

APPLICATION OF PROGRESSIVE MUSCLE RELAXATION (PMR) THERAPY IN GOUT PATIENTS WITH ARTHRITIS WITH PAIN NURSING PROBLEMS

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ABSTRACT

Gout arthritis is an inflammatory disease that causes joint pain so it requires effective management in addition to pharmacological therapy. This study aims to analyze the effect of progressive muscle relaxation on changes in joint pain in gout arthritis patients in the working area of the Dlanggu Mojokerto Health Center. The research used a pre-experimental design with a one group pretest-posttest approach. A sample of 83 respondents was selected using the purposive sampling technique. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the progressive muscle relaxation intervention for 10–15 minutes, once a day. Before the intervention, 97.6% of respondents experienced moderate pain, while after the intervention 51.8% experienced mild pain. The average pain score decreased from 5.19 to 3.59. The results of the Wilcoxon test showed a value of $Z = -8.147$ with $p = 0.000$ ($p < 0.05$), which showed a significant effect of progressive muscle relaxation on the reduction of joint pain. This intervention can be used as a non-pharmacological therapy to accompany pharmacological therapy in reducing pain in gout arthritis patients in primary health services.

Keywords: *gout arthritis, progressive muscle relaxation, joint pain.*

INTRODUCTION

Gout arthritis is a progressive condition caused by the accumulation of monosodium urate crystals in connective tissues, joints and kidneys due to high uric acid levels (hyperuricemia) that occur chronically. This condition is characterized by clinical manifestations in the form of acute joint pain, redness, swelling, and significant movement limitations (Dalbeth, 2024). Joint pain is a major problem for gout arthritis patients because the urinary crystals activate the NLRP3 inflammasome which causes the release of pro-inflammatory cytokines such as interleukin 1β (IL- 1β), this process increases the sensitivity of nociceptors and amplifies pain perception. If not treated properly, these joint pain attacks can last from a few days to weeks (Poulsen, 2025).

According to the report *World Health Organization* WHO (2023), joint pain is a health problem that continues to increase worldwide. In 2019, about 528 million people worldwide suffered from joint pain, with an increase of 113%. About 73% of sufferers (Kunta, 2022). WHO reports, specifically related to gout arthritis, hyperuricemia affects about 1 - 4% of the world's population. In some countries, the prevalence of gout even reaches 6% - 10% aged 80 years and above, with an annual incidence of 2.68 cases per 1,000 people, a percentage of 1 - 2% in the adult population (Ardiansari, 2024). According to Basic Health Research data (Riskesdas, 2018), joint diseases based on diagnosis or symptoms in Indonesia reached 24.7%, with the highest prevalence in individuals over 75 years old at 54.8% (Aminah, 2022). Gout arthritis affects one or more joints, especially in the lower and upper extremities such as the fingers, toes, ankles (Ramadhani, 2022). This condition is characterized by joint pain, swelling, redness, and limited movement, thus interfering with the patient's daily activities which has the potential to interfere with the patient's mobility and

daily activities (Zellina Putri Ramadhani, 2022). In East Java Province, the prevalence of joint disease reached 6.82%, significantly increasing in the age group of 55–64 years (12.84%), 65–74 years (15.39%), and over 75 years (16.27%), based on gender, more women (8.46%) than men (6.13%) (Mandalika, 2025).

Gout arthritis occurs due to the interaction of internal factors such as age, gender, genetics, and impaired kidney function, as well as external factors such as a diet high in purines, alcohol consumption, obesity, and lack of physical activity. These factors cause an increase in uric acid levels in the blood (hyperuricemia) which then forms uric acid levels in the serum triggering the formation and deposition of monosodium uric crystals (MSU) in the joints (Poulsen, 2025). These inflammatory processes increase the production of inflammatory mediators such as prostaglandins and chemokins that cause vasodilation and increased capillary permeability. As a result, edema, erythema, and increased intraarticular pressure occur. The activation of this nociceptor produces afferent implus that is delivered through the A delta and C nerve fibers to the central nervous system so that intense pain perception occurs in acute attacks of gout (Dalbeth, 2024). Lack of physical activity is one of the external factors that can trigger the occurrence of gout arthritis. Low physical activity causes the body's metabolism to be suboptimal, resulting in increased weight and fat accumulation (obesity). In addition, the lack of movement of the body also causes blood circulation to be less smooth, thus accelerating the deposition of monosodium crystals in the joints (FitzGerald, 2020).

The *GAP research* from the research on progressive muscle relaxation in gout arthritis patients in the working area of the Dlanggu Mojokerto Health Center has never been carried out. Previous research was conducted on different locations and characteristics of respondents so that the results could not necessarily be generalized to the community in the working area of the Dlanggu Health Center. Most previous studies only compared pain categories, while this study also assessed changes in NRS scores individually, providing a more comprehensive picture of pain reduction. This study is expected to strengthen scientific evidence regarding the effectiveness of progressive muscle relaxation as a nonpharmacological therapy in primary health services with the existence of *GAP research* from the study, the novelty that can be developed by the researcher is the first study to examine the effect of progressive muscle relaxation on changes in joint pain in gout arthritis patients in the working area of the Dlanggu Mojokerto Health Center. The research was carried out in primary health services (puskesmas) so as to provide scientific evidence in accordance with the conditions of the community in the community. The study not only compared pain categories, but also evaluated the changes in each respondent's NRS score, so that the results better illustrated the changes in pain intensity individually. The results of the study support the application of progressive muscle relaxation as a non-pharmacological intervention that is practical and easy to apply in nursing services at health centers.

Solution One of the progressive muscle relaxations is a non-pharmacological therapy that is effective in reducing pain through the mechanism of decreasing sympathetic nerve activity, increasing muscle relaxation, as well as increasing the release of endorphins and improving blood circulation (Scott, 2019). Non-pharmacological therapy that can be used as an adjunct therapy in the management of gout arthritis pain is progressive muscle relaxation. Management of gout arthritis is generally carried out with pharmacological therapy, such as the administration of nonsteroidal anti-inflammatory drugs (NSAIDs),

colchicine, corticosteroids, and uric acid-lowering drugs such as allopurinol or febuxostat. Pharmacological therapy has been shown to be effective in reducing pain and controlling inflammatory processes in the acute phase as well as preventing recurrence. However, the long-term use of these drugs needs to consider the risk of side effects, such as gastrointestinal disorders, kidney function disorders, liver function disorders, and hypersensitivity reactions in some patients. In addition, pharmacological therapy is not always able to overcome the muscle tension and discomfort that accompany joint pain, so non-pharmacological interventions are needed as companion therapy. This technique is done by tensing and then systematically relaxing muscle groups so that it helps reduce muscle tension, improve blood circulation, increase the release of endorphins, and decrease sympathetic nerve activity. These mechanisms can reduce pain perception, increase comfort, and improve movement function in gout arthritis patients. Progressive muscle relaxation is also relatively safe, easy to learn, does not require special tools, and can be performed independently by patients at home as complementary therapy to pharmacological treatment. Although some studies have shown that progressive muscle relaxation is effective in reducing pain intensity in various musculoskeletal conditions, research on the effectiveness of this intervention in gout arthritis patients in the working area of the Dlanggu Health Center is still limited. Therefore, this study was conducted to analyze the effect of progressive muscle relaxation on changes in joint pain in gout arthritis patients in the working area of the Dlanggu Health Center (Mohamed, 2021).

METHODS

This research has obtained ethical approval from [No.70/KEP/UBS-PPNI//IV/2026] as well as research permits from Bina Sehat University PPNI Mojokerto and the Mojokerto Regency Health Office. Each respondent signed an informed consent sheet before data collection. Data collection was carried out through pain intensity measurement using the Numeric Rating Scale (NRS) before and after the administration of progressive muscle relaxation.

Researcher uses quantitative design This research is a quantitative research with a pre-experimental design using a one group pretest–posttest design approach. The study was conducted by measuring the pain scale of respondents before (pretest) and after (posttest) the administration of progressive muscle relaxation intervention to determine changes in joint pain in gout arthritis patients.

The study population was all gout arthritis patients in the working area of the Dlanggu Health Center as many as 100 patients. The research sample amounted to 83 respondents who were selected using a non-probability sampling technique with a purposive sampling method based on the inclusion and exclusion criteria that have been set.

Samples are part of the population to be studied or part of the characteristics of the population as a whole, so that the results of the study can be generalized (Scott, 2020). The sample in this study was patients suffering from gout, arthritis, joint pain in the Dlanggu Health Center Working Area as many as 83 patients.

A research instrument is a tool used to measure phenomena or variables, both natural and social, observed. The research instrument with the questionnaire method should be compiled based on the indicators that have been described in the operationalization table of the variables more clearly and can be structured in the scoring techniques used in the

numerical pain scale (NRS) technique questionnaire before the intervention. Furthermore, respondents were given progressive muscle relaxation interventions according to the Standard Operating Procedures (SOP) for ± 10 –15 minutes, carried out 1 time a day. After the intervention was completed, pain intensity was measured again using the same instrument as the posttest data.

Data analysis is the process of examining and processing data obtained to make data easier to understand, test, and assess the validity of research hypotheses. Using univariate analysis to describe respondent characteristics and the distribution of pain scales before and after the intervention. Bivariate analysis was conducted using the Wilcoxon Signed Rank Test with a significance level of $\alpha = 0.05$ to determine the effect of progressive muscle relaxation on changes in joint pain in gout arthritis patients.

FINDINGS AND DISCUSSION

RESEARCH RESULTS

Table 1 Distribution of Respondent Frequency Based on General Data in the Working Area of the Dlanggu Mojokerto Health Center in 2026.

Yes	General data	Frequency	Percentage (%)
1.	Age of respondents		
	46 – 55 years old	18	21,7
	56 – 65 years old	59	71,1
	> 65 years old	6	7,2
2.	Gender		
	Men – men	19	22,9
	Women	64	77,1
3.	Jobs		
	Not working	42	50,6
	Work	41	49,4
4.	Education level		
	Not in school	11	13,3
	SD	31	37,3
	Junior High School	27	32,5
	High School/Vocational School	12	14,5
	Colleges	2	2,4
	Total	83	100

Source: Primary Data, 2026

Table 1 shows that most of the respondents were aged 56 – 65 years old with a total of 59 respondents with a percentage of 71.1% and 18 respondents with the age of 46 – 55 years as much as 21.7% and 6 respondents with the age of > 65 years as much as 7.2%. In terms of gender, most of the respondents were female, 64 respondents with 77.1% and 19 male respondents with 22.9%. This indicates that women are more at risk of joint pain due to gout arthritis, especially postmenopausal when there is a decrease in the hormone estrogen which plays a role in maintaining healthy bones and joints. In the employment data, 49.4% or 41 respondents had jobs and 50.6% or 42 respondents did not have jobs such as IRT. The

education data shows that the average respondent has an elementary education level of 31 respondents with a percentage of 37.3%, 27 respondents or 32.5% have a junior high school education level, 12 respondents or 14.5% have a high school/vocational education level, 11 respondents or 13.3% education only up to the elementary school level, and 2 respondents or 2.4% have a college education.

Table 2 Distribution of Respondent Frequency Based on Joint Pain Intensity Before Progressive Muscle Relaxation in the Work Area of the Dlanggu Mojokerto Health Center in 2026.

Intensity of joint pain	Frequency	Percentage
No pain	0	0
Mild pain	2	2,4
Moderate pain	81	97,6
Severe pain	0	0
Total	83	100

Source: Primary Data, 2026

Table 2 shows that almost all respondents experienced moderate pain before being given progressive muscle relaxation, namely 81 respondents (97.6%), while most of the respondents experienced mild pain before being given progressive muscle relaxation, namely 2 respondents (2.4%).

Table 3 The distribution of respondent frequencies is based on the intensity of joint pain before the provision of progressive muscle relaxation in the working area of the Dlanggu Mojokerto Health Center in 2026.

Intensity of joint pain	Frequency	Percentage
No pain	0	0
Mild pain	43	51,8
Moderate pain	40	48,2
Severe pain	0	0
Total	83	100

Source: Primary Data, 2026

Table 3 shows that most of the respondents experienced mild pain after being given progressive muscle relaxation as many as 43 respondents (51.8%), while most of the respondents experienced moderate pain after being given progressive muscle relaxation as many as 40 respondents (48.2%).

DISCUSSION

1. Joint Pain Before Progressive Muscle Relaxation

Based on the results of the study, table 2 shows that most of the respondents experienced joint pain with moderate pain intensity on a scale (4 – 6) as many as 81 respondents or 97.6% and 2 respondents 2.4% were already at mild pain intensity on a scale (1 – 3).

This is in line with Dalbeth's (2024) theory which states that the prevalence of gout arthritis increases significantly with age. Gout arthritis is characterized by severe pain in

the joints, swelling, redness, and frequent sudden pain. The pain experienced in gout arthritis is very typical and is often described as intense pain, and can wake the sufferer up at night. This inflammatory process usually lasts from a few days to weeks and is known as an acute gout attack. At this stage the joints become very sensitive to touch, movement and often experience limited mobility in the joints. When gout is left untreated, repeated attacks can cause vein crystals to continue to build up around joints and other soft tissues, forming a tumor (Frida, 2025).

Researchers assume that many factors affect joint pain, including age, gender, and education level. Therefore, gout arthritis is a condition that can be suffered by either women or men. It is characterized by pain and inflammation in the joints that occurs when too much uric acid crystallizes and builds up on the joints. Due to the many side effects caused by the use of pharmacological drugs such as allopurinol. It is hoped that by doing progressive muscle relaxation therapy regularly, there will be a decrease in the scale of joint pain. There are many factors that affect gout arthritis, one of which is gender in women.

Based on the results of the study, table 1 shows that some of the respondents affected by gout arthritis, one of which is female as many as 64 respondents or 77.1% and a small number of male respondents as many as 19 respondents or 22.9%.

According to Mandalika's theory (2025) Epidemiologically, gout arthritis is more common in women than men. A prevalence estimate states that gout arthritis occurs in both women and men. In men, uric acid levels increase during puberty. In the fourth to sixth years of life, gout disease begins to appear. However, men can also develop gout arthritis earlier if they have a genetic predisposition and have risk factors. Meanwhile, in women it increases during menopause and reaches its peak in the sixth to eighth years of life.

Researchers assume that many found in women are factors that affect gout arthritis. In addition, according to researchers, the factors that occur in the incidence of gout arthritis hormonal factor (estrogen): estrogen has a uricosuric effect that increases uric acid excretion through the kidneys. In women who have entered menopause, a decrease in estrogen levels causes the kidneys to reduce the ability to excrete uric acid resulting in hyperuricemia (Ilusya & Alfian, 2025). Postmenopausal body composition change factors: after menopause, women experience an increase in visceral fat mass related to insulin resistance. Insulin resistance inhibits the excretion of uric acid by the renal tubules, thus aggravating hyperuricemia. Consumption pattern factors: women in rural areas often consume foods high in purine such as tempeh, tofu, chips, and nuts as a daily side dish. Lack of physical activity: women with IRT status tend to have lower physical activity so that purine metabolism is not optimal and the risk of hyperuricemia increases (Dalbeth, 2024).

Based on the results of the study, table 1 shows that most of the respondents are aged 56-65 years with a total of 59 respondents with a percentage of 71.1% and 18 respondents with a percentage of 46-55 years as much as 21.7% and 6 respondents with a > age of 65 years as much as 7.2%.

According to the World Health Organization (WHO), the age of 46 – 55 years is included in the Middle Age category, the age of 56 – 65 years is included in the Elderly category, and while the age above or > 65 years is included in the Old category. In middle

age, organ function begins to decline, joint cartilage mass decreases, and the elasticity of the body's connective tissue decreases, which is a predisposition to the occurrence of musculoskeletal disorders including gout arthritis. Meanwhile, in the early elderly group (60-74 years) according to Dalbeth (2024), there was a significant decrease in the glomerular filtration rate (GRF). This results in a decrease in the kidneys' capacity to excrete uric acid, a decrease in the activity of the uricase enzyme responsible for breaking down uric acid, a decrease in muscle mass (sarcopenia), which leads to impaired purine metabolism, and the accumulation of monosodium uric crystals (MSUs) in the joints in the long term. The condition of the age of 56 – 65 years is also characterized by a decrease in the body's antioxidant capacity, increased oxidative stress, and hormonal changes, all of which cause inflammation in the joints to become more severe (Poulsen, 2025).

The researcher assumes that the high proportion of respondents in the age group of 56–65 years (early elderly) is very scientifically relevant, because this age group is in a phase where various physiological changes in the body have occurred meaningfully ranging from decreased kidney function, decreased hormones, to increased oxidative stress which cumulatively increases the risk of hyperuricemia and joint pain. Gout screening programs and health education need to be intensified from the age of 45 so that gout arthritis can be detected and treated early before irreversible joint damage occurs.

Based on the results of the study, table 1 shows that the employment data is almost balanced between those who have a job as many as 49.4% or 41 respondents and those who do not have a job as many as 50.6% or 42 respondents.

Gout arthritis is related to work in several ways. Strenuous work can lead to an increase in the production of lactic acid that competes with uric acid in the excretory process in the kidneys thereby increasing uric acid levels in the blood and causing recurrent microtrauma to the joints, which makes inflammation more severe (FitzGerald, 2020). Obesity and insulin resistance, which inhibits the excretion of uric acid by the renal tubules, can be caused by lifestyle in respondents who are not working or have IRT status. Psychological stress due to workload increases cortisol levels which is pro-inflammatory and can exacerbate the inflammatory response in the joints.

The researchers assumed that the fact that gout arthritis was influenced by many risk factors, not just one, was reinforced by the balance between working and non-working respondents. This suggests that the treatment of gout arthritis should be comprehensive and applicable to everyone, regardless of employment status.

2. Joint pain after progressive muscle relaxation

Based on the results of the study, table 4.3 shows that as many as 43 respondents or 51.8% experienced mild pain on a scale (1 – 3) after being given progressive muscle relaxation and around 40 respondents 48.2% experienced moderate pain on a scale (4 – 6) after being given progressive muscle relaxation. The reduction in pain that occurred after the administration of progressive muscle relaxation showed that this intervention had a positive effect on the respondents' condition. During the implementation of therapy, respondents were asked to perform relaxation exercises gradually by tightening and then relaxing muscle groups starting from the upper extremities, shoulders, face, neck, chest, and legs. Each muscle contraction is maintained for about 5 – 10 seconds, then followed by relaxation for 10 seconds while performing deep breathing techniques slowly and

regularly. These movements made respondents more aware of the difference between tense muscle conditions and relaxed muscle states. After several repetitions, most respondents reported that the body felt more comfortable, muscle tension was reduced, and joint pain was no longer felt as strongly as it was before the intervention.

According to Cahyati (2021), Progressive muscle relaxation is a technique that is carried out through systematic contraction and relaxation of body muscle groups. In this study, the movement started from the upper body to the lower part. These movements include tightening the hand muscles and the back muscles of the hands, biceps muscles, shoulder muscles, facial muscles, neck muscles, chest muscles, and leg muscles. After each muscle group is tightened for a few seconds, the muscles are then slowly relaxed while regulating the breath. In people with gout arthritis, pain causes the muscles around the joint to contract constantly in response to the body's protection against pain. Long-lasting muscle tension can reduce blood flow to the tissues so that the oxygen supply decreases and metabolites such as lactic acid build up. This condition aggravates the pain experienced by the patient (Sudaryanti, 2023). In addition to improving blood circulation, progressive muscle relaxation also decreases the activity of the sympathetic nervous system and increases the activity of the parasympathetic nervous system. Decreased sympathetic activity causes heart rate, blood pressure, and muscle tension to decrease so that the body is in a calmer state. On the other hand, increasing parasympathetic activity provides a relaxation effect, improves the tissue recovery process, and increases patient comfort (Irawan & Abdillah, 2026). During relaxation exercises, the brain also stimulates the release of endorphins and enkephalin hormones. Both hormones are the body's natural opioids that work to inhibit the transmission of pain impulses to the central nervous system. As a result, the pain stimuli received by the brain become less so that the intensity of pain felt by the patient decreases (Karcz, 2024). Progressive muscle relaxation can also be explained through the Gate Control Theory: stimuli resulting from muscle contraction and relaxation as well as the sensation of stretching will activate large diameter nerve fibers (A-beta). The activation of these fibers helps to "close the pain gate" in the spinal cord so that the transmission of pain impulses from the pain fibers (A-delta and C) to the brain is reduced. Thus, the perception of pain felt by the patient becomes lower. In addition to physiological mechanisms, progressive muscle relaxation also provides psychological benefits. During the exercise, respondents focused on muscle movements and breathing patterns so that attention to pain was reduced. Relaxed conditions also help reduce anxiety and stress which often aggravate the perception of pain in people with gout arthritis (Muharni Sri, 2023).

The researchers assume that the change in pain score, not just the change in the category. Based on the Wilcoxon test, all respondents experienced a decrease in pain scores. However, in some respondents, the decrease was only 1 point, from a score of 6 to 5 or from 5 to 4, so it is still in the category of moderate pain according to NRS. In addition, the magnitude of the decrease in pain can also be influenced by other factors such as ongoing inflammation, dietary adherence, use of analgesics, physical activity, sleep quality, and stress that have not been controlled in studies. There are still respondents who are in the moderate pain category after the intervention because the decrease in pain score that occurs is not large enough to change the pain category. The condition is influenced by several factors, such as age, the length of time you have had

gout arthritis, the level of inflammation due to the deposition of monosodium crystals in the veins, adherence to a low-purine diet, physical activity, the use of analgesic drugs, sleep quality, and stress levels. A decrease in pain after progressive muscle relaxation occurs because this exercise not only focuses on the sore joints, but involves almost the entire muscle group of the body. Tightening movements then gradually relax the muscles that were previously under tension to become more relaxed. The relaxation improves blood circulation, increases oxygen supply to tissues, reduces muscle stiffness, and stimulates the release of endorphins so that pain intensity is reduced. The researcher also argued that exercises that were carried out slowly and accompanied by breathing techniques provided a calming effect for the respondents. When the body becomes more relaxed, anxiety about pain decreases so that the perception of pain felt by the patient is also reduced. Therefore, progressive muscle relaxation is an effective nonpharmacological therapy, easy to learn, safe to perform, does not require special tools, and can be practiced independently at home as an adjunct therapy to reduce pain in gout arthritis patients.

3. The Effect of Progressive Muscle Relaxation on Joint Pain Changes

Based on the results of the statistical researchers, the Wilcoxon Signed Rank Test showed that every 83 respondents experienced a decrease in the pain scale, which means a p value = 0.000 ($p < 0.05$), and none of them experienced an increase in the pain scale. This shows that there is a statistically significant influence between the administration of progressive muscle relaxation on changes in joint pain in gout arthritis patients in the working area of the Dlanggu Health Center. Based on the results of tabulation of pain score difference data after the administration of progressive muscle relaxation, all respondents experienced a decrease in pain intensity. Most of the respondents experienced a decrease of **2 scores**, namely 44 respondents (53.0%), followed by a decrease of 1 score of 36 respondents (43.4%), while 3 respondents (3.6%) experienced a decrease of 3 scores, which was the highest decrease in this study. None of the respondents experienced an improvement or no change in pain score after the intervention. In addition, although there were respondents who experienced a decrease in scores of up to three points, no respondents were found who experienced a decrease in more than one pain category.

The results showed that the effectiveness of progressive muscle relaxation was not only assessed from the change in pain category, but also from the decrease in the *Numeric Rating Scale* (NRS) score in each respondent. Although some respondents were still in the moderate pain category after the intervention, their pain scores decreased. This shows a clinical improvement in pain intensity. On the other hand, some respondents experienced a downgrade of the category from moderate pain to mild pain, which suggests that the effects of the intervention differ on each individual according to their respective physiological conditions and body responses. Despite differences in respondent characteristics, sample count, and duration of intervention, all studies showed the same direction of results, namely progressive muscle relaxation was able to reduce pain intensity. The differences in outcomes between respondents in this study, such as respondents who only experienced a decrease in NRS scores without a change in pain

category, were thought to be influenced by physiological conditions, initial pain severity, age, and individual responses to relaxation therapy.

The researcher assumes that most of the respondents experienced a 2-score decrease because progressive muscle relaxation is able to provide an optimal relaxation effect on muscles that are under tension due to joint pain. However, there were still 36 respondents who only experienced a decrease of 1 score. This is influenced by several factors that were not entirely controlled in the study, such as the age of the respondents, most of whom were in the elderly group, the length of time they suffered from gout arthritis, the level of inflammation due to the deposition of monosodium crystals in the veins, adherence to a low-purine diet, physical activity, the use of analgesic drugs, sleep quality, and stress levels. These factors allowed each respondent to respond differently to progressive muscle relaxation interventions. Meanwhile, there were 3 respondents who experienced a decrease of 3 scores, which was the largest decrease in the study. According to the researchers, this condition shows that in some respondents, progressive muscle relaxation provides a more optimal effect, so that muscle relaxation, increased blood circulation, and endorphin release take place better. However, no respondents were found to have decreased in more than one pain category, as the initial scores of respondents were in the moderate pain range and after the intervention most moved to the mild pain category or remained in the moderate pain category with lower scores. This suggests that the effectiveness of progressive muscle relaxation is more noticeable from the magnitude of the decrease in NRS score than from the change in pain category alone. Therefore, the analysis of difference data provides a more detailed picture of each respondent's response to the intervention than simply comparing the distribution of pain categories before and after treatment.

The effectiveness of progressive muscle relaxation in lowering joint pain is significantly explained through several theoretical and research foundations. According to Irwan (2026), progressive muscle relaxation works through a decrease in the activity of the sympathetic nervous system and an increase in the activity of the parasympathetic nervous system simultaneously, resulting in a decrease in the stress hormone cortisol, a decrease in muscle tone, and a reduction in muscle spasms around the sore joint, which directly reduces mechanical pressure on the joint area and relieves pain. According to the theory Squirting (2023) One of the non-pharmacological methods known as progressive muscle relaxation has the ability to decrease the intensity of pain through a decrease in the activity of the sympathetic nervous system and an increase in the activity of the parasympathetic system. Ultimately, it results in a decrease in muscle tension and a decrease in the patient's perception of pain. In addition, these findings are consistent with several previous studies, such as a study at the Pandere Health Center, which found a relationship between progressive muscle relaxation and a decrease in pain levels in elderly people with gout arthritis with a p-value of 0.000 ($p < 0.05$), and a study at LKS-LU Pangesti Lawang, which found a value of $Z = -3,500$ with a p-value of 0.000.

CONCLUSION

Based on this study, it shows that progressive muscle relaxation has a significant effect on reducing joint pain in gout arthritis patients in the working area of the Dlanggu Health Center. All respondents experienced a decrease in pain scores after the intervention, with the results of the Wilcoxon Signed Rank Test showing a value of $p = 0.000$ ($p < 0.05$). These findings prove that progressive muscle relaxation is an effective, safe, easy-to-learn, nonpharmacological intervention that can be used as an adjunct therapy to help reduce joint pain in gout arthritis patients. Suggestions: 1. For health workers, progressive muscle relaxation can be applied as a non-pharmacological intervention to accompany pharmacological therapy in the management of joint pain in gout arthritis patients in primary health services. 2. For patients, progressive muscle relaxation exercises are recommended to be done regularly according to the instructions of health professionals to help reduce pain and improve comfort. 3. For future researchers, it is recommended to use a stronger research design, such as quasi-experimental or randomized controlled trials (RCTs) with control groups, larger sample sizes, longer duration of interventions, and consider other factors such as uric acid levels, dietary adherence, drug use, physical activity, and sleep quality to obtain more comprehensive results.

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