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NON-PHARMACOLOGICAL INTERVENTIONS IN THE PREVENTION OF POSTOPERATIVE NAUSEA AND VOMITING: SCOPING REVIEW

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Abstract: Objective: To map and synthesize current scientific evidence on non-pharmacological nursing interventions used to prevent postoperative nausea and vomiting (PONV) in adult surgical patients. **Methods:** This scoping review followed the Joanna Briggs Institute (JBI) methodology and adhered to the PRISMA-ScR guidelines. The research question was formulated using the PCC mnemonic (Population, Concept, Context). Searches were conducted in CINAHL Complete and MEDLINE Complete databases via the EBSCOhost platform, covering the past ten years and including studies published in English, Spanish, and Portuguese. After applying inclusion and exclusion criteria, 13 studies were included for analysis. **Results:** The studies, encompassing randomized controlled trials, systematic reviews, meta-analyses, and quasi-experimental designs, identified a broad range of effective non-pharmacological interventions. The main categories were aromatherapy with essential oils (ginger, lavender, peppermint, lemon), P6 (Neiguan) acupressure and related techniques, music therapy, and other complementary approaches, such as foot reflexology, controlled breathing, chewing gum, oral ginger intake, preoperative education, and family presence. These interventions demonstrated significant reductions in nausea intensity and vomiting frequency, decreased need for rescue antiemetics, improved patient comfort, and enhanced satisfaction with perioperative care. **Conclusion:** Non-pharmacological nursing interventions are safe, cost-effective, and clinically valuable strategies for the prevention and management of PONV. Their integration into perioperative protocols reinforces the nurse's autonomous and evidence-based role, contributing to improved patient recovery, reduced phar-

macological dependence, and the humanization of surgical care.

Keywords: Postoperative nausea and vomiting; non-pharmacological interventions; complementary therapies; perioperative nursing.

INTRODUCTION

Postoperative nausea and vomiting (PONV) are frequent complications during the perioperative period, with a significant impact on comfort, clinical recovery, and patient satisfaction. In many cases, they are perceived as more distressing than postoperative pain itself (Milheiro et al., 2023). Their prevalence ranges from 20% to 80%, influenced by patient-specific risk factors, type of surgery, and anesthetic technique employed (Arslan & Çelik, 2024).

These manifestations have a multifactorial origin, triggered by various stimuli associated with surgical and anesthetic procedures. Nausea is a subjective and unpleasant sensation that often precedes vomiting, which corresponds to a physiological reflex characterized by the expulsion of gastric contents through the mouth (Alves et al., 2024).

PONV usually occurs within the first 24 hours after surgery and may persist for more than three days. It is classified as early (within the first two hours after surgery) or late (after this period). These reactions may arise in response to factors present before, during, or after surgery, reflecting the complexity of their pathophysiology (Alves et al., 2024; Arslan & Çelik, 2024).

The main risk factors include female gender, a history of motion sickness or prior

PONV, nonsmoking status, use of opioids, general anesthesia, and prolonged surgical duration (Arslan & Çelik, 2024).

PONV can lead to significant clinical complications such as dehydration, electrolyte imbalance, arrhythmias, hemorrhage, wound dehiscence, and gastric content aspiration. In more severe, although less frequent, cases, complications such as esophageal rupture, subcutaneous emphysema, or pneumothorax may occur (Arslan & Çelik, 2024).

In the operating room setting, these complications compromise not only the patient's well-being but also their clinical stability, potentially resulting in increased intra-abdominal pressure, delayed early mobilization, and prolonged hospital discharge. These repercussions are particularly relevant in ambulatory surgeries, where rapid recovery and early return to daily activities are prioritized (Wilson et al., 2023).

Effective management of PONV requires an integrated, multidisciplinary approach involving both pharmacological and non-pharmacological interventions. Despite the widespread use of antiemetic agents, including 5-HT₃ receptor antagonists, corticosteroids, and dopamine antagonists, their efficacy remains limited and adverse effects such as sedation, headache, and cardiovascular disturbances are common. Non-pharmacological interventions have emerged as safe, accessible, and increasingly evidence-based alternatives or adjuncts (Arslan & Çelik, 2024; Moeen, 2016; Pinto et al., 2025).

Among these strategies, acupuncture at the P6 point, aromatherapy with essential oils such as ginger or peppermint, music therapy, breathing and relaxation tech-

niques, chewing gum, foot reflexology, and preoperative education stand out. These interventions reduce anxiety and, consequently, the risk of PONV induced by surgical stress (Arslan & Çelik, 2023; Gan et al., 2014; Wilson et al., 2023).

The relevance of this topic lies in recognizing the autonomous, critical, and interventional role of nurses within the perioperative context. The adoption of non-pharmacological measures reflects a patient-centered, holistic, and evidence-based nursing practice, with a positive impact on surgical experience, recovery time, and quality indicators of care delivery.

Despite the growing acknowledgment of the importance of non-pharmacological interventions in PONV prevention, their implementation in clinical practice remains limited. Furthermore, existing literature reveals significant gaps concerning the systematization and evaluation of these interventions in perioperative care. Therefore, it is relevant to identify, map, and synthesize the available evidence to support future evidence-based practice and guide research in this field. Accordingly, this scoping review aims to map the existing evidence on non-pharmacological nursing interventions for the prevention of postoperative nausea and vomiting in adult surgical patients.

MATERIALS AND METHODS

This scoping review (ScR) was conducted according to the methodology proposed by the Joanna Briggs Institute (JBI®) and in compliance with the Preferred Reporting Items for Systematic Reviews and

Meta-Analyses extension for Scoping Reviews (PRISMA-ScR®) guidelines.

RESEARCH QUESTION

The research question was developed based on the PCC framework (Population, Concept, and Context), as recommended by the JBI®. It was formulated as follows: “What non-pharmacological nursing interventions are used to prevent postoperative nausea and vomiting in adult patients?”

INCLUSION AND EXCLUSION CRITERIA

In accordance with the PCC framework, inclusion criteria were defined as follows: for the Population (P), studies involving interventions performed by nurses were included; for the Concept (C), non-pharmacological interventions aimed at preventing nausea and vomiting; and for the Context (C), studies conducted in the postoperative period.

Two additional inclusion criteria were applied: (1) a ten-year publication limit to ensure the inclusion of up-to-date scientific evidence, and (2) language, restricting the selection to studies published in English, Spanish, or Portuguese, languages mastered by the research team.

Studies were excluded if they involved pediatric populations, were conducted by nursing students or nursing technicians, or consisted of opinion papers, narrative reviews, or editorials.

SEARCH STRATEGY

The literature search was performed using the EBSCOhost® content platform, provided by the Escola Superior de En-

fermagem do Porto (ESEP), and included the CINAHL Complete® and MEDLINE Complete® databases.

Descriptors were selected based on MeSH Terms and CINAHL Headings, aligned with the terms defined in the research question. Boolean operators AND and OR were used to combine search terms, resulting in the following search string: (“postoperative nausea and vomiting” OR “ponv” OR “post operative nausea and vomiting”) AND (“complementary therapies” OR “non-pharmacological interventions” OR “perioperative nursing”).

STUDY SELECTION

The initial search, conducted on May 19th, 2025, identified 118 articles. After applying the automatic filters for language and publication period, the results were exported to Rayyan® review software, then two reviewers independently screened titles and abstracts. A third reviewer resolved any discrepancies.

The study selection process is detailed in the PRISMA-ScR flow diagram, ensuring methodological rigor and transparency (Page et al., 2021).

DATA EXTRACTION AND ANALYSIS

Data extraction was performed using a grid developed by the researchers, collecting the following information: author and year of publication, study design, objectives, type of non-pharmacological intervention, main results, and conclusions. The synthesis of the included studies is presented in tables.

To enhance clarity and consistency in reporting, the included studies were subsequently organized according to the nature

of the non-pharmacological intervention. This methodological strategy simplifies a comparative and systematic analysis of the available evidence. Therefore, the studies were grouped into categories.

RESULTS

The PRISMA-ScR 2020 flow diagram illustrates the selection process (Figure 1).

Figure 1 shows that a total of 118 articles were obtained through the database searches. After removing duplicates and applying the inclusion criteria (language and time frame), 27 articles were excluded, resulting in 16 studies selected for title and abstract screening. After abstract reading, two studies were excluded because they involved a pediatric population, and 14 were selected for full-text review. Following full-text assessment, one study was excluded

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only

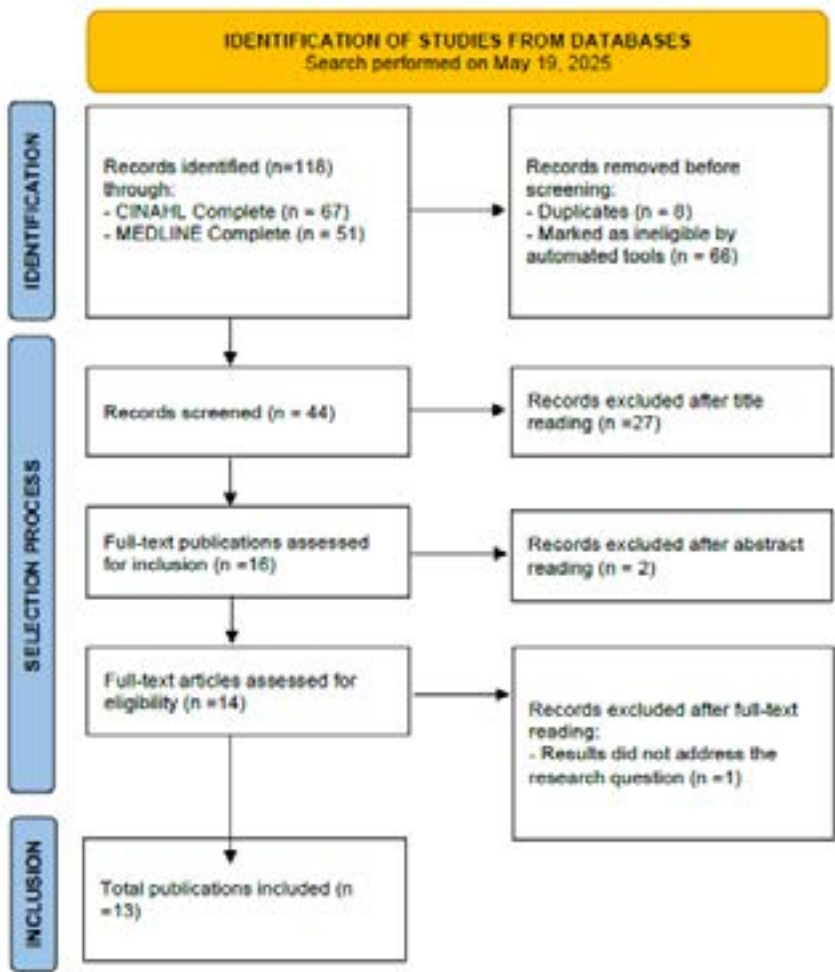


Figure 1. PRISMA-ScR flow diagram

based on the concept criterion, as its results did not address the research question. Consequently, 13 studies were included in this review.

STUDY CHARACTERISTICS

Table 1 outlines the general characteristics of the included studies, such as the author(s)/year of publication, study design, objective, sample/context and country of origin.

A total of thirteen studies were included in this review, as summarized in Table 1. Most were randomized controlled clinical trials ($n = 6$), complemented by three systematic reviews, one meta-analysis, one quasi-experimental study, and one analytical observational study. This distribution highlights a body of evidence predominantly composed of experimental design, supporting the methodological strength of the findings.

Sample sizes ranged from 30 to 206 participants, involving adult surgical patients across a variety of clinical contexts, particularly laparoscopic, orthopedic, and urological procedures. The studies were conducted in diverse geographic regions, including Turkey, Iran, Egypt, Taiwan, Indonesia, Australia, and the United States, reflecting the global interest and cultural diversity in the use of non-pharmacological nursing interventions for postoperative care.

The main objectives of the included studies were to evaluate the effectiveness of non-pharmacological interventions, such as aromatherapy, acupressure, music therapy, foot reflexology, controlled breathing techniques, and chewing gum, in the prevention or reduction of postoperative nausea and vomiting (PONV).

INTERVENTION OUTCOMES

The systematic reviews and meta-analyses synthesized existing evidence, with a particular focus on nursing-led complementary therapies. Collectively, these studies represent a methodologically heterogeneous yet internationally representative body of evidence, forming the basis for the synthesis of intervention outcomes presented in Table 2.

To enhance clarity and coherence in the presentation of results, the articles were grouped into four main categories: aromatherapy, acupressure and P6-related techniques, music therapy, and other complementary therapies (including foot reflexology, controlled breathing, chewing gum, oral ginger intake, preoperative education, and family presence).

Aromatherapy

Aromatherapy emerged as one of the most extensively investigated and consistently effective non-pharmacological interventions for the prevention and management of postoperative nausea and vomiting (PONV). The meta-analysis by Wang et al. (2024), which included 11 studies with a total of 1,154 participants, demonstrated that inhalation of essential oils, particularly ginger, lavender, and peppermint, significantly reduced the severity of postoperative nausea, although findings regarding vomiting were less consistent. The authors suggest that these beneficial effects may be related to olfactory stimulation of the limbic system, activating brain areas involved in autonomic and emotional regulation, including the hypothalamus and pituitary gland.

These results are supported by several clinical trials. Rambod et al. (2023), in a

Study	Author(s), Year	Study Design	Objective	Sample	Country
S1	Çetinkaya, F. (2019)	Randomized controlled clinical trial	Assess the effect of music on PONV after laparoscopic cholecystectomy	67 patients (32 intervention / 35 control)	Turkey
S2	Wang et al. (2024)	Systematic review and meta-analysis	Evaluate effectiveness of aromatherapy for preventing PONV	11 studies (1154 participants)	Taiwan
S3	Cronin et al. (2015)	Prospective quasi-experimental randomized study	Compare controlled breathing alone vs. with isopropyl alcohol for nausea	82 women undergoing ambulatory laparoscopic surgery	USA
S4	Darvall, Handscombe & Leslie (2017)	Randomized controlled trial	Test non-inferiority of chewing gum vs. ondansetron for PONV	94 women undergoing laparoscopic or breast surgery	Australia
S5	Hofmann et al. (2016)	Randomized clinical trial (double-blind)	Test P6 acupressure for PONV prevention in high-risk outpatients	110 adults with ≥4 PONV risk factors	USA
S6	Arslan & Çelik (2023)	Systematic review	Synthesize nursing non-pharmacological interventions for PONV	58 studies	Turkey
S7	Salamah et al. (2023)	Meta-analysis of Randomized controlled trial	Assess acupressure efficacy for PONV after laparoscopy	11 RCTs; 941 participants	Egypt
S8	Rambod et al. (2023)	Randomized clinical trial	Test lemon inhalation aromatherapy on pain and PONV	90 participants (45 intervention / 45 control); lower-limb fracture surgery	Iran
S9	Amirhosseini et al. (2020)	Randomized clinical trial	Test lavender and clary sage aromatherapy after percutaneous nephrolithotomy	79 participants; 3 arms	Iran
S10	Shamsikhani & Hosseini (2025)	Systematic review	Evaluate foot reflexology for nausea and vomiting	6 Randomized controlled trial	Iran/Turkey/France
S11	Hadi et al. (2024)	Analytical observational cross-sectional study	Evaluate peppermint and lavender aromatherapy after spinal anesthesia	30 adults; colorectal cancer laparotomy; outcomes within 24 h	Indonesia
S12	Asay et al. (2019)	Systematic review	Evaluate aromatherapy for prevention/treatment of PONV in adults	5 Randomized controlled trial (2012–2017)	USA
S13	Farhadi et al. (2016)	Randomized controlled trial	Test dry cupping at P6 for PONV prevention	206 adult women; laparoscopic cholecystectomy	Iran

Table 1. General characteristics of the selected studies.

Study	Type of Intervention	Description / Application	Main Findings	Conclusion / Relevance for Nursing
S1	Music therapy	Patient-preferred music during first 24 h post-op	↓ nausea severity and ↓ vomiting vs. control ($p<0.05$)	Simple, safe, low-cost complement to postoperative care.
S2	Aromatherapy	Essential oils incl. ginger, lavender, peppermint, clary sage; also, isopropyl alcohol in some trials	Overall ↓ nausea intensity; mixed effect on vomiting; ginger and lavender strongest	Promising adjunct; safe and inexpensive; supports implementation with clinical judgment.
S3	Controlled breathing ± isopropyl alcohol	Slow, deep breathing with/without isopropyl alcohol inhalation	Significant within-group ↓ nausea; no between-group differences	First-line, self-managed, no-cost technique for immediate symptom relief.
S4	Chewing gum	Chew at PONV onset in PACU	Symptom resolution in ~75%; non-inferior to ondansetron; high acceptability	Practical, safe option; feasible where resources are limited.
S5	P6 acupressure	Bilateral bead-adhesive on P6 (Neiguan) for 24 h	↓ PONV at all checkpoints (Phase I/II/24 h)	Effective, low risk; easily delivered by trained nurses.
S6	Nursing non-pharmacological strategies	Seven categories: acupressure, aromatherapy, ginger, music, pre-op education, family presence, etc.	Majority of studies show benefit (e.g., ~80% acupressure positive)	Reinforces autonomous, holistic nursing practice in perioperative care.
S7	P6 acupressure	Bilateral P6 stimulation during laparoscopy	↓ early and late PONV; ↓ antiemetic use; robust sensitivity analyses	Strong evidence base; suitable for protocolization.
S8	Lemon aromatherapy	Inhalation every 2 h from pre-op through 16 h post-op (orthopedic fractures)	↓ pain; ↓ PONV frequency/severity; ↓ rescue antiemetics	Safe complementary measure: no adverse events reported.
S9	Lavender & clary sage aromatherapy	Inhalation immediately post-op and at 3 h and 6 h	↓ pain and nausea; lowest vomiting with lavender arm	Comfort-enhancing; supports reduced antiemetic needs.
S10	Foot reflexology	Pressure on foot reflex points related to Gastrointestinal function	↓ nausea intensity and vomiting frequency across adult contexts	Non-invasive, low-risk therapy suitable for nursing settings.
S11	Peppermint & lavender aromatherapy	Essential oil inhalation after spinal anesthesia for colorectal laparotomy; outcomes vs. nutritional status	Lower PONV and wound complications with better PNI; aromatherapy beneficial	Highlights value of pre-op nutritional assessment and Essential oil as adjunct.
S12	Aromatherapy	peppermint, ginger, proprietary blends	3/5 trials positive; patient preference high; heterogeneity noted	Consider as adjuvant; need standardized protocols and larger RCTs.
S13	Dry cupping at P6	Intermittent negative-pressure cups on P6 vs. sham	↓ nausea and vomiting at 2, 6, 24 h; ↓ rescue antiemetics	Non-invasive, low-cost; operationally simple for hospital use.

Table 2. Non-pharmacological interventions and main findings (n = 13).

randomized controlled trial (RCT) involving 90 orthopedic surgery patients, compared lemon essential oil inhalation with standard care. The intervention group experienced a significant reduction in nausea intensity, vomiting frequency, and the need for rescue antiemetic medication. Similarly, Amirhosseini et al. (2020) evaluated the effects of lavender and clary sage essential oil inhalation in 79 patients undergoing percutaneous nephrolithotomy, reporting significant decreases in both nausea severity and vomiting episodes, particularly in the lavender group. The authors explained that essential oils act through both olfactory and cutaneous absorption pathways, stimulating the limbic system and triggering neuroendocrine and autonomic responses that promote relaxation, pain control, and stabilization of gastrointestinal motility.

Comparable findings were reported by Hadi et al. (2024), in a quasi-experimental study involving 30 patients who underwent laparotomy under spinal anesthesia. Inhalation of peppermint and lavender essential oils significantly reduced PONV within the first 24 postoperative hours. The authors also noted that preoperative nutritional status positively influenced the response to aromatherapy, underscoring the need for individualized care.

Evidence from systematic reviews reinforces these observations. Asay et al. (2019), in a review including five randomized controlled trials, found that three studies demonstrated a significant reduction in PONV with aromatherapy, while the remaining two showed no differences compared to control groups; nonetheless, patient satisfaction and preference for aromatherapy were consistently high. Similarly, Arslan and Çelik (2023), in a comprehen-

sive systematic review of non-pharmacological nursing interventions, reported that approximately 70% of included studies showed significant symptom improvement with essential oils, particularly peppermint, ginger, and lavender.

Overall, aromatherapy stands out as a safe, low-cost, and easily applicable nursing intervention with positive effects on both physical symptoms and emotional well-being in postoperative patients.

Acupressure and P6-Related Techniques (Neiguan)

Acupressure and related techniques targeting the P6 (Neiguan) point represent another group of interventions with robust evidence for PONV prevention. Rooted in traditional Chinese medicine, these methods involve mechanical stimulation of specific points believed to regulate energy flow. Physiologically, they influence the autonomic nervous system and the vagus nerve, structures directly involved in the vomiting reflex.

The meta-analysis by Salamah et al. (2023), which included 11 randomized controlled trials with 941 participants, confirmed significant reductions in the incidence of nausea and vomiting during both early and late postoperative phases, as well as decreased need for antiemetic medication among intervention groups. Hofmann et al. (2016), in a randomized clinical trial with 220 high-risk ambulatory surgical patients, found that acupressure at the P6 point significantly reduced the occurrence of PONV across all assessment periods up to 24 hours postoperatively.

In addition to conventional acupressure, Farhadi et al. (2016) investigated dry

cupping therapy applied at the P6 point in 206 women undergoing laparoscopic cholecystectomy. The intervention produced statistically significant reductions in nausea intensity and vomiting frequency compared to controls. The proposed mechanism involves local stimulation of peripheral nerve fibers and the release of endogenous substances with analgesic and antiemetic properties.

According to Arslan and Çelik (2023), acupressure is among the most studied non-pharmacological interventions for PONV, with approximately 80% of reviewed studies reporting favorable outcomes. Beyond its demonstrated efficacy, acupressure is characterized by simplicity, affordability, and safety, making it a viable autonomous nursing practice within perioperative care.

Music Therapy

Music therapy was identified as a sensory and emotional intervention capable of promoting relaxation, reducing anxiety, and mitigating symptoms such as pain and nausea. In the randomized controlled trials by Çetinkaya (2019), involving 80 patients undergoing laparoscopic cholecystectomy, postoperative music listening resulted in significant reductions in nausea intensity and vomiting incidence within the first 24 hours compared with standard care. The author highlighted that music influences both physiological and psychological processes, modulating autonomic responses and altering symptom perception.

Arslan and Çelik (2023), in their systematic review, corroborated these findings, reporting that music therapy decreases anxiety and pain, facilitates relaxation, and indirectly contributes to reducing PONV.

These results support music therapy as a non-invasive, person-centered, and easily integrated nursing strategy within perioperative settings.

Other Complementary Therapies

This category encompasses several complementary approaches that, although less frequently studied, demonstrated favorable outcomes in PONV reduction.

Foot reflexology, reviewed by Shamsikhani and Hosseini (2025), showed consistent efficacy in reducing both the intensity and frequency of nausea and vomiting across various clinical settings, including surgery, hemodialysis, and pregnancy. The proposed mechanism involves stimulation of specific reflex points on the feet that correspond to body organs and systems, thereby promoting autonomic and gastrointestinal regulation.

Controlled breathing, examined by Cronin et al. (2015), was associated with significant reductions in nausea intensity, whether used alone or in combination with isopropyl alcohol inhalation. This technique promotes relaxation and restores sympathetic–parasympathetic balance, offering a simple, self-administered, and cost-free intervention.

Chewing gum, studied by Darvall et al. (2017), achieved a 75% nausea resolution rate in the intervention group and was found to be non-inferior to ondansetron therapy. The proposed physiological explanation involves stimulation of gastrointestinal motility, increased salivary flow, and secretion of digestive enzymes, thereby accelerating gastric emptying and reducing discomfort.

Oral ginger intake, highlighted by Arslan and Çelik (2023), was reported as effective in 87% of the reviewed studies, significantly reducing nausea severity and the need for antiemetic drugs. The bioactive compounds gingerol and shogaol exert antiemetic effects by modulating serotonergic receptors in both the gastrointestinal tract and the central nervous system.

Finally, preoperative education and family presence were identified as supportive strategies with indirect benefits in reducing PONV. According to Arslan and Çelik (2023), providing informed preoperative and emotional support throughout the perioperative period helps reduce anxiety and enhance patient comfort. These interventions align with nursing theoretical frameworks such as Orem's Self-Care Theory and Kolcaba's Comfort Theory, underscoring that person-centered care extends beyond pharmacological management and contributes to holistic recovery.

DISCUSSION

Aromatherapy emerged as one of the most promising interventions, supported by consistent evidence across different surgical contexts. The meta-analysis by Wang et al. (2024) and the randomized controlled trials by Rambod et al. (2023) and Amirhosseini et al. (2020) demonstrated that inhalation of essential oils, such as ginger, lavender, peppermint, and lemon, significantly reduced the severity of nausea and, in some cases, the frequency of vomiting. These effects are attributed to olfactory stimulation of the limbic system and cutaneous absorption of bioactive compounds, which influence neuroendocrine and autonomic responses.

However, methodological heterogeneity among the studies, particularly regarding the choice of oils, concentrations used, and mode and duration of administration, limits the generalization of results. The review by Asay et al. (2019) reinforces this limitation, presenting mixed findings regarding effectiveness. Nevertheless, the high level of patient acceptance and the absence of significant adverse effects make aromatherapy a viable option, especially when pharmacological treatment is contraindicated. Its potential underscores the nurse's role in the safe and evidence-based implementation of complementary therapies in perioperative care.

Acupressure at the P6 (Neiguan) point stood out as one of the interventions with the strongest scientific support. Studies by Salamah et al. (2023) and Hofmann et al. (2016) reported significant reductions in both the incidence and intensity of PONV, showing efficacy comparable to that of conventional antiemetics. Stimulation of the P6 point directly modulates the activity of the vagus nerve and brainstem structures involved in the vomiting reflex, promoting autonomic regulation and symptom reduction. Dry cupping, a related technique applied at the same point, also showed promising results (Farhadi et al., 2016), although further validation in multicenter trials is required. The systematic review by Arslan and Çelik (2023) emphasizes acupressure as a safe, accessible, and easily integrated nursing intervention, reinforcing the nurse's autonomous role in applying evidence-based comfort and symptom-control measures.

Regarding music therapy, the literature confirms its indirect benefits in reducing PONV, primarily through anxiety reduction and relaxation promotion.

Çetinkaya (2019) reported significant decreases in nausea and vomiting within the first 24 postoperative hours, while Arslan and Çelik (2023) corroborated that music therapy helps modulate unpleasant symptoms through pleasant sensory stimulation. Grounded in the distraction theory and the gate control theory of pain, music therapy emerges as a non-invasive, person-centered, and low-cost strategy that complements standard postoperative care. However, variability in music style, timing, and duration of exposure highlights the need for protocol standardization to enhance reproducibility and comparability across studies.

Beyond these more extensively studied interventions, several complementary therapies have also shown beneficial effects in the prevention and management of PONV, although supported by a smaller body of evidence. Foot reflexology, for example, has been associated with significant symptom reduction in various clinical contexts by stimulating reflex zones that promote homeostatic balance and relaxation (Shamsikhani & Hosseini, 2025). Despite differences in intervention protocols, findings indicate that reflexology is a safe, well-tolerated, and easily implemented technique.

Controlled breathing represents another effective strategy for enhancing autonomic self-regulation. When combined with isopropyl alcohol inhalation, it has been shown to alleviate nausea during the early postoperative phase by promoting sensory distraction and modulating autonomic activity (Cronin et al., 2015).

Chewing gum, as explored by Darvall et al. (2017), emerged as a simple and cost-effective alternative, demonstrating efficacy comparable to ondansetron in resolving nausea. Its mechanism involves

stimulation of gastrointestinal motility and activation of sensory pathways that interfere with the vomiting reflex. High patient acceptance and ease of implementation make it particularly attractive in surgical settings with limited resources.

Oral ginger intake demonstrated high efficacy in preventing PONV, being reported as beneficial in 87% of reviewed studies (Arslan & Çelik, 2023). The bioactive compounds gingerol and shogaol act as serotonin and dopamine receptor antagonists, reducing emetic stimulation in the vomiting centers. Additionally, preoperative education and family presence showed indirect effects on PONV reduction by lowering anxiety and enhancing emotional comfort. These approaches, grounded in nursing theoretical frameworks such as Orem's Self-Care Theory and Kolcaba's Comfort Theory, emphasize the importance of person-centered, humanized care as a determinant of recovery and well-being.

In summary, this review confirms that non-pharmacological interventions hold significant clinical and therapeutic potential in the perioperative setting. They should be considered as adjuvant or alternative approaches to pharmacological therapy, particularly in patients with high risk, contraindications, or resistance to conventional antiemetics. The variety of interventions analyzed enables personalized and patient-centered care, promoting comfort, autonomy, and humanization of surgical recovery. The demonstrated efficacy of several approaches reinforces the nurse's role as an autonomous therapeutic agent, capable of integrating evidence-based complementary practices into professional care. The implementation of such strategies contributes to improved clinical outcomes, reduced need for anti-

emetics, and more efficient use of healthcare resources.

Despite the relevance of these findings, certain limitations must be acknowledged. Most of the included studies involved small sample sizes and specific clinical contexts, limiting the generalization of results. Significant methodological heterogeneity was also noted, both in study design and in intervention protocols, including the type of essential oil, duration and technique of acupuncture, or length of music exposure, which hindered direct comparisons and prevented quantitative synthesis. Some studies also presented methodological weaknesses, such as lack of blinding and use of non-standardized assessment tools. Moreover, the inclusion of studies with varying levels of evidence may have influenced the overall strength of conclusions.

Future research should prioritize multicenter randomized controlled trials with larger sample sizes and standardized protocols to enhance external validity and comparability. It would also be valuable to explore combined non-pharmacological interventions, for instance, aromatherapy with acupuncture or music therapy, to assess potential synergistic effects in PONV prevention and management.

From a clinical perspective, it is recommended to strengthen perioperative nurses' education and training in the use of these interventions and to integrate them into institutional protocols, ensuring their safe and evidence-based application. Further investigation into the cost-effectiveness of these strategies is also warranted, as their simplicity and low cost may contribute to sustainable healthcare delivery and improved patient outcomes.

CONCLUSION

Overall, this integrative review synthesized the available evidence regarding the effectiveness of non-pharmacological interventions in preventing and managing postoperative nausea and vomiting (PONV). The findings suggest that strategies such as aromatherapy, P6 acupuncture, foot reflexology, chewing gum, music therapy, oral ginger intake, and controlled breathing represent promising approaches with relevant clinical benefits and a low risk profile. Despite methodological heterogeneity and the limitations identified, these interventions demonstrate strong potential as complementary or alternative resources to pharmacological therapy, particularly in contexts of high risk, contraindication, or patient refusal of medications.

The nurse's role in the perioperative setting is central to the implementation of these practices, given the proximity to patients and the ability to integrate safe, low-cost, and person-centered interventions into care. It is therefore essential to invest in the continuous education of professionals, in the standardization of protocols, and in the promotion of methodologically robust research that consolidates scientific evidence and defines clear practical recommendations.

Integration of non-pharmacological strategies into perioperative care represents a significant progress in care quality, contributing not only to the reduction of PONV but also to the overall improvement of surgical experience, recovery, and patient safety. Such approaches reinforce nursing's commitment to evidence-based practice and to the humanization of healthcare.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the research, authorship, and publication of this article.

AUTHOR CONTRIBUTIONS

Conceptualization: PP, MS, and CP; Methodology: PP and CP; Data collection and analysis: PP and MS; Validation: MS and CP; Writing – original draft preparation: PP and MS; Writing – review and editing: CP; Supervision: CP.

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