

---

## Physical Activity as a Non-Pharmacological Intervention for Chronic Pain in Elderly Gouty Arthritis

Siti Naimatuz Zahro<sup>1)</sup>, Dina Camelia<sup>2)</sup>, Leo Yosdimyati R<sup>3)</sup>, Tiara Fatma P<sup>4)</sup>

<sup>1,2,3)</sup> STIKes Bahrul Ulum, Jombang, Jawa Timur, Indonesia

<sup>4)</sup> AKPER Bahrul Ulum, Jombang, Jawa Timur, Indonesia

\*Corresponding Author

Email : [sitinaimatuzzahro@gmail.com](mailto:sitinaimatuzzahro@gmail.com)

---

### Abstract

Chronic pain in elderly people with gout arthritis remains a problem that lacks structured treatment, negatively impacting their quality of life and daily activities. This study aims to analyze the effect of physical activity on the level of chronic pain in elderly people with gout arthritis in Kejambon Hamlet, Dapurkejambon Village. The study used a quantitative research type with a pre-experimental one group pretest-posttest design. The study was conducted on elderly people experiencing gout arthritis pain with a mild and moderate pain scale, taken using a purposive sampling technique according to the inclusion and exclusion criteria, resulting in 20 respondents. Data were collected using a pre-post test pain scale observation sheet and analyzed using the Wilcoxon Signed Ranks Test. The results showed that, before the intervention, most respondents experienced moderate pain (15 respondents (75%), and after the intervention, most respondents experienced a decrease in pain levels to mild (15 respondents (75%). The Wilcoxon test results showed a significance value of 0.001 ( $p < 0.05$ ), which means there is a significant effect of physical activity on reducing the level of chronic pain in elderly people with gout arthritis. It was concluded that physical activity significantly reduced chronic pain levels in elderly people with gouty arthritis. This study recommends that this activity can be used as an effective non-pharmacological intervention in geriatric nursing practice.

**Keywords:** Physical Activity, Chronic Pain, Elderly, Gout Arthritis.

---

### INTRODUCTION

Chronic pain is one of the most common health issues among the elderly and is a multidimensional burden encompassing physical, emotional, and social aspects. One of the most common types of chronic pain is gouty arthritis, a chronic inflammatory joint disease that results from the deposition of monosodium urate crystals in the joints due to high levels of uric acid in the blood. The accumulation of these crystals triggers recurrent inflammation, causing severe pain, swelling, redness, and progressive limitation of movement if not properly managed. The impact of this condition is not only limited to daily activities but also significantly reduces the quality of life of the elderly, especially those with pre-existing functional limitations.

The effects of chronic pain in the elderly go beyond physical symptoms to psychological issues, including increased risk of depression, sleep disturbances, social isolation, and decreased independence. Recent studies have shown that when pain is not optimally managed, older adults tend to become inactive, withdraw from social activities, and become more dependent on family and long-term care facilities. Therefore, a comprehensive and sustainable approach to managing chronic pain is crucial in the healthcare system for the elderly.

Global prevalence indicates that approximately 34.2% of elderly people experience joint pain, making musculoskeletal problems one of the most common complaints in this age group. Based on the 2019 Basic Health Research (Riskesdas), approximately 9.7% of elderly people in Indonesia reported experiencing joint pain, with variations between regions. In East Java, the prevalence of gouty arthritis reached 6.72%, while in Jombang Regency there were 2,375 cases (8.91%), the majority of which were experienced by elderly people with comorbidities such as hypertension, diabetes mellitus, and dyslipidemia. These figures indicate the urgency of preventive and promotive interventions at the community level to minimize the long-term impact of this disease.

Generally, approaches to pain management due to gouty arthritis focus on pharmacological treatments, such as the use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), colchicine, and

corticosteroids. Although effective in relieving acute symptoms, long-term use of these drugs carries the risk of serious side effects, such as gastric ulcers, impaired renal function, hepatotoxicity, and cardiovascular complications. Furthermore, repeated use of these drugs can lead to pharmacological dependence and the possibility of rebound effects when therapy is discontinued. Therefore, non-pharmacological approaches are increasingly being considered as safer alternatives and oriented towards improving quality of life.

One non-pharmacological strategy that has been proven effective and relatively easy to implement is structured physical activity. Physical activity helps reduce pain through a number of physiological mechanisms such as increased blood circulation, improved tissue oxygenation, increased muscle and joint elasticity, and stimulated the release of endorphins as the body's natural analgesics. In addition to reducing pain, physical activity can also reduce systemic inflammation, improve emotional stability, and maintain cognitive function in older adults [5]. Forms of exercise such as walking, joint range-of-motion exercises, and stretching have been shown to reduce pain intensity, increase joint mobility, and increase the confidence of older adults to remain socially and functionally active.

Although numerous studies have demonstrated the effectiveness of physical activity for musculoskeletal pain, there remains a gap in the literature in the context of older adults living in rural communities in Indonesia, where access to non-pharmacological interventions remains very limited. Many institution-based programs fail to take into account local socio-cultural characteristics and economic conditions. Rural older adults are generally not exposed to Standard Operating Procedure (SOP)-based approaches or formal health training, necessitating a more contextual and community-empowering intervention model.

Considering these conditions, this study aims to evaluate the effect of physical activity on chronic pain in elderly people with gouty arthritis in Kejambon Hamlet, Dapurkejambon Village, within the Tambakrejo Community Health Center, Jombang Regency. The main focus of this study is the implementation of simple and consistent physical activity, guided by community health cadres with supervision from health workers, without involving active pharmacological therapy or strict dietary restrictions. This approach aims to reflect the real conditions and daily lives of elderly people in this community.

This research plays a strategic role in developing a community-based intervention model tailored to the needs of rural elderly. This model adopts the results of previous research and adapts them into a simpler and more applicable standard operating procedure (SOP). The novelty of this research lies in the formulation of a physical activity SOP that is not only easily understood by the general public but also allows for independent implementation or with the guidance of cadres, without being tied to formal health care facilities.

The SOPs used were developed through a contextual approach that took into account various factors such as physical limitations, local customs, environmental conditions, and the community's health literacy level. This made the intervention more inclusive, enabling the participation of older adults with educational and economic limitations. Unlike conventional clinical approaches, this study emphasized the importance of community empowerment and independence through ongoing health education.

In addition to assessing the effectiveness of physical activity in reducing pain, this study also explored the potential sustainability of the program through integration with the primary care system. This included the active role of cadres, family support, involvement of community leaders, and collaboration with elderly health post (Posyandu) activities. It is hoped that the results of this study can be used as a basis for formulating evidence-based policies for the broader management of chronic pain in the elderly.

Furthermore, this research is expected to strengthen the paradigm of community-based health promotion, with an approach that not only treats symptoms, but also builds local capacity to maintain an active and healthy lifestyle. In the context of Indonesia, which is undergoing a demographic

transition with an increasing elderly population, such a strategy is crucial in supporting a health system that is more oriented towards prevention and active community participation. With all the elements that have been described, this research is expected to become an empirical and applicable reference in the effective, contextual, and sustainable non-pharmacological management of chronic pain due to gouty arthritis in rural communities in Indonesia.

## RESEARCH METHODS

This study uses a quantitative approach with a pre-experimental design. The design applied is One-Group Pretest-Posttest Design. This study was conducted in Kejambon Hamlet, Dapurkejambon Village, Tambakrejo Health Center, Jombang. Data collection for this study used a purposive sampling method. Data on pain level and uric acid level measurements were collected based on the Pre-Post Test Numerical Rating Scale (NRS) observation sheet created by the researcher with NRS scale criteria: no pain, mild pain, moderate pain, and severe pain. While the measurement of uric acid levels was carried out using a uric acid level measurement tool. The intervention was carried out for one week with 2 meetings, namely with details of the first day before doing physical activity, pain level and uric acid level measurements were carried out as pre-test data, then on the last day after the intervention, pain level measurements were carried out as post-test. Then the data were analyzed to determine the effect of physical activity on chronic pain levels in the elderly.

The population in this study was elderly people experiencing gouty arthritis pain in Kejambon Hamlet, Dapurkejambon Village. To determine the sample size, a purposive sampling technique with inclusion and exclusion criteria was used, resulting in a total of 20 elderly people.

## RESULTS AND DISCUSSION

The results of general data based on respondent characteristics are shown in Table 1. Meanwhile, the results of the Wilcoxon test analysis are shown in Table 1.

**Table 1. Percentage of general data indicators**

Characteristics	Frequency (f)	Percentage (%)
Gender		
Man	2	10%
Woman	18	90%
Work		
Housewife	16	80%
Private	1	5%
Businessman	1	5%
Farm workers	2	10%
Education		
Elementary School	19	95%
Not pass	1	5%
Physical activity		
Yes	9	45%
No	11	55%
Diet		
Yes	0	0%
No	20	100%
Consumption of drugs		
Yes	6	30%
No	14	70%
Medical history		
There isn't any	8	40%
Diabetes mellitus	6	30%
Hypertension	4	20%
History of fractures	1	5%
cholesterol	1	5%

**Table 2. Results of analysis of physical activity on chronic pain levels**

No	Chronic pain level	Pre		Post	
		F	%	F	%
1	No pain	0	0%	1	5%
2	Light	15	25%	15	75%
3	Currently	5	75%	4	20%
4	Heavy	0	0%	0	0%
	Amount	20	100	20	100

*Wilcoxon test asymp.sig. (2-tailed d) = 0.001 < 0.05*

### Discussion

This study revealed that before the intervention, 75% of elderly people experienced moderate pain due to gouty arthritis. After two sessions of physical activity over a week, 75% of participants showed a reduction in pain to mild levels, and another 5% no longer experienced pain. These findings confirm the effectiveness of a non-pharmacological approach, namely physical activity, in reducing the intensity of chronic pain in elderly people with gouty arthritis. These results are consistent with

the explanation of Fu et al. (2025) that structured physical activity can increase joint flexibility, improve blood circulation, and stimulate the release of  $\beta$ -endorphins, the body's natural analgesic. The physiological mechanism of physical activity on pain perception can be explained through the concept of exercise-induced hypoalgesia (EIH), which is a reduction in pain perception resulting from light to moderate intensity aerobic exercise (Jones & Barry, 2021). This process stimulates the central nervous system to inhibit pain signal transmission through the release of several neurotransmitters and hormones. In addition to its analgesic effect, EIH also improves the emotional state and psychological well-being of older adults, which helps accelerate the pain recovery process.

Data analysis also showed that demographic factors influenced pain. The majority of participants were postmenopausal women, who, according to Tang et al. (2025), are at higher risk of elevated uric acid levels due to decreased estrogen, which previously played a role in aiding uric acid excretion through the kidneys. This decreased hormone levels lead to the accumulation of urate crystals in the joints, which trigger inflammation and pain.

In addition to hormonal influences, low physical activity also exacerbates pain intensity. As many as 55% of participants were found to have no prior exercise habits. Caiado et al. (2022) explained that long-term physical inactivity can lead to muscle weakness, decreased flexibility, and joint stiffness, which exacerbate chronic pain. Therefore, simple interventions such as walking and stretching are highly relevant for older adults.

Education also influences understanding of pain. The majority of respondents (95%) had a primary education, which correlates with low health literacy, including recognizing signs of disease, prevention strategies, and managing chronic pain (Heger et al., 2019). Low levels of education are often accompanied by limited access to health information and services, which results in suboptimal management of gouty arthritis.

Although most patients showed a reduction in pain, four elderly patients (20%) continued to experience moderate pain after the intervention. This is thought to be due to comorbidities such as diabetes mellitus and a history of joint trauma. Anggraini (2022) stated that in diabetic patients with chronic hyperglycemia, there is an increase in pro-inflammatory cytokines and the enzyme xanthine oxidase, which triggers increased uric acid levels.

A history of joint trauma, such as fractures or soft tissue injuries, can increase the risk of chronic pain up to sixfold due to structural changes in the tissue and nerve hypersensitivity in the affected area (Rahmanto & Aisyah, 2019). These factors are important considerations in assessing variations in response to physical interventions.

The results of the statistical test using the Wilcoxon Signed Ranks Test showed a significance value of 0.001 ( $p < 0.05$ ), indicating that physical activity interventions have a significant impact on reducing chronic pain. Consistent physical exercise can activate the neuromodulation system, strengthen joint-supporting muscles, and improve posture, which contribute to reducing pain locally and systemically.

Throughout the intervention, none of the respondents took painkillers or followed a low-purine diet. Therefore, the improvements observed can be directly attributed to the physical activity intervention. This aligns with Harni (2021), who stated that non-pharmacological strategies based on physical activity are an effective approach, particularly for communities with limited access to medical services and pharmacotherapy.

Overall, the results of this study indicate that light physical activity-based interventions such as walking and stretching are practical, safe, and affordable strategies for reducing chronic pain due to gouty arthritis. However, the effectiveness of the intervention is greatly influenced by individual factors such as the presence of comorbidities and physical capacity. Therefore, a holistic, personalized approach is still needed to ensure optimal and sustainable intervention success.

## CONCLUSION

The main findings of this study indicate that physical activity significantly reduces chronic pain levels in elderly people with gouty arthritis. Before the intervention, most respondents (75 percent) experienced moderate pain, while after two sessions of physical activity over a week, 75 percent of respondents showed a decrease in pain to mild, and 5 percent no longer experienced pain. The Wilcoxon Signed Ranks Test statistical test yielded a p-value of 0.001 ( $p < 0.05$ ), confirming the positive effect of light physical activity such as walking and stretching on pain perception. However, there are limitations to this study, including the pre-experimental design without a control group, the relatively small sample size ( $n = 20$ ), and the absence of uric acid level measurements before and after the intervention, making it impossible to fully determine whether the change in pain was influenced by uric acid reduction or simply by perception factors and natural analgesic mechanisms.

Suggestions for further research include developing a quasi-experimental design with a control group, enlarging the sample size, and adding measurements of uric acid levels and inflammatory parameters to strengthen the causal relationship between physical activity and pain reduction. It is also recommended to vary the duration, intensity, and type of exercise to determine the optimal dose of physical intervention in elderly people with comorbidities. Practically, this study implies that light physical activity can be integrated into geriatric nursing programs and primary health care services in rural communities as a safe, affordable, and easily implemented non-pharmacological intervention by health workers under the guidance of health workers, thereby supporting improved quality of life and independence in elderly people with gouty arthritis.

## REFERENCES

- AM Heredia-Rizo, MJ Casuso-Holgado, and J. Martínez-Calderón, "Editorial: Interprofessional approaches for the management of chronic diseases," *Front. Med.*, vol. 11, p. 1490575, Sept. 2024, doi: 10.3389/FMED.2024.1490575/BIBTEX.
- A. Ngadiran and E. Pujiati, "The effectiveness of elderly exercises on changes in depression and quality of life in the elderly," *J. Health.*, vol. 13, no. 1, pp. 2721–8007, 2024.
- BK Jones, M.D., Booth, J., Taylor, J.L., & Barry, "Exercise-induced hypoalgesia: A meta-analysis of exercise dosing for the treatment of chronic pain," *PLoS One*, vol. 16, no. 1, 2021.
- C. Piroddi, "Non-pharmaceutical Interventions and Social Distancing as Intersubjective Care and Collective Protection," *Asian Bioeth. Rev.*, vol. 14, no. 4, pp. 379–395, 2022, doi: 10.1007/s41649-022-00212-7.
- D. Anggraini, "Clinical Aspects of Hyperuricemia," *Sci. J.*, vol. 1, no. 4, pp. 299–308, Jul. 2022, doi: 10.56260/SCIENA.V1I4.59.
- FROM THE OAI," *Osteoarthr. Cartil.*, vol. 30, pp. S10–S11, Apr. 2022, doi: 10.1016/j.joca.2022.02.005.
- HB Meral, A. Rezvani, S. Tolu, A. Usen, and MF Dasdelen, "Structural changes in the upper trapezius muscle of fibromyalgia patients identified by quantitative ultrasonography: a cross-sectional study," *Springer*, vol. 45, no. 5, May 2025, doi: 10.1007/S00296-025-05871-X.
- Ministry of Health of the Republic of Indonesia, "2018 National Riskesdas Report," Jakarta: Health Research and Development Agency Publishing Institute, 2019.
- M. Luthfi et al., "Nursing Care for Elderly TN. D with a Medical Diagnosis of Gout Arthritis," *Sci-tech J.*, vol. 4, no. 2, pp. 103-109–103 – 109, May 2025, doi: 10.56709/STJ.V4I2.731.
- N. Dalbeth, A. L. Gosling, A. Gaffo, and A. Abhishek, "Gout," *Lancet*, vol. 397, no. 10287, pp. 1843–1855, May 2021, doi: 10.1016/S0140-6736(21)00569-9.
- N. Martínez-Velilla et al., "Cognition Influences the Effects of Physical Exercise on Pain in Acute Hospitalized Older Adults," *J. Am. Med. Dir. Assoc.*, vol. 23, no. 1, pp. 175–176, Jan. 2022, doi:10.1016/j.jamda.2021.08.013.

- S. Arazi, F. Rashidi, A. Raiesifar, Y. Veisani, and A. Azadi, "The Effect of a Non-Pharmacological Multicomponent Pain Management Program on Pain Intensity and Quality of Life in Community-Dwelling Elderly Men With Chronic Musculoskeletal Pain," *Pain Manag. Nurs.*, vol. 24, no. 3, pp. 311–317, 2023, doi: 10.1016/j.pmn.2023.01.001.
- S. Rahmanto and K. Aisyah, "The Relationship Between History of Knee Injury and Patients with Potential Knee Osteoarthritis at Dinoyo Community Health Center, Malang City," *J. Physioter. dan Rehabil.*, vol. 3, no. 1, pp. 20–29, Jan. 2019, doi: 10.33660/JFRWHS.V3I1.31.
- SY Harni, *Physical Activity and Cognitive Function of the Elderly*. Central Java: CV. EUREKA MEDIA AKSARA, 2021.
- TC Fu, NE Lane, SH Lee, JC Chen, SF Hsu, and CM Chang, "Editorial: Rehabilitation and alternative medicine in the healthcare for chronic rheumatic pain disorders," *Front. Med.*, vol. 12, p. 1586105, Mar. 2025, doi: 10.3389/FMED.2025.1586105/BIBTEX.
- T. Susanto, Kumboyono, IF Kusuma, A. Purwandhono, and J. Sahar, "Community-based intervention of chronic disease management program in rural areas of Indonesia," *Front. Nurs.*, vol. 9, no. 2, pp. 187–195, Jun. 2022, doi: 10.2478/FON-2022-0021.
- VS Caiado et al., "Effects of Physical Exercises Alone on the Functional Capacity of Individuals with Obesity and Knee Osteoarthritis: A Systematic Review," *Biology (Basel)*, vol. 11, no. 10, p. 1391, Oct. 2022, doi: 10.3390/BIOLOGY11101391/S1.
- Z. Huang, W. Guo, and J. Martin, "CLUSTERING AND DIMENSIONAL REDUCTION FOR VISUALIZING KNEE OSTEOARTHRITIS PHENOTYPES: DATA