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The Effectiveness of Rheumatic Exercise on Functional Independence among Elderly with Joint Pain: A Study in a Nursing Home

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Abstrak

Joint pain is one of the most common health problems experienced by older adults and leads to reduced mobility, pain, and dependence in performing daily activities. This study aims to analyze the effectiveness of rheumatic exercise on the functional independence of older adults with joint pain. This is a quantitative study with a quasi-experimental design using a one-group pretest–posttest approach. A total of 18 older adults who met the inclusion criteria served as study participants. Rheumatoid arthritis exercises were performed three times a week for four weeks, consisting of a warm-up phase, core movements, and a cool-down phase with repetitive joint movements focusing on flexion, extension, and rotation. The level of independence was measured using the Barthel Index, and the data were analyzed using the Wilcoxon Signed-Rank Test with a significance level of $p < 0.05$. The results showed a significant improvement in functional independence following the intervention ($p = 0.001$). The mean ADL score increased from 71.11 before the intervention to 79.72 after four weeks of rheumatoid exercise. This improvement was associated with increased joint flexibility, muscle strength, and reduced stiffness resulting from regular and controlled movements. These findings indicate that rheumatoid arthritis exercises are effective as a nonpharmacological intervention for improving functional ability and independence in older adults with joint pain.

Keywords:: *Exercises, Rheumatism, Eldery, Joint Pain, Functional Independence*

INTRODUCTION

The elderly population is experiencing rapid growth worldwide, including in Indonesia. According to data from the Indonesian Central Statistics Agency (Badan Pusat Statistik, 2023), older adults account for approximately 12% of the total population, and this figure is projected to increase to 20% by 2045. Similarly, the World Health Organization (2025) reported that there were about one billion people aged 60 years and above in 2020, and this figure is expected to rise to 1.4 billion by 2030. This demographic transition toward an aging population presents complex challenges, particularly concerning health, mobility,

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and independence among the elderly. This demographic shift toward an aging population has significant implications for health systems, social protection, and elderly care services. As individuals age, physiological, psychological, and social changes occur that may affect their overall quality of life (Ika Nur Rohmah & Bariyah, 2012; Pany & Boy, 2019).

One of the most prevalent health problems among older adults is joint pain, commonly associated with degenerative processes such as osteoarthritis or rheumatoid arthritis. Joint pain in the elderly is often chronic, leading to decreased physical mobility, reduced functional independence, and lower quality of life (Sima et al., 2022). The pain originates from structural changes in the joints, such as cartilage thinning, inflammation of the synovial tissue, and reduced elasticity of supporting muscles and ligaments. These conditions can limit daily physical activities and cause emotional distress, which in turn leads to social isolation and dependency on others.

Joint pain significantly affects the physical and emotional well-being of older adults. Persistent pain not only limits mobility but also induces stress responses that increase anxiety, heart rate, and blood pressure (M Hartwig, 2006). Over time, this condition can accelerate tissue degeneration, decrease immune function, and impair daily functioning. According to Lahaye et al. (2019) and Huang & Lu (2024), arthritis ranks among the top two chronic diseases affecting older adults, with a global prevalence of around 40.9%. This chronic pain often leads to reduced range of motion, muscle weakness, and dependency in performing basic Activities of Daily Living (ADL) such as bathing, dressing, walking, and eating (Zhang et al., 2005).

Functional independence is an essential indicator of the well-being and quality of life among the elderly. It refers to the ability to perform basic and instrumental activities of daily living (ADL) without assistance, such as eating, dressing, bathing, and toileting (Ribeiro et al., 2018). The Barthel and Katz Indexes are widely used to assess this level of independence and have demonstrated high validity and reliability (Wade et al., 1987). When joint pain increases, functional ability declines, resulting in reduced autonomy and an increased need for external support.

A preliminary observation conducted at Panti Werdha Rindang Asih II Bongsari, Semarang, revealed that among 27 elderly residents, three were bedridden and six were unable to perform daily activities independently due to sensory or mobility limitations. The remaining 18 elderly residents met the inclusion criteria, demonstrating the potential to

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participate in physical activity programs. Assessments using a goniometer and the Barthel Index of Activities of Daily Living indicated varying levels of joint discomfort and decreased functional independence among these participants. These findings emphasize the importance of implementing physical exercise interventions to maintain joint mobility and enhance independence among nursing home residents.

Physical exercise has been recognized as an effective non-pharmacological approach to maintaining joint flexibility, reducing pain, and improving functional capacity among older adults. One of the recommended interventions is rheumatic exercise, a low-impact physical activity specifically designed for elderly individuals with joint pain. Rheumatic exercise focuses on gentle and repetitive joint movements such as flexion and extension to improve range of motion (ROM), strengthen surrounding muscles, and reduce stiffness (Mas'adah, 2017); Hati & Rahmadana Lubis, 2022). Conducted three times a week for approximately three weeks, this type of exercise has been shown to enhance physical balance, alleviate pain, and promote independence in performing daily activities.

Previous studies have demonstrated the effectiveness of rheumatic exercise in improving physical function and autonomy among the elderly. Susilowati et al. (2017), in her study at the Panti Wreda Dharma Bakti Surakarta, reported that before the intervention, only 5.55% of elderly participants were independent, whereas after participating in rheumatic exercise, the proportion increased to 72.2%. These findings suggest that consistent participation in rheumatic exercise can significantly enhance independence in daily activities.

Therefore, considering the increasing prevalence of joint pain and its impact on elderly independence, this study aims to analyze the effectiveness of rheumatic exercise on functional independence among elderly individuals with joint pain at Panti Werdha Rindang Asih II Bongsari, Semarang. The results are expected to provide evidence-based insights into non-pharmacological strategies for maintaining mobility, reducing pain, and improving the quality of life among the elderly population.

METHOD

This study employed a quasi-experimental quantitative approach with a one-group pretest–posttest design The purpose was to determine the effectiveness of rheumatic exercise in improving functional independence among elderly individuals with joint pain at Panti Werdha Rindang Asih II Bongsari, Semarang. This design allows direct

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measurement of changes in independence and pain level within the same group (Sugiyono, 2019). The research was conducted over four weeks, with exercise sessions held three times per week, each lasting approximately 30 minutes. The population consisted of 27 elderly residents, and based on inclusion criteria, 18 participants were eligible and voluntarily participated in the study. The sampling technique used was purposive sampling, focusing on elderly individuals experiencing joint pain and able to perform mild physical activity.

The research was conducted over four weeks, with exercise sessions held three times per week, each lasting approximately 30 minutes. The population consisted of 27 elderly residents, and based on inclusion criteria, 18 participants were eligible and voluntarily participated in the study. The sampling technique used was purposive sampling, focusing on elderly individuals experiencing joint pain and able to perform mild physical activity. Data were collected through observation and measurement using standardized instruments: (1) the Barthel Index to assess functional independence, (2) the Numeric Rating Scale (NRS) to measure joint pain intensity, and (3) a goniometer to evaluate joint range of motion (ROM). The intervention procedure included three stages: (1) Preparation – obtaining permission, coordinating with nursing home management, and screening participants, (2) Implementation – conducting rheumatic exercise sessions consisting of warm-up (5 minutes), core movements (20 minutes) focusing on flexion–extension and rotational movements of the joints, and cool-down (5 minutes). Each session was supervised to ensure safety and consistency.(3) Evaluation – performing pretest and posttest measurements using the Barthel Index and NRS to evaluate changes in functional independence and pain levels.

The collected data were analyzed using SPSS version 29. Normality tests were conducted before statistical analysis. If data were normally distributed, a paired t-test was used; otherwise, the Wilcoxon signed-rank test was applied to compare pretest and posttest results. The significance level was set at $p < 0.05$. All participants provided informed consent before the study began. Ethical considerations such as confidentiality, voluntary participation, and participant safety were maintained throughout the research process.

RESULT

This study aimed to determine the effectiveness of rheumatic exercise on the functional independence of elderly individuals with joint pain at Panti Werdha Rindang Asih II Bongsari, Semarang. The research was conducted from August 24 to September 20, 2025, involving 18 elderly participants who met the inclusion criteria. Each participant

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attended 12 rheumatic exercise sessions over four weeks (three times per week, 30 minutes per session).

Table 1. Characteristics of Elderly

Characteristics	Category	Frequency (n)	Percentage (%)
Age	50-69 Years	12	66.7
	≥ 70 Years	6	33.3
Gender	Male	12	66.7
	Female	6	33.3
Education	No schooling	1	5.6
	Elementary school	3	16.7
	Junior high school	5	27.8
	Senior high school	9	50.0

Most participants (66.7%) were aged 50–69 years, predominantly male (66.7%), and had a senior high school education level (50.0%).

Table 2. Pre-test Results of Activity Daily Living (ADL) Before Rheumatic Exercise

Variable	Mean ± SD	Min	Max
ADL Score	71.11±18.44	20	90

Table 2 presents the results of the pre-test measurement of functional independence among elderly participants before the rheumatic exercise intervention. The mean ADL score obtained was 71.11 with a standard deviation of 18.44, and a score range between 20 and 90. These data indicate that most elderly participants had moderate levels of independence before the intervention.

Table 3. Post-test Results of Activity Daily Living (ADL) After Rheumatic Exercise

Variable	Mean ± SD	Min	Max
ADL Score	79.72±17.77	25	95

The average ADL score increased from 71.11 before the intervention to 79.72 after four weeks of rheumatic exercise, with a mean difference of 8.61 points (an improvement of 12.11%). The standard deviation decreased from 18.44 to 17.70,

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indicating that participants' levels of independence became more homogeneous following the intervention. Since the data were not normally distributed, the Wilcoxon Signed Rank Test was used to analyze pre-test and post-test differences. Table 4 presents the test results.



Figure 1. Rheumatic Exercise Implementation

The Figure 1 shows elderly participants performing rheumatic exercise under the supervision of the researcher. The session included warm-up, core, and cool-down phases with low-impact joint movements focused on flexibility, strength, and pain reduction. Exercises were conducted three times per week for four weeks in a group setting, ensuring safety, consistency, and participant engagement.

DISCUSSION

The findings of this study showed a significant increase in functional independence among elderly participants after performing rheumatic exercise for four weeks ($p = 0.001$). The mean ADL score increased from 71.11 in the pre-test to 79.72 in the post-test, indicating improved ability to perform daily activities independently. This result suggests that regular rheumatic exercise has a positive impact on physical function and autonomy in elderly individuals with joint pain. The improvement in functional independence can be attributed to the physiological effects of the exercise.

Rheumatic exercise involves repetitive joint movements such as flexion, extension, and rotation that help maintain range of motion (ROM), improve muscle strength, and enhance blood circulation to periarticular tissues. These effects reduce joint stiffness, alleviate pain, and enable smoother movement patterns, ultimately supporting functional ability. Similar findings were reported by Mas'adah (2017) and Susilowati et al. (2017), who found significant improvements in ADL performance among elderly

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individuals after participating in rheumatic exercise programs. This result also aligns with Rausch Osthoff et al. (2018), who emphasized that structured physical activity based on low-impact joint movements can significantly improve musculoskeletal function, reduce disability, and enhance quality of life in older adults with arthritis.

Rheumatic exercise consists of three main series: the warm-up, the core movement, and the cool-down.

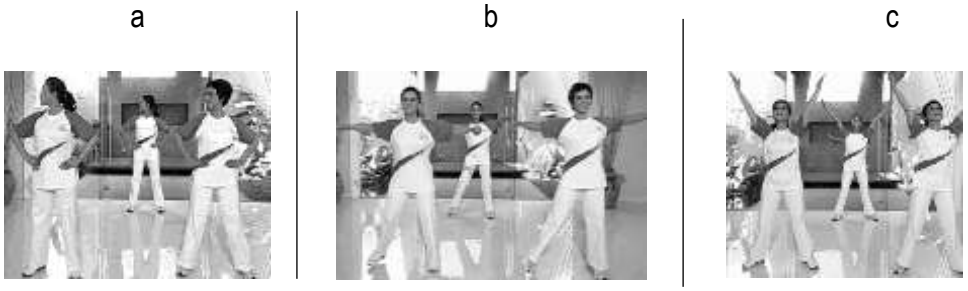


Figure 2. Series of Rheumatic Exercise

The implementation of rheumatic exercise in this study consisted of three main series: warm-up, core movement, and cool-down. The warm-up phase began with gentle stretching and slow rhythmic movements involving the neck, shoulders, arms, and legs. These movements aimed to prepare the muscles and joints for more active exercise, increase blood circulation, and reduce the risk of stiffness or injury. The gradual movement during this phase also helped improve joint lubrication and readiness for further activity. The core movement focused on repetitive joint motions involving both the upper and lower limbs. Participants performed arm movements such as raising and lowering the arms, lateral extensions, and circular rotations, combined with leg movements including stepping, bending, and gentle kicking motions. These coordinated actions emphasized flexion and extension of the joints, which are effective in increasing flexibility, balance, and strength of periarticular muscles. The continuous and rhythmic execution of these movements contributed to pain reduction and improvement in functional ability among the elderly. The final phase of rheumatic exercise was the cool-down, which included slow, relaxed movements such as deep breathing, shoulder rotations, and light stretching. This series allowed the body to gradually return to a resting state, stabilizing the heart rate and reducing muscle tension after the main exercise session. The calm and rhythmic movements during the cool-down also promoted relaxation, providing both physical and psychological comfort for the participants.

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The significant improvement observed in this study may also be attributed to the routine and structured nature of the exercise, which was performed three times per week for four weeks. Regular activity helps maintain joint mobility and muscle endurance, reduces stiffness, and supports smoother movement patterns. The repetition of flexion and extension movements performed in each session helps improve the range of motion and enhances functional capability in the elderly.

Based on the observation during implementation, participants showed greater enthusiasm and comfort in movement after several sessions. The group-based exercise also provided psychological benefits, such as increased motivation and interaction among participants, which indirectly improved adherence to the program. These outcomes emphasize that rheumatic exercise is a safe, effective, and low-cost non-pharmacological intervention suitable for elderly individuals with joint pain, especially in nursing home settings.

CONCLUSION

This study found that rheumatic exercise effectively improves the functional independence of elderly individuals with joint. The results showed a significant increase in the mean Barthel Index score from 71.11 before the intervention to 79.72 after four weeks of rheumatic exercise ($p = 0.001$). The findings of this study are emphasize the importance of structured physical exercise in maintaining musculoskeletal health and functional independence in older adults. Future studies are advised to include post-test measurements of NRS and ROM to obtain more comprehensive results.

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