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Research article

Effectiveness Of Video-Based Progressive Muscle Relaxation On Pain Intensity And Sleep Quality Among Patients With Osteoarthritis

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ABSTRACT

Background: Osteoarthritis is a degenerative joint disease commonly associated with chronic pain and sleep disturbances, which significantly reduce patients' quality of life. Persistent pain and poor sleep quality often interact bidirectionally, leading to worsening physical and psychological conditions. Therefore, effective, feasible, and non-pharmacological interventions are needed to manage pain and improve sleep quality. This study aimed to evaluate the effectiveness of video-based progressive muscle relaxation on pain intensity and sleep quality among patients with osteoarthritis.

Methods: A quasi-experimental study with a pretest–posttest control group design was conducted in healthcare facilities in Pontianak, Indonesia. A total of 50 patients with osteoarthritis were recruited using purposive sampling and assigned to an intervention group (n = 25) and a control group (n = 25). The intervention group performed video-based progressive muscle relaxation once daily for seven consecutive days in addition to standard care, while the control group received standard care only. Pain intensity was measured using the Numeric Rating Scale (NRS), and sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Data were analyzed using the Mann–Whitney U test.

Results: The intervention group showed significantly greater reductions in pain intensity and improvements in sleep quality compared with the control group ($p < 0.001$). The magnitude of change in both outcomes was substantially higher in the intervention group, indicating a strong effect of video-based progressive muscle relaxation.

Conclusion: Video-based progressive muscle relaxation is effective in reducing pain intensity and improving sleep quality among patients with osteoarthritis. This intervention has important implications for nursing practice and health sciences, as it provides a practical, safe, and easily implemented non-pharmacological strategy to support self-care management in patients with chronic musculoskeletal conditions.

I. Introduction

Osteoarthritis is one of the most common degenerative joint diseases and a major cause of chronic pain, physical disability, and reduced quality of life among adult and older populations. This condition is characterized by progressive degeneration of articular cartilage, changes in subchondral bone, and inflammation of periarticular tissues (World Health Organization, 2023). Globally, the World Health Organization reported that more than 528 million people are living with osteoarthritis, and its prevalence continues to increase along with population aging, rising obesity rates, and sedentary lifestyles (World

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Health Organization, 2023). Osteoarthritis is also recognized as a leading contributor to activity limitation and reduced productivity among older adults.

In Southeast Asia, the prevalence of osteoarthritis, particularly knee osteoarthritis, is relatively high, ranging from 35% to 45% among individuals aged over 60 years. This high prevalence is associated with age-related joint structural changes, long-term physical activity, and risk factors such as excess body weight (Lawford et al., 2024). Women have been reported to be at a higher risk of developing osteoarthritis than men, especially after menopause, which is linked to hormonal changes and decreased bone density (Zhou et al., 2021).

In Indonesia, osteoarthritis represents a common chronic health problem among adult and older populations. Data from the National Basic Health Research indicate that approximately 21.8% of older adults experience chronic joint pain consistent with osteoarthritis symptoms (Ministry of Health of the Republic of Indonesia, 2018). This condition contributes to reduced independence among older adults, increased dependence on family members, and a growing burden on primary and referral healthcare services. In addition to aging, high body mass index and non-ergonomic physical activity patterns contribute to the occurrence and severity of osteoarthritis (Zhou et al., 2021).

In West Kalimantan Province, osteoarthritis is frequently encountered in healthcare services, particularly among late-adult and elderly patients. The characteristics of the local population, many of whom work in physically demanding sectors such as agriculture and informal labor, may increase the risk of musculoskeletal disorders, including osteoarthritis. In Pontianak City, preliminary observations conducted by the researchers at healthcare facilities revealed that chronic joint pain and joint stiffness are among the most common reasons for visits by patients with osteoarthritis.

Preliminary interviews with patients indicated that most individuals experienced persistent joint pain that tended to worsen at night, resulting in disturbed sleep quality. This finding is consistent with previous studies reporting that more than 60% of patients with osteoarthritis experience sleep disturbances associated with increased pain sensitivity, fatigue, and psychological distress (Kim et al., 2022). Poorly managed chronic pain may lead to physical limitations, reduced physical activity, muscle weakness, and an increased risk of falls. Psychologically, chronic pain is associated with anxiety, stress, depression, and decreased quality of life (Kim et al., 2022). Prolonged sleep disturbances may further exacerbate pain perception through impaired central pain modulation, thereby creating a reinforcing cycle between pain and poor sleep (Mashhadi-Naser et al., 2024).

The management of osteoarthritis commonly involves pharmacological therapies such as analgesics and non-steroidal anti-inflammatory drugs. However, long-term use of these medications is associated with gastrointestinal adverse effects, renal impairment, and cardiovascular risks, particularly among older adults (Zhou et al., 2021). Therefore, non-pharmacological approaches are considered an essential component of safe and sustainable nursing care.

Progressive muscle relaxation is a non-pharmacological intervention that has been shown to reduce muscle tension, alleviate pain, and improve sleep quality across various clinical populations (Khir et al., 2024; Mirzanah et al, 2020). However, conventional implementation of progressive muscle relaxation often relies on direct assistance from healthcare professionals, which may limit continuity and adherence. The use of video-based media offers an opportunity to enhance patient compliance and independence by providing standardized and repeatable relaxation guidance (Patten et al., 2022; Gould et al., 2024).

Considering the high prevalence of osteoarthritis, the significant impact of chronic pain and sleep disturbances, and the limitations of conventional non-pharmacological interventions, evaluating the effectiveness of video-based progressive muscle relaxation is clinically relevant. Such an approach has the potential to support the development of practical digital nursing interventions that promote self-care management for patients with degenerative joint diseases

METHODS

Design and Samples

This study employed a quantitative approach with a quasi-experimental design using a pretest–posttest control group. The design was applied to evaluate the effectiveness of video-based progressive muscle relaxation on pain intensity and sleep quality among patients with osteoarthritis. The study was conducted at healthcare facilities in Pontianak City, West Kalimantan Province, Indonesia. Data

collection was carried out from January 2026 following the approval and ethical clearance obtained prior to the study. The study population consisted of patients diagnosed with osteoarthritis who received care at the selected healthcare facilities. A total of 50 participants were recruited using purposive sampling and allocated into two groups: an intervention group (n = 25) and a control group (n = 25). The inclusion criteria were patients diagnosed with osteoarthritis, experiencing mild to severe joint pain, able to communicate effectively and follow instructions, and willing to participate in the study. The exclusion criteria included patients with cognitive impairment or severe hearing disorders, patients with acute disease complications requiring specialized management, and patients who did not complete the entire intervention protocol.

Research Instruments and Data Collection

Pain intensity was measured using the Numeric Rating Scale (NRS), which ranges from 0 to 10, where 0 indicates no pain and 10 represents the most severe pain. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI), a validated instrument consisting of 19 items covering seven components of sleep quality. The total PSQI score ranges from 0 to 21, with higher scores indicating poorer sleep quality. Data collection began with an explanation of the study objectives and procedures to potential participants, followed by the completion of informed consent forms. At baseline, participants in both groups completed pretest assessments using the NRS and PSQI instruments.

Participants in the intervention group received video-based progressive muscle relaxation sessions lasting approximately 10–12 minutes, performed once daily for seven consecutive days in addition to standard care. The control group received standard care without progressive muscle relaxation. After seven days, posttest measurements were conducted in both groups using the same instruments to assess changes in pain intensity and sleep quality.

Data Analysis

Collected data were analyzed using statistical software. Descriptive analysis was performed to describe participant characteristics. Data normality was assessed using the Shapiro–Wilk test. As the data were not normally distributed, differences in changes in pain intensity and sleep quality between the intervention and control groups were analyzed using the Mann–Whitney U test with a significance level set at $\alpha = 0.05$. Effect size was calculated to determine the magnitude of the intervention effect.

Research Process

The research process included participant recruitment, informed consent acquisition, baseline assessment (pretest), implementation of the video-based progressive muscle relaxation intervention for seven days, post-intervention assessment (posttest), and statistical data analysis to evaluate the effectiveness of the intervention.

Ethical Considerations

This study was conducted in accordance with ethical principles for research involving human participants. Ethical approval was obtained from the Research Ethics Committee of Institut Teknologi dan Kesehatan Muhammadiyah Kalimantan Barat (approval number: 04/II.AU/KET.ETIK/I/2026). All participants received clear information regarding the study objectives, benefits, and procedures, and confidentiality was ensured. Participants were informed of their right to withdraw from the study at any time without any consequences.

RESULTS

Results describe the major findings of the study. It should be clear, concise and can be reported on texts or graphics. Please provide some introduction for the information presented on tables or images.

Participant Characteristics

Table 1. Participant Characteristics

Characteristics	Category	n	(%)
Age (years)	< 60	28	56.0
	≥ 60	22	44.0
Sex	Male	18	36.0
	Female	32	64.0
Educational Level	Elementary–Junior High	20	40.0
	Senior High School	18	36.0
	Higher Education	12	24.0
Duration of OA	< 5 years	29	58.0
	≥ 5 years	21	42.0
Body Mass Index	Normal	17	34.0
	Overweight/Obese	33	66.0
Study Group	Intervention	25	50.0
	Control	25	50.0

A total of 50 participants were included in this study, consisting of 25 participants in the intervention group and 25 participants in the control group. Based on the univariate analysis (Table 1), most participants were aged under 60 years (56.0%) and were female (64.0%). The majority of participants had a basic to secondary educational background (76.0%). More than half of the participants had been diagnosed with osteoarthritis for less than five years (58.0%). In terms of nutritional status, most participants were classified as overweight or obese (66.0%). The distribution of participants between the intervention and control groups was equal, with each group comprising 50.0% of the total sample.as overweight or obese (66.0%). The distribution of participants between the intervention and control groups was equal, with each group comprising 50.0% of the total sample.

Pain and Sleep Quality Scores Before and After the Intervention

Table 2. Descriptive Statistics of Pain and Sleep Quality Scores Before and After the Intervention

Variable	Group	n	Pre-test (Mean ± SD)	Post-test (Mean ± SD)
Pain (NRS)	Intervention	25	6.40 ± 0.90	4.60 ± 0.95
	Control	25	6.20 ± 0.85	5.20 ± 0.75
Sleep Quality (PSQI)	Intervention	25	12.30 ± 1.60	9.60 ± 1.75
	Control	25	12.10 ± 1.55	11.10 ± 1.40

Descriptive analysis indicated reductions in pain intensity and improvements in sleep quality in both groups after seven days of observation. However, the magnitude of change was greater in the intervention group. Pain scores in the intervention group decreased from 6.40 ± 0.90 to 4.60 ± 0.95, whereas the control group showed a smaller reduction. Similarly, sleep quality improved more markedly in the intervention group, as reflected by a larger decrease in PSQI scores compared with the control group.

Pain and Sleep Quality Scores Before and After the Intervention

Table 3. Descriptive Statistics of Changes in Pain and Sleep Quality Scores (Δ) by Group

Variable	Group	n	Mean ± SD	Min–Max
Δ Pain (NRS)	Intervention	25	1.80 ± 0.90	1–4
	Control	25	1.00 ± 0.00	1–1
Δ Sleep Quality (PSQI)	Intervention	25	2.70 ± 1.75	1–5
	Control	25	1.00 ± 0.00	1–1

The analysis of score changes demonstrated that the intervention group experienced greater improvements than the control group. Mean reductions in pain and improvements in sleep quality were higher in the intervention group. In addition, the wider range of score changes in the intervention group suggests more varied and clinically meaningful responses compared with the relatively homogeneous changes observed in the control group.

Effectiveness of Video-Based Progressive Muscle Relaxation on Changes in Pain Intensity and Sleep Quality Between Groups

Table 4. Comparison of Changes in Pain and Sleep Quality Scores Between Groups (Mann–Whitney U Test)

Variable	Group	n	Mean ± SD	Min–Max	Mean Rank	Z	p-value	Effect Size (r)
Δ Pain (NRS)	Intervention	25	1.80 ± 0.90	1–4	38.00	−6.588	<0.001	0.93
	Control	25	1.00 ± 0.00	1–1	13.00			
Δ Sleep Quality (PSQI)	Intervention	25	2.70 ± 1.75	1–5	38.00	−6.614	<0.001	0.94
	Control	25	1.00 ± 0.00	1–1	13.00			

Normality testing using the Shapiro–Wilk test indicated non-normal data distribution ($p < 0.05$); therefore, between-group comparisons were conducted using the Mann–Whitney U test. The results showed that changes in pain intensity and sleep quality were significantly greater in the intervention group than in the control group ($p < 0.001$). Higher mean rank values in the intervention group indicate superior improvements. The large effect sizes ($r = 0.93$ for pain reduction and $r = 0.94$ for sleep quality improvement) demonstrate a strong clinical impact of video-based progressive muscle relaxation.

DISCUSSION

Effect of the Intervention on Pain Intensity

The findings of this study demonstrated that the mean reduction in pain intensity in the intervention group (1.80 ± 0.90) was almost twice that observed in the control group (1.00 ± 0.00). This difference was statistically significant ($p < 0.001$) and was accompanied by a very large effect size ($r = 0.93$), indicating a strong and consistent clinical impact of the intervention. Such a large effect size suggests that the observed improvement was not only statistically meaningful but also clinically relevant, reflecting a substantial reduction in pain that is likely to be perceptible and meaningful to patients in their daily lives. In clinical pain research, effect sizes of this magnitude are relatively uncommon, particularly in non-pharmacological interventions, underscoring the robustness and potential value of the intervention evaluated in this study.

From a pathophysiological perspective, pain in osteoarthritis is a complex and multifactorial phenomenon. While structural joint damage, cartilage degradation, and osteophyte formation have traditionally been considered the primary drivers of osteoarthritic pain, contemporary evidence increasingly highlights the role of neuromuscular and neurophysiological mechanisms. These include

increased periarticular muscle tension, altered muscle activation patterns, central sensitization, and prolonged activation of the sympathetic nervous system. Chronic pain conditions such as osteoarthritis are often characterized by a sustained state of heightened arousal within the autonomic nervous system, leading to persistent muscle guarding, reduced joint mobility, ischemia of periarticular tissues, and amplification of nociceptive input. As a result, pain perception may become disproportionate to the degree of structural damage observed on imaging, explaining the often-weak correlation between radiographic severity and reported pain intensity (De Paolis et al, 2019).

Progressive muscle relaxation (PMR) directly targets several of these underlying mechanisms. By systematically tensing and relaxing specific muscle groups, PMR promotes increased body awareness and facilitates the voluntary release of excessive muscle tension. This process has been shown to reduce sympathetic nervous system activity while enhancing parasympathetic dominance, thereby shifting the autonomic balance toward a state of relaxation. Reduced sympathetic activation leads to vasodilation, improved local blood circulation, and enhanced oxygen delivery to musculoskeletal tissues, which may contribute to the clearance of inflammatory mediators and metabolic by-products associated with pain. In parallel, parasympathetic activation has been linked to reduced stress hormone release, improved emotional regulation, and modulation of pain processing pathways at the spinal and supraspinal levels. Through these combined mechanisms, PMR may attenuate both peripheral nociceptive input and central pain amplification processes, resulting in a meaningful reduction in perceived pain intensity (Khir et al., 2024).

The strong effect observed in the present study also supports the growing recognition that non-pharmacological interventions can exert powerful influences on pain outcomes when they are well-designed and appropriately delivered. Pharmacological management of osteoarthritis pain, while often necessary, is frequently limited by side effects, contraindications, and diminishing effectiveness over time. Non-steroidal anti-inflammatory drugs, for example, are associated with gastrointestinal, renal, and cardiovascular risks, particularly in older adults who represent a substantial proportion of the osteoarthritis population. In this context, interventions such as PMR offer a safe, low-cost, and accessible adjunct or alternative to medication-based approaches (Hasanpour-Dehkordi et al, 2019). The large effect size observed in this study suggests that PMR, when delivered effectively, may substantially reduce reliance on analgesic medications and contribute to a more holistic and sustainable pain management strategy.

The magnitude of the intervention effect observed in this study was higher than that reported in several previous studies, which generally demonstrated moderate to large effect sizes. This discrepancy warrants careful consideration and may be explained by several methodological and contextual factors. One particularly noteworthy aspect of the present study is the use of video-based delivery for the PMR intervention. Video-based interventions offer several advantages over traditional face-to-face or verbally instructed approaches. First, they provide standardized visual and auditory guidance, ensuring that all participants receive consistent instructions and demonstrations. This standardization minimizes variability in technique execution, which can occur when instructions are delivered verbally or interpreted subjectively by different instructors or participants.

Second, video-based delivery allows participants to practice PMR in their own environment and at their own pace, which may enhance comfort, engagement, and adherence. Adherence is a critical determinant of the effectiveness of behavioral and mind–body interventions, yet it is often insufficiently addressed in clinical trials. Participants who are able to access guided sessions at convenient times and locations may be more likely to practice regularly and to integrate the technique into their daily routines. Regular and consistent practice is essential for achieving and maintaining the physiological and psychological benefits of PMR, including sustained reductions in muscle tension and autonomic arousal. The higher effect size observed in this study may therefore reflect superior adherence and practice quality facilitated by the video-based format.

Video media can engage multiple sensory modalities simultaneously, combining visual demonstration with verbal cues and, in some cases, background music or pacing signals. This multimodal stimulation may enhance learning, retention, and correct execution of the relaxation technique. Visual cues, in particular, can help participants better understand the sequence of muscle groups involved and the distinction between tension and relaxation phases. This may be especially important for older adults or individuals with limited prior experience in relaxation or mindfulness practices. By reducing cognitive

load and uncertainty, video-based instruction may allow participants to focus more fully on bodily sensations and relaxation responses, thereby amplifying the intervention's effectiveness.

These findings extend previous evidence supporting the effectiveness of progressive muscle relaxation in reducing musculoskeletal pain, as reported by Akıncı et al. (2025), by demonstrating a more practical and sustainable delivery approach. While earlier studies have established the efficacy of PMR in various chronic pain conditions, including low back pain, fibromyalgia, and osteoarthritis, many have relied on in-person training sessions or brief instructional periods followed by unsupervised practice. Such approaches may limit scalability and long-term adherence, particularly in resource-constrained healthcare settings. In contrast, video-based PMR interventions can be easily disseminated, reproduced, and integrated into routine care or home-based rehabilitation programs.

Beyond pain reduction, the observed benefits of PMR may have broader implications for physical function, psychological well-being, and quality of life in individuals with osteoarthritis. Chronic pain is closely intertwined with anxiety, depression, sleep disturbances, and reduced participation in daily activities. By reducing pain intensity and promoting relaxation, PMR may indirectly improve mood, enhance sleep quality, and increase willingness to engage in physical activity or therapeutic exercise. Improved psychological well-being may, in turn, further reduce pain perception through bidirectional interactions between emotional states and pain processing pathways. Although these outcomes were not the primary focus of the present study, they represent important avenues for future research.

The large and consistent effect observed also raises important questions regarding the optimal integration of PMR into multimodal osteoarthritis management programs. Current clinical guidelines increasingly emphasize the importance of patient education, self-management strategies, and non-pharmacological interventions alongside medical treatment. PMR aligns well with these principles, as it empowers patients with a self-administered tool that can be used flexibly and repeatedly without external supervision. Video-based PMR could be incorporated into digital health platforms, rehabilitation apps, or telehealth services.

Effect of the Intervention on Sleep Quality

In addition to pain reduction, this study found that video-based progressive muscle relaxation (PMR) produced an even slightly greater effect on sleep quality than on pain intensity, with a large effect size of r = 0.94. The mean improvement in Pittsburgh Sleep Quality Index (PSQI) scores in the intervention group (2.70 ± 1.75) substantially exceeded that of the control group (1.00 ± 0.00), indicating a clinically meaningful enhancement in sleep outcomes attributable to the intervention. Furthermore, post-intervention PSQI scores in the intervention group approached the threshold for better sleep quality (9.60 ± 1.75), whereas the control group remained within the range of clinically significant sleep disturbance (11.10 ± 1.40). These findings suggest that PMR delivered through a video-based format may be particularly effective in addressing sleep-related difficulties among patients with osteoarthritis, a population in which sleep disturbance is both highly prevalent and often under-treated.

The relationship between pain and sleep disturbance in osteoarthritis is widely recognized as bidirectional and self-perpetuating. Chronic joint pain interferes with both sleep initiation and sleep maintenance, leading to frequent nocturnal awakenings, reduced slow-wave sleep, and non-restorative sleep experiences. In turn, insufficient or fragmented sleep exacerbates pain perception by lowering pain thresholds and amplifying central sensitization. Neurobiological mechanisms underlying this relationship include dysregulation of descending inhibitory pain pathways, heightened sympathetic nervous system activity, and increased production of pro-inflammatory cytokines such as interleukin-6 and tumor necrosis factor-α. Kim et al. (2022) reported that patients with osteoarthritis who experience poor sleep quality are at greater risk of more severe pain, reduced physical functioning, and diminished quality of life, underscoring the clinical importance of addressing sleep as a core component of osteoarthritis management rather than as a secondary symptom.

Progressive muscle relaxation may help disrupt this pain–poor sleep–pain cycle by inducing physiological and psychological states that are conducive to restorative sleep. The technique involves the systematic tensing and relaxing of major muscle groups, which enhances bodily awareness and facilitates the release of accumulated muscular tension (Mirzanah et al, 2020). Through repeated practice, PMR activates the parasympathetic nervous system, leading to reductions in heart rate, blood pressure, and respiratory rate, as well as decreased levels of cortisol and other stress hormones. These

physiological changes are accompanied by reductions in cognitive and emotional arousal, which are key contributors to insomnia and delayed sleep onset in individuals experiencing chronic pain. By creating a calm pre-sleep state, PMR may directly improve sleep latency, sleep efficiency, and subjective sleep quality (Chegeni et al, 2018).

The use of a video-based format may further enhance the effectiveness of PMR by providing standardized guidance, visual cues, and a sense of structured support, particularly for older adults who may have difficulty learning relaxation techniques through written instructions alone. Video delivery also allows for repeated use at home, promoting self-management and adherence without increasing the burden on healthcare providers (Harorani et al, 2020). In this context, the observed improvements in PSQI scores suggest that participants were able to integrate PMR into their nightly routines, leading to cumulative benefits over time. The relatively large standard deviation observed in the intervention group may reflect individual differences in baseline sleep disturbance, engagement with the intervention, or responsiveness to relaxation techniques, which warrants further exploration in future studies.

The findings of the present study are consistent with previous research demonstrating the positive effects of PMR on sleep quality among individuals with chronic and musculoskeletal conditions. Mashhadi-Naser et al. (2024) reported significant improvements in sleep duration, sleep efficiency, and overall PSQI scores following a structured PMR program in patients with chronic pain conditions. Similarly, Hakverir et al. (2024) found that PMR significantly reduced insomnia severity and nighttime awakenings in individuals with musculoskeletal disorders, suggesting that the benefits of PMR on sleep may generalize across different pain-related populations. The convergence of these findings strengthens the evidence base supporting PMR as a non-pharmacological intervention for sleep disturbance in chronic pain contexts.

Notably, the greater effect observed on sleep quality compared with pain intensity in the present study suggests that PMR may primarily influence sleep-related processes, with subsequent secondary effects on pain. Improved sleep may enhance pain tolerance, reduce fatigue, and improve mood, all of which can contribute to a lower subjective experience of pain during waking hours. This temporal and mechanistic pathway aligns with emerging models of pain management that emphasize sleep as a modifiable upstream factor in the pain experience. Rather than viewing pain reduction as the sole or primary outcome, such models advocate for a more holistic approach that targets interconnected domains, including sleep, psychological well-being, and daily functioning (Aksu et al, 2018).

From a clinical and nursing perspective, these findings have important implications. Nurses play a central role in patient education, symptom management, and the implementation of non-pharmacological interventions. Incorporating PMR into routine nursing care for patients with osteoarthritis may offer a low-cost, low-risk strategy to improve sleep quality while simultaneously contributing to pain relief. Given the limitations and potential adverse effects of long-term pharmacological treatments for both pain and sleep disturbances, non-invasive interventions such as PMR are particularly appealing for older adults and those with multiple comorbidities. Moreover, video-based PMR interventions can be easily disseminated in clinical and community settings, supporting continuity of care beyond hospital or clinic visits.

The present study provides evidence that video-based progressive muscle relaxation is not only effective in reducing pain intensity but may exert an even stronger impact on sleep quality among patients with osteoarthritis. By improving sleep, PMR may indirectly attenuate pain and enhance overall functioning, thereby addressing two interrelated and clinically significant symptoms simultaneously. These findings support the view that nursing interventions for patients with osteoarthritis should target sleep quality alongside pain as equally important clinical outcomes. Future research should explore the long-term effects of PMR, identify factors that predict individual responsiveness, and examine the integration of PMR with other behavioral and rehabilitative strategies to optimize outcomes for this population.

A key strength of this study lies in the use of video-based progressive muscle relaxation as the intervention modality. This approach addresses common challenges in nursing practice, including limited time, workforce constraints, and difficulties in sustaining patient education. Video-based interventions enable patients to perform relaxation exercises independently, repeatedly, and consistently, thereby enhancing adherence and the internalization of self-care behaviors.

This approach is particularly relevant in primary healthcare and community settings, including Pontianak City and the broader West Kalimantan region, where healthcare resources may be limited relative to service demands. Consistent with the findings of Patten et al. (2022) and Lawford et al. (2024), digital interventions have been shown to be effective self-management strategies for chronic diseases, including osteoarthritis, and may reduce long-term dependence on pharmacological therapies. From a nursing perspective, video-based progressive muscle relaxation can be positioned as an evidence-based, safe, low-cost, and easily integrated independent nursing intervention that aligns with the holistic nursing paradigm addressing physical, psychological, and behavioral dimensions of care.

Limitations and Implications for Future Research: Despite the strong findings, this study has several limitations. The relatively short duration of the intervention limits the ability to assess long-term effects. Additionally, the use of subjective measurement instruments may introduce response bias. Future studies are recommended to evaluate the long-term effectiveness of video-based progressive muscle relaxation, assess its impact on joint function and overall quality of life, and combine subjective measures with objective physiological or functional assessments.

CONCLUSION

Video-based progressive muscle relaxation was shown to be effective in reducing pain intensity and improving sleep quality among patients with osteoarthritis. The intervention group demonstrated statistically and clinically greater improvements than the control group, with large effect sizes observed for both outcomes. These findings indicate that video-based progressive muscle relaxation is a practical, safe, and easily implemented non-pharmacological intervention that can be incorporated into nursing care to support self-management in patients with osteoarthritis, particularly in the management of chronic pain and sleep disturbances.

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CONFLICTS OF INTEREST:

Conflicts of Interest: The authors declare no conflicts of interest related to this study.

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