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The Effectiveness of Ergonomic Exercises on Joint Pain Severity among the Elderly

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ABSTRACT

Introduction: Joint pain is a prevalent health issue among the elderly, often impairing mobility and quality of life. Non-pharmacological interventions such as ergonomic exercises have gained attention for their safety, accessibility, and potential effectiveness in reducing pain.
Objective: This study aimed to evaluate the effect of ergonomic exercise on joint pain intensity among elderly residents at UPTD PSLU Tresna Werdha Natar, South Lampung, in 2025.
Methods: A quasi-experimental study with a one-group pre-test and post-test design was conducted. A total of 36 elderly participants aged 60 years and above were recruited using total sampling. Joint pain was assessed using a standardized numerical rating scale ranging from 0 (no pain) to 10 (worst possible pain). Participants engaged in a structured ergonomic exercise program. Pre- and post-intervention pain scores were analyzed using the paired t-test in SPSS.
Results: The mean joint pain score prior to the intervention was 2.81 (SD = 0.53), which significantly decreased to 2.08 (SD = 0.50) following the ergonomic exercise program. Statistical analysis showed a significant reduction in pain scores ($p < 0.001$).
Conclusion: Ergonomic exercises demonstrated a significant effect in reducing joint pain among elderly residents. These findings support the integration of ergonomic exercise routines into daily care practices in nursing home settings to enhance elderly well-being and functional independence.

Keywords: elderly, ergonomic exercise, joint pain, non-pharmacological intervention

Introduction

Elderly people often experience health problems due to the aging process, including physical, cognitive, emotional, and mental decline. According to the World Health Organization (WHO), elderly individuals are defined as those aged 60 years and above. Life expectancy (LE) serves as one of the key indicators of a nation's development. As a developing country, Indonesia continues to improve various aspects of its national welfare, which contributes to a steady increase in life expectancy. In 2022, the life expectancy in Indonesia reached 71.85 years. In 2023, it increased to 72.39 years, and in 2024, it remained at 72.39 years (Central Statistics Agency, 2024). In Lampung Province, life expectancy in 2024 was 71.50 years (BPS Lampung, 2024). This trend has led to a growing elderly population, which in turn presents numerous health-related challenges requiring special attention. Aging affects multiple organ systems, including the integumentary, cardiovascular, gastrointestinal, reproductive, neurological, urinary, and musculoskeletal systems. Degeneration of the musculoskeletal system, in particular, often leads to joint pain. Changes in collagen content reduce joint flexibility and contribute to discomfort. Erosion of the joint capsule results in limited joint mobility, swelling, and pain.

Joint pain is one of the most common complaints in elderly individuals, especially at an advanced age. As the body ages, a degenerative process occurs in the joints, bones, and supporting tissues. If left untreated, joint pain can lead to significant discomfort, stiffness, reduced muscle function, impaired balance, walking difficulties, and disruption of daily activities (Setyowati et al., 2021). Management of joint pain may involve both pharmacological and non-pharmacological therapies (Astutik et al., 2022; Hamdani et al., 2023). Non-pharmacological approaches include stretching, deep-breathing relaxation techniques, warm compresses, active range of motion exercises, and therapeutic gymnastics. Ergonomic gymnastics has been shown to reduce joint pain, improve joint range of motion, enhance muscle strength and endurance, and prevent joint stiffness in elderly individuals (Arisandy et al., 2023). Ergonomic gymnastics is particularly recommended because its movement patterns are effective, efficient, and resemble logical prayer movements, which are naturally familiar and have been practiced routinely by many people throughout their lives (Fatiha et al., 2021).

Based on a pre-survey conducted on November 12, 2024, among 75 elderly residents at the UPTD PSLU Tresna Werdha Natar, South Lampung, 37 individuals reported experiencing joint pain. From interviews with 10 elderly respondents, 40% stated they had ankle joint pain with a pain scale of 3 (mild pain), 20% reported knee joint pain with a scale of 4 (moderate pain), 30% had hand joint pain with a scale of 5 (moderate pain), and 10% reported ankle joint pain with a scale of 7 (severe pain). None of the respondents received pharmacological treatment during pain episodes, relying instead on self-massage of the affected area. Moreover, none of them were aware that ergonomic gymnastics could help alleviate joint pain, and therefore, none had ever practiced it.

Based on the aforementioned background and supporting evidence, this study aims to examine the effectiveness of ergonomic gymnastics on the joint pain scale in the elderly at UPTD PSLU Tresna Werdha Natar, South Lampung, in 2025.

Objective

This study aimed to evaluate the effect of ergonomic exercise on joint pain intensity among elderly residents at UPTD PSLU Tresna Werdha Natar, South Lampung, in 2025.

Method

This study employed a quasi-experimental design with a one-group pre-test and post-test approach, conducted at UPTD PSLU Tresna Werdha Natar, South Lampung. The target population consisted of elderly residents aged 60 years and above. A total of 36 participants were selected using total sampling based on the following inclusion criteria: cognitively intact, physically capable of participating in exercise, and having no acute musculoskeletal injuries or medical contraindications to physical activity.

Joint pain levels were assessed using a validated numerical joint pain scale ranging from 0 (no pain) to 10 (worst possible pain). Participants engaged in ergonomic exercise sessions conducted twice per week over a two-week period. The exercise program consisted of structured, low-impact movements aimed at enhancing joint flexibility, improving circulation, and alleviating musculoskeletal discomfort.

Data were collected before and after the intervention and analyzed using the Paired t-test with SPSS version 29 to determine the statistical significance of changes in joint pain scores. Written informed consent was obtained from all participants prior to their inclusion in the study.

Result

Effectiveness of Ergonomic Gymnastics on Joint Pain Scale in the Elderly at UPTD PSLU Tresna Werdha Natar South Lampung in 2025.

Table 1. Joint Pain Scores Before and After Ergonomic Exercises

Joint Pain Scale	n	Mean	SD	P-value
Before gymnastics	36	2.81	0.525	0.000
After gymnastics	36	2.08	0.500	

The results of the parametric test (paired t-test) of the elderly joint pain scale are presented in table the average level of joint pain before being given ergonomic gymnastics was 2.81. In the measurement after being given ergonomic gymnastics, the average score for the level of joint pain was 2.08. This indicates a decrease in joint pain in the elderly after being given ergonomic gymnastics. Based on the results of the parametric test (Paired t-test), a significance value of 0.000 ($p<0.05$) was obtained. This means that H0 is rejected and Ha is accepted, meaning that ergonomic gymnastics is effective in reducing the scale of joint pain in the elderly at the UPTD PSLU Tresna Werdha Natar, South Lampung.

Discussion

According to Prasetyawati Putri et al. (2022), the implementation of ergonomic gymnastics serves as a non-pharmacological complementary therapy capable of reducing pain levels. Ergonomic gymnastics is a movement technique designed to restore or correct spinal alignment, as well as improve muscle and joint flexibility. Gandari et al. (2019) further support this by stating that ergonomic gymnastics has a therapeutic effect on joint pain reduction. This is achieved through proper movements that promote full-body relaxation, eliminate negative

electrical charges, and enhance oxygen circulation throughout the body, ultimately increasing comfort and vitality.

The practice of ergonomic gymnastics induces mental calmness, which facilitates physical relaxation. This relaxation phase is crucial for resting organ systems after daily activity. During this phase, the release of adrenaline—a stimulant hormone—is inhibited, promoting a sense of calm. Such a relaxed state is beneficial for alleviating fatigue, exhaustion, and muscle pain (Malo et al., 2019).

The findings of the present study align with previous research. Malo et al. (2019) demonstrated that ergonomic gymnastics significantly reduced joint pain in elderly women at the Cipiring II Landungsari Malang elderly health post. They concluded that ergonomic gymnastics reduces pain by correcting the alignment and flexibility of the nervous system and improving blood circulation. Additionally, it enhances oxygen supply to the brain and activates various bodily systems, including the cognitive, musculoskeletal, thermoregulation, uric acid metabolism, cholesterol reduction, blood sugar balance, lactic acid regulation, and immune response systems.

This is further supported by Setyowati et al. (2023), who examined the effectiveness of ergonomic gymnastics for knee pain in elderly women. Their study revealed a statistically significant reduction in knee pain, with a p-value of 0.00 ($p < 0.05$), indicating that ergonomic gymnastics effectively alleviates musculoskeletal-related discomfort and enhances quality of life.

Similarly, Sari et al. (2023) found that ergonomic gymnastics significantly reduced joint pain in elderly residents of the Sabai Nan Aluih Sicincin Tresna Werdha Social Home, Padang Pariaman Regency. Using a paired t-test, they reported a p-value of 0.01 ($p < 0.05$), concluding that ergonomic gymnastics is an effective non-pharmacological intervention. The therapy promotes recovery by restoring nervous system function, improving blood circulation, enhancing oxygenation to the brain, and activating metabolic processes related to uric acid, cholesterol, blood sugar, and electrolyte balance. The intervention was implemented four times over two weeks and was noted for its cost-effectiveness and simplicity.

Based on the current study and supporting literature, the researcher assumes that joint pain significantly interferes with the elderly's daily activities. Therefore, ergonomic gymnastics is a suitable intervention. It is a simple, low-cost exercise that can be performed twice a week and is easy to learn and implement. Respondents in this study also reported that the movements were easy to remember and could be performed independently at home or in any setting.

Conclusion

The findings of this study demonstrate that ergonomic exercises significantly reduced joint pain among elderly residents at UPTD PSLU Tresna Werdha Natar ($p < 0.001$). These results highlight the potential of ergonomic exercises as an effective non-pharmacological intervention to alleviate musculoskeletal discomfort in the elderly. Incorporating ergonomic exercises into routine care programs in nursing homes may enhance physical function, reduce pain, and improve quality of life. However, to further validate these findings, future studies employing a control group and larger sample size are recommended.

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Not applicable.

Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

The researchers stated that there is no conflict of interest related to the implementation and publication of the results of this research. The entire research process, from planning, data collection, analysis, to report preparation, was carried out independently without any influence or pressure from any third party. A commitment to research ethics is upheld throughout the research process, ensuring transparency, accuracy and honesty in reporting results. Respondents' participation was voluntary with informed consent, and their confidentiality and privacy were maintained in accordance with applicable research ethics standards. With this statement, researchers hope that the research results can be trusted and used as a valid reference for the development of science and health practices related to ethnomedicine and reproductive health.

Ethical consideration

Not applicable.

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