

THE APPLICATION OF OSTEOARTHRITIS GYMNASTICS AS AN EFFORT TO REDUCE PAIN LEVELS IN ELDERLY PEOPLE SUFFERING FROM OSTEOARTHRITIS AT *POSYANDU LANSIA* (INTEGRATED CARE FOR THE ELDERLY) IN THE WORKING AREA OF MOJOLABAN HEALTH CENTER, SUKOHARJO REGENCY

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ABSTRACT

Introduction: Osteoarthritis has affected 7% of the world's population, more than 500 million people worldwide, the number of people affected globally increased by 48% up to 2019. In 2019, osteoarthritis was the 15th highest cause of living with disability worldwide and was responsible for 2% of the global total. Non-pharmacological therapies, such as osteoarthritis gymnastics are used to reduce pain in knee osteoarthritis. **Purpose:** To find out the effect of osteoarthritis gymnastics on pain reduction in elderly who have knee osteoarthritis at *Posyandu Lansia* (integrated care for the elderly) in the working area of Mojolaban Health Center, Sukoharjo Regency. **Method:** The design in this study is a type of Quasi-Experimental research with a one group pretest-posttest design. Sampling techniques use purposive sampling techniques, with inclusion criteria by researchers. The sample size is 20 respondents. **Results:** The results of the bivariate test using the Wilcoxon test proved that there is a significant influence of osteoarthritis gymnastics on pain reduction in people with osteoarthritis with a value of $p: 0.000 < 0.05$. **Conclusion:** There is a significant influence of osteoarthritis exercise on pain reduction in people with osteoarthritis.

INTRODUCTION

Osteoarthritis is a degenerative joint disease, which mainly attacks articular cartilage. It is related to aging and will most probably affect joints that have been subjected to strain over time, including the knees, hips, fingers, and lumbar spine. Osteoarthritis has become one of the ten most common diseases in the developed countries. Globally, the incidence rate of osteoarthritis among men is estimated to be 9.6% and 18.0% among women over the

age of 60 who have symptomatic osteoarthritis. About 80% of people with osteoarthritis will have limitations in their movement, and 25% will not be able to do the main daily activities (World Health Organization, 2020)

Osteoarthritis has affected 7% of the world's populations, more than 500 million people worldwide and the number of people affected globally has increased by 48% up to 2019. In 2019, osteoarthritis was the 15th highest cause of people with disabilities in the world and was

responsible for 2% of the global total. Although as compared to regions with a medium socio-demographic index, countries with a high socio-demographic index have a greater rate of osteoarthritis. Osteoarthritis is the leading cause of disability in the elderly, and the trend of an aging population and obesity tends to increase. The data urgently requires serious attention and further development of treatment for osteoarthritis has made no progress comparable to many other chronic musculoskeletal and non-communicable diseases. (Hunter dan March, 2020)

According to data from the (Basic Health Research (RISKESDAS, 2018), the prevalence of joint disease in Indonesia is around 7.3% and osteoarthritis (OA) or arthritis being the most common joint disease. Although joint disease is often associated with age, otherwise known as degenerative diseases, it has occurred in people aged 15-24 years (prevalence rate is about 1.3%), and prevalence rates continue to rise people aged 24-35 years (3.1%) and 35-44 years (6.3%).

Joint diseases, especially osteoarthritis, are often considered trivial, even though they are one of the obstacles in the activity. Joint diseases that are not treated seriously can impair quality of life, according to data that states osteoarthritis will be the world's fourth leading cause of helplessness by 2020. The problem of osteoarthritis is getting closer to reaching the productive age population in Indonesia. Despite this, Indonesia has been named the third country with the worst work-life balance, according to new research. Over 60 hours per week is predicted to be worked by 14.3% of the working-age population (Kloppenburger & Berenbaum, 2020).

Nowadays, there is no drug that can cure osteoarthritis. Today's treatments only serve to reduce pain and maintain joint function. There are three basic objectives of osteoarthritis therapy, namely:

controlling pain and other symptoms; overcoming disruptions in daily activities; and inhibiting the disease's progress. Exercise, weight loss, joint protection, physical therapy, and medication are all possible treatments. Even if all of these treatment options fail, surgery may be considered for treatment. Osteoporosis gymnastics is one of the treatment options because it provides a form of exercise for the body and limbs to awaken muscle strength, joint flexibility, agility, speed, and balance of one's movements so that joint range of motion is well maintained (Wahyuni, *et al*, 2019).

METHODS AND MATERIALS

This research method is Quasy-Experiment using the design of One Group Prettest-Posttest design. This design explains the influence of treatment involving the subject group, namely the treatment group given osteoarthritis gymnastics.

The study was conducted at *Posyandu Lansia*, in the working area of Mojolaban Health Center, Sukoharjo Regency. Participants in this study included 92 people with osteoarthritis. Inclusion criteria in this study included active elderly at *Posyandu Lansia* in the working area of Mojolaban Health Center, Sukoharjo Regency, elderly with mild and moderate pain, elderly aged 60-65 years, elderly who are willing to participate as respondents, and exclusion criteria in this study is participants with a history of knee trauma, surgery, inflammatory knee pain, or a history of intra-articular injections within the last 3 months, as well as those with other medical conditions that may impair their ability to exercise (e.g., uncontrolled cardiovascular, respiratory, or neurological diseases), were excluded. Patients suffering from psychiatric illnesses and communication disorders such as hearing

or cognitive impairment were also excluded.

The sampling method used is purposive sampling, while the number of samples is 20. The instrument used is an observation sheet of the NRS pain scale (Numeric Rating Scale). The study gathered both primary and secondary data. In research analysis techniques, it is used univariate and bivariate analysis with the Wilcoxon Match Pairs Test for paired variables and ordinal scale.

RESULTS AND DISCUSSION

Univariate Analysis Results

The Pain Intensity of Osteoarthritis Sufferers before Doing Osteoarthritis Gymnastics

The following table shows the pain intensity of people with knee osteoarthritis before doing osteoarthritis gymnastics:

Table 1. Pain Intensity in the Elderly Osteoarthritis Sufferers before Doing Osteoarthritis Gymnastic

Based on the results of the analysis, as shown in table 1 above, the highest value of pain experienced by respondents before doing osteoarthritis gymnastics is moderate

No	Skor	Pain Intensity	Frequency	Percentage (%)
1	4-6	Moderate Pain	14	70 %
2	7-9	Controlled Severe Pain	6	30 %
Total			20	100 %

pain, with 14 elderly people (70%), and the lowest value of pain experienced by respondents before doing osteoarthritis gymnastics is controlled severe pain intensity, with 6 elderly people (30%), for a total of 20 elderly people. According to the findings of the data analysis, the frequency of pain intensity before being given osteoarthritis gymnastics treatment is as high as 14 people (70%) and those who experience severe controlled pain as many

as 6 people (30%).

Pain respondents who had knee osteoarthritis before doing osteoarthritis gymnastics treatment from a group of 20 elderly people, 14 of them had moderate pain and 6 had severe controlled pain. This is because thinning cartilage or joint cartilage in people with osteoarthritis, which makes incompetence (disability). The joint pain is felt slowly. Pain might be felt when doing activities. When doing activities, sometimes pain is felt. But it decreases when used for rest, and as the disease progresses, it becomes more severe and causes pain. It also can disrupt sleep. (Pratiwi, 2019).

Knee pain in these respondents is also the most common symptom felt in knee osteoarthritis patients. At first, the pain is localized in certain parts, but if it continues, the pain is usually felt in the entire knee. Swelling, decreased joint space, and mechanical abnormalities often accompany pain (Putri, 2019).

Knee pain in respondents in this study is one of the signs and symptoms of osteoarthritis. Pain due to osteoarthritis of the knee is pain that occurs due to thickening or irregular bone protrusions called per capita, which then interferes with the surrounding tissue and causes pain. This pain occurs if the patient's knee is under pressure or when moving their knee, so that people with osteoarthritis will feel pain when the pressure is right on the painful area

The Pain Intensity of Osteoarthritis Sufferers after Doing Osteoarthritis Gymnastics

The following table shows the pain intensity of people with knee osteoarthritis after doing osteoarthritis gymnastics:

Table 2. Pain Intensity in the Elderly Osteoarthritis Sufferers after Doing

No	Skor	Pain Intensity	Frequency	Percentage (%)
1	0	No Pain	1	5 %
2	1-3	Mild Pain	11	55 %
3	4-6	Moderate Pain	8	40 %
Total			20	100 %

Based on the results of the analysis as shown in table 2 above, the level of moderate pain has the highest frequency, with as many as 11 respondents (55%) and the lowest frequency is in the elderly, with a level of pain intensity as many as 1 person (5%).

The intensity of pain in elderly respondents with knee osteoarthritis decreased after they were given osteoarthritis gymnastics, with those who experienced moderate pain decreasing from 70% of 14 people to 40% of 8 people, and those who experienced mild pain decreasing from 55% of 11 people to 5% of 1 person.

Gymnastics participants experienced a decrease in pain intensity after being treated for osteoarthritis. This demonstrates that providing osteoarthritis gymnastics is effective in relieving pain in people suffering from knee osteoarthritis. This is supported by (Cahyani, Surachmi, 2019) Physical exercise is an important part of managing osteoarthritis. Physical exercise is intended to improve joint function, protect joints from damage by reducing joint stress, increase joint strength, prevent disability, and improve physical fitness. Physical exercise increases joint mobility while also strengthening the muscles that support and protect the joints. It also alleviates joint pain and stiffness and has the potential to reduce swelling.

According to (Dinartika, Purwanto, 2019). research, there is management in reducing osteoarthritis pain, namely by non-pharmacological actions that are expected to contribute significantly to

osteoarthritis management. Physical exercise, static exercise, muscle strengthening, and physiotherapy are all beneficial for reducing pain and increasing joint range of motion.

As a result, it is possible to conclude that there is a difference in the intensity of pain before and after receiving osteoarthritis exercise. People with knee osteoarthritis can reduce their pain intensity from moderate (70%) to mild (55%). Osteoarthritis gymnastics is a type of physical exercise that has a positive impact on the ability of joint muscles to provide fitness and endurance. This is supported by research findings that show a difference in the intensity of pain before and after receiving osteoarthritis gymnastics, implying that osteoarthritis gymnastics can reduce the pain intensity of knee osteoarthritis sufferers at *Posyandu Lansia* in Palur Village.

Bivariate Analysis Results

Bivariate analysis is used to determine the effect of osteoarthritis exercise on pain reduction in people with osteoarthritis in *Posyandu Lansia*. The difference in pain intensity before and after the treatment of osteoarthritis gymnastics using the Wilcoxon test at a significant level of 5%. The results can be explained as follows:

Pain Intensity Before and After Osteoarthritis Gymnastics Treatment in People with Osteoarthritis

Table 3 The Intensity of Joint Pain Before and After the Treatment of Osteoarthritis Gymnastics

Treatment	Pain Intensity				Total
	No pain	Mild Pain	Moderate pain	controlled severe pain	
Before	0	0	14	6	20
After	1	11	8	0	20

Based on table 3, 14 respondents

experienced moderate pain before doing osteoarthritis gymnastics, while 6 respondents experienced severe controlled pain. 1 respondent was not in pain after doing osteoarthritis gymnastics, 11 respondents had mild pain and 8 respondents had moderate pain.

The Wilcoxon Signed Ranks Test, a statistical test with a significance level of 5%, was used to determine whether or not the effect of osteoarthritis gymnastics on pain reduction in patients with knee osteoarthritis at *Posyandu Lansia*, Palur Village. The statistical test results are shown in the table below:

Table 4 Wilcoxon Signed Ranks Test Results

Pain intensity	z	p	Result
<i>Pre test-Post test</i>	-4,008	0,000	Significant

Based on the Wilcoxon Signed-Ranks Test, the pain intensity of all 20 responders decreased after doing osteoarthritis gymnastics treatment compared to before the treatment. The z table for a significant number of 5%, which is 1.96, will be compared to the calculated value of z (4,008) with a significant number (0,000) of the result. Based on these results, it can be inferred that $z = (4,008) > z \text{ table } (1.96)$ or $p (0,000) < \alpha (0,05)$, implying that osteoarthritis gymnastics has a significant impact on pain reduction in osteoarthritis sufferers at *Posyandu Lansia* in Palur Village.

Based on the results of the normality of data using the Saphiro-Wilk test, the level of pain before and after the treatment of osteoarthritis gymnastics has a P value of $< 0,05$, meaning that the distribution of data is not normal. The hypothesis test, using the Wilcoxon Signed Ranks Test statistical test, obtained a p value of $0,000 < 0,05$, meaning that osteoarthritis gymnastics has a significant influence on pain reduction in people with knee osteoarthritis at *Posyandu Lansia*, Palur Village in the working area of Mojolaban Health Center.

This study found that osteoarthritis exercise has a significant impact on pain reduction in people with knee osteoarthritis at *Posyandu Lansia* in Palur Village. This is in accordance with research conducted by Sitinjak and Hastuti (2016). There was an impact of rheumatic gymnastics on pain scale changes in the elderly with knee osteoarthritis, as measured by a decrease in the pain scale in both treatment and control groups. The pain scale of the treatment group was lower than the control groups. The pain scale was reduced more effectively in the group experiencing rheumatic gymnastics than in the group without rheumatic gymnastics.

Patients with musculoskeletal disorders frequently complain about pain. Patients with knee osteoarthritis frequently complain of slowing increasing pain, crepitus, and decreased joint function. Because of the presence of this knee pain, a person or person with osteoarthritis is afraid to do activities or movements, that can lower their quality of life (Wardojo et al., 2021).

According to Arthritis Care and Exercise research, stretching can stimulate the increased release of endorphin hormones. Researchers found that exercise three times a week significantly improved the health of arthritis patients, including osteoarthritis. (Nurhidayah, 2012).

The movements in osteoarthritis are intended to relax muscles and joints, strengthen muscles and joints around the hips and knees, reduce stiffness in pain and joints, and to help improve movement by lightening foot movement and increasing range of motion. This is in accordance with what has been done by researchers, namely through the treatment of osteoarthritis gymnastics for three times a week for two weeks, with a duration of 10-15 minutes of decreased pain in people with knee osteoarthritis.

Respondents in this study were given osteoarthritis gymnastics three times a week for two weeks to reduce pain. The difference in pain before and after osteoarthritis

gymnastics treatment was 5.85 on the pain scale, with the average after osteoarthritis gymnastics being 3.25. The reduction of pain is due to physical activity assisting in recovery after the acute period has passed. Osteoarthritis gymnastics, which involves movements to stretch and strengthen the support muscles of damaged joints, is one of its applications. Joint pain will decrease as the muscles that support the joints strengthens. Osteoarthritis gymnastics is a type of physical exercise that improves the ability of joint muscles to provide fitness and increase endurance. If the muscles are frequently trained, synovial fluid will either increase or decrease. This synovial fluid acts as a lubricant in the joints; people with knee osteoarthritis, adding synovial fluid to the joints can reduce the risk of injury and prevent the onset of knee pain (Suhendriyo, 2014).

Patients' quality of life can be improved by providing osteoarthritis gymnastics intervention in patients with knee osteoarthritis. Active movements in osteoarthritis gymnastics aim to improve joint stability and strength of the muscles around the knee, specifically the quadriceps, particularly the vastus medialis, because this movement helps to reduce irritation that occurs on the surface of the patella articularis cartilage, maintaining and improving active stability in the knee joint and also maintaining nutrients in the synovial for the better. With repeated movements in osteoarthritis gymnastics, the activity of the muscles around the joints rises, which accelerates blood flow, boosts metabolism, and the rest of the metabolism will be carried away by the blood flow, so the pain is reduced. Pain from an injury or disease might impair the muscle's capacity to maintain joint stability. (Dinartika dan Purwanto, 2019)

If the increase in vastus medialis muscle strength is proportional to the increase in quadriceps muscle strength, which balances the pull force acting on the patella, the patella groove will return to normal, and the friction

that occurs in the patella and femur articularis cartilage that causes stimulation to the nociceptor or afferent fibers of pain will be reduced.(Nugraha & Kambayana, 2017).

Cahyani and Surachmi (2019) discovered that muscle stretching exercises and aerobic exercises are effective in reducing pain and improving physical function in mild to moderate knee osteoarthritis. Pain in people with knee osteoarthritis degrees I and II can be reduced by doing exercise (knee flexion extensions), strengthening exercise, and aerobics. Exercise can reduce knee osteoarthritis patients by increasing physiological pressure, which increases the formation of proteoglycans by adult cartilage cells, muscle strength to support the load on the joint area, and increases the metabolism of synovial joint fluid, which provides nutrients to the surrounding cartilage (Susilawati et al., 2015).

The elderly continue to underestimate joint pain caused by osteoarthritis, despite the fact that the pain can interfere and limit the elderly in their daily activities.(Sisilia et al., 2021).

The findings of the osteoarthritis intervention show that non-pharmacological treatments, such as osteoarthritis exercise, were very effective in reducing joint pain levels, particularly among the elderly. (Fatmala & Nur Hafifah, 2021).

The action of rheumatic gymnastics to reduce pain works by reducing the stimulation of nerve endings or blocking the path of pain impulses to the brain. The painful area will send a signal to the hypothalamus through the spinal cord. When the hypothalamus's heat receptors are stimulated, the effector system sends signals that cause peripheral vasodilation. This vasodilation increases blood flow, which results in a more consistent oxygen supply to tissues and increased tissue metabolism. (Nasution,Hidayah N & Siregar, 2020).

Exercise for osteoarthritis can increase nerve distribution activity in the

brain, specifically an increase in parasympathetic neurotransmitters (norepinephrine, dopamine, and serotonin) (Wahyuningsih et al., 2020). Increased beta-endorphin concentrations in the blood and parasympathetic nerves can lower heart rate and pulse, so that it can cause pain that reduces joint stiffness (Makarm et al., 2021).

Exercise for osteoarthritis has been shown to reduce pain in the elderly. Exercise for osteoarthritis affects the work of the cerebral cortex, including cognitive and emotional aspects, so that it can provide positive perceptions and relaxation, thereby indirectly assisting in the maintenance of body homeostasis balance (Elviani et al., 2021).

So, it can be concluded that there is a difference in the intensity of pain between before and after the treatment of osteoarthritis gymnastics. Osteoarthritis gymnastics can reduce the intensity of pain in people with knee osteoarthritis. Osteoarthritis gymnastics is a form of physical exercise that has a good influence on improving the ability of joint muscles to provide fitness and increase endurance. This is supported by the analysis results, which show a difference in pain intensity between before and after osteoarthritis gymnastics treatment, namely with the results of hypothesis testing using the Wilcoxon Signed Ranks Test, which obtained a p value of $0.000 < 0.05$. As a result, osteoarthritis gymnastics can reduce the intensity of pain in elderly people with knee osteoarthritis.

CONCLUSIONS AND SUGGESTIONS

Based on the results of the analysis and discussion above, researchers can conclude that The intensity of pain in people with knee osteoarthritis before doing osteoarthritis gymnastics are performed falls into the category of moderate pain intensity, The intensity of pain in people with knee osteoarthritis after doing osteoarthritis

gymnastics is in the category of mild pain intensity, There is a difference in pain in the elderly who have knee osteoarthritis before and after the treatment of osteoarthritis gymnastics, There is an effect of osteoarthritis gymnastics on pain reduction in the elderly who have knee osteoarthritis at *Posyandu Lansia* in the working area of Mojolaban Health Center

The suggestions For the Elderly as Respondents Osteoarthritis gymnastics is expected to be done independently when experiencing pain in the knee joint as one of the therapies to reduce the intensity of pain, For Elderly Cadres According to research findings, osteoarthritis gymnastics reduces pain intensity, thus the elderly cadres are expected to apply osteoarthritis gymnastics at *Posyandu Lansia* in Palur Village as one of the activities for pain reduction in the elderly with knee osteoarthritis, For Health Workers it is expected to provide information and input objectively about how to handle knee osteoarthritis patients to optimize movement before and after the treatment of osteoarthritis gymnastics. Osteoarthritis gymnastics can reduce the intensity of pain in people with knee osteoarthritis. Osteoarthritis gymnastics is a form of physical exercise that has a good influence on improving the ability of joint muscles to provide fitness and increase endurance. This is supported by the analysis results, which show a difference in pain intensity between before and after osteoarthritis gymnastics treatment, namely with the results of hypothesis testing using the Wilcoxon Signed Ranks Test, which obtained a p value of $0.000 < 0.05$. As a result, osteoarthritis gymnastics can reduce the intensity of pain in elderly people with knee osteoarthritis function with osteoarthritis gymnastics. Suggestions for future researchers is can conduct additional research by comparing the comparison treatment and then evaluating its effectiveness.

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