Original Article

Effectiveness Of Movement-Based Relaxation And Positive Affirmation Therapy in Reducing Anxiety And Pain Among Cancer Patients: A Quasi-Experimental Study

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ABSTRACT

Background: Cancer patients frequently experience anxiety and pain that may negatively affect treatment adherence and quality of life. Complementary non-pharmacological interventions integrating relaxation, physical movement, and positive affirmation have shown potential benefits in symptom management. However, most previous studies evaluated relaxation, movement, or affirmation separately, and evidence regarding integrated mind–body interventions remains limited. This study aimed to examine the effectiveness of movement-based relaxation and positive affirmation therapy in reducing anxiety and pain among cancer patients.

Methods: A quasi-experimental pretest–posttest control group design was conducted in an oncology inpatient unit of a tertiary hospital in Indonesia. This study adhered to the TREND guideline. The independent variable was movement-based relaxation combined with positive affirmation therapy, while the dependent variables were anxiety and pain levels. Forty-eight adult cancer patients were recruited using consecutive sampling and allocated into intervention (n = 24) and control groups (n = 24). The intervention group received six sessions (three times per week for two weeks; 25–30 minutes per session), while the control group received standard hospital care. Data were analyzed using the Wilcoxon Signed Rank Test and Mann–Whitney U Test.

Results: Anxiety scores significantly decreased in the intervention group. Anxiety decreased from 61.3 ± 6.2 to 47.4 ± 7.1, and pain decreased from 6.9 ± 1.2 to 4.1 ± 0.9 in the intervention group. The mean difference in anxiety was 14.25 ± 5.18 ($p < 0.001$; 95% CI 11.82–16.68), while pain showed a mean difference of 2.67 ± 0.98 ($p < 0.001$; 95% CI 2.18–3.16), compared to the control group. Large effect sizes were observed for anxiety ($d = 2.68$) and pain ($d = 2.54$).

Conclusion: Movement-based relaxation and positive affirmation therapy effectively reduced anxiety and pain among cancer patients. This integrated mind–body intervention represents a feasible complementary nursing strategy to enhance holistic oncology care.

Keywords: Anxiety; Pain; Cancer; Complementary Therapies; Relaxation Therapy; Mind-Body Therapies.

Implications for Practice:

- Movement-based relaxation therapy improves patient symptom management through evidence-based complementary nursing care.
- The intervention supports updating oncology nursing protocols toward holistic mind–body symptom management.
- The therapy provides a low-cost and culturally adaptable intervention suitable for resource-limited clinical settings

Introduction

Anxiety and pain are two of the most frequently experienced symptoms among patients with cancer during treatment. These symptoms may arise due to the disease itself or as side effects of therapy such as chemotherapy, radiotherapy, and surgical procedures. According to data from the International Agency for Research on Cancer (International Agency for Research on Cancer, 2023), approximately 70–80% of cancer patients experience pain with varying levels of severity, while 30–50% report moderate to severe anxiety during treatment (Faller & al., 2022 ; Bray et al., 2024). The coexistence of anxiety and pain not only causes physical and emotional distress but also affects treatment adherence, immune function, and overall quality of life (Morikawa & Kajiwara, 2023; Snijders et al., 2023).

Prevalence data in Indonesia also indicate an alarming trend. According to the Global Cancer Observatory (GLOBOCAN) 2022, Indonesia recorded more than 408,661 new cancer cases with 242,988 deaths, making it one of the countries with the highest cancer burden in Southeast Asia (Ministry of Health of the Republic of Indonesia, 2023). Data from the 2018 National Basic Health Research (RISKESDAS) reported a cancer prevalence of 1.4% of the total population, with a tendency to increase annually. In South Sulawesi Province, cancer prevalence has also risen, with breast cancer being the most common type. Regional data indicated 1,220 newly diagnosed cases across several districts/cities in 2020, and 17,484 reported cancer cases in 2021, accompanied by an increasing mortality rate. Cancer symptom management remains particularly challenging in Low- and Middle-Income Countries (LMICs), including Indonesia, where access to psychosocial services, pain specialists, and integrative oncology programs is limited. In contrast, high-income countries commonly provide multidisciplinary supportive care teams and structured psycho-oncology services that integrate pharmacological and non-pharmacological approaches. In many Indonesian hospital settings, symptom management still relies predominantly on pharmacological treatment due to limited resources, high patient loads, and insufficient complementary care protocols. Consequently, scalable, low-cost, and nurse-led complementary interventions are urgently needed to address the unmet psychological and physical symptom burden among cancer patients in LMIC contexts.

Anxiety among cancer patients may arise due to uncertainty regarding treatment outcomes, adverse effects of therapy, or fear of disease recurrence. Meanwhile, pain is commonly caused by tumor progression, tissue inflammation, or chemotherapy-induced peripheral nerve damage (Snijders & al., 2023). These conditions indicate that the management of pain and anxiety in cancer patients requires a holistic approach that addresses both physiological and psychological aspects (Maindet et al., 2019).

Pharmacological management of pain and anxiety typically involves the use of opioid analgesics, non-opioid agents, and anxiolytics (Guo et al., 2023). Although effective, prolonged use of these medications may result in side effects such

as dependency, constipation, sedation, sleep disturbances, and impaired organ function (Moser & al., 2024). Therefore, non-pharmacological complementary interventions are needed to help reduce symptoms more optimally while supporting medical treatment without introducing additional adverse effects (Dyer et al., 2018).

Previous studies have shown that individual interventions, such as physical exercise, relaxation techniques, or positive affirmations, can reduce psychological and physiological symptoms in cancer patients. For instance, light physical activity has been associated with reductions in fatigue and pain (Guo et al., 2023)., relaxation techniques have been shown to lower stress and anxiety (Chui et al., 2021), and positive affirmations have been associated with improved self-confidence and optimism (Hashemzadeh & al., 2020). However, these techniques typically target a single physical or psychological dimension and therefore produce partial and short-term effects. Consequently, a combination of interventions that integrates both physical and psychological elements is considered more effective for holistic symptom reduction, as it simultaneously modulates stress responses through neurophysiological and cognitive mechanisms (Martini & al., 2024).

One promising complementary approach is movement-based relaxation and affirmation therapy. This intervention integrates physical and psychological elements by promoting body–mind balance through gentle therapeutic movements, breathing relaxation techniques, and positive affirmations. Gentle movement helps reduce muscle tension, improve blood circulation, and activate the parasympathetic nervous system, resulting in relaxation and reduced pain perception (Guo et al., 2023; Moser et al., 2024). Meanwhile, positive affirmations work psychologically by enhancing self-efficacy, reducing negative thoughts, and fostering acceptance of the disease (Hashemzadeh & al., 2020; Chen & al., 2025). The integration of these three techniques is considered highly relevant for cancer patients as it involves complementary neurophysiological mechanisms, including parasympathetic activation, endorphin release, and cognitive regulation of stress (Moser et al., 2024; Chen & al., 2025).

The selection of a movement-based approach combined with positive affirmation is based on the interplay between physiological and psychological factors in individuals with cancer. Anxiety can exacerbate pain perception by increasing sympathetic nervous system activity and muscle tension, while chronic pain may heighten emotional distress and intensify anxiety (Chui et al., 2021). Thus, combining movement, relaxation, and positive affirmation is expected to produce a synergistic effect in reducing both symptoms simultaneously. From a neurophysiological perspective, anxiety activates the sympathetic nervous system, leading to increased muscle tension, elevated cortisol secretion, and heightened nociceptive sensitivity. Persistent sympathetic activation may amplify central pain processing pathways, thereby intensifying pain perception. Conversely, chronic pain can reinforce emotional distress, creating a bidirectional cycle of anxiety and pain amplification. Therefore, interventions that promote parasympathetic activation and cognitive regulation are theoretically positioned to disrupt this maladaptive cycle. This approach aligns with the Roy Adaptation Model, which conceptualizes individuals as adaptive systems responding to environmental stimuli through two primary coping subsystems: the regulator and the cognator. The regulator subsystem operates through physiological mechanisms such as

neural, chemical, and endocrine responses, while the cognator subsystem involves cognitive-emotional processes including perception, judgment, and learning. Movement and relaxation techniques primarily target the regulator mode by modulating autonomic balance and reducing physiological stress responses. In contrast, positive affirmations engage the cognator mode by reshaping cognitive appraisal, strengthening self-efficacy, and promoting adaptive meaning-making. By simultaneously addressing both subsystems, the intervention is theoretically positioned to enhance adaptive responses to cancer-related stressors. (Roy & Andrews, 2016).

Based on the aforementioned rationale, this study aims to analyze the effectiveness of a movement-based relaxation and affirmation intervention in reducing anxiety and pain among cancer patients. Beyond evaluating symptom reduction, this study contributes to the development of holistic oncology nursing interventions that integrate physiological and cognitive components within a structured protocol. To our knowledge, no prior study has evaluated an integrated movement–relaxation–affirmation protocol delivered as a structured bedside nursing intervention in inpatient oncology settings.

Methods

Study Design

This study employed a quasi-experimental pretest–posttest control group design. The study was conducted in an oncology inpatient unit of a Type A referral hospital in Indonesia from September to October 2025. This study adhered to the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) guideline to ensure transparent reporting of nonrandomized intervention studies. (Polit & Beck, 2021).

Participants

The study population consisted of adult cancer patients hospitalized in the oncology inpatient ward of a referral hospital in Indonesia who experienced anxiety and pain during treatment. Participants were recruited consecutively during the study period.

Inclusion criteria were: (1) aged 18–65 years; (2) hospitalized with a confirmed diagnosis of cancer (stages I–IV); (3) conscious, verbally communicative, and cooperative; (4) anxiety score of ZSAS > 45 (mild to severe); (5) pain score of NRS ≥ 4 (moderate to severe); and (6) willing to participate by signing informed consent. Exclusion criteria included severe cognitive impairment or psychiatric disorders, use of high-dose sedatives or anxiolytics during the study period, unstable clinical condition, severe physical limitations preventing participation in light movement activities, or inability to complete the intervention sessions.

During recruitment, 56 eligible patients were assessed. Eight patients declined participation due to fatigue or personal reasons. A total of 48 participants were enrolled (participation rate: 85.7%) and allocated into the intervention group (n = 24) and control group (n = 24). Allocation was conducted using a quasi-random systematic assignment, in which patients with odd recruitment numbers were assigned to the control group and even numbers to the intervention group. The recruitment and allocation process is illustrated in Figure 1. Non-participation bias was minimized by offering inclusion consecutively to all eligible patients.

The sample size was calculated based on the comparison of two independent means using $\alpha = 0.05$ and $\beta = 0.20$, with an estimated standard deviation of 3.8 and a minimum detectable mean difference of 3.4 derived from previous research. The minimum required sample was 19

participants per group; after adding 20% to account for potential dropout, the final sample was set at 24 per group (total n = 48), providing an estimated statistical power of approximately 80%.

Instruments

Anxiety and pain were measured using standardized instruments that had undergone language adaptation procedures prior to data collection.

Anxiety

Anxiety was measured using the Zung Self-Rating Anxiety Scale (ZSAS), which consists of 20 items scored on a 4-point Likert scale. Total scores range from 20 to 80, with higher scores indicating greater anxiety severity. The interpretation is as follows: 20–44 (normal), 45–59 (mild anxiety), 60–74 (moderate anxiety), and 75–80 (severe anxiety). For example, a participant scoring 52 would be categorized as experiencing mild anxiety.

The ZSAS instrument was translated into Indonesian using a forward–backward translation procedure. First, the original English version was translated into Indonesian by a bilingual expert. The translated version was then independently back-translated into English by another bilingual translator to ensure semantic equivalence. Discrepancies were discussed and resolved by the research team to maintain conceptual consistency.

Permission to use the ZSAS was obtained from the original instrument source. The Indonesian version demonstrated good internal consistency, with Cronbach's alpha coefficients reported above 0.85 in cancer populations, and 0.87 in previous validation studies.The instrument was administered through interviewer-assisted administration to ensure comprehension, particularly for participants experiencing fatigue or physical weakness.

Pain

Pain intensity was assessed using the Numerical Rating Scale (NRS), which ranges from 0 to 10, where 0 indicates no pain and 10 indicates the worst imaginable pain. Pain severity categories are defined as 1–3 (mild pain), 4–6 (moderate pain), and 7–10 (severe pain). For instance, a pain score of 6 indicates moderate pain.

The NRS was provided in Indonesian and verbally explained by the researcher to ensure standardized administration. The scale has demonstrated strong reliability in cancer populations, with a test–retest correlation coefficient of 0.94.

Both instruments were administered before (pretest) and after (posttest) the intervention period under standardized conditions.

Intervention (Optional)

The intervention group received movement-based relaxation and affirmation therapy for two consecutive weeks, delivered three times per week (total of six sessions). Each session lasted approximately 25–30 minutes and was conducted individually in the patient's hospital room.

The intervention consisted of three integrated components delivered sequentially within one continuous session: (1) gentle therapeutic movements, (2) guided breathing relaxation, and (3) structured positive affirmations. The session was structured as follows:

- Initial phase (5–7 minutes): gentle stretching and diaphragmatic breathing to reduce muscle tension and enhance oxygenation.
- Core phase (15–18 minutes): slow rhythmic movements synchronized with controlled breathing to promote parasympathetic activation and body awareness.
- Closing phase (approximately 5 minutes): structured positive

affirmations delivered through soft verbalization focused on self-acceptance, strength, and calmness (e.g., "I am strong and capable of facing this process," "My body is relaxed and comfortable").

The components were delivered integratively without rigid separation to maximize synergistic effects on mind–body balance and symptom reduction.

Intervention Provider Qualifications

The intervention was delivered directly by the principal researcher, a registered nurse currently enrolled in a Master of Nursing program. The intervention procedures were implemented strictly based on a structured Standard Operating Procedure (SOP) and an intervention manual developed from existing literature and evidence-based guidelines on relaxation, therapeutic movement, and positive affirmation techniques. Prior to data collection, the researcher conducted independent rehearsal sessions to ensure procedural consistency, clarity of instruction, and adherence to the predefined intervention protocol.

Fidelity Monitoring

To ensure intervention fidelity, a structured intervention checklist was developed based on the intervention protocol. Each session was documented using the checklist to confirm that all components (movement sequence, breathing technique, affirmation script, duration, and session flow) were delivered consistently. Adherence to session duration and sequence was monitored using a standardized session log. No protocol deviations were reported during the study period. The intervention protocol was compiled into a written manual detailing session structure, movement descriptions, breathing instructions, affirmation scripts, and safety precautions. This manual served as a standardized guide throughout the intervention process.

Safety Monitoring

Prior to each session, participants' general clinical conditions (blood pressure, level of fatigue, and pain tolerance) were assessed to ensure readiness for light movement activities. The intervention consisted only of low-intensity, non-strenuous movements designed for hospitalized patients. Sessions were immediately discontinued if participants reported dizziness, excessive fatigue, discomfort, or worsening pain. No adverse events were reported during the study.

Materials and Equipment

The intervention required minimal equipment, including a standard hospital bed or chair, a small pillow for positioning support if needed. No specialized devices were required.

The frequency of three sessions per week was selected based on previous evidence demonstrating that moderate frequency (2–3 sessions per week) effectively reduces anxiety and pain without increasing physical burden or reducing adherence (Guo et al., 2023; Moser et al., 2024). The integrated approach is supported by prior studies indicating that combining physical relaxation and cognitive affirmation provides synergistic benefits for emotional regulation and pain control in chronic conditions (Chui et al. (2021); Hashemzadeh & al. (2020). The control group received standard hospital care, including routine medical treatment, pharmacological pain management, and psychosocial support, without additional complementary intervention.

Data Collection

Data were collected twice: (1) pretest assessment conducted prior to the first intervention session, and (2) posttest assessment conducted after completion of the sixth intervention session (two-week period). Data collection was performed directly by the principal researcher, a registered nurse enrolled in a Master of Nursing program, who acted as the sole data collector to maintain procedural consistency. Prior to data collection, the researcher conducted structured preparation sessions to standardize administration procedures, ensure uniform explanation of questionnaire items, and minimize interviewer bias. Both instruments were administered using an interviewer-administered format to ensure participant comprehension, particularly for patients experiencing fatigue or physical discomfort. The researcher provided neutral clarification without leading responses to reduce measurement bias. All collected data were coded using unique identification numbers and entered into IBM SPSS Statistics version 29.0 for analysis. Double-entry verification was performed to ensure accuracy of data input. Electronic data files were stored in a password-protected computer accessible only to the research team, and hard-copy questionnaires were stored in a locked cabinet to maintain confidentiality. No missing data occurred during the study, as all participants completed both pretest and posttest assessments. If missing data had occurred, listwise deletion would have been applied during statistical analysis. The participant recruitment and allocation flow is presented in Figure 1. The figure has been revised to ensure visual consistency in font style, alignment, and arrow formatting in accordance with journal standards.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 29.0.2.0. Descriptive statistics were calculated to summarize respondent characteristics and study variables. Continuous variables were presented as mean ± standard deviation (SD), while categorical variables were presented as frequency and percentage. Baseline homogeneity between intervention and control groups was assessed using the Chi-square test for categorical variables and Levene's test for equality of variances for continuous variables. A p-value > 0.05 indicated no statistically significant baseline differences between groups. Normality of data distribution was examined using the Shapiro–Wilk test. If data were normally distributed ($p > 0.05$), parametric tests were applied, including the Paired t-test for within-group pre–post comparisons and the Independent t-test for between-group comparisons. If the assumption of normality was violated ($p < 0.05$), nonparametric tests were used, namely the Wilcoxon Signed-Rank Test for within-group comparisons and the Mann–Whitney U Test for between-group comparisons. Nonparametric tests were selected because anxiety and pain scores were not normally distributed and the sample size per group was relatively small ($n = 24$), which increases the risk of violating parametric assumptions. All statistical tests were two-tailed with a significance level set at $p < 0.05$. In addition to p-values, effect sizes (Cohen's d) were calculated to estimate the magnitude of intervention effects. Mean differences along with 95% confidence intervals (95% CI) were reported to provide precision estimates of the observed effects. No missing data occurred during the study, as all participants completed both pretest and posttest assessments. Therefore, no imputation procedures were required. If missing data had occurred, listwise deletion would have been applied.

Ethical Considerations

This study received ethical approval from the Health Research Ethics Committee (KEPK), Faculty of Nursing, Universitas Islam Sultan Agung (UNISSULA) Semarang (Approval No.: 1276/A.1-KEPK/FIK-SA/VIII/2025), issued on 21 August 2025. The study was conducted in accordance with the principles of the Declaration of Helsinki regarding research involving human participants. Prior to participation, all eligible patients received both verbal and written explanations concerning the study objectives, procedures, potential benefits, and minimal risks. Participants were informed of their right to refuse or withdraw from the study at any time without any consequences for their medical care. Written informed consent was obtained from all participants before data collection. To ensure confidentiality, each participant was assigned a unique identification code, and no personal identifiers were included in the data analysis or reporting. Data were used solely for research purposes and were not shared with unauthorized parties.

Results

A total of 48 respondents participated in the study, consisting of 24 respondents in the intervention group and 24 in the control group. Descriptive analysis showed that the mean age of respondents in the intervention group was 49.8 years, with the majority being female (70.8%), married (79.2%), and having completed senior high school education (37.5%). Most of them were housewives and self-employed (each 25%), and used NSAIDs (25%) and analgesics (20.8%) as adjunctive therapy (**Table 1**).

In the control group, the mean age was 43.9 years, with the majority being male (58.3%), married (62.5%), and also holding senior high school education (37.5%). The most common occupation was civil servant (25%), and the majority were using gabapentin (29.2%) and chemotherapy (25%) as supportive treatment.

Both groups were found to be statistically homogeneous ($p > 0.05$), as confirmed by Levene's test and Chi-square test for demographic variables, indicating comparability of baseline characteristics between groups.

Table 1. Respondent Characteristics (n = 48)

Characteristic	Category	Intervention Group		Control Group		Homogeneity Test (p-value)
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	
Age						
	31-40	5	20,8	6	25,0	0,128
	41–50	6	25,0	4	16,7	
	51–60	10	41,7	3	12,5	
	>60	3	12,5	1	4,2	
Sex						
	Male	7	29,2	14	58,3	0,067
	Female	17	70,8	10	41,7	
Marital Status						
	Married	19	79,2	15	62,5	0,248
	Single	5	20,8	6	25,0	
	Widow/Widower	0	0,0	3	12,5	
Educational Level						
	Primary School	2	8,3	2	8,3	0,999
	Junior High School	6	25,0	5	20,8	
	Senior High School	9	37,5	9	37,5	
	College/University	7	29,2	8	33,3	
Occupation						
	Housewife	6	25,0	6	25,0	0,336
	Entrepreneur	6	25,0	5	20,8	
	Private Employee	4	16,7	5	20,8	

Characteristic	Category	Intervention Group		Control Group		Homogeneity Test (p-value)
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	
	Civil Servant	5	20,8	3	12,5	
	Others	3	12,5	5	20,8	
Medication History						
	Mild Opioids	4	16,7	0	0,0	
	NSAIDs	6	25,0	3	12,5	
	Analgesics	5	20,8	5	20,8	0,524
	Gabapentin	4	16,7	7	29,2	
	Chemotherapy	4	16,7	6	25,0	
	Others	1	4,1	3	12,5	
Total		24	100	24	100	

Note: The mean age of respondents in the intervention group was approximately 49.8 years, with most being female (70.8%), married (79.2%), and holding a senior high school education (37.5%). In contrast, the control group had a mean age of 43.9 years, with the majority being male (58.3%), married (62.5%), and also educated at senior high school level (37.5%). Most participants were civil servants (25%) and were receiving gabapentin (29.2%) or chemotherapy (25%) as supportive therapy.

Homogeneity analysis was performed using the Chi-square test, where $p > 0.05$ indicates no statistically significant differences between groups. Based on the homogeneity test results (**Table 1**), there were no significant differences (p > 0.05) between the intervention and control groups in all demographic variables. This indicates that both groups had comparable baseline characteristics prior to intervention, supporting the validity of subsequent comparative outcome analysis.

Distribution and Comparison of Anxiety and Pain Levels

The analysis showed a significant reduction in the mean scores of anxiety and pain in the intervention group after receiving movement-based relaxation and affirmation therapy. In contrast, the control group did not demonstrate a statistically significant change..

Table 2 Mean Scores and Comparison of Anxiety and Pain Between Groups

Variable	Group	Pretest (Mean ± SD)	Posttest (Mean ± SD)	ΔMean	p-value (Within Group)	p-value (Between Groups)
Anxiety (ZSAS)	Intervention	61.3 ± 6.2	47.4 ± 7.1	-13.9	<0.001	<0.001
	Control	62.0 ± 5.9	60.4 ± 6.3	-1.6	0.231	
Pain (NRS)	Intervention	6.9 ± 1.2	4.1 ± 0.9	-2.8	<0.001	<0.001
	Control	6.8 ± 1.1	6.5 ± 1.0	-0.3	0.188	

Notes: The Wilcoxon Signed-Rank Test was used to assess changes within each group, while the Mann–Whitney U Test was used for between-group comparisons.

Table 2 shows that the intervention group experienced a reduction in mean anxiety scores of 13.9 points and a decrease in pain scores of 2.8 points following the intervention (p < 0.001). Meanwhile, the control group demonstrated only a slight and statistically insignificant reduction ($p > 0.05$). Between-group comparison also indicated a significant difference ($p <$ 0.001), confirming the effectiveness of the intervention on both measured variables.

Effect Size

Effect size analysis was conducted to determine the magnitude of the intervention's impact on changes in anxiety and pain levels. A Cohen's *d* value greater than 0.8 is considered strong, and the

results of this study demonstrated values above 2, indicating a very strong and clinically significant effect.

Table 3. Effect Size on Reduction of Anxiety and Pain

Variable	ΔMean Intervention	ΔMean Control	Effect Size (Cohen's d)	Interpretation
Anxiety (ZSAS)	-13.9	-1.6	2.68	Very Strong
Pain (NRS)	-2.8	-0.3	2.54	Very Strong

Cohen's *d* values of 2.68 for anxiety and 2.54 for pain indicate that the intervention has a very strong effect in reducing anxiety and pain levels among cancer patients. Clinically, these findings suggest that the application of a combined movement-based relaxation and affirmation therapy provides significant benefits and may be considered as a complementary nursing intervention in oncological practice (**Table 3**).

Table 4 Normality Test of Anxiety and Pain Scores (Shapiro-Wilk Test)

Variable	Group	Measurement	W	df	p-value	Interpretation
Pain	Control	Pre-test	0.923	24	0.069	Normal
	Control	Post-test	0.919	24	0.055	Normal
	Intervention	Pre-test	0.902	24	0.023	Not normal
	Intervention	Post-test	0.87	24	0.005	Not normal
Anxiety	Control	Pre-test	0.954	24	0.332	Normal
	Control	Post-test	0.944	24	0.195	Normal
	Intervention	Pre-test	0.954	24	0.33	Normal
	Intervention	Post-test	0.97	24	0.674	Normal

Normality testing was performed using the Shapiro–Wilk test because the sample size in each group was fewer than 50 participants. As shown in Table 4, anxiety scores in both groups at pre-test and post-test were normally distributed ($p > 0.05$). For pain scores, the control group demonstrated normal distribution at both measurements ($p > 0.05$), whereas the intervention group showed non-normal distribution at pre-test ($p = 0.023$) and post-test ($p = 0.005$). Given the presence of non-normal distribution in some variables, non-parametric statistical tests (Wilcoxon Signed-Rank Test and Mann–Whitney U Test) were applied for hypothesis testing to ensure appropriate analysis (**Table 4**).

Discussion

Effectiveness of Movement-Based Relaxation and Affirmation Therapy on Anxiety

This study demonstrated that movement-based relaxation combined with positive affirmation effectively reduced anxiety among patients with cancer. The findings are consistent with neurophysiological evidence indicating that rhythmic movement and controlled breathing activate the parasympathetic nervous system and suppress excessive sympathetic arousal (Guo et al., 2023). Reduced sympathetic activation contributes to decreased cortisol secretion and improved emotional regulation, thereby enhancing psychological stability.

In high-income countries, mind–body interventions such as mindfulness-based

stress reduction, yoga therapy, and progressive muscle relaxation have shown moderate effectiveness in reducing anxiety among oncology patients (Martini et al., 2024; Chui et al., 2021). However, these programs often require certified instructors, structured group sessions, or specialized facilities. In contrast, the present intervention was delivered individually at the bedside without additional equipment, making it more feasible for low- and middle-income countries (LMICs) such as Indonesia, where psychosocial oncology resources remain limited.

The addition of positive affirmation represents a key distinguishing component of this intervention. While many prior studies evaluated relaxation or movement independently, affirmation techniques enhance self-efficacy and perceived control, which are critical in chronic illness adaptation (Hashemzadeh et al., 2020; Chen et al., 2025). In the Indonesian cultural context, verbal affirmation and spiritually grounded self-strengthening practices are socially acceptable and aligned with collective coping traditions. This cultural congruence may increase patient receptivity and engagement, thereby amplifying therapeutic outcomes.

From a theoretical perspective, these findings reinforce the Roy Adaptation Model (Roy & Andrews, 2016). The relaxation component primarily stimulates the regulator subsystem through physiological modulation, whereas positive affirmation activates the cognator subsystem by influencing perception, coping, and meaning-making processes. Optimizing both subsystems simultaneously may explain the broader adaptive response observed in anxiety reduction.

Effectiveness of the Intervention on Pain Reduction

The significant reduction in pain supports the physiological and cognitive mechanisms underlying the intervention. Therapeutic movement improves peripheral circulation and stimulates endorphin release, which functions as a natural analgesic (Anshasi et al., 2023; Guo et al., 2023). This aligns with the gate control theory of pain, where non-nociceptive input modulates pain transmission pathways.

Controlled breathing reduces muscular tension and autonomic hyperactivation, both of which are associated with increased pain perception (Morikawa & Kajiwara, 2023). Furthermore, positive affirmation may alter pain appraisal by reducing catastrophic thinking and enhancing coping confidence (Hashemzadeh et al., 2020). These combined mechanisms address both the sensory and emotional dimensions of pain.

Studies conducted in high-resource oncology centers have reported beneficial effects of yoga-based and mindfulness-based interventions for cancer-related pain (Martini et al., 2024; Moser et al., 2024). However, such interventions may require structured programs and specialized personnel. The current therapy, by contrast, utilizes simple guided movement and affirmation techniques that can be integrated into routine nursing care without additional infrastructure. This characteristic makes it particularly relevant for implementation in LMIC healthcare systems.

Rather than treating anxiety and pain as separate symptoms, this intervention targets their bidirectional interaction. Anxiety increases sympathetic activation and muscle tension, which amplify pain perception, while chronic pain intensifies emotional distress (Chui et al., 2021). By promoting parasympathetic activation and cognitive regulation simultaneously, the therapy may disrupt this maladaptive cycle.

Implications and limitations

This study contributes conceptually to the theoretical understanding of integrated complementary interventions involving movement, relaxation, and affirmation in the management of anxiety and pain, particularly by highlighting the role of non-specific mechanisms such as emotional support, therapeutic interaction, and expectancy effects in shaping clinical outcomes. Scientifically, the findings suggest that intervention effectiveness is influenced not only by its core components but also by relational and psychosocial contexts of care delivery. However, several limitations should be acknowledged, including the use of a quasi-experimental design without full randomization, which may introduce selection bias and limit causal inference; reliance on self-reported measures that are subject to individual perception; a relatively short intervention period that restricts assessment of long-term sustainability; the potential influence of non-specific therapeutic factors; and the single-hospital setting, which may limit the generalizability of the findings to broader populations and healthcare contexts.

Relevance to Practice

This study highlights the practical relevance of integrating movement-based relaxation and positive affirmation therapy into routine oncology nursing care. As a structured, low-cost, and non-invasive intervention, it can be incorporated into standard anxiety and pain management protocols without requiring specialized equipment. The approach supports holistic, patient-centered care consistent with mind–body nursing principles (Chen et al., 2025) and offers a scalable complementary strategy for LMIC healthcare systems where psychosocial oncology services may be limited. By addressing physiological and psychological responses simultaneously, this intervention strengthens nursing contributions to comprehensive cancer care.

Conclusion

Movement-based relaxation combined with positive affirmation is an effective complementary nursing intervention for reducing anxiety and pain among patients with cancer. By integrating physiological regulation through movement and breathing with cognitive reinforcement through affirmation, this mind–body approach supports holistic symptom management in oncology care. The intervention is simple, low-cost, and feasible for implementation in routine clinical settings, particularly in resource-limited environments. These findings suggest that integrated mind–body nursing interventions represent practical and culturally adaptable strategies for oncology symptom management. Further randomized, multicenter trials with longer follow-up periods are warranted to strengthen causal evidence and evaluate long-term clinical sustainability.

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CrediT Authorship Contributions Statement

Muhamad Candra Romadon: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft.

Erna Rochmawati: Supervision, Validation, Writing, Review & Editing.

Conflicts of Interest

The authors declare that there is no conflict of interest.

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Supplementary Materials

Supplementary File S1: Research Instrument contains the full questionnaire used for data collection.

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