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Rheumatic Exercises and Pain Levels In Rheumatic Patients: A Study at Kalijudan Public Health Center Surabaya

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ABSTRACT Rheumatism is a condition marked by joint inflammation, swelling, and pain, often causing limitations in daily activities and decreasing productivity. Prolonged symptoms, especially over 10 years, may lead to joint damage, making patients reliant on others and impacting their social and economic functioning. This study aims to examine the effect of rheumatic exercises on pain levels among rheumatic patients in the Kalijudan Public Health Center area, Surabaya. The research employed a pre-experimental one-group pretest-posttest design involving 31 participants selected through purposive sampling. Rheumatic exercises were the independent variable, while pain levels were the dependent variable, measured using the Numeric Rating Scale (NRS). The results showed a Wilcoxon test value of 0.000, indicating a statistically significant difference in pain levels before and after the intervention. These findings demonstrate that rheumatic exercises effectively reduce pain in rheumatic patients. The study concludes that implementing rheumatic exercise programs can be a beneficial non-pharmacological intervention to manage pain in patients with rheumatism, particularly in community health settings like the Kalijudan Public Health Center.
INDEX TERMS Rheumatic Exercises, Pain, Rheumatism, NRS

I. INTRODUCTION

Rheumatism is an inflammatory condition that affects the joints, characterized by swelling and pain [1] Joint pain experienced by individuals with rheumatism can interfere with daily activities and lead to decreased productivity. In the long term, rheumatism may cause joint damage that impacts both social and economic aspects of life. Individuals who have experienced rheumatic symptoms for over ten years often become dependent on others for daily activities and are unable to work optimally [2] .

Globally, it is estimated that around 19 million people suffer from rheumatism, with 70% being women [3]. In Indonesia, based on physician diagnoses, the prevalence of rheumatism among individuals aged over 15 years is 7.30%, with the highest rate found in the age group above 75 years, at 18.95%. The province with the highest prevalence is Aceh, at 13.26%, while East Java stands at 6.72% [4]. The disability rate caused by diseases, including rheumatism, in East Java Province is recorded at 52.8% [5]. At Kalijudan Public Health Center, 39 cases of rheumatism were reported in the past month. Rheumatism is a chronic disease that causes inflammation, with early symptoms including stiffness, pain, and swelling in the joints [2]. The inflammation targets the synovial lining of the joints, leading to joint erosion. As a result, sufferers experience stiffness, swelling, and pain that can hinder daily activities [6]. Stiffness typically occurs in the morning but subsides once the individual begins to move [7].

One of the interventions that can be offered to individuals with rheumatism is low-impact exercise that does not strain the joints and bones [2]. As pain is the primary symptom, pain management becomes a crucial aspect of treatment. Several non-pharmacological methods that can help reduce pain include deep breathing relaxation, warm or cold compresses, rest, acupuncture, and physical exercise [8].

Rheumatic exercise is a form of regular and structured physical activity consisting of effective, efficient, and logical movements for people with rheumatism [9]. The movements generally focus on joint mobility, range of motion, balance, and joint strength. The goal is to reduce pain, allowing individuals to perform daily activities normally [10]. One study reported that rheumatic exercise performed for four weeks could reduce pain levels by up to three points [11]. Another study showed that rheumatic exercise conducted

once a week for four weeks reduced the number of individuals experiencing moderate pain while increasing those experiencing mild pain. Similar findings were reported by Dinartika et al., who found a significant effect of rheumatic exercise on pain intensity after just one week [12].

Based on the background above, it is evident that many individuals with rheumatism experience joint pain as their main complaint. Therefore, pain management is a crucial initial step, one of which is through rheumatic exercise. It is thus necessary to analyze whether rheumatic exercise has an effect on pain levels among individuals with rheumatism in the working area of Kalijudan Public Health Center. This study aims to evaluate the effectiveness of rheumatic exercises in reducing pain levels among individuals with rheumatism at the Kalijudan Public Health Center in Surabaya.

II. METHODOLOGY

This study employed a pre-experimental design using a one-group pretest-posttest approach. In this design, all participants belonged to a single group and were observed before and after the intervention without the inclusion of a control group. A pretest was conducted to measure the initial pain levels of the respondents, followed by the implementation of rheumatic exercises as the intervention. After the intervention, a posttest was administered to assess any changes in pain levels. Although this design lacks a control group for comparison, it is still considered appropriate for preliminary investigations aiming to determine whether an intervention yields observable effects on a specific outcome. The one-group pretest-posttest design allows researchers to detect changes within the same group over time, providing valuable insight into the potential effectiveness of the intervention. This design is particularly suitable when the research is conducted in natural settings, such as community health centers, where implementing randomization or including a control group may be impractical due to ethical, logistical, or resource-related constraints [13] .

The population in this study included all individuals with rheumatism within the working area of Kalijudan Public Health Center, located in Sutorejo Subdistrict, totaling 39 individuals. The sample was selected based on inclusion and exclusion criteria determined by the researcher. The sample size was calculated using Slovin's formula, with an additional 10% added to account for potential dropouts, resulting in a final total of 31 respondents. The sampling technique used was purposive sampling, which involves selecting participants based on specific considerations relevant to the research objectives. In this case, only subjects who met the criteria as rheumatism patients and were willing to participate in the exercise program were selected as respondents [13].

The independent variable in this study was rheumatic exercise, which refers to a series of structured movements designed to enhance body flexibility, strengthen muscles, and reduce joint stiffness and pain. The exercise was conducted regularly in several sessions, consisting of warm-up, core, and cool-down phases. The dependent variable was the level of pain experienced by the respondents, measured using the Numeric Rating Scale (NRS). Pain levels were assessed using the NRS, which is a self-reported scale that asks participants to rate their pain intensity on a scale from 0 to 10, where 0 indicates no pain and 10 represents the worst possible pain. This scale was administered by the researcher using a pain questionnaire, which was filled out by the respondents before and after the intervention. To ensure consistency and accuracy in pain reporting, the researcher provided clear instructions on how to complete the NRS. Prior to data collection, the researcher conducted a brief training session to familiarize the respondents with the scale and explain how to assess their pain based on their individual perception. This ensured that respondents understood how to rate their pain appropriately and reliably.

The study was conducted in the working area of Kalijudan Public Health Center, specifically in Sutorejo Subdistrict, from January 4 to January 29, 2025. Along with the NRS questionnaire, an observation sheet was also used to record other relevant data during the study. The data collection procedure began with obtaining research approval and coordinating with the health center. Upon receiving consent, the researcher screened potential participants based on inclusion and exclusion criteria. A pretest was conducted to assess initial pain levels, followed by an intervention in the form of rheumatic exercise, which was carried out four times over two weeks. After the intervention, a posttest was conducted to evaluate changes in pain levels.

This study received ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Surabaya, with reference number 00672235782111220241225252, dated December 25, 2024. The research was carried out in accordance with the principles of research ethics, including respect for individual dignity and rights, the confidentiality of participants' personal data, fairness in the treatment of all participants, and ensuring that the research provides benefits to both the participants and society at large[14].

As part of the ethical considerations, all participants were given a full explanation of the research objectives, procedures, benefits, and potential risks, and were asked to provide written informed consent prior to participation. To mitigate risks, the rheumatic exercise protocol was designed in accordance with medically approved guidelines that are safe and appropriate for individuals with rheumatism, and the implementation was directly supervised by healthcare professionals. If any signs of discomfort or risk of injury were observed during the intervention, participants were free to withdraw from the study at any time without any consequences.

III. RESULT

This study was conducted from January 13 to January 29, 2025, with a total of 31 respondents. Data collection in this study was done by performing rheumatic exercises for 30

minutes with the respondents. The exercise was done collectively at the local RW hall with a frequency of 4 times during 4 meetings. This study used univariate analysis followed by bivariate analysis, which included Normality tests and the Wilcoxon test. The analysis in this study was conducted using SPSS software. From the research conducted, data on the characteristics of rheumatic patients based on gender, age, BMI, occupation, duration of suffering, history of injury, and treatment were obtained as follows:

Table 1.
Characteristics of Rheumatic Patients in the Working Area of Kalijudan Public Health Center, Surabaya

No	Characteristic	Freq.	Percentage
1.	Gender		
	Male	2	6,45%
	Female	29	93,55%
	Total	31	100,00%
2.	Age		
	45-54	10	32,25%
	55-65	16	51,63%
	66-74	4	12,90%
	75-90	1	3,22%
	>90	0	0,00%
	Total	31	100,00%
3.	Body Mass Index		
	Underweight	0	0,00%
	Normal	15	48,38%
	Overweight	3	9,68%
	Obesity	13	41,94%
	Total	31	100,00%
4.	Occupation		
	Civil Servant/Army/Police	1	3,22%
	Self-employed	7	22,58%
	Other	23	74,20%
	Total	31	100,00%
5.	Duration of Illness		
	< 1 year	5	16,13%
	>1 year	26	83,87%
	Total	31	100,00%
6.	Medication		
	Regular	12	38,70%
	Irregular	19	61,30%
	Total	31	100,00%
7.	History of Injury		
	No	31	100,00%
	Yes	0	0,00%
	Total	31	100,00%
8.	Blood Pressure		
	Hypertension	13	41,93%
	Normal	18	58,07%
	Hypotension	0	0,00%
	Total	31	100,00%
9.	Pulse		
	Tachycardia	4	12,90%
	Normal	27	87,10%
	Bradycardia	0	0,00%
	Total	31	100,00%

Based on TABLE 1, Based on the frequency distribution results from 31 respondents, the majority were female (93.55%), while only 6.45% were male. This indicates that rheumatism sufferers in this study were predominantly women, which aligns with existing literature suggesting that women are more susceptible to rheumatic diseases due to hormonal and autoimmune factors. In terms of age, the largest group was within the 55–65 age range (51.63%), followed by those aged 45–54 years (32.25%). This suggests that rheumatic complaints are most commonly experienced by middle-aged to early elderly individuals, correlating with age-related joint degeneration.

Regarding body mass index (BMI), 41.94% of respondents were classified as obese, while 48.38% had normal body weight. This is a significant finding, as obesity is a contributing factor to increased joint stress, potentially intensifying rheumatic pain. Although not the primary focus of statistical analysis, this trend suggests that overweight individuals may experience slower pain reduction compared to those with a normal BMI. The majority of respondents (74.20%) fell into the "other" occupational category (e.g., housewives or retirees), with only a small proportion being self-employed or employed in the civil service, military, or police force. Lower physical activity levels in this group may influence the necessity of interventions like rheumatic exercise to enhance joint flexibility. Most respondents had been living with rheumatism for over a year (83.87%), indicating that the majority of cases were chronic.

Nevertheless, the rheumatic exercise intervention still demonstrated a significant impact on pain reduction, highlighting its potential benefits even for long-term sufferers. In terms of medication adherence, 61.30% of respondents reported irregular medication intake. This reinforces the importance of non-pharmacological approaches such as rheumatic exercise as alternative pain management strategies, particularly for patients with poor adherence to drug therapy. All respondents had no prior history of injury (100%), suggesting that their pain was likely due solely to rheumatic conditions rather than trauma. Normal blood pressure was observed in 58.07% of respondents, while 41.93% were hypertensive. Additionally, most had a normal pulse rate (87.10%), with a small number experiencing tachycardia (12.90%). These two parameters are important for ensuring the safety of exercise interventions.

Table 2.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center, Surabaya Based on Gender

Crosstabulation of Gender

		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Female	F	0	5	24	0	0	12	17	0	7
	%	0.0%	17.2%	82,8%	0.0%	0.0%	41.4%	58.6%	0.0%	
Male	F	0	0	2	0	0	0	2	0	0
	%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0**	
	%	**0.0%**	**16.1%**	**83,9 %**	**0,0%**	**0.0%**	**38.7%**	**61.30%**	**0.0%**	

TABLE 2 shows that a greater reduction in pain levels occurred among female rheumatic patients. This is supported by research by Khajehei & Behroozpour, which states that women produce more endorphins, especially after childbirth and during breastfeeding, making rheumatic exercise more effective for women compared to men. This is supported by research by Khajehei & Behroozpour, which states that

women produce more endorphins, especially after childbirth and during breastfeeding, making rheumatic exercise more effective for women compared to men.

Table 3
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Age.

Crosstabulation of Age		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Mid Age	F	0	1	9	0	0	4	6	0	3
	%	0.0%	10.0%	90.0%	0.0%	0.0%	40.0%	60.0%	0.0%	
Elderly	F	0	2	14	0	0	6	10	0	4
	%	0.0%	12.5%	87.5%	0.0%	0.0%	37.5%	62.5%	0.0%	
Young Elderly	F	0	1	3	0	0	1	3	0	0
	%	0.0%	25.0%	75.0%	0.0%	0.0%	25.0%	75.0%	0.0%	
Old Elderly	F	0	1	0	0	0	1	0	0	0
	%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 3 shows that rheumatic patients of elderly age experienced a more significant reduction in pain levels. According to Wijayakusuma, cartilage thinning in old age causes friction and inflammation that triggers joint pain [15]. This indicates that rheumatic exercise is more effective for the elderly due to their good immune system and protected cartilage, compared to younger or older elderly individuals who are more vulnerable to pain.

Table 4.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Body Mass Index (BMI).

Crosstabulation of BMI		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Normal Weight	F	0	2	13	0	0	6	9	0	4
	%	0.0%	13.3%	86.7%	0.0%	0.0%	40.0%	60.0%	0.0%	
Overweight	F	0	1	2	0	0	1	2	0	0
	%	0.0%	33.3%	66.7%	0.0%	0.0%	33.3%	66.7%	0.0%	
Obesity	F	0	2	11	0	0	5	8	0	3
	%	0.0%	15.4%	84.6%	0.0%	0.0%	38.5%	61.5%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 4 shows that rheumatic patients with a normal body mass index experienced a more significant reduction in pain. According to Dowell et all, obesity increases the load on the joints, worsening pain. This indicates that patients with a normal body mass index are more suitable for rheumatic exercise because they are not burdened by excess weight, making it easier to alleviate pain [16].

Table 5.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Occupation.

Crosstabulation of Occupation		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Self-employed	F	0	1	6	0	0	1	6	0	0
	%	0.0%	14.3%	85.7%	0.0%	0.0%	14.3%	85.7%	0.0%	
Civil Servant/Army/ Police	F	0	0	1	0	0	0	1	0	0
	%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	
Other	F	0	4	19	0	0	11	12	0	7
	%	0.0%	17.4%	82.6%	0.0%	0.0%	47.8%	52.2%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 5 shows that housewives, the majority of whom are female, experienced a more significant reduction in pain. According to Khajehei & Behroozpour , women produce more endorphins after childbirth and breastfeeding, making rheumatic exercise more effective for them compared to men [17].

TABLE 6. Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Duration of Suffering.

Crosstabulation of Duration of Illness		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
More than 1 year	F	0	4	22	0	0	9	17	0	5
	%	0.0%	15.4%	84.6%	0.0%	0.0%	34.6%	65.4%	0.0%	
Less than 1 year	F	0	1	4	0	0	3	2	0	2
	%	0.0%	20.0%	80.0%	0.0%	0.0%	60.0%	40.0%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 6 shows a more significant reduction in pain among rheumatic patients who have been suffering for more than one year. According to Green, patients who have passed the inflammation phase tend to move their joints more easily because their muscles and tissues have adapted, making rheumatic exercise more effective for them [18]. According to Green, patients who have passed the inflammation phase tend to move their joints more easily because their muscles and tissues have adapted, making rheumatic exercise more effective for them

Table 7.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Medication

Crosstabulation of Medication		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Irregular	F	0	5	14	0	0	9	10	0	4
	%	0.0%	26.3%	73.7%	0.0%	0.0%	47.4%	52.6%	0.0%	
Regular	F	0	0	12	0	0	3	9	0	3
	%	0.0%	0.0%	100.0%	0.0%	0.0%	25.0%	75.0%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 7 shows a more significant reduction in pain among rheumatic patients who do not regularly take medication. According to Sitopu, regular medication increases the chances of recovery; however, long-term use of medication can inhibit the effects of endorphins, making pain more difficult to relieve [19]. This indicates that rheumatic exercise is more effective for patients who do not take medication regularly. This indicates that rheumatic exercise is more effective for patients who do not take medication regularly.

Table 8.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on History of Injury

Crosstabulation of History of Injury		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
No	F	0	5	26	0	0	12	19	0	7
	%	0.0%	16.1%	83.9%	0.0%	0.0%	38.7%	61.3%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 8 shows a more significant reduction in pain among rheumatic patients without a history of injury. According to Bhaskar et al., individuals with a history of injury tend to experience increased pain [20]. This indicates that rheumatic exercise is more effective for patients without a history of injury, as their pain does not intensify.

Table 9.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Blood Pressure.

Crosstabulation of Blood Pressure		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Hypertension	F	0	3	10	0	0	5	8	0	2
	%	0.0%	23.1%	76.9%	0.0%	0.0%	38.5%	61.5%	0.0%	
Normal	F	0	2	16	0	0	7	11	0	5
	%	0.0%	11.1%	88.9%	0.0%	0.0%	38.9%	61.1%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 9 shows a more significant reduction in pain among rheumatic patients with normal blood pressure. According to Medline, the narrowing of blood vessels in individuals with hypertension hinders the flow of hormones, including endorphins [21]. This indicates that rheumatic exercise is more effective in patients with normal blood pressure, as the flow of endorphin hormones is not obstructed.

Table 10.
Distribution of Pain Levels in Rheumatic Patients in the Working Area of Kalijudan Public Health Center Based on Pulse Rate

Crosstabulation of Pulse		Pretest				Posttest				S
		No Pain	Mild Pain	Moderate Pain	Severe Pain	No Pain	Mild Pain	Moderate Pain	Severe Pain	
Tachycardia	F	0	1	3	0	0	2	2	0	2
	%	0.0%	25.0%	75.0%	0.0%	0.0%	50.0%	50.0%	0.0%	
Normal	F	0	4	23	0	0	10	17	0	6
	%	0.0%	14.8%	85.2%	0.0%	0.0%	37.0%	63.0%	0.0%	
Total	**F**	**0**	**5**	**26**	**0**	**0**	**12**	**19**	**0.0%**	
	%	**0.0%**	**16.1%**	**83.9%**	**0.0%**	**0.0%**	**38.7%**	**61.3%**	**0.0%**	

TABLE 10 shows that rheumatic patients with a normal pulse experienced a greater reduction in pain. According to Suryana, pain can increase pulse rate due to the adrenaline hormone that stimulates the heart. While Fensynthia states that a rapid pulse caused by stress or anxiety inhibits the performance of endorphin hormones [22]. This indicates that rheumatic exercise is more effective when performed on patients with a normal pulse, as adrenaline does not interfere with the effectiveness of endorphins in reducing pain.

A. PAIN LEVEL CHARACTERISTICS IN RHEUMATIC PATIENTS

Table 11.
Distribution of pain level measurements in rheumatic patients before being given rheumatic exercise in the working area of Kalijudan Public Health Center, Surabaya.

No	Characteristic	Frequency	Percentage
1.	**Pain Level**		
	No Pain	0	**0,00%**
	Mild Pain	5	**16,13%**
	Moderate Pain	26	**83,87%**
	Severe Pain	0	**0,00%**
	Total	31	**100%**

Based on TABLE 11, before the rheumatic exercise was given, it was found that nearly all individuals with rheumatism experienced moderate pain (83.87%) and a small portion experienced mild pain (16.13%).

B. PAIN LEVEL CHARACTERISTICS IN RHEUMATIC PATIENTS

Table 12.
Distribution of pain level measurements in rheumatic patients after being given rheumatic exercise in the working area of Kalijudan Public Health Center, Surabaya.

No	Characteristic	Frequency	Percentage
1.	**Pain Level**		
	No Pain	0	**0,00%**
	Mild Pain	20	**64,51%**
	Moderate Pain	11	**35,58%**
	Severe Pain	0	**0,00%**
	Total	31	**100,00%**

Based on TABLE 12, after the implementation of rheumatic exercise, the majority of patients experienced mild pain (64.51%), while 35.58% experienced moderate pain.

C. ANALYSIS OF THE EFFECT OF RHEUMATIC EXERCISE ON PAIN INTENSITY IN RHEUMATIC PATIENTS

To analyze the effect of rheumatic exercise on pain intensity, a normality test was conducted using the Shapiro-Wilk test, which indicated that both pretest and posttest data were not normally distributed ($p < 0.05$). Therefore, the Wilcoxon test was used to analyze paired data with an ordinal scale. If $p < 0.05$, it indicates a significant effect of rheumatic exercise on pain intensity; whereas if $p > 0.05$, it indicates no significant effect. The Wilcoxon test was chosen because the data were not normally distributed and it is appropriate for testing differences between paired groups. The following are the results of the Wilcoxon test conducted:

Table 13.
Wilcoxon Test

Test Statistics[a]	
	Postest - Prestest
Z	-4.563[b]
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on positive ranks.	

Based on TABLE 13, the results of the Wilcoxon test show a significant (2-tailed) value of 0.000 for the pretest and posttest. This significance value indicates $p < 0.05$, thus H1 is accepted, which means there is a significant effect of rheumatic exercise on pain intensity in rheumatic patients in the working area of Kalijudan Public Health Center, Surabaya.

IV. RESULT

A. IDENTIFICATION OF PAIN INTENSITY IN RHEUMATIC PATIENTS

Among 31 patients with rheumatism, the majority were female, with most experiencing moderate pain before participating in rheumatic exercise. All male participants also reported moderate pain, with none experiencing mild pain. This finding aligns with studies by Aprilyadi & Soewito and WHO, which indicate that women are more susceptible to rheumatism due to hormonal factors—particularly the decline in estrogen during menopause, which accelerates bone mass loss [23] [3]. Rheumatic patients were predominantly elderly, including both young-old and old-old age groups, most of whom experienced moderate pain. According to Wijayakusuma, rheumatic conditions such as osteoarthritis commonly occur as a result of aging, which affects the immune system and leads to joint degeneration [24].

Half of the patients had a normal body mass index (BMI), while the other half were obese, with most from both groups reporting moderate pain. Maniking et al. explain that excess body weight increases joint stress and stimulates adipocytes to secrete inflammatory proteins, which can damage joints and intensify pain [25]. The majority of patients were housewives, while the rest were self-employed. Nearly all individuals in both categories experienced moderate pain prior to the exercise intervention. Repetitive work activities, particularly those involving prolonged static postures, such as household chores, may lead to joint tension and inflammation [26]. Most patients had been living with rheumatism for more than one year, and the majority reported moderate pain.

According to the Indonesian Rheumatology Association, prolonged rheumatism tends to become chronic, resulting in persistent pain due to ongoing joint inflammation [27]. Most patients underwent treatment irregularly, and both those with regular and irregular treatment routines generally continued to experience moderate pain. Sitopu et al. emphasized that treatment without consistency and physical activity is insufficient to significantly reduce pain [28]. Patients with both normal and high blood pressure experienced moderate pain. Suryana noted that pain can elevate blood pressure through the release of stress hormones, which cause vasoconstriction. Similarly, patients with normal pulse rates also experienced moderate pain. Pain triggers the release of adrenaline, which increases heart rate indicating a connection between pain and the body's physiological response.

These findings are consistent with the study by Afnuhazi, which reported that most elderly individuals experienced moderate to severe pain before engaging in rheumatic exercise [29]. In addition, Rahayu et al. explained that pain perception is influenced by gender, age, previous pain experiences, and hormonal factors [30]. Pain in rheumatism is caused by inflammation that produces pannus—an abnormal layer of tissue that erodes bone surfaces, leading to joint erosion. This results in pain, stiffness, and impaired joint mobility, and is further exacerbated by factors such as age, BMI, and activity patterns [31].

B. *IDENTIFICATION OF PAIN INTENSITY IN RHEUMATIC PATIENTS*

A study involving 31 patients with rheumatism showed a reduction in pain intensity after participating in rheumatic exercise, with 65% experiencing mild pain and 35% experiencing moderate pain. These findings align with the results of Afnuhazi, which also reported a decrease in pain following rheumatic exercise [29]. The reduction in pain was more pronounced in female participants, which is presumed to be due to higher endorphin production [17]. Elderly individuals also showed a better response to rheumatic exercise, likely because they are more capable of expressing pain and have passed the inflammatory phase of the disease [30] [24]. In terms of body mass index, patients with normal weight experienced greater pain reduction compared to those who were obese, as joint load is lighter in individuals with normal weight. The majority of participants were housewives, who also demonstrated a more significant reduction in pain, which may be supported by hormonal factors. Patients who had been living with rheumatism for more than a year responded more positively, as their bodies may have adapted to the condition [18]. Interestingly, patients who did not regularly take medication showed greater pain reduction, possibly because there was no chemical interference with the release of endorphins [28] [32]. None of the participants had a history of injury, which, according to Bhaskar et al., supports the effectiveness of rheumatic exercise [20]. Additionally, patients with normal blood pressure and pulse rates showed better outcomes, as the flow of endorphins was not disrupted [21] [22]. These findings are supported by studies conducted by Dinartika et al and Pamungkas et al. (n.d.), which reported significant differences between groups that performed rheumatic exercise and those that did not, with the exercise group experiencing a greater reduction in pain [12].

C. *THE EFFECT OF RHEUMATIC EXERCISE ON PAIN INTENSITY IN PATIENTS WITH RHEUMATISM*

The results of this study indicate a decrease in pain levels following the administration of rheumatic exercise. This finding is further supported by the results of the Wilcoxon statistical test, which showed a p-value of 0.000 (<0.05), indicating that H_1 is accepted and H_0 is rejected. This means that there is a significant effect of rheumatic exercise on pain levels among patients with rheumatism in the working area of Kalijudan Public Health Center, Surabaya. These results are consistent with a study conducted by Virgo et al., entitled The Effect of Rheumatic Exercise on Joint Pain in the Elderly, which reported a Wilcoxon test result with a p-value of 0.003 (<0.05), thereby accepting H_1 and rejecting H_0 [33]

This suggests that rheumatic exercise has a significant effect on joint pain in elderly individuals. Rheumatic exercise is a form of physical activity with movements that are highly effective, efficient, and logical, performed in a regular and structured manner for individuals with rheumatism [9]. In general, the movements focus on joint

motion speed, range of motion, balance, and joint strength, thereby reducing pain experienced by individuals with rheumatism and enabling them to carry out daily activities without significant interference [10].

According to Triswani, physical activity stimulates the release of endorphins, which act as natural analgesics [34]. When endorphins are released, they bind to opioid receptors in the nervous system, inhibiting proteins responsible for transmitting pain signalsAccording to Junaidi, individuals with rheumatism must maintain a balance between activity and rest [35]. When experiencing fatigue, soreness, or joint pain, it is advisable to take a rest. However, prolonged rest or complete inactivity should be avoided, as it may lead to joint stiffness, which can worsen the rheumatic condition. Engaging in regular exercise can reduce the risk of complications, help improve muscle strength, increase joint range of motion, support weight loss, and alleviate pain and stiffness [18].

The study demonstrates that rheumatic exercise is effective in reducing pain levels among individuals with rheumatism, particularly in elderly women aged 55–65 years, with normal body weight, occupations predominantly held by women, no history of injury, suffering from rheumatism for more than one year, normal blood pressure and pulse rate, and undergoing irregular treatment. This activity stimulates the production of endorphins, which function as natural analgesics, thereby reducing pain and joint stiffness. Therefore, rheumatic exercise is recommended as a routine activity in healthcare facilities for patients who meet these criteria, while alternative methods may be considered for those who do not.

This study has several limitations. The absence of a control group is a major limitation, making it difficult to determine whether changes in pain levels were caused by the rheumatic exercise or other factors. The short duration of the intervention also limits the ability to assess long-term effects on pain levels. Additionally, the use of only one method, rheumatic exercise, restricts comparisons with other interventions. The heterogeneity of the respondents, including differences in age, gender, and physical condition, may also affect the results and limit generalizability. Finally, the study required precise coordination of time, as all participants needed to gather at the same time for the intervention, which could be challenging in studies with many participants.

IV. CONCLUSION

The results of this study indicate that prior to the intervention, nearly all respondents experienced moderate pain, with a small proportion reporting mild pain. Following the implementation of rheumatic exercise as an intervention, a significant reduction in pain intensity was observed, with the majority of respondents reporting a decrease to mild pain, and nearly half remaining in the moderate pain category. Based on statistical analysis, it can be concluded that rheumatic exercise has a significant effect on reducing pain intensity in patients with rheumatism within the working area of Kalijudan Public Health Center, Surabaya.

Given these promising results, it is recommended that health centers such as Kalijudan Public Health Center incorporate regular rheumatic exercise sessions into their standard care protocols for rheumatism patients. This could help to improve patient outcomes, reduce reliance on medication, and enhance quality of life for individuals suffering from chronic rheumatic pain. By offering structured, accessible exercise programs as part of routine care, health centers can promote both pain relief and physical well-being. For future research, it is essential to consider long-term follow-up studies to assess the sustained effects of rheumatic exercises over time. Additionally, incorporating a control group in future studies would provide more robust evidence of the intervention's effectiveness. Researchers could explore variations in exercise protocols, such as different frequencies or intensities, to optimize the impact on pain reduction and overall patient well-being.

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