

# An interventional analysis of the combined effects of five-finger relaxation and aromatherapy on sleep quality among breast cancer patients

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## ABSTRACT

Sleep disturbances and anxiety are two common complaints experienced by breast cancer patients undergoing chemotherapy. Non-pharmacological approaches have emerged as important strategies to improve patients' overall quality of life in a holistic manner. This study aimed to evaluate the effectiveness of combining the five-finger relaxation technique and aromatherapy in improving sleep quality and reducing anxiety levels among breast cancer patients undergoing chemotherapy. A quasi-experimental design with a pretest-posttest control group approach was employed. A total of 30 participants were equally divided into two groups (intervention and control). The intervention was administered over a two-week period and consisted of five-finger relaxation training and the use of lavender essential oil aromatherapy before bedtime. The instruments used were the Pittsburgh Sleep Quality Index (PSQI) and the Hamilton Anxiety Rating Scale (HARS). The analysis revealed a significant decrease in PSQI scores ( $p = 0.021$ ) and HARS scores ( $p = 0.037$ ) in the intervention group, whereas no significant changes were observed in the control group. These findings indicate that the combined intervention is effective in improving sleep quality and reducing anxiety. This intervention is recommended as an applicable complementary therapy that can be integrated into nursing practice, particularly in supportive care for cancer patients.

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## INTRODUCTION

Breast cancer is one of the most significant public health concerns globally, particularly among women. According to the World Health Organization in 2022, breast cancer was the most common cancer in women worldwide, with an estimated 2.3 million new cases and 670,000 deaths annually (World Health Organization, 2024). In Indonesia, breast cancer has the highest prevalence of all

cancers based on data from the Global Burden of Cancer Study (GLOBOCAN) in 2020, with 68,858 new cases accounting for approximately 16.6% of all cancer cases, and it is the leading cause of cancer-related deaths (Kementerian Kesehatan RI, 2022).

Breast cancer treatment, particularly chemotherapy, often results in various physical and psychological side effects (Al-Mhanna et al., 2024). One of the most prevalent issues is sleep disturbance. Poor sleep quality is frequently reported by patients undergoing chemotherapy, triggered by nausea, pain, fatigue, and emotional instability such as anxiety and stress (Cheong et al., 2021). Sleep disorders are not minor complaints; they have systemic implications on healing processes, immune function, and overall quality of life. In the long term, sleep disturbances may increase the risk of chronic fatigue, decreased immune resistance, and other psychosocial impairments (W. H. Cheng et al., 2023). Management of sleep disturbances in cancer patients generally relies on pharmacological treatments such as hypnotic or sedative medications (Xin et al., 2024). While these are effective in the short term, long-term use is associated with various adverse effects including dependence, cognitive impairment, and complex drug interactions (Alaei et al., 2024). Therefore, there is an urgent need to explore safer, more accessible non-pharmacological alternatives that can enhance patients' quality of life.

One such non-pharmacological approach gaining attention in nursing practice is relaxation techniques. The five-finger relaxation technique is a simple method that combines mental focus, deep breathing, and sensory stimulation through sequential touch of the fingers (Elnosary et al., 2024). Empirical evidence has shown its effectiveness in reducing anxiety and improving sleep quality, particularly in individuals experiencing high levels of stress (Her & Cho, 2021). The technique is short in duration, requires no special equipment, and can be taught for independent use by both patients and their families (Motlagh et al., 2025). Aromatherapy is another widely used complementary nursing interventions. The use of essential oils, particularly lavender and chamomile, has been shown to produce mild sedative effects through activation of the limbic system and olfactory pathways in the brain (H. Cheng et al., 2022). Several studies have demonstrated that aromatherapy can improve sleep quality, reduce anxiety, and promote deep relaxation (H. Cheng et al., 2022; Y. Zhang et al., 2023).

Lavender has anxiolytic properties supported by meta-analyses, while chamomile is considered a safe alternative for individuals sensitive to lavender (Shammas et al., 2021). In this study, lavender was selected as the sole aromatherapy agent due to its favorable safety profile, accessibility, and broad acceptance in oncology care. To anticipate variations in patient olfactory preferences or sensitivities, the intervention design includes screening for scent tolerance and, when needed, suggesting culturally familiar and easily obtainable alternatives such as lemongrass or chamomile, both of which have demonstrated mild calming and decongestant effects and are widely used in traditional and community-based wellness practices (An et al., 2023).

The combination of five-finger relaxation and aromatherapy is hypothesized to have a synergistic potential to improve sleep quality and reduce anxiety (Lu et al., 2023). However, to date, studies explicitly examining the combined effectiveness of these interventions in breast cancer patients are limited. Most prior research has focused on either relaxation techniques or aromatherapy as separate interventions. Furthermore, educational and self-training approaches involving patients and families have received limited attention in the implementation of such interventions (Hanci et al., 2025). Although both five-finger relaxation and aromatherapy have been shown to be individually effective in addressing sleep disturbances and anxiety, the integration of these methods as a combined intervention has not been widely studied, especially among breast cancer patients undergoing chemotherapy. Most existing studies investigate one intervention in isolation, without considering the possible synergistic effects of simultaneous application. Moreover, few studies have employed controlled experimental designs to evaluate the impact of this combined intervention on both sleep quality and anxiety using valid and reliable measurement instruments.

Therefore, there is an urgent need for research that not only assesses the effectiveness of this combined intervention but also provides strong scientific evidence to inform the development of evidence-based nursing practices. This study aims to analyze the effectiveness of the combination of the five-finger relaxation technique and aromatherapy in improving sleep quality and reducing anxiety levels among breast cancer patients undergoing chemotherapy.

## RESEARCH METHOD

This study employed a quasi-experimental design using a pretest-posttest control group approach to evaluate the effectiveness of the combination of five-finger relaxation and aromatherapy in improving sleep quality and reducing anxiety among breast cancer patients undergoing chemotherapy. The study was conducted at Banjarmasin General Hospital over a two-week intervention period. A total of 30 participants who met the inclusion criteria were selected: female patients aged 35–65 years with a diagnosis of stage I–III breast cancer, undergoing at least the second cycle of chemotherapy, experiencing sleep disturbances as indicated by a Pittsburgh Sleep Quality Index (PSQI) score  $\geq 5$ , able to communicate effectively, and willing to participate in the intervention sessions.

Purposive sampling was used to select participants, who were then evenly divided into two groups: 15 in the intervention group and 15 in the control group. The intervention group received a combination therapy consisting of five-finger relaxation, performed every night for 10–15 minutes before bedtime, and lavender essential oil aromatherapy, applied via diffuser using 3–5 drops for 30 minutes before sleep. The intervention was guided and monitored regularly by the researchers through direct communication and online media. The control group received standard care without any additional interventions. Data were collected using two main instruments: the Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality and the Hamilton Anxiety Rating Scale (HARS) to measure anxiety levels. Measurements were taken at two points: before and after the intervention. A PSQI score of  $\geq 5$  indicates poor sleep quality, while the HARS assesses psychological and somatic symptoms of anxiety. Data analysis was conducted using SPSS software. Univariate analysis was used to describe respondent characteristics, while paired sample t-tests were used to compare pretest and posttest scores within groups. Independent sample t-tests were employed to compare outcomes between the intervention and control groups. A significance level of  $p < 0.05$  was set for all statistical tests.

## RESULTS AND DISCUSSIONS

### Respondent characteristics

**Table 1.** Respondent characteristics

No	Characteristics	Category	Total	
			Intervention Group (n=15)	Control Group (n=15)
1	Age	35-44 years	5 (33.3%)	4 (26.7%)
		45-54 years	6 (40%)	7 (46.7%)
		55-65 years	4 (26.7%)	4 (26.7%)
2	Occupation	Housewife	9 (60%)	10 (66.7%)
		Informal worker	4 (26.7%)	3 (20%)
		Civil/private employee	2 (13.3%)	2 (13.3%)
3	Cancer Stage	Stage I	2 (13.3%)	2 (13.3%)
		Stage II	8 (53.3%)	7 (46.7%)
		Stage III	5 (33.3%)	6 (40%)
4	Chemotherapy Duration	2-3 cycles	6 (40%)	5 (33.3%)
		4-5 cycles	7 (46.7%)	8 (53.3%)
		>5 cycles	2 (13.3%)	2 (13.3%)
5	Duration of Sleep Disorders	<3 months	5 (33.3%)	6 (40%)
		3-6 months	6 (40%)	5 (33.3%)

No	Characteristics	Category	Total	
			Intervention Group (n=15)	Control Group (n=15)
		>6 months	4 (26.7%)	4 (26.7%)
	Total		15	100%

The age distribution indicates that the majority of respondents in both groups were between 45 and 54 years old. Most patients were diagnosed with stage II breast cancer, and the most common occupation was housewife. Regarding the duration of chemotherapy, the majority of respondents had undergone 4 to 5 cycles, indicating that they were in the advanced phase of the treatment protocol. In terms of sleep disturbance duration, most respondents in both the intervention and control groups had been experiencing sleep disorders for 3 to 6 months.

**Effectiveness of the Combination of Five-finger Relaxation and Aromatherapy on Sleep quality and Anxiety**

**Table 2.** Sleep quality (PSQI) and Anxiety (HARS) scores before and after the intervention

Variable	Group	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Difference (Δ)	P-value*
Sleep Quality	Intervention	11.1 ± 2.3	8.2 ± 2.1	-2.9	0.021
	Control	10.7 ± 2.0	10.3 ± 1.9	-0.4	0.366
Anxiety Level	Intervention	21.6 ± 3.8	16.9 ± 3.5	-4.7	0.037
	Control	21.1 ± 4.0	20.2 ± 3.7	-0.9	0.228

\*paired sample t-test, statistically significant at p>0.05

According to Table 2, the average PSQI score in the intervention group decreased from 11.1 to 8.2 after the intervention, indicating an improvement in sleep quality, although some participants remained within the poor sleep quality category. This reduction was statistically significant (p = 0.021). Similarly, the anxiety score based on HARS decreased from 21.6 to 16.9, with a p-value of 0.037. In contrast, the control group did not exhibit any statistically significant changes in either sleep quality or anxiety levels. These results suggest that although not all participants experienced substantial improvements, the combination of the five-finger relaxation technique and aromatherapy was generally effective in moderately enhancing sleep quality and reducing anxiety within a two-week period.

This study aimed to evaluate the effectiveness of a combined intervention involving five-finger relaxation techniques and aromatherapy in improving sleep quality and reducing anxiety among breast cancer patients undergoing chemotherapy. The results indicated that this intervention produced a significantly positive impact on both measured variables namely sleep quality, as assessed using the Pittsburgh Sleep Quality Index (PSQI), and anxiety levels, measured by the Hamilton Anxiety Rating Scale (HARS). The changes observed in the intervention group were not present in the control group, reinforcing the argument that the effects were specifically attributable to the intervention rather than the passage of time or routine care alone.

Specifically, the PSQI score in the intervention group decreased from a mean of 11.1 to 8.2, indicating improvements in sleep components such as sleep latency, sleep efficiency, and nighttime disturbances. Although the final score remained above the clinical threshold for good sleep quality (PSQI < 5), the nearly 3-point reduction was statistically significant (p = 0.021), suggesting a meaningful enhancement in sleep quality. This finding aligns with the studies by (Dani & Babu, 2025), which demonstrated that the five-finger relaxation technique effectively reduces tension and accelerates sleep onset in patients experiencing pain or emotional stress. The technique works by activating the parasympathetic nervous system through focused breathing and cognitive-sensory stimulation, which contributes to decreased heart rate, blood pressure, and muscle tension—all physiological prerequisites for deeper, higher-quality sleep (F. Zhang et al., 2025).

Meanwhile, the aromatherapy used in this study employed lavender essential oil, which has been scientifically proven to exert anxiolytic and sedative effects by influencing the limbic system in the brain (Cui et al., 2022). The scent of lavender has been shown to enhance the expression of gamma-aminobutyric acid (GABA), a neurotransmitter that suppresses neuronal activity and induces calming effects while reducing hyperarousal (Beerappa et al., 2023). In this way, aromatherapy not only provides sensory comfort but also contributes to emotional regulation and facilitates the transition to non-REM sleep (Calkosiński et al., 2021; Deng et al., 2022). The combination of these two techniques offers a synergistic potential to enhance relaxation both psychologically and physiologically.

The effectiveness of the intervention was further evidenced by a significant reduction in anxiety scores, from 21.6 to 16.9 ( $p = 0.037$ ). Anxiety is a common concern among breast cancer patients undergoing chemotherapy, often associated with uncertainty about the future, altered body image, side effects of treatment, and a sense of helplessness regarding their condition (Czakert et al., 2022). If left unaddressed, such anxiety can exacerbate sleep disturbances, hinder physical recovery, and negatively affect overall quality of life. The five-finger relaxation technique serves as both a cognitive and somatic intervention, promoting positive thinking and redirecting attention away from fear or negative thoughts (Shayani & Marães, 2023). Meanwhile, aromatherapy complements this effect through sensory pathways that reduce prefrontal cortex activity related to stress perception (Emami-Sigaroudi et al., 2021).

In contrast, the control group did not demonstrate meaningful changes. The PSQI and HARS scores in the control group decreased only slightly ( $\Delta = -0.4$  and  $-0.9$ , respectively) and were not statistically significant ( $p > 0.05$ ). This suggests that standard care alone is insufficient to produce significant improvements in sleep quality or anxiety among breast cancer patients. Therefore, supportive interventions that target psychological and sensory dimensions such as those employed in this study are essential complements to medical treatment. Nonetheless, the effectiveness of this intervention is not without limitations. The two-week duration may not be sufficient to yield optimal or sustained outcomes. In clinical practice, sleep disturbances and anxiety in cancer patients are dynamic and often influenced by chemotherapy cycles, medical examination results, and psychosocial factors. Consequently, the continuation of relaxation and aromatherapy interventions should be incorporated into ongoing care facilitated by healthcare providers, especially nurses (Tola et al., 2021).

Additionally, individual responses to the intervention may vary. Some patients may have specific aroma preferences or differing levels of receptiveness to relaxation techniques. In this study, participants who demonstrated the most significant improvements tended to have a more open attitude toward complementary therapies and strong family support. These contextual factors should be considered when implementing such interventions in practice, ensuring they are delivered not only technically but also in alignment with the patients' preferences and needs. The relatively small sample size ( $n = 30$ ) also represents a limitation. Although statistical analysis revealed significance, generalizing the findings to broader populations should be done cautiously. Future research should employ randomized controlled trial designs with larger sample sizes and longer intervention periods to assess the consistency and sustainability of therapeutic effects. Additional outcome variables, such as quality of life, activity patterns, and emotional disturbances, could also be included in subsequent studies.

Despite these limitations, the findings of this study offer important implications for nursing practice, particularly in oncology and palliative care settings. The combination of the five-finger relaxation technique and aromatherapy represents a non-invasive, low-cost, side-effect-free, and easily teachable form of complementary therapy that can be implemented by both patients and their families. Within both hospital and community-based settings, this intervention could be integrated into self-care education programs or psychosocial support groups. Nurses play a central role in implementing such interventions, acting as both facilitators of training and evaluators of

their effectiveness through structured monitoring of sleep quality and emotional well-being (Y. Zhang et al., 2023).

Conceptually, this study supports a holistic approach in nursing, where patients' physical, psychological, and spiritual aspects are addressed in an integrated manner. Such interventions serve not only as medical adjuncts but also as expressions of respect for patients' dignity and autonomy in the healing process. When patients are empowered to choose, understand, and engage in supportive therapies that are meaningful to them, their motivation, independence, and confidence in managing their illness may be enhanced (Kahveci & Taylan, 2025). In conclusion, the combination of five-finger relaxation techniques and aromatherapy has been proven to be an effective and applicable intervention strategy for improving sleep quality and reducing anxiety in breast cancer patients undergoing chemotherapy. This study provides foundational evidence for the development of holistic, humane, and sustainable nursing interventions. Enhancing the capacity of nursing personnel in complementary therapies and integrating such approaches into healthcare service protocols are essential steps toward optimizing patients' overall well-being.

## CONCLUSION

This study confirms that combining five-finger relaxation techniques with aromatherapy is effective in improving sleep quality and reducing anxiety among breast cancer patients undergoing chemotherapy. The intervention provides short-term physical and psychological benefits by synergistically modulating the autonomic nervous system and supporting emotional regulation. Compared to standard care, the intervention group demonstrated significantly greater improvements in sleep and anxiety scores. Given its simplicity, safety, and low cost, this approach aligns well with the principles of sustainable nursing practice, requiring minimal equipment, brief training, and flexible delivery. To address resource constraints and nursing workload in clinical settings, the intervention can be delivered through structured group sessions, incorporated into routine health education, or taught as a self-care skill during chemotherapy visits. In community nursing practice, this method holds strong potential for implementation through home visits, palliative outreach programs, or local health centers especially in underserved areas enabling patients and caregivers to apply the technique independently. Future research with larger, randomized samples and extended follow-up is needed to assess long-term effects and further explore its adaptability across diverse care environments, supporting its broader integration into holistic, community-based cancer care models.

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