

## THE EFFECT OF RHEUMATIC GYMNASTICS ON JOINT PAIN IN OSTEOARTHRITIS PATIENTS

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### Abstract

*Osteoarthritis is a disease characterized by joint pain. For this reason, non-pharmacological interventions for rheumatic exercises are needed regularly and routinely to reduce joint pain. This study aims to determine the effect of rheumatic exercise on joint pain in patients with osteoarthritis. Type of research is a pre-experimental design with a One Group Pretest – Posttest approach. The study population was patients with osteoarthritis. The sampling used is non-probability sampling with Accidental Sampling technique, the number of samples as many as 27 people. The research instrument used rheumatic gymnastics SOP and pain instrument with a numeric rating scale. Data analysis using the Wilcoxon test. The results showed that the patient's joint pain before rheumatic exercise was moderate pain average pain scale 4.70, after rheumatic exercise the joint pain experienced mild pain with average scale 3.63. The results of the statistical test showed that the p-value was  $0.012 < (0.05)$ , so the research hypothesis was accepted. The conclusion of the study showed that there was an effect of rheumatic exercise on joint pain in patients with osteoarthritis. It is hoped that health workers can apply rheumatic exercise therapy as an alternative to non-pharmacological therapy in reducing joint pain in patients with osteoarthritis.*

**Keywords:** Rheumatic gymnastics; Joint pain; Osteoarthritis

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### 1. Introduction

Every citizen of the Republic of Indonesia has the right to obtain health as referred to in the preamble to the 1945 Constitution. It is further explained in Law No. 36 concerning Health which states that every Indonesian citizen has the right to obtain quality, safe, affordable health services and has the right to choose the service he wants. Meanwhile, the government's obligation is to provide all health facilities, both physical and social, to achieve the highest degree of health (Kemenkes, 2019)

The achievement of public health status is accompanied by an increase in the elderly population and a high life expectancy. In 2015-2020 it is estimated that the life expectancy of the Indonesian people will reach 70 years or more (Kemenkes, 2019). With the increase in life expectancy, there is an increase in diseases associated with the elderly which are often called

degenerative diseases, one of which is Osteoarthritis.

Osteoarthrosis or osteoarthritis (OA) is a degenerative joint disease associated with joint cartilage damage. Vertebrae, hips, knees, and ankles are most commonly affected by OA (Smeltzer & Bare, 2014). OA is the most common rheumatic joint disease, especially in people over 50 years of age. Over 85% of people over the age of 65 describe OA on x-ray, although only 35%-50% have only symptoms. Age under 45 years, the prevalence of Osteoarthritis is more common in men, while at the age of 55 years it is more common in women. Several studies have shown that there is an increase in the occurrence of Osteoarthritis in obesity, in the weight-bearing joints of the body (Misnadiarly, 2010).

Osteoarthritis is a major cause of musculoskeletal pain which can result in loss of joint movement. Osteoarthritis by the American College of Rheumatology is defined as a

condition in which there are symptoms of defects in cartilage integrity. Osteoarthritis usually affects weight-bearing joints such as the hips, knees, vertebrae, and can affect the shoulders, finger joints, and ankles (Carlos, 2013).

The prevalence of osteoarthritis based on the International Osteoarthritis Research Society (OARSI) (2016) increased by 73% in 2013 and ranks as the third fastest growing condition related to disability behind dementia and diabetes mellitus (OARSI, 2016). Data from the results of the Basic Health Research (RISKESDAS) found that there was a decrease in the prevalence of joint disease at the age > 15 years from 11.9% in 2013 to 7.3% in 2018, while the prevalence in Riau did not change from 2013 to 2018 which is 7.1% (Kemenkes, 2019).

Signs and symptoms that can be found in people with osteoarthritis such as stiffness that occurs in the morning generally 15 minutes or more due to changes in the joints, enlargement of the joints (deformity), changes in gait, usually there are also signs of inflammation in the joints (pain, pressure, impaired movement, uniform warmth and redness), and usually the pain will increase with activity, improving with rest. Pain in the joints can be caused by movement or holding heavy loads because there are changes in the shape of the joints (Digulio et al., 2014).

Joint pain is the most common complaint. Joint pain in OA is a localized deep pain, the pain will increase if there is movement of the affected joint and a little less with rest. Pain can also radiate (radiculopathy) for example in cervical and lumbar osteoarthritis. Intermittent claudication is pain radiating to the calf in lumbar osteoarthritis that has experienced spinal stenosis (Misnadiarly, 2010).

Non-pharmacological therapies one of that can be used to treat pain in patients with osteoarthritis is rheumatic exercise. Rheumatic exercise is a good method for the prevention and relief of symptoms and can serve as an adjunct therapy. Rheumatic gymnastics is exercise that focuses on maintaining the maximal range of joint motion. One of the goals of this rheumatic exercise is to reduce joint pain and maintaining of physical balance in patients with osteoarthritis (Heri, 2014).

Rheumatic Gymnastics is a practical and effective method of maintaining a healthy body. The movements contained in Rheumatic Gymnastics are very effective, efficient, and logical movements because the series of movements are carried out regularly and organized for people with osteoarthritis (Nugroho & Wahyudi, B.SC., 2008).

Research has found that exercising three times a week can reduce to improve the health of

people with rheumatic diseases. The application of rheumatic exercise to improve joint pain and maintaining the physical health of rheumatic disease sufferers. Some of the advantages of applying rheumatic exercise are that bones become more flexibility, muscles stay tight and reduce blood circulation, maintain normal blood fat levels, are less prone of injury, and better body cell reactions (Transyah & Rahma, 2020).

Rheumatic gymnastics can help reduce the pain experienced or felt by people with rheumatic diseases. The method of body movement in rheumatic gymnastics can also reduce the risk of developing rheumatism (Simanjuntak & Manurung, 2018). This rheumatic exercise is expected to reduce movement ability, and function, muscle strength, power, joint balance, joint biomechanics, and sense position of joint. The rheumatic exercise is shown to move the joints while stretching the muscles and strengthening the muscles that can help to support the joints in the body (Afnuhazi, 2018).

Periodic rheumatic exercise routines can reduce the level of pain and joint stiffness and pain where in rheumatic gymnastics there are elements that involve dynamic muscle contractions and involve muscles so that this can increase the volume of cardiac output. In addition, rheumatic gymnastics can affect individual coping to overcome the pain they feel because this coping is an effective function that will help sufferers in overcoming pain (Simanjuntak & Manurung, 2018).

In general, the movement in rheumatic gymnastics can reduce movement ability, function of joint, muscle strength and endurance of joint, aerobic capacity, balance of joint, joint biomechanics and sense position of joint. This exercise concentrates on joint capability by stretching the muscles and strengthening the muscles and strengthening the muscles, because these muscles help the joints to support of the body. By doing rheumatic gymnastics, it is hoped that the quality of life of the elderly will increase so that the elderly can perform the Activity of Daily Living (ADL) to the maximum and not become a burden to others (Heri, 2014). This is evidenced by several researchers who conducted research on the provision of Rheumatic Gymnastics exercises.

Research conducted by Suhendriyo (2014), on the effect of Rheumatic Gymnastics on reducing pain in patients with knee osteoarthritis in Karangasem Surakarta. The results of this study illustrate that there is a significant effect in giving Rheumatic Gymnastics to reduce pain in patients with pain of joint or knee osteoarthritis, seen from the p value = 0.005 in the control group and in the treatment group (Suhendriyo, 2014). From the

explanation above, the writer wants to know whether there is an effect of rheumatic exercise on joint pain in patients with osteoarthritis.

## 2. Method

### Research design

The type of research used is pre-experimental design with the One Group Pre-Test - Post-Test approach. This design is used to measure the respondent's pain before the implementation of rheumatic exercise, then measure the respondent's pain again after the implementation of rheumatic exercise.

### Study setting and period

The location of the research was at Puskesmas Simpang Dolok, Batubara Regency, North Sumatra. The research process starts from making proposals to conducting research starting from March to June 2022. While the research is carried out on 10 and 11 June 2022, which is when there is an elderly Integrated Healthcare Center at the Puskesmas Simpang Dolok.

### Population and sample

The population in this study were patients with osteoarthritis who were in the work area of the Puskesmas Simpang Dolok. Based on medical record data, there were 44 patients with Osteoarthritis who received treatment for the last 3 months, from March to May 2022, with an average of 15 patients per month.

While the sampling technique used is non-probability sampling with Accidental Sampling technique, sampling with this technique is done by taking or selecting samples that happen to exist at the time of the study, sample selection is based on patient medical record data. Where this research was carried out for 2 days, namely during the implementation of the elderly Integrated Healthcare Center at the Puskesmas Simpang Dolok on June 10 and 11 2022, so the number of samples obtained during the implementation of this research were 27 people, with details of 13

people on June 11, 2022. and 14 people on June 11, 2022.

### Research instrument

The research instrument used rheumatic gymnastics SOPs and pain gauges with a numeric rating scale. The SOP for rheumatic gymnastics was adopted from the results of the SOP for rheumatic gymnastics used at the Puskesmas Simpang Dolok, while the numerical rating scale instrument was an instrument that had been previously standardized.

### Ethical consideration

The ethical test in this study, has received permission and is feasible to be carried out, the research ethics test was obtained from the Institute for Research and Community Service (LPPM) of Haji University, North Sumatra, with Number: 066/Unhaj/LPPM/VI/2022.

### Data analysis

Processing data by collecting data and then analyzing data with SPSS using the Wilcoxon Test. This test was conducted because the sample in this study amounted to 27 respondents (< 30 respondents), so it is not feasible to do parametric tests. In addition, the results of the data normality test using the Shapiro-Wilk test showed that the distribution of the data was not normally distributed in both the pain data before and after the rheumatic exercise, with p-values of 0.040 and p-0.00 ( $p < 0.05$ ). This test uses a nonparametric test, namely the Wilcoxon test. The results of data normality can be seen in the table below:

## 3. Results and Discussion

Based on table 2, it is known that the distribution of respondents' characteristics is based on the majority of Virility (Prasenum) 55-59 years 59.3%, the gender of the majority is female as much as 70.4%, the majority of education is SMA and College respectively 44.4% and occupation the majority are self-employed as much as 37%.

**Table 1.** Data normality test results

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Joint pain before intervention	.209	27	.004	.920	27	.040
Joint pain after intervention	.415	27	.000	.696	27	.000

Based on table 3, it is known that there was a decrease in joint pain in respondents, it appears that the majority of tended, respondents who had moderate pain before the rheumatic exercise intervention with the average pain scale 4.70, after the intervention turned into mild pain with the average pain scale 3.63. The research data also

showed that there were 17 respondents who decreased pain before and after the intervention, while the occurrence of an increase in pain was 2 respondents and 8 respondents had the same pain both before and after the rheumatic exercise intervention. The results of the Wilcoxon test analysis showed a p-value of 0.012 ( $< 0.05$ ). This

means that  $H_0$  is rejected.  $H_a$  is accepted, which means that there is an effect of rheumatic exercise on joint pain in patients with osteoarthritis.

Based on the results of the study, it was found that there was a decrease in joint pain in respondents, where respondents who had moderate

pain before the rheumatic exercise intervention, after the intervention turned into mild pain. The results of the Wilcoxon test analysis showed a p-value of 0.012 ( $<0.05$ ) which indicated that there was an effect of rheumatic exercise on joint pain in patients with osteoarthritis.

**Table 2.** Distribution of Respondents Characteristics

Characteristics	frequency	Percentage
<b>Age</b>		
Virility (Prasenum) 55-59 years	16	59.3
Early advanced age (Senescen) 60-65 years old	7	25.9
Elderly at high risk >65 years old	4	14.8
<b>Gender</b>		
Man	8	29.6
Woman	19	70.4
<b>Education</b>		
Junior high school	3	11.1
Senior high school	12	44.4
College	12	44.4
<b>Work</b>		
Housewife	7	25.9
Fisherman	3	11.1
Self-employed	10	37.0
civil servant	7	25.9
<b>Total</b>	<b>27</b>	<b>100.0</b>

**Table 3.** The results of the analysis of the effect of rheumatic exercise on joint pain in patients with osteoarthritis

Variable	Min - Max	Mean	Std. deviation	Negative + positive ranks	Ties	Z	pvalue
Joint pain before intervention	2 - 8	4.70	1.49	17 + 2	8	-2.500	0.012
Joint pain after intervention	2 - 6	3.63	1.39				

Osteoarthritis is a degenerative disease of the joints caused by several factors that have the characteristics of damage to the cartilage (joint cartilage). Cartilage is a hard tissue that is slippery and surrounds the end of the hard bone in the joints which functions as a smoothing motion between bones and as a damper when the joints carry out activities or friction (Zairin, 2016). Osteoarthritis (OA) is the most common joint disorder and causes disability characterized by progressive loss of joint cartilage (Huda & Kusuma, 2015).

Pain is an unpleasant sensory and emotional experience caused by a stimulus resulting from actual or potential tissue damage, which is subjective and individual. Pain is a physiological mechanism that aims to protect oneself when a person feels pain, his behavior will change. Pain stimuli can be physical or mental (Potter & Perry, 2013)

Other studies have shown that exercise rheumatic three times a week can significantly improve the health of people with rheumatic diseases. The application of rheumatic exercise to

improve of joint pain and maintainance the physical health of rheumatic disease sufferers. Some of the advantages of applying exercise rheumatic are that bones become more flexibility, and muscles stay tight and reduce blood circulation, maintain normal blood of fat levels, are less prone of injury, and better body cell reactions before do exercise (Transyah & Rahma, 2020).

Rheumatic gymnastics is a movement that is regularly and organized, especially for patients with rheumatism that focuses on joint movements to stretch and strengthen joint muscles. Rheumatic gymnastics is carried out three times a week which can be done individually or in groups (Sitinjak et al., 2016).

Rheumatic gymnastics can help reduce the pain experienced or felt by people with rheumatic diseases. The method of body movement in rheumatic gymnastics can also reduce the risk of developing rheumatism (Simanjuntak & Manurung, 2018). This rheumatic exercise is expected to reduce movement abilities, function of joint, muscle strength and power of joint, joint of

balance, joint biomechanics, and sense position of joint. The rheumatic exercise is shown to move the joints while stretching the muscles and strengthening the muscles that can help to support the joints in the body (Afnuhazi, 2018).

Rheumatic exercise is a good method for the prevention and relief of symptoms and can serve as an adjunct therapy. Rheumatic gymnastics is exercise that focuses on maintaining the maximum range of joint space. One of the goals of this rheumatic exercise is to improve joint pain and maintaining physical balance in patients with osteoarthritis (Heri, 2014).

Periodic rheumatic exercise routines can reduce the level of pain and joint stiffness and pain where in rheumatic gymnastics there are elements that involve dynamic muscle contractions and involve muscles so that this can increase the volume of cardiac output. In addition, rheumatic gymnastics can affect individual coping to overcome the pain they feel because this coping is an effective function that will help sufferers in overcoming pain (Simanjuntak & Manurung, 2018).

In general, the movement in rheumatic gymnastics can reduce movement abilities, function of joint or knee, muscle strength and endurance of knee joint, aerobic capacities, balance of joint, joint biomechanics and sense position of joint. The exercise of rheumatic concentrates on joint or knee movement by stretching the muscles and strengthening the muscles and strengthening the muscles, because these muscles help the joints or knee to support the bar. By doing rheumatic gymnastics, it is hoped that the quality of life of the elderly will increase so that the elderly can perform the Activity of Daily Living (ADL) to the maximum and not become a burden to others. This is evidenced by several researchers who conducted research on the provision of Rheumatic Gymnastics exercises.

Research conducted by Suhendriyo (2014), on the effect of Rheumatic Gymnastics on improvement of pain in patients with joint or knee osteoarthritis in Karangasem Surakarta. The results of this study illustrate that there is a significant effect in giving Rheumatic Gymnastics to reduce pain in patients with knee osteoarthritis, seen from the p value = 0.005 in the control group and in the treatment group (Suhendriyo, 2014).

Research by Wahyuningsih, et al (2020) found that rheumatic exercise had an effect on reducing the intensity of joint pain in patients with osteoarthritis (Wahyuningsih et al., 2020). Dinartika, Purwanto and Imamah (2018) in their research also showed that there was a significant effect on reducing pain with a p value (0.003) (Dinartika et al., 2019).

Another study by Siregar (2015) found that the average value before exercise was 5 and after exercise was 3.5 with a p-value of 0.00 meaning that there was a significant effect between before and after exercise. And it is hoped that rheumatic exercise routines can be applied regularly as a therapy for improvement the level of rheumatic pain in the elderly (Siregar, 2015). Afnuhazi (2018) also stated in his research that there was a decrease in the pain scale after doing rheumatic exercise in the elderly and it was also recommended for the elderly to always do rheumatic exercise regularly (Afnuhazi, 2018).

According to Pujiati (2017), rheumatic gymnastics has several benefits, including: reducing joint pain, preventing joint stiffness, maintaining joint range of motion, increasing movement ability, position, function, muscle strength and endurance, balance, and joint position, and Streamlining blood flow (Pujiati & Mayasari, 2017).

Research using a systematic review method of 20 articles also shows, there is an effect of rheumatic exercise to improvement of pain scales in the elderly with Rheumatoid Arthritis (Transyah & Rahma, 2020). A case study by Novana, Faradisi and Fazriyah (2021) shows that rheumatic exercise can reduce pain scale. Suggestions for nurses are expected to apply rheumatic gymnastics to reduce pain scale in rheumatic patients (Tri Novana et al., 2021) Udianto and Rudiyanto (2016) also stated that there was an effect of giving rheumatic exercise therapy to changes in pain levels in the elderly at the Mangga Integrated Healthcare Center in the working area of the Sobo Banyuwangi Public Health Center (Udianto & Rudiyanto, 2016).

#### **4. Conclusions and suggestions**

Based on the results of the research that has been done, it can be concluded that rheumatic exercise which is done regularly and regularly can reduce the symptoms of joint pain experienced in patients with osteoarthritis. Rheumatic gymnastics that is done regularly in addition to reducing joint pain can also increase physical fitness in maintaining health. It is hoped that the implementation of rheumatic gymnastics can be applied and used as a routine activity by health services both in hospitals, health centers, clinics and other health facilities.

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