

REVIEW ARTICLE OPEN ACCESS

The Effect of Hand Massage on Pain Management After Breast Cancer Surgery: A Narrative Review

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ABSTRACT

Postoperative pain following breast cancer surgery remains a significant clinical challenge and may negatively affect recovery and quality of life if inadequately managed. In recent years, nonpharmacological nursing interventions have gained increasing attention as adjuncts to pharmacological pain control. This narrative review aimed to summarize the available evidence regarding the short-term effects of hand massage on postoperative pain among women undergoing breast cancer surgery. A literature search was conducted using PubMed, CINAHL, ScienceDirect, and Google Scholar to identify studies published between July 2024 and June 2025. Clinical and experimental studies evaluating the effect of hand massage on postoperative pain intensity, anxiety, or analgesic use were considered eligible. Due to the limited availability of recent evidence, one earlier highly relevant controlled study was also included to contextualize the current findings. In total, three studies (one randomized controlled trial and two quasi-experimental studies) met the inclusion criteria. Across the included studies, hand massage was associated with short-term reductions in pain intensity and anxiety during the early postoperative period. However, considerable heterogeneity was observed in massage protocols, study designs, and outcome measures. Small sample sizes and methodological limitations further restrict the strength and generalizability of the evidence. In conclusion, hand massage may be considered an exploratory supportive adjunctive nursing intervention for postoperative pain management after breast cancer surgery. However, the current evidence base remains limited, heterogeneous, and methodologically constrained, requiring cautious interpretation before any clinical recommendations can be made.

1 | Introduction

Breast cancer is the most common malignancy among women worldwide and remains a major cause of cancer-related mortality [1, 2]. Despite advances in early detection and treatment, surgical intervention continues to be the primary approach for most cases. However, postoperative pain following breast cancer surgery remains a significant clinical and nursing concern, as inadequate pain control may delay wound healing, prolong hospitalization, and reduce quality of life [3].

Pharmacologic therapy is the mainstay of postoperative pain management, but it is often associated with side effects and may not fully alleviate pain [4]. Consequently, there has been growing interest in nonpharmacological interventions, such as relaxation, aromatherapy, acupressure, and massage, which can be safely implemented by nurses as part of multimodal pain management strategies [5].

Among these, hand massage is a simple, low-risk, and cost-effective nursing intervention that may relieve pain and

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anxiety through mechanisms such as mechanoreceptor stimulation, improved local circulation, and activation of the gate control theory of pain [6, 7]. It also facilitates nurse–patient communication and promotes emotional comfort [8].

1.1 | Physiological Mechanisms Underpinning the Analgesic Effects of Hand Massage

The observed effectiveness of hand massage in mitigating pain and anxiety is not solely attributable to localized effects; rather, it is mediated by a comprehensive range of physiological responses involving the central nervous system and neuroendocrine pathways [6].

1. Sensory Modulation (The Gate Control Theory): The rhythmic, gentle manipulation inherent in hand massage stimulates mechanoreceptors within the skin. As the hand is densely packed with sensory receptors [7], this afferent input effectively modulates or “closes the gate” in the spinal cord where nociceptive (pain) signals are transmitted, consequently diminishing the perception of pain [6].
2. Autonomic Regulation and Relaxation: Therapeutic touch is recognized for its capacity to reduce sympathetic activity while simultaneously stimulating the parasympathetic system. This autonomic shift facilitates a state of profound relaxation, leading to decreases in heart rate and blood pressure [9, 10]. The resulting psychological comfort contributes to an elevated pain threshold.
3. Neuroendocrine and Biochemical Effects: Massage is also postulated to influence central pain modulation by decreasing the stress response hormone cortisol and promoting the release of the body’s natural analgesics, such as endorphin [9, 11]. These favorable biochemical alterations are integral to alleviating pain perception and enhancing emotional well-being.

While massage therapy in general has been studied across different surgical contexts, evidence specifically addressing hand massage after breast cancer surgery remains limited [12, 13]. Therefore, this narrative review aims to summarize the current evidence on the effects of hand massage on postoperative pain among breast cancer patients and to identify implications for nursing practice and future research.

1.2 | Post–Breast Surgery Pain and Management

Pain is a common and distressing problem for women undergoing breast cancer surgery. It negatively affects mobility, sleep, psychological well-being, and overall quality of life. Postoperative pain arises from tissue trauma, inflammatory mediator release, and potential nerve injury during surgery [14]. In addition, factors such as pre-existing pain, anxiety, and younger age increase the risk of both acute and chronic pain after surgery [3].

Effective pain management requires comprehensive assessment and individualized planning. Persistent pain following breast cancer surgery is often managed through a multimodal strategy, combining pharmacologic and nonpharmacologic interventions [3]. Pharmacologic treatments typically include nonopioid and opioid analgesics, adjuvant drugs (such as gabapentin, antidepressants, or corticosteroids), and regional anesthesia techniques. However, medication-related side effects, limited

duration of action, and patient variability have prompted interest in complementary approaches [4, 15].

Nonpharmacologic interventions such as including acupuncture, relaxation, aromatherapy, exercise, music therapy, and massage are increasingly used as adjuncts in nursing practice to improve comfort and reduce analgesic consumption [16, 17]. Among these, hand massage has gained attention as a simple and effective nursing technique that enhances relaxation, stimulates circulation, and may reduce pain perception through sensory modulation mechanisms [6].

1.3 | Massage and Hand Massage Applications

Massage has been used for centuries as a therapeutic touch that supports physical and psychological well-being. In nursing practice, massage is recognized as a safe, noninvasive, and low-cost method to enhance comfort and reduce pain [5, 10]. It produces beneficial physiological effects such as improved venous and lymphatic circulation, decreased muscle tension, and reduced cortisol levels, while also promoting emotional relaxation and trust between the nurse and the patient [9, 18].

Among different massage types, hand massage is especially suitable for postoperative care because the hands contain numerous sensory receptors that stimulate peripheral nerves and influence pain perception through the gate control mechanism [6]. Hand massage involves rhythmic, gentle manipulation of the soft tissues from the palm to the wrist using techniques such as effleurage, petrissage, and friction [8]. The intervention is simple, does not require special equipment, and can be safely performed by trained nurses within 15–20 min per session.

Previous studies have shown that hand massage can reduce pain intensity, anxiety, and stress while improving relaxation and comfort in postoperative patients [11, 19–21]. In patients undergoing breast cancer surgery, however, the evidence base remains limited. Studies by Mantika et al. [12], Putri and Lazuardi [13], and Fadilah et al. [22] reported significant decreases in pain scores after hand massage sessions, suggesting potential benefits for short-term postoperative pain management. Nonetheless, these studies had small sample sizes, short follow-up periods, and methodological variability.

Overall, the current literature indicates that hand massage may serve as a supportive nursing intervention to complement pharmacologic pain management after breast cancer surgery. However, further research is needed to determine optimal duration, frequency, and pressure levels, and to standardize protocols for clinical nursing use.

2 | Methods

2.1 | Methodology

2.1.1 | Review Design

This study was conducted as a narrative review aiming to summarize and critically discuss the available clinical evidence on the use of hand massage as an adjunctive nonpharmacological nursing intervention for postoperative pain management following breast cancer surgery. A narrative approach was chosen due to the limited number and heterogeneity of available studies, which precluded a systematic review or meta-analysis.

2.1.2 | Data Sources and Search Strategy

A literature search was performed using PubMed (MEDLINE), CINAHL, ScienceDirect, and Google Scholar. The primary search focused on studies published between July 2024 and June 2025 in English or Turkish. To ensure conceptual continuity and contextual completeness, one earlier controlled study frequently cited in the literature was also included, despite falling outside the predefined time frame.

The search strategy used combinations of the following keywords and Boolean operators:

("Breast Cancer" OR "Breast Neoplasms") AND ("Hand Massage" OR "Therapeutic Touch") AND ("Postoperative Pain" OR "Pain Management").

Although the search period was intentionally restricted to recent publications (July 2024–June 2025) to reflect the most up-to-date evidence, this narrow timeframe inherently limited the number of eligible studies. Therefore, this review should be interpreted as a focused synthesis of recent evidence rather than a comprehensive overview of all available literature on hand massage in postoperative breast cancer care.

2.1.3 | Inclusion and Exclusion Criteria

Studies were included if they:

1. Involved women undergoing breast cancer surgery,
2. Evaluated hand massage as the primary intervention,
3. Reported postoperative pain-related outcomes (e.g., pain intensity, anxiety, and analgesic use),
4. Used experimental or quasi-experimental designs,
5. Had accessible full texts.

Review articles, case reports, editorials, conference abstracts, and studies evaluating other massage types (e.g., foot or full-body massage) were excluded.

2.1.4 | Quality Considerations

Given the narrative design of this review, no formal quality appraisal tools (e.g., Joanna Briggs Institute [JBI] or Critical Appraisal Skills Programme [CASP]) were applied. Instead, methodological limitations of the included studies, such as sample size, study design, and protocol heterogeneity, were descriptively evaluated and discussed.

3 | Findings

The literature search, guided by the established inclusion criteria, identified three core clinical studies evaluating the efficacy of hand massage in postoperative pain management following breast cancer surgery. A summary of the design, sample size, intervention protocol, and primary outcome results of these studies is presented in Table 1.

This descriptive classification was added to improve transparency regarding the methodological robustness of the available

evidence, as a formal quality appraisal tool was not applied due to the narrative design of the review.

As summarized in Tables 1 and 2, the available evidence is limited by small sample sizes, heterogeneous intervention protocols, insufficient methodological reporting, and overall methodological concerns across the included studies, which considerably restrict the strength of clinical interpretations despite consistently favorable short-term outcomes.

4 | Discussion

Before interpreting the findings, it is important to emphasize that the included studies demonstrate substantial methodological limitations, particularly in terms of insufficient reporting of sample sizes, randomization procedures, and intervention standardization. These reporting gaps significantly restrict the interpretability of the results and weaken the strength of potential clinical implications. Therefore, the findings summarized in this review should be approached with methodological caution, as further reflected in the methodological concern levels summarized in Table 2.

While the physiological mechanisms of massage were detailed in the introduction, the present discussion focuses primarily on interpreting the limited clinical findings. These findings relate to the use of hand massage as an adjunctive nonpharmacological nursing intervention for postoperative pain management following breast cancer surgery. Although these mechanisms [6, 7, 9, 11] provide a theoretical basis for the observed effects, the limited number of included studies and their methodological heterogeneity require that these interpretations be approached with caution and considered in relation to the methodological concern levels summarized in Tables 1 and 2.

4.1 | Analytical Synthesis: Common Findings and Consistencies

Across the reviewed studies, hand massage was consistently associated with short-term reductions in acute postoperative pain severity and anxiety levels [12, 13, 22] although the magnitude and durability of these effects varied across studies. The randomized controlled trial (RCT) conducted by Mantika et al. [12] demonstrated statistically significant reductions in pain intensity and anxiety compared with usual postoperative care, whereas the quasi-experimental studies reported favorable pre–post changes following hand massage sessions. While these findings indicate a consistent trend toward short-term benefit, the limited sample sizes and study designs preclude definitive conclusions regarding the reliability and generalizability of hand massage as a stand-alone nursing intervention. Nevertheless, the simplicity of the intervention, its feasibility at the bedside, and its potential to enhance nurse–patient interaction [8] may justify its cautious consideration as a supportive component of postoperative nursing care.

4.2 | Protocol Heterogeneity and Reasons for Inconsistencies

Despite the overall favorable trend, substantial methodological differences among the included studies restrict the

TABLE 1 | Methodological and outcome characteristics of key clinical studies included in the review.

Author (year)	Country	Study design	Sample size (n)	Comparison/control	Hand massage protocol	Outcome measures	Main findings	Methodological notes
Mantika et al. (2024) [12]	Indonesia	Randomized controlled trial	Not clearly reported (postmastectomy patients)	Usual postoperative care	Hand massage applied once daily for 15 min during the first 3 postoperative days	Pain intensity (VAS), anxiety	Statistically significant reduction in pain and anxiety compared with control group	Limited reporting of sample size and randomization process
Putri and Lazuardi (2023) [13]	Indonesia	Quasi-experimental study	Small sample (exact number not specified)	Pre-post intervention (no parallel control group)	Short-duration hand massage sessions during early postoperative period	Pain scores, relaxation level	Pain scores decreased and relaxation improved after intervention	Lack of control group; short follow-up period
Fadilah et al. (2016) [22]	Indonesia	Controlled clinical study	Not reported	Routine care	Hand massage sessions (duration not specified)	Pain intensity, patient comfort	Reduction in reported pain intensity following hand massage	Older study; limited methodological detail; included for contextual relevance

TABLE 2 | Descriptive methodological quality classification of included studies.

Study	Design	Methodological concern level
Mantika et al. [12]	Randomized controlled trial	Moderate concern (limited reporting of sample size and randomization)
Putri and Lazuardi [13]	Quasi-experimental	High concern (absence of control group, short follow-up)
Fadilah et al. [22]	Controlled clinical study	High concern (very limited methodological reporting)

generalizability of the findings. Specifically, there is considerable heterogeneity in the key study protocols regarding massage duration, frequency of application, and the type of oil used. For instance, Mantika et al. [12] utilized 15-min sessions, whereas other studies opted for shorter durations. Such heterogeneity prevents direct comparison of outcomes and limits the ability to identify optimal intervention parameters, including duration, frequency, and technique. Additionally, the efficacy of non-pharmacological interventions such as hand massage may be influenced by psychosocial factors, including patient expectations, anxiety levels, and individual pain perception [23], which were not systematically controlled or measured in the reviewed studies. These variations further contribute to the high methodological concern levels presented in Table 2.

4.3 | Clinical Application and Future Directions

Despite these limitations, hand massage may cautiously enhance the nursing role as a supportive component of multimodal pain management strategies, particularly due to its low risk profile and absence of pharmacological side effects [4]. Future research should prioritize well-designed, adequately powered RCTs aimed at establishing standardized hand massage protocols (including duration, pressure, and frequency) and evaluating longer-term outcomes such as analgesic consumption, wound healing, functional recovery, and quality of life [3]. In particular, multicenter RCTs are essential to strengthen the evidence base and to support the integration of evidence-based hand massage interventions into postoperative clinical nursing guidelines.

5 | Limitations of the Review

Although this narrative review suggests potential short-term benefits of hand massage in postoperative pain management following breast cancer surgery, several important limitations must be carefully considered when interpreting the findings.

5.1 | Quality of Evidence and Generalizability

Only one RCT was identified among the included studies, while the remaining studies employed quasi-experimental or controlled designs. The predominance of nonrandomized designs, combined with small and inadequately reported sample sizes, substantially limits the level of evidence and generalizability of the findings.

5.2 | Heterogeneity in Intervention Protocols

A pronounced lack of standardization was observed across the hand massage intervention protocols. Variability in massage duration, frequency of application, use of oils, and training or professional background of the individual administering the massage (e.g., nurse, researcher, or caregiver) complicates direct

comparison of outcomes across studies and limits reproducibility.

5.3 | Search Strategy and Selection Bias

The review was primarily limited to studies published in English and Turkish and was conducted using a restricted number of electronic databases. In addition, the predefined search period (July 2024–June 2025) was narrow, and one earlier study was included to provide contextual continuity, which may introduce selection bias.

5.4 | Lack of Formal Quality Appraisal

A further limitation of this narrative review is the absence of a formal methodological quality appraisal using standardized tools such as the JBI or CASP checklists. As a result, the internal validity and risk of bias of the included studies could not be systematically assessed, and methodological limitations were evaluated descriptively rather than quantitatively. To partially address this limitation, a simple descriptive methodological classification of the included studies was provided in Table 2 to enhance transparency regarding the strength of the available evidence.

5.5 | Outcome Measurement Limitations

Most included studies relied predominantly on subjective outcome measures, such as self-reported pain intensity and relaxation scales. Objective outcomes, including analgesic consumption, functional recovery, or long-term pain trajectories, were either inconsistently reported or not assessed, further limiting the robustness of the conclusions.

6 | Conclusion

Pain management following breast cancer surgery remains a critical domain of nursing practice requiring a cautious and multimodal approach. Based on the limited available evidence, hand massage may be considered an exploratory supportive nursing intervention with potential short-term benefits for reducing pain intensity and anxiety in the early postoperative period. At present, the evidence remains preliminary, heterogeneous, and methodologically limited, and is therefore insufficient to support definitive clinical recommendations.

Author Contributions

T.A.: conceptualization, investigation, project administration, visualization, supervision, writing–original draft, and review and editing.

K.O.Y.: conceptualization, investigation, writing–original draft, and review and editing.

C.C.: conceptualization, investigation, writing–original draft, and review and editing.

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Ethics Statement

In this study, which was conducted in accordance with the principles of the Declaration of Helsinki, the research articles included in the sample were obtained from electronic databases that were open to access, so the research did not require ethical approval. The studies included in the review were cited as references.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

This study is a narrative review. All data used in this article are derived from previously published studies and are available in the cited references.

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