis showed that 30 respondents had poor knowledge before receiving health education about hypertension. After receiving health education about hypertension, 22 respondents had good knowledge (73%), and 8 respondents had poor knowledge (27%). Therefore, there was an increase in public knowledge after receiving education, with 20 respondents (38.5%).

The results of implementing ergonomic exercises three times a week showed that 32 respondents experienced a decrease in systolic blood pressure, from 146 mmHg to 140 mmHg, and 16 respondents experienced a decrease in diastolic blood pressure, from 81 mmHg to 71 mmHg. This is consistent with research conducted by (Veri & Amelia, 2020) that showed a decrease in systolic and diastolic blood pressure after ergonomic exercise intervention in pre-elderly individuals (45-59 years). Another study by Astuti (2021) also found that before

ergonomic exercises, the average blood pressure of respondents was 146.45 mmHg, and after ergonomic exercises, the average systolic blood pressure was 137.32 mmHg in the elderly group.

Ergonomic exercise interventions can lower blood pressure by helping restore the nervous system's position and flexibility, allowing for smooth blood flow to the brain. Ergonomic exercise movements can directly open, cleanse, and activate all body systems, such as the cardiovascular system. They can also improve vasodilation, which can reduce peripheral vascular resistance. Increased blood vessel elasticity facilitates blood vessel flexibility, and blood flow through the heart is smoother (Astuti, 2021). Studies evaluating ergonomic exercises in hypertensive elderly individuals report consistent (some with $p \leq 0.01$) and significant reductions in systolic blood pressure at a frequency of 3x/week. Diastolic blood pressure results fluctuate, and frequency differences are not always significant. Diastolic blood pressure reductions are typically smaller and sometimes insignificant in small samples. The actual effect size depends on: baseline blood pressure (greater if the baseline is higher), duration and frequency of exercise, intensity, and respondent compliance

(Rohmana et al., 2024). Another study conducted by Irawan and Maidartati (2023) carried out ergonomic exercise 3x/week for 3 weeks and found that there was an effect between before and after ergonomic exercise, based on the Paired Sample T-Test, which obtained a p value of 0.000 for both systolic and diastolic pressure.

Ergonomic exercise movements consist of the opening, standing upright, and fundamental movements, such as open chest posture, bowing in gratitude, sitting powerfully, sitting in a burning position, and lying down in surrender. Prostration, for example, can also increase blood flow to the upper body, especially the eyes, head, ears, nose, and lungs, allowing toxins to be cleansed and high blood pressure to be controlled. Ergonomic exercise movements can relax the body, expand the chest cavity, and promote normal heart function (Arwani et al., 2023).

When performing ergonomic exercises, people also show greater interest in aerobics. This is supported by research (Hastuti & Kurnia, 2024), which explains that aerobics offers a combination of physical and social benefits. It feels more lively, easier to follow, and perceived as an attractive and healthy lifestyle option. Ergonomic exercises, scientifically proven

effective in lowering systolic blood pressure and reducing pain, are often considered too technical and less enjoyable for group participants. However, aerobics has a downside: after aerobics, appetite for fatty or savory foods increases, although an increase in absolute calorie intake does not always accompany this. This condition can hinder weight loss if left unchecked. Furthermore, for the elderly or individuals with certain cardiovascular conditions, moderate- to high-intensity aerobics may be less safe without close supervision. Although numerous studies demonstrate benefits for the elderly, the intensity and type of exercise should be tailored to the individual's health condition (Hsieh et al., 2025).

A limitation of this study was the lack of measurement of respondents' compliance in implementing ergonomic exercises independently. The sustainability of the ergonomic exercise program among residents in rural areas has not been optimally implemented due to the community's preference for aerobic exercise.

5. CONCLUSION

The results of respondents' blood pressure measurements before and after

the intervention showed an effect of ergonomic exercises on changes in systolic blood pressure, as evidenced by a p-value <0.001. Providing ergonomic exercises to respondents affected changes in diastolic blood pressure, as evidenced by a p-value of 0.005. Nursing evaluation obtained outcome criteria related to the increased availability of health promotion programs, as evidenced by implementing ergonomic exercise activities 3 times a week. Outcome criteria related to participation in community health programs increased, as evidenced by the enthusiasm of all research respondents to attend every joint exercise meeting. Outcome criteria related to compliance with environmental health standards increased, as evidenced by all respondents complying with the appeal from students to participate in every exercise meeting consistently and following the entire series of activities.

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AUTHOR CONTRIBUTIONS

Substantial contributions to conception, data collection, data analysis,

and writing: Nurul Kamila and Rizkiyani Istifada.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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