The Effect of Progressive Muscle Relaxation Technique on Pain

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ABSTRACT

Pain is a common clinical problem that can be managed through both pharmacological and non-pharmacological approaches, including progressive muscle relaxation. This study aimed to examine the effect of progressive muscle relaxation technique on pain among patients in the Fatmawati Ward of RSUD Sekarwangi. A pre-experimental study with a one-group pretest–posttest design was conducted involving 25 respondents selected through purposive sampling, consisting of patients experiencing mild to moderate pain. Progressive muscle relaxation was administered once daily for approximately 15–20 minutes over the intervention period. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the intervention, and data were analyzed using the Wilcoxon Signed Rank Test. The results showed that prior to the intervention, most patients experienced moderate pain (84%), while after the intervention all patients (100%) reported mild pain. Statistical analysis revealed a significant difference in pain levels before and after the intervention ($p = 0.001; < 0.05$). These findings indicate that progressive muscle relaxation is effective in reducing pain among hospitalized patients. This technique can be considered a complementary nursing intervention in hospital pain management, and future studies are recommended to involve larger samples, control groups, and longer follow-up periods to evaluate its long-term effectiveness and broader clinical applications.

Keywords: progressive muscle relaxation, pain, patients, Numeric Rating Scale.

INTRODUCTION

Health is a fundamental component that determines an individual's quality of life, particularly among hospitalized patients with complex medical conditions. Hospitals, as advanced healthcare facilities, play a crucial role in managing patients with acute and chronic illnesses, including pulmonary disorders that often require intensive and invasive care (Kasan et al., 2023). Patients treated in pulmonary care units frequently experience pain resulting from the disease process itself as well as from diagnostic and therapeutic procedures (Wijaya & Nurhidayati, 2020).

Pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Ghozhdi et al., 2022). In pulmonary patients, pain commonly occurs following procedures such as chest tube insertion, bronchoscopy, and thoracic surgery (Tyastuti et al., 2025). Pain related to thoracic procedures may restrict chest expansion and

impair effective coughing, which can interfere with respiratory function and delay recovery. If pain is not adequately managed, it may lead to adverse physiological responses such as increased blood pressure, heart rate, and respiratory rate (Brunner & Suddarth, 2015). In addition, unmanaged pain can cause psychological disturbances including anxiety, sleep problems, and reduced comfort during hospitalization (Ramli, 2025).

Pain management in clinical settings is commonly achieved through pharmacological interventions, particularly the administration of analgesic medications. Although effective, pharmacological therapies are often associated with side effects such as nausea, vomiting, constipation, dizziness, and the risk of drug dependence when used for prolonged periods (Malinda & Wulandari, 2022). These limitations highlight the importance of integrating non-pharmacological approaches as complementary strategies to optimize pain control while minimizing adverse effects.

One non-pharmacological intervention that has gained attention in nursing practice is Progressive Muscle Relaxation (PMR). Progressive muscle relaxation is a technique developed by Edmund Jacobson that involves systematically tensing and relaxing specific muscle groups to induce physical and psychological relaxation (Nurfitriani et al., 2025). Compared with other non-pharmacological interventions, PMR is simple to perform, does not require special equipment, and can be easily taught and guided by nurses. Physiologically, PMR reduces sympathetic nervous system activity and decreases muscle tension, which contributes to pain reduction (Irli, 2021). Previous studies have shown that PMR is effective in reducing pain intensity and improving patient comfort in various clinical conditions (Hasanuddin & Purnama, 2022).

Several studies on progressive muscle relaxation have focused on postoperative patients, elderly populations, or individuals with chronic musculoskeletal disorders. However, evidence regarding the application of PMR among hospitalized pulmonary patients, particularly those experiencing pain related to invasive respiratory procedures, remains limited.

Based on preliminary observations in the Fatmawati Ward of Sekarwangi Regional General Hospital, many patients continued to report moderate to severe pain despite receiving pharmacological analgesics. Furthermore, the routine application of progressive muscle relaxation by nurses has not been consistently implemented or integrated into standard nursing care protocols (Rahayu et al., 2022).

Therefore, this study aims to examine the effect of progressive muscle relaxation technique on pain among patients in the Fatmawati Ward of Sekarwangi Regional General Hospital. This research is expected to contribute to evidence-based nursing practice by providing empirical evidence supporting progressive muscle relaxation as a safe, effective, and feasible complementary intervention for pain management in pulmonary patients.

METHODS

This study employed a quantitative pre-experimental design using a one-group pretest–posttest approach to examine the effect of progressive muscle relaxation on pain among patients in the Fatmawati Ward of Sekarwangi Regional General Hospital. This design was selected to evaluate changes in pain intensity before and after the intervention within the same group of participants (Sugiyono, 2022).

The study population consisted of hospitalized patients receiving treatment in the Fatmawati Ward during the data collection period. The sample size of 25 respondents was determined based on the availability of eligible patients during the study period and the minimum sample requirement for nonparametric statistical analysis in pre-experimental studies. A purposive sampling technique was used to recruit participants who met the inclusion criteria (Arikunto, 2019).

Inclusion criteria were patients who experienced mild to moderate pain as assessed using the Numeric Rating Scale, were conscious, cooperative, and willing to participate by providing informed consent. Mild pain was defined as an NRS score of 1-3, while moderate pain was defined as an NRS score of 4-6. Patients with severe acute pain requiring immediate pharmacological intervention, cognitive impairment, neuromuscular disorders, or major postoperative conditions were excluded from the study.

The respondents had varying medical diagnoses related to pulmonary conditions and medical procedures, including pain following diagnostic or therapeutic interventions. Differences in medical diagnoses and clinical conditions were recognized as potential confounding factors that might influence pain perception. These factors were considered during data interpretation and are discussed further in the discussion section.

Progressive muscle relaxation was administered as the intervention in this study. The technique was performed once daily for approximately 15-20 minutes per session. The intervention was guided and supervised by trained nurses who had been instructed in the standard procedure of

progressive muscle relaxation. The technique involved sequential tensing and relaxing of major muscle groups, starting from the lower extremities and progressing to the upper body, while encouraging slow and deep breathing to enhance relaxation.

Data were collected using two instruments. An observation checklist was used to ensure consistent implementation of the progressive muscle relaxation procedure. Pain intensity was measured using the Numeric Rating Scale before the intervention (pretest) and after the intervention (posttest). The Numeric Rating Scale is a standardized instrument with established validity and reliability for pain assessment.

Statistical analysis was conducted using descriptive and inferential methods. Descriptive statistics were used to summarize respondent characteristics, including age, gender, and pain category. Prior to hypothesis testing, data normality was assessed. Because pain score data were not normally distributed, changes in pain intensity before and after the intervention were analyzed using the Wilcoxon Signed Rank Test. A significance level of 0.05 was applied to determine statistical significance.

This study acknowledges the limitation of the pre-experimental design, particularly the absence of a control group. Without a comparison group, causal inference is limited, and external factors such as disease progression or concurrent treatments may have influenced the outcomes. Nevertheless, this design was considered appropriate for preliminary evaluation of the effectiveness of progressive muscle relaxation in a clinical setting.

This research received ethical clearance from the Health Research Ethics Committee of the Faculty of Health Sciences, Muhammadiyah University of Sukabumi, with approval number: 109/KET/KE-FKES/I/2025. All participants gave informed consent, and data confidentiality was strictly maintained.

RESULTS

The research results can be seen in the table below:

Table 1. Distribution of Respondents' Characteristics (n=25)

Characteristic	Frequency (f)	Percentage (%)
Gender		
Male	12	48
Female	13	52

The distribution of respondent characteristics is presented in Table 1. Based on gender, the majority of respondents were female, with 13 participants (52%), while 12 participants (48%) were male. This distribution indicates a relatively balanced proportion of male and female patients in the Fatmawati Ward during the study period. Gender differences are considered relevant in pain-related studies, as biological and psychological factors may influence pain perception and response to interventions.

In addition, the characteristics of respondents based on age were presented using descriptive statistical analysis, since the data are numerical. A complete overview is presented in Table 2 below:

Table 2. Descriptive Statistics Based on Age (n = 25)

Characteristic	N	Minimum	Maximum	Mean
Age (years)	25	32	48	42.80

Respondent characteristics based on age are summarized in Table 2. The descriptive analysis shows that respondents' ages ranged from 32 to 48 years, with a mean age of 42.8 years. This age range reflects middle-aged adults, a group that may experience changes in pain perception and physical tolerance due to physiological aging processes.

Table 3. Frequency Distribution of Pain Levels (n = 25)

Measurement	Mild		Moderate		Severe	
	f	%	f	%	f	%
Before	4	16	21	84	0	0
After	25	100	0	0	0	0

The distribution of pain levels before and after the progressive muscle relaxation intervention is shown in Table 3. Prior to the intervention, most respondents experienced moderate pain, with 21 participants (84%), while 4 participants (16%) reported mild pain. After the intervention, all respondents (100%) reported mild pain, and none experienced moderate or severe pain.

Before conducting the bivariate analysis, a normality test was performed to determine whether the pain data before and after the intervention were normally distributed. The results of the Kolmogorov-Smirnov test are presented in Table 4 below:

Table 4. Normality Test Results

Measurement	Kolmogorv-Smirnov		Conclusion
	Statistic	Sig.	
Pretest	0.506	0.001	Abnormal
Posttest	0.298	0.001	Abnormal

The results of the Kolmogorov-Smirnov test showed a significance value (Sig.) of 0.001 (< 0.05) for both the pre-intervention and post-intervention measurements. This indicates that the data are not normally distributed; therefore, the analysis of differences in pain levels was conducted using the nonparametric Wilcoxon Signed Ranks Test.

Tabel 5. Uji Wilcoxon *Signed Ranks Test* for Pain Differents

		N	Sig. (2-tailed)
Posttets pain-pretest pain	*Negative Ranks*	21[a]	0.001
	Positive Ranks	0[b]	
	Ties	4[c]	
	Total	25	

The results of the Wilcoxon Signed Ranks Test are presented in Table 5. Of the 25 respondents, 21 experienced a decrease in pain levels after the intervention, while no respondents showed an increase in pain. Four respondents had unchanged pain levels before and after the intervention. The test yielded a significance value of 0.001 ($p < 0.05$), indicating a statistically significant difference in pain intensity before and after the progressive muscle relaxation intervention.

DISCUSSION

Respondent Characteristics Overview

The characteristics of respondents in this study included gender and age, which are known to influence pain perception and response to pain management interventions. The findings showed that slightly more than half of the respondents were female. Women are generally reported to utilize healthcare services more frequently, which may explain their higher representation in this study (Hidayat et al., 2025). In the context of pain, female patients often report higher pain sensitivity, which may affect baseline pain levels prior to intervention (Herawati et al., 2021).

Although this study did not specifically analyze pain reduction based on gender, the overall decrease in pain levels after progressive muscle relaxation suggests that this intervention was effective across both male and female respondents. Previous studies indicate that non-pharmacological interventions such as progressive muscle relaxation can be beneficial regardless of gender, although individual pain perception may vary (Ariawan et al., 2025). Understanding these variations allows nurses to provide more individualized pain management strategies in clinical practice (Yoo et al., 2022).

With regard to age, respondents were predominantly middle-aged adults. This age group may experience alterations in pain perception due to physiological changes associated with aging. However, in this study, age-related factors did not appear to hinder the effectiveness of progressive muscle relaxation, suggesting that the technique is suitable for adult patients within this age range. Progressive muscle relaxation has been shown to be adaptable and effective across various adult age groups when properly guided (Aziz et al., 2025).

Pain Levels Before and After Progressive Muscle Relaxation

The findings demonstrated that prior to the intervention, most respondents experienced moderate pain, while after the intervention all respondents reported pain levels within the mild category. This indicates a substantial reduction in pain intensity following the application of progressive muscle relaxation. Similar reductions in pain levels have been reported in previous studies involving different patient populations (Muflihah & Sari, 2022).

Physiologically, progressive muscle relaxation reduces sympathetic nervous system activity and enhances parasympathetic responses, leading to decreased muscle tension and improved relaxation. This mechanism supports the reduction of pain perception through increased endorphin release, which functions as the body's natural analgesic (Fudori & Inayati, 2021). In addition, the relaxation response generated by this technique helps patients shift attention away from pain, thereby improving comfort during hospitalization (Areva et al., 2025).

The Effect of Progressive Muscle Relaxation on Pain Among Patients

The Wilcoxon Signed Ranks Test results showed a statistically significant reduction in pain intensity following the intervention, with the majority of respondents experiencing decreased pain levels. However, a small proportion of respondents (16%) did not show changes in pain intensity after the intervention. This lack of response may be influenced by individual factors such as differences in pain tolerance, psychological state, underlying medical conditions, or

concurrent use of analgesic medications, which were not fully controlled in this study (Dewiyanti. et al., 2021).

Variations in response to progressive muscle relaxation have been reported in previous research, indicating that patient characteristics such as emotional state, prior experience with relaxation techniques, and severity of the underlying condition may affect outcomes (Simbung et al., 2022). Despite these variations, no respondents experienced an increase in pain, indicating that the intervention is safe and well-tolerated.

These findings strengthen existing evidence that progressive muscle relaxation is an effective and practical non-pharmacological intervention in clinical nursing practice. To enhance its clinical application, progressive muscle relaxation could be incorporated into standard hospital pain management protocols as a complementary therapy alongside pharmacological treatment. Nurses may implement this technique as part of routine nursing care, particularly for patients experiencing mild to moderate pain, to improve comfort and support recovery during hospitalization (Syokumawena. et al., 2022).

CONCLUSION

This study demonstrates that progressive muscle relaxation is effective in reducing pain levels among patients in the Fatmawati Ward of Sekarwangi Regional General Hospital. Based on the analysis of 25 respondents, the Wilcoxon Signed Ranks Test showed a significant difference in pain intensity before and after the intervention, with a p-value of 0.001 (< 0.05). Following the application of progressive muscle relaxation, all participants experienced a reduction in pain to the mild category, indicating the clinical potential of this technique as a non-pharmacological pain management strategy for hospitalized patients.

From a practical perspective, progressive muscle relaxation can be easily integrated into routine nursing care as a complementary intervention alongside pharmacological therapy, particularly for patients experiencing mild to moderate pain. However, the findings of this study should be interpreted with caution due to certain limitations, including the relatively small sample size and the absence of a control group, which may limit the generalizability of the results. Future studies involving larger samples, controlled designs, and diverse clinical settings are recommended to further validate the effectiveness of progressive muscle relaxation and support its broader implementation in hospital pain management protocols.

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LIMITATION

This study has several limitations that should be considered when interpreting the findings. First, the relatively small sample size of 25 respondents may limit the generalizability of the results to broader hospital patient populations. Future studies involving larger and more diverse samples are recommended to enhance external validity and allow for stronger generalization of the findings.

Second, the short observation period, which was limited to data collection between September-November 2025, did not allow for assessment of the long-term effectiveness of progressive muscle relaxation. Longer follow-up periods are needed in future research to evaluate the sustainability of pain reduction over time.

Third, pain intensity was assessed using the Numeric Rating Scale, a subjective instrument that relies on individual patient perception. Although the NRS is standardized and widely used, variability in pain reporting may still occur. Future studies could minimize potential bias by ensuring consistent assessor training and by combining subjective pain measures with objective indicators, such as physiological responses, to strengthen outcome assessment.

Despite these limitations, this study contributes valuable preliminary evidence supporting the effectiveness of progressive muscle relaxation as a non-pharmacological intervention for pain management among hospitalized patients and provides a foundation for further research and clinical application in nursing practice.

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