Summer 6-8-2023

Assessing the Perceived Barriers to the Administration of Adjunctive Aromatherapy in Nurses Caring for Pediatric Patients with Postoperative Nausea and Vomiting: An Evidence-Based Practice Project

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In partial fulfillment of the requirements for the Doctor of Nursing Practice Degree

Abstract

Purpose

This project examines perioperative nurses' perceived barriers to using adjunctive aromatherapy for postoperative nausea and vomiting (PONV) treatment in pediatric patients.

Background

PONV is more prevalent in children than adults. Aromatherapy, a holistic approach using natural oils, has shown promise in treating PONV but faces barriers in clinical practice.

Methods

A mixed-methods evidence-based practice project was conducted at a large urban pediatric hospital in the United States. Pre and post-surveys were administered to evaluate nurses' knowledge and perceived barriers to using adjunctive aromatherapy before and after an educational in-service.

Results

Among 27 perioperative nurses surveyed, antiemetic medications were the primary treatment for PONV. Identified barriers included product availability, caregiver refusal, and patient-specific factors. After the in-service, perceived barriers decreased, and nurses reported greater familiarity with adjunctive aromatherapy and increased likelihood of use.

Conclusion

Increased education promotes the incorporation of adjunctive aromatherapy into clinical practice. To successfully integrate aromatherapy, healthcare organizations should establish oversight teams, staff training, and intervention monitoring. Institutional policies should address product and patient selection, monitoring, and documentation. Implementing these measures ensures consistency, potentially eliminating perceived barriers and promoting aromatherapy use for PONV treatment among nurses.

Keywords: postoperative nausea and vomiting, aromatherapy, essential oils, barriers to integration, perceived nursing barriers, complementary therapies, integrative health

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Assessing the Perceived Barriers to the Administration of Adjunctive Aromatherapy in Nurses Caring for Pediatric Patients with Postoperative Nausea and Vomiting: An Evidence-Based Practice Project

Postoperative nausea and vomiting (PONV) is a common but undesirable and unpleasant consequence for pediatric patients following surgery. The phenomenon of PONV is described as occurring within twenty-four to forty-eight hours following surgery (Ames & Machovec, 2020). The current practice for preventing and managing PONV in pediatric patients is the administration of antiemetic medications (Gan et al., 2020). Studies have suggested aromatherapy as a complementary therapy to strategies already in place that treat nausea and vomiting (Hines et al., 2018). The National Institutes of Health (NIH) (2020) describe aromatherapy as "the use of essential oils from plants (flowers, herbs, or trees) as a complementary health approach." There are thousands of aromatic species used to produce essential oils and each oil consists of its own chemical constituents that give the oil its medicinal properties (Baptista-Silva, 2020).

At a major urban pediatric hospital in the southeastern United States, perioperative nurses frequently care for patients with postoperative nausea and vomiting (PONV). Despite the availability of adjunctive aromatherapy as a standard of care treatment option, it is infrequently utilized. To investigate the reason for this underutilization, a surgical pediatric nurse practitioner with expertise in managing PONV initiated an evidence-based practice project. The project investigator sought to identify the reasons behind the infrequent use of adjunctive aromatherapy in managing patients with PONV by assessing the perceived barriers to its use among perioperative nurses. Through this understanding, the project investigator aims to pave the way

for future initiatives that will effectively increase the use of this valuable treatment among perioperative nurses, ultimately improving patient outcomes.

Background and Significance

Nausea and vomiting are unpleasant adverse effects of anesthesia that frequently impact postoperative patients. The incidence at which a patient considered low-risk may experience the phenomenon of PONV is about 20%-30% (Kovac, 2021). Patients deemed high-risk for the development of PONV have an 80% likelihood of suffering from its effects (Kovac, 2021). Children are disproportionately affected in that they experience postoperative nausea and vomiting (PONV) at a rate of at least two times more than adult patients (Kovac, 2021).

Postoperative nausea and vomiting (PONV) remain significant contributors to pediatric morbidity following surgery (Kovac, 2021). The incidence of PONV ranges from 8-42% across all pediatric surgical patients and 70-80% in high-risk pediatric patients (Kovac, 2021). Postoperative patients suffering from nausea and vomiting are at risk for dehydration, electrolyte disturbances, wound dehiscence, and other complications that may result in a lengthened recovery time and an extended hospital stay (Simon, 2020).

A cost data analysis by Gress et al. (2020) found patients who experience PONV recover at the cost of $102.43 more than patients without PONV. This study also concluded healthcare systems lose revenue from patients readmitted to the hospital with PONV (Gress et al., 2020). Green et al. (2017) completed a study to identify causes of unplanned hospital admissions following ambulatory surgeries in pediatric patients and concluded PONV was one of the top three reasons patients were unexpectedly admitted to the hospital following surgical procedures. Kovac (2021) noted PONV to be the fourth most common reason for unplanned admissions in pediatric patients following surgery. In the state of Georgia, the cost of one inpatient day in the

hospital is $1,939 per patient (Kaiser Family Foundation, n.d.). With over 3.9 million pediatric surgeries each year in the United States these numbers can add up quickly, costing healthcare systems significant revenue loss (Gress et al., 2020; Rabbitts & Groenewald, 2020).

Problem Statement

PONV is a common occurrence in pediatric patients undergoing surgery. While aromatherapy is an accessible option to alleviate PONV, it is infrequently utilized by perioperative nurses. To improve the integration of aromatherapy into clinical practice, it is crucial to identify and address any perceived barriers nurses may encounter in administering it as an adjunct therapy, rather than solely relying on antiemetic medication.

Purpose of the Project

The aim of the evidence-based practice (EBP) project is to examine nurses' perceived barriers to administering adjunctive aromatherapy so future work can be done to eliminate the barriers and enhance the use of aromatherapy in clinical practice to manage PONV. Reducing the unpleasant experience of PONV will prevent complications and prolonged hospital stays that result from the phenomena and will increase patient comfort and overall satisfaction with care. This project will illustrate the value of adjunctive therapies in enhancing health outcomes for patients while promoting a holistic approach to patient care.

Clinical Practice Question

The investigator organized the clinical question using the problem, intervention, comparison, outcome (PICO) format to conduct the evidence-based practice project. The clinical question asks, "For nurses caring for pediatric patients with postoperative nausea and vomiting, what are the perceived barriers to administering adjunctive aromatherapy?"

Review and Synthesis of the Literature

The literature search was conducted using the specific databases of CINAHL, Cochrane Library, and Nursing Reference Center Plus. The search consisted of the key topics of the project, including aromatherapy or essential oils, postoperative nausea and vomiting or PONV, and pediatrics or children. The initial search terms used were aromatherapy or essential oils and pediatric or children or adolescents or youth or child or teenager, and postoperative nausea and vomiting or PONV or post operative nausea and vomiting. MeSH terms were also used which included aromatherapy and children or pediatric and postoperative nausea and vomiting. The parameters implemented to limit the search included **the** years 2016 to present, articles in English**,** and published in academic journals. Additional sources were identified through individual searches of cross-references of selected articles. Please see **the** Appendix for **the** search strategy. Literature was evaluated using the Johns Hopkins Nursing Evidence-Based Practice Appendix E: Research Evidence Appraisal Tool (Dang & Dearholt, 2018).

Risk Stratification for the Development of PONV

Gan et al. (2020) searched over 400 articles to provide the most up-to-date guidelines for the management of postoperative nausea and vomiting (PONV). The guidelines were developed so providers caring for adult and pediatric patients could refer to them for the most recent evidence surrounding best practices to prevent and manage PONV. Since pediatric risk factors for developing PONV differ from those of adult patients, a systematic review of 53 articles on PONV in pediatric patients was also completed. Several patient factors that contributed to an increased risk of developing PONV included personal or family history of PONV, personal history of motion sickness, females who reached menarche, and children over the age of three years. Perioperative factors which placed pediatric patients at an increased risk for developing PONV were the type of surgery (strabismus surgery, otoplasty, or adenotonsillectomy), length of

surgery (over 30 minutes), use of certain anesthetic gases, and long-acting opioids administered postoperatively. Patients who fell in the high-risk category for PONV had an 80% incidence of developing the phenomenon compared to patients in lower-risk categories whose estimated incidence was 30% (Gan et al., 2020).

Kovac (2021) recognized many of the same risk factors identified in the review by Gan et al. (2020) that are likely to contribute to the development of PONV in pediatric patients. Kovac reviewed over 200 articles from December 2006 to July 2020. Surgical procedures found to place patients at higher risk of PONV included herniorrhaphy, orchiopexy, laparoscopy, and brain surgeries, which the review by Gan et al. did not cite (Kovac, 2021). Anxiety was described as a contributor to nausea and vomiting in children (Kovac, 2021).

Simon (2020) performed a quasi-experimental study to evaluate the effectiveness of integrating a PONV risk scoring system into pediatric patients' charts to predict their risk of developing PONV so providers could intervene appropriately with prophylactic antiemetic administration. The screening tool only addressed patients' history of PONV, as the measures to assess other risk factors in pediatric PONV (age > 3 years, strabismus surgery, surgery length > 30 minutes, and contributory family history of PONV) were already being screened by the facility. A total of 2,279 pre-intervention cases and 2,006 post-intervention cases of patients 3 to 18 years of age, classified into five cohorts based on surgery type, were reviewed. The screening tool for PONV increased provider awareness of patient risk factors for developing PONV leading to a decreased rate of PONV in patients following the introduction of the tool. In the pre and post-intervention patients who experienced PONV (n = 273), the highest incidence of PONV was in patients undergoing orthopedic procedures (n = 98) followed by general surgery patients (n = 82) (Simon, 2020).

The findings from the above studies demonstrate several risk factors that place pediatric patients at high risk for developing PONV, which clinicians involved in the care of the patients should consider throughout the perioperative period (Gan et al., 2020; Kovac, 2021; Simon, 2020). The most frequently identified factors placing pediatric patients at high risk of developing PONV include a personal or family history of PONV and/or motion sickness, surgery length greater than 30 minutes, inhalation of volatile anesthetic gases, use of long-acting opioids post-operatively (Gan et al., 2020; Kovac, 2021; Simon, 2020) and certain surgical procedures including strabismus surgery and other surgeries of the eyes, ears, nose, and throat (Gan et al., 2020; Kovac, 2021; Simon, 2020), and herniorrhaphy, abdominal surgeries, and neurosurgeries (Kovac, 2021; Simon, 2020). There is evidence to suggest pain and anxiety are contributory to PONV in pediatric patients (Kovac, 2021).

Cost-Effectiveness and Current Guidelines for Treating PONV in Children

In their systematic review, Gan et al. (2020) identified several methods to decrease the standard risks of PONV in pediatric patients, which included optimization of hydration status in patients, use of regional anesthesia when appropriate, avoidance of general anesthesia and anesthetic gases considered volatile, minimization of opioids in the intraoperative and postoperative settings, and replacing neostigmine for neuromuscular blockade reversal with Sugammadex. Caudal blocks, intravenous acetaminophen in the preoperative setting, and non-steroidal anti-inflammatory medications administered for analgesia may decrease the overall use of opioids thus reducing PONV (Gan et al., 2020). Ondansetron remains the "gold standard", a 5-hydroxytryptamine 3 ($5\text{-}HT_3$) receptor agonist in the management of PONV whether given prophylactically or as a rescue antiemetic (Gan et al., 2020, p. 419). As with adult patients, pediatric patients at high risk for developing PONV should receive multimodal prophylactic

antiemetics from separate pharmacologic classes, specifically intraoperative steroids, such as dexamethasone, in combination with 5-HT_3 receptor agonists, like Ondansetron (Gan et al., 2020).

Adverse effects of Ondansetron are headache, elevated transaminases, and constipation, and as with all antiemetics the lowest dose should be given when possible (Gan et al., 2020). Treatment with an antiemetic medication from a different drug class should be provided when prophylactic antiemetics fail or patients develop PONV without having received a prior antiemetic (Gan et al., 2020). Finally, the average antiemetic drug cost patients $3.66 (hospital cost of $0.304) per dose and patients' willingness to pay for the prevention of PONV was $30 ($80 for parents of pediatric patients). PONV increased patient time in the post-anesthesia care unit (PACU) by one hour, amounting to $74 (Gan et al., 2020). Thus, there is a need for more research surrounding nonpharmacologic therapies like acupuncture and aromatherapy to treat PONV from a patient outcome and cost basis (Gan et al., 2020).

Gress et al. (2020) performed a financial evaluation to determine the economic impact of PONV. Patients who experienced PONV spent approximately 63 more minutes in the PACU versus patients without PONV, resulting in an increased cost of $102.43 for recovery time in the PACU. Hospitals lost revenue for patients admitted with post-discharge nausea and vomiting by filling a bedspace that would normally occupy a patient with a more profitable diagnosis. The hospital cost for one dose of an antiemetic medication was $0.35 while the cost to patients per one antiemetic dose was $4.17. Surgical patients' median willingness to pay out of pocket for antiemetic medications was $46.85, with the actual cost for medications that prevent PONV much lower per patient. Patient satisfaction and quality of life are increased when PONV is prevented (Gress et al., 2020).

According to a quasi-experimental study by Mohr et al. (2021), one episode of vomiting increases a patient's recovery time in the PACU by approximately 20 minutes. Mohr et al. noted antiemetics are the go-to treatment for PONV. Adverse effects of antiemetics include headache, constipation, QT prolongation, and drowsiness and antiemetics may only improve symptoms in 20-30% of patients due to the timing of drug administration and delays in administration. Patients who experienced PONV have a higher rate of dissatisfaction in their care (Mohr et al., 2021). Aromatherapy was found to be an effective adjunct to antiemetics in reducing PONV and further studies should be conducted involving larger sample sizes (Mohr et al., 2021).

Overall findings indicate it is most cost-effective for healthcare systems to prevent PONV in patients (Gan et al., 2020; Gress et al., 2020; Mohr et al., 2021). PONV increases patient recovery time in the PACU significantly (Gan et al., 2020; Gress et al., 2020; Mohr et al., 2021). Patients are willing to pay higher costs than the cost of antiemetics to prevent PONV (Gan et al., 2020; Gress et al., 2020) and are more satisfied with their care when PONV is avoided (Gress et al., 2020; Mohr et al., 2021). Certain antiemetic medications like Ondansetron have a side-effect profile that includes headache, constipation (Gan et al., 2020; Mohr et al., 2021), and other adverse effects of antiemetic medications include elevated transaminases (Gan et al., 2020), QT prolongation and drowsiness (Mohr et al., 2021). Antiemetics may not be effective in preventing PONV in all patients (Mohr et al., 2021) and complementary therapies should be further investigated as some evidence suggests they may be beneficial adjuncts in reducing PONV (Gan et al., 2020; Mohr et al., 2021).

Impact of Aromatherapy on Patient Health Outcomes

Nausea and Vomiting

Fearrington et al. (2019) performed a nurse-led prospective, double-blind randomized control trial to evaluate the effectiveness of aromatherapy to manage PONV in ambulatory surgical adult patients (n=322). Patients in the intervention group (n=143) who were offered peppermint, ginger, or a combination of the two aromatherapies experienced a decrease in the need for antiemetics following surgery. Aromatherapy positively impacted the management of not only nausea in patients, but also stress and anxiety, pain, and insomnia.

Hamilton et al. (2022) implemented a quality improvement project in two perioperative settings (post-anesthesia care unit and medical-surgical floor) by incorporating aromatherapy as an adjunctive treatment for pain, anxiety, and PONV in adult patients undergoing gynecologic surgery. Patients who received aromatherapy for nausea (n=35) reported reduced nausea scores following the intervention. The decrease in scores was statistically significant, with the average pre-aromatherapy score of 5.829 on a 10-point analog scale dropping to 2.543 after the intervention (p=0.000). This project also demonstrated surgical patients who received aromatherapy for pain (n = 15) and anxiety (n = 7) showed a decrease in their symptoms within 15 minutes of administration (Hamilton et al., 2022).

Amedio (2016) evaluated the impact Quease Ease (QE), a combination of peppermint, spearmint, lavender, and ginger aromatherapies, had on decreasing PONV in adult patients when used in addition to antiemetics. The pilot study was conducted from February 2015 through May 2015 and involved 318 patients undergoing outpatient orthopedic surgeries. Nurses in the post-anesthesia care unit (PACU) administered QE as the initial therapy for nausea before offering an antiemetic. The QE intervention decreased nausea scores and 37% of patients did not require any

additional treatment for PONV following its use. There was also a decrease in rescue antiemetics given to patients who received the aromatherapy. The patients who received aromatherapy spent less time (6 minutes) in PACU following the intervention.

Mohr et al. (2021) completed a quasi-experimental study involving 100 hospitalized adult patients across four separate units (medical, surgical, cardiac, and orthopedic units). Patients were placed in three arms of the study based on their choice of intervention which included the option of peppermint aromatherapy in addition to antiemetic therapy for nausea, peppermint aromatherapy alone, or antiemetic therapy alone for the treatment of nausea and vomiting. The third arm of antiemetics alone was dropped as only three patients opted for this option. Patients experienced a decrease in nausea and vomiting across the aromatherapy arm (n = 65) and across the combined aromatherapy and antiemetic arm (n = 35). Results of the study support the use of peppermint aromatherapy as an adjunct to antiemetics in treating nausea and vomiting, or as a stand-alone therapy for the treatment of nausea and vomiting (Mohr et al., 2021).

A quality improvement project was piloted by Brown et al. (2018) on a short-stay surgical unit to assess if a blended orange and ginger aromatherapy patch decreased nausea in 50 postoperative adult patients. Patients were primarily female (n = 44) which placed them at higher risk for the development of PONV. Participants were administered aromatherapy patches consisting of a blend of orange and peppermint scents. The aromatherapy patch decreased PONV in most participants, and there was no increase in nausea reported by many of the participants following the aromatherapy intervention.

Karsten et al. (2020) examined 100 postoperative adult patients to correlate peppermint aromatherapy's impact on PONV. Patients in the intervention group (n = 50) were given the peppermint aromatherapy intervention upon waking in the post-anesthesia care unit and asked to

rate their nausea on the Nausea Scale with Descriptors (0- no nausea, 5- severe nausea), while the control group (n = 50) received the usual PONV treatment of antiemetics. The intervention group experienced PONV at an overall rate of 4% less than the control group and had an overall nausea scale rating of 1-2 compared with the control group's rating of 3-4. The findings lacked statistical significance; however, peppermint aromatherapy should still be considered for adjunctive treatment of PONV, and more research on its effects should be piloted on larger populations (Karsten et al., 2020).

Momani et al. (2017) performed a systematic review of 53 studies that used complementary therapies to decrease nausea and vomiting in oncology patients. Orange popsicles released an aroma that decreased nausea in adult patients across multiple studies. Bergamot essential oil increased nausea and anxiety in pediatric patients. More research needs to be developed around complementary therapies for nausea and vomiting in pediatric patients, as a knowledge gap is present (Momani et al., 2017).

Hines et al. (2018) performed a systematic review of studies published between January 1st, 2011 to March 2nd, 2017 and found 16 studies assessed the impact of various types of inhaled aromatherapy (ginger, peppermint, spearmint, lavender, cardamom, and some combination aromatherapies) on PONV in participants. Participants who received the aromatherapy intervention versus placebo required fewer antiemetics to treat nausea. Isopropyl alcohol alleviated symptoms of nausea faster than antiemetics alone, and both adult and pediatric patients who received isopropyl alcohol inhalation therapy required fewer rescue antiemetics. Eight of the sixteen studies showed peppermint aromatherapy (alone or in combination with other essential oils) had little to no impact on nausea severity (Hines et al., 2018). Patients who received aromatherapy reported higher levels of satisfaction in their care. The overall evidence of

the 16 studies was low for several reasons and it was recommended future studies should be performed with more accuracy (Hines et al., 2018).

Abril et al. (2019) conducted a pilot study to assess the impact of peppermint aromatherapy on postoperative nausea in women undergoing laparoscopic abdominal surgery. Participants were offered aromatherapy in the post-operative setting as a first-line treatment for nausea. Of the 25 participants, 88% (n = 22) used the aromatherapy inhaler in the post-anesthesia care unit (PACU) and reported a decrease in their nausea following the intervention. 73% of patients had complete relief of nausea after using aromatherapy in the PACU. The study was not statistically significant in correlating PONV with the aromatherapy intervention, but the results do support a clinical significance in aromatherapy use (Abril et al., 2019).

Czarnecki et al. (2022) conducted a quality improvement project to develop and implement an aromatherapy program aimed at treating PONV in pediatric patients. The sample included 191 children from 3 to 22 years old and was primarily conducted on an inpatient surgical floor. Patients who received the aromatherapy intervention underwent various procedures such as spinal fusions and appendectomies (81.7%) or dental procedures (12.6%). Peppermint and lavender aromatherapy inhalers were offered for generalized patient discomfort. Ginger, peppermint, lavender, and vetiver inhalers were administered to patients with upset stomachs. Patients who were anxious, sad, or agitated were offered lavender, vetiver, bergamot, or wild orange inhalers. For aromatherapy sessions with documented nurse responses (n = 290), the majority of cases (n = 125 or 43.1%) demonstrated an improvement in symptoms following aromatherapy inhaler use. Sessions involving lavender or peppermint scents improved symptoms most frequently. Throughout the entire project, there were no adverse events reported.

Peppermint essential oil or a combination of peppermint with other essential oils alleviates symptoms of nausea and PONV in adult patients across several studies (Abril et al., 2019; Amedio, 2016; Brown et al., 2018; Czarnecki et al., 2022; Karsten et al., 2020; Mohr et al., 2021). Multiple studies have found peppermint aromatherapy decreases the overall antiemetic or rescue antiemetic use in postoperative adult patients (Amedio, 2016; Fearrington et al., 2019; Hines et al., 2018). Peppermint essential oil also reduced anxiety and pain in adult patients (Hamilton et al., 2022). Inhalation of isopropyl alcohol decreased PONV in pediatric patients faster than antiemetics and patients needed fewer rescue antiemetics with the intervention (Hines et al., 2018). Bergamot essential oil increased nausea and anxiety in pediatric patients (Momani et al., 2017) while peppermint, ginger, or a combination of the two essential oils decreased stress, anxiety, pain, and/or nausea in pediatric patients (Czarnecki et al., 2022; Fearrington et al., 2019). Peppermint, lavender, ginger, or a combination of those scents provided relief from upset stomach, agitation, discomfort, and anxiety in postoperative pediatric patients (Czarnecki et al., 2022). More studies should be conducted to evaluate the effects of aromatherapy on PONV in children (Hines et al., 2018; Karsten et al., 2020; Momani et al., 2017).

Stress, Anxiety, and Pain

Weaver et al. (2019) conducted a pilot study to determine aromatherapy's impact on improving symptoms of nausea, pain, or anxiety in 90 pediatric palliative care patients. Aromatherapy scents were assigned to each patient based on symptoms with a lavender mix for anxiety, a ginger combination for nausea, and a peppermint mix for pain or discomfort. Validated scales were used to assess outcomes for patients with the BARF scale for patients with nausea (n = 30), Wong-Baker FACES scale for patients experiencing pain (n = 30), and Children's Anxiety and Pain Scale (CAPS) for patients with stress or anxiety (n = 30). The

results demonstrated aromatherapy improved patient symptoms across all three areas for up to 60 minutes post-intervention.

Ghaderi and Solhjou (2020) conducted a randomized control trial to examine the impact of lavender aromatherapy on stress, anxiety, and pain in pediatric patients undergoing dental procedures. The study involved a total of 24 pediatric patients, with 12 patients in the intervention and control groups each. Patient salivary cortisol levels and heart rates were obtained to assess the overall stress of patients before and during the procedure. Patients rated their pain using the Face Rating Scale (FRS). Lavender aromatherapy decreased stress and anxiety, and pain perception in pediatric patients (Ghaderi & Solhjou, 2020).

A randomized control clinical trial was conducted by Arslan et al. (2020) to determine the physiologic and psychologic effects of lavender aromatherapy on the stress and pain levels of pediatric patients 6-12 years of age (n = 126) undergoing dental extraction. Researchers administered the Face Image Scale (FIS) to assess the anxiety levels of patients at four separate intervals, preoperative, inhalation (intervention group only), anesthesia injection, and tooth extraction. The FLACC scale and Wong-Baker Faces scale were administered to patients based on their developmental level and assessed at two intervals, anesthesia injection, and tooth extraction. Children receiving lavender aromatherapy (n = 63) were found to have decreased anxiety and pain compared to the control group (n = 63). Heart rate and blood pressure were measured at the same four intervals as the FIS to assess the physiologic effects of lavender aromatherapy. Children who received the lavender aromatherapy had decreased blood pressures and heart rates following tooth extraction compared to the control group. Overall, the findings correlated lavender aromatherapy with calming effects on children physiologically and psychologically (Arslan et al., 2020).

A common theme from these studies is inhaled lavender aromatherapy contains analgesic and anxiolytic properties in the pediatric population (Arslan et al., 2020; Ghaderi & Solhjou, 2020; Weaver et al., 2019). Lavender aromatherapy also demonstrates physiologic effects of decreasing blood pressure and heart rate in patients undergoing procedures (Arslan et al., 2020; Ghaderi & Solhjou, 2020). Ginger essential oil decreases nausea in pediatric patients while peppermint essential oil decreases pain (Weaver et al., 2019).

Administration of Aromatherapy

Methods of Administration, Types of Essential Oils, and Mechanism of Action

Baptista-Silva et al. (2020) performed a literature review to provide information surrounding the components and biomedical application of essential oils in their volatile form. Essential oils are organic chemical compounds derived from many sources in nature like flowers, plants, roots, and seeds. The molecular structure of the essential oil determines its effect. The oils can be extracted from their source using various techniques like water or steam distillation and solvent extraction. Once extracted, essential oils can be inhaled through the respiratory tract and distributed to the bloodstream. The oils are rapidly absorbed through inhalation and cross the blood-brain barrier interacting with the central nervous system to produce biologic effects like sedation, anticonvulsant, antiemetic, and analgesia (Baptista et al., 2020).

Allard and Katseres (2018) reviewed research surrounding essential oils to discuss their administration, common use, reported benefits, as well as risks and contraindications. When essential oils are delivered via inhalation the olfactory bulb stimulates the limbic system potentially affecting a person's heart and respiratory rate, blood pressure, memory, and hormone levels. The chemical constituents of essential oils determine their effects and may contain properties that are antibacterial, antiviral, antifungal, and anti-inflammatory. To assess the

chemical components of an essential oil, gas chromatography and mass spectrometry can be used. Commonly used essential oils cited in the literature review by Allard and Katseres (2018) include bergamot for a calming effect, eucalyptus for muscle aches and arthritis pain, and lavender for anxiety and insomnia.

Farrar and Farrar (2020) discussed ways in which clinicians and/or patients could deliver aromatherapy in the publication *Clinical Aromatherapy.* There are four ways aromatherapy can be administered which include a topical application (essential oil is transdermally absorbed such as with massage therapy and perfume), oral absorption via capsulated essential oils, internal absorption using a scented suppository or vaginal douche, and finally via inhalation either direct (diffuser, cloth) or indirect (candles, room sprays). The mechanism of action for the inhalation of aromatherapy involves triggering the olfactory bulb from the nostrils, which provides a brain stimulus that activates an emotional response via neurotransmitters from the amygdala and hippocampus (Farrar & Farrar, 2020). The response may lead to feelings of calmness, provide an analgesic effect, and have a physiologic effect on blood pressure, heart rate, temperature, and tension. The aromatherapy particles also pass through the upper and lower respiratory tracts, then pulmonary vessels, and finally into the bloodstream where the particles can disperse into organs and tissues. The authors discussed several types of essential oils, their derivative, and their clinical use. Many essential oils were found effective in addressing several common ailments including lavender for analgesic and anxiolytic properties, mandarin for analgesia, anxiety and as a digestive tonic, sweet orange for anxiety and analgesia, ginger for immunity, digestive support, and analgesia, and finally peppermint for analgesia, inflammation, and digestion (Farrar & Farrar, 2020).

Arslan et al. (2020) described a similar mechanism of action for inhaled aromatherapy noting emotions and intellect of persons have a direct impact on the central nervous system. In discussing inhaled lavender aromatherapy's anxiolytic properties, Arslan et al. described the process in which the aromatherapy particles are absorbed and thereafter a person's limbic system, amygdala, and olfactory bulb release stress-reducing hormones like endorphins and serotonin to alter feelings of anxiety and pain.

Conlon et al. (2017) noted the following essential oils and their use: lavender to promote relaxation and a sense of calm, mandarin for anxiety relief, restlessness, indigestion, nausea and to boost the spirit, spearmint for sleep or nausea and hiccup relief, lemon for mental fatigues and headaches, and finally ginger for nausea, upset stomach, constipation, diarrhea, and muscle soreness.

Boyce and Natschke (2019) discussed the types of aromatherapies considered in their study and the use of each: lavender for stress and anxiety reduction, insomnia, headaches, and nausea, ginger for nausea, motion sickness, congestion, and sinusitis, peppermint for nausea, indigestion, pain, headache, inflammation, and spasms, and lastly sweet orange for anxiety, nervousness, and insomnia.

Consistencies among the studies include the use of lavender essential oil for stress and anxiety, peppermint essential oil for nausea, and sweet orange and mandarin essential oils for anxiety and restlessness (Arslan et al., 2020; Boyce & Natschke, 2019; Conlon et al., 2017; Farrar & Farrar, 2020). Several studies also described similar mechanisms of action for aromatherapy which contribute to its biologic effects (Allard & Katseres, 2018; Arslan et al., 2020; Baptista-Silva et al., 2020; & Farrar & Farrar, 2020).

Practice Implementation, Clinician Perception and Adverse Effects of Aromatherapy

Conlon et al. (2017) conducted a quality improvement pilot project on a general pediatric unit to assess the process of implementing aromatherapy into the care of pediatric patients. The importance of selecting aromatherapy suppliers who could provide safety data for the product, specific product information, and offered products with appropriate labels and packages was vital. The process of providing education to nursing staff surrounding the implications, administration, and contraindications of aromatherapy administration must be carefully outlined (Conlon et al., 2017). Following the implementation of the aromatherapy intervention, no adverse effects were reported by patients; however, some nurses who administered the aromatherapy experienced sneezing, nausea, and watery eyes. Administering certain aromatherapy scents to patients with allergies or aversions specific to the scent should be avoided and caution is advised in administering aromatherapy to patients with asthma or restrictive airway disease. Most nurses on the general pediatric unit favorably responded to implementing aromatherapy administration into patient care. The staff reported willingness to try the intervention if there was a chance it would improve the health outcomes of their patients. The staff also appreciated an alternative option to medications to provide patients with symptom relief (Conlon et al., 2017).

Allard and Katseres (2018) examined the safety of essential oils for use in acute care settings. Essential oils are not regulated by the Food and Drug Administration (FDA); therefore, clinicians need to investigate the source of the essential oil and ensure the product is of high quality and has undergone gas chromatography and mass spectrometry testing. This testing helps determine if the essential oil has been adultered, or combined with other substances, such as ethanol or mineral oil, that would promote an adverse response. Adverse reactions to essential

oils are determined by the chemical composition, quality, dilution, and route of administration of the oil and by the age of the patient. Allard and Katseres (2018) recommend a policy and protocol be set in motion before incorporating aromatherapy into practice and that staff be educated on the safety and use of essential oils.

Boyce and Natschke (2019) discussed the necessary steps for consideration when implementing an aromatherapy program in a large tertiary care hospital. The selection of an essential oil vendor should consider the chemical compositions and safety of the offered product, as well as the wholesale availability and manufacturing standards of the country in which the product originates. Institutions must have constant oversight and create policies surrounding the safe use of aromatherapy and nurses should consider the administration of aromatherapy the same way in which they do medications. Nurses who requested to administer aromatherapy were required to complete a module that discussed clinical indications for aromatherapy, contraindications and adverse effects of aromatherapy, and administration techniques. Following module completion, the nurses completed a competency assessment with a registered nurse validated to administer aromatherapy. Once the program was fully implemented, around 250 nurses became certified to administer aromatherapy. Contraindications to aromatherapy administration included patients with asthma or restrictive airway disease and patients with allergies or sensitivity to essential oils. The implementation of aromatherapy was enthusiastically received by staff (Boyce & Natschke, 2019).

Michlig et al. (2021) performed a mixed methods study at a large academic pediatric hospital to evaluate the knowledge and perceptions of aromatherapy pediatric clinicians possessed. The surveys of 987 participants with a makeup of registered nurses (62%), physicians (15%), advanced practice providers (7%), and fellows and resident physicians (3%) were

reviewed. A large percentage of respondents found it important to have knowledge of non-pharmacologic treatment options for patients and 85% of participants had some knowledge of aromatherapy. Approximately 95% of participants never or seldomly discussed the use of essential oils with their patients. Over half of the respondents were open to incorporating aromatherapy into their current practice but would like more information surrounding the evidence, safety, and several other aspects of aromatherapy (Michlig et al., 2021).

Expanding on the study by Michlig et al. (2021), Czarnecki et al. (2022) successfully implemented an aromatherapy program in the same pediatric hospital system, aimed at managing symptoms of agitation, anxiety, upset stomach, discomfort, and sleep issues in children undergoing surgery. The team decided to use aromatherapy inhalers of various essential oils Before introducing the aromatherapy intervention to patients, the team worked with nursing and medical committees throughout the facility to develop evidence-based policies and procedures surrounding the use of adjunctive aromatherapy. A key component to the integration of aromatherapy in the clinical setting involved providing multi-modal education, like posters and hands-on or video demonstrations, to nurses and other clinicians interested in administering the aromatherapy. The education included guidelines for selecting which type of aromatherapy inhaler to administer based on patient symptoms, how to administer the aromatherapy, safety considerations, contraindications for its use, and documentation requirements. The aromatherapy products were stored in a secure location which required a key to access.

Each of these studies demonstrates the willingness of clinicians to discuss barriers and facilitators to implementing aromatherapy programs into hospital systems and to consider adding aromatherapy to current patient care practices (Allard & Katseres, 2018; Boyce & Natschke, 2019; Conlon et al., 2017; Michlig et al., 2021). Three of the studies (Boyce & Natschke, 2019;

Conlon et al., 2017; Czarnecki et al. 2022) addressed concerns about the adverse effects of aromatherapy in patients with restrictive airway disease and asthma.

Strengths and Limitations of the Evidence

The evidence supports postoperative nausea and vomiting (PONV) is a frequent occurrence in pediatric patients and should be managed swiftly and effectively (Gan et al., 2020; Kovac, 2021; Simon, 2020). Though a wealth of research exists surrounding aromatherapy, there are limited studies to determine its clinical effects, particularly in the pediatric population. Despite limited research, the studies explored herein have found aromatherapy to be an effective intervention in managing pain, anxiety, nausea, and vomiting in pediatric patients; however, sample sizes were small, and only two randomized control trials were included (Arslan et al., 2020; Ghaderi & Solhjou, 2020; Weaver et al., 2019). There is strong support in the literature for further exploration of complementary therapies and aromatherapy in the treatment of PONV for children and adults (Gan et al., 2020; Hines et al., 2018; Karsten et al., 2020; Mohr et al., 2021; Momani et al., 2017). The primary objective of this project is to identify the barriers faced by nurses to using aromatherapy in the care of pediatric patients with PONV. By recognizing these barriers, future evidence-based practice initiatives can be developed to address them effectively, ultimately promoting the utilization of aromatherapy and bridging the existing knowledge gap surrounding its efficacy in treating PONV among children.

Project Development Using the Iowa Model of Evidence-Based Practice to Promote Quality Care Conceptual Framework

Conceptual frameworks prove helpful to nurses in providing a logical approach to investigating and implementing practice changes related to an identified health phenomenon (McCaffrey, 2012). The project lead investigated many conceptual frameworks and considered

how each one could guide the DNP project. Ultimately, the project lead framed the DNP project using the Iowa Model of Research-Based Practice to Promote Quality Care (Buckwalter et al., 2017). The Iowa Model provides the guidance needed to develop and evaluate new practice approaches in healthcare with its stepwise order, straightforward approach, and ease of application to the DNP project focusing on practice change in the hospital using adjunctive aromatherapy.

Overview of The Iowa Model

In the early 1990s, nurses from the University of Iowa Hospitals and Clinics identified a need for a practice model that would promote clinicians' integration of research findings with clinical practice (Buckwalter et al., 2017). To address this need, the team of nurses created the Iowa Model of Research-Based Practice to Promote Quality Care. Buckwalter et al. noted with time, practices grounded in research became described as evidence-based practices and nurse scholars thereafter revised the Iowa Model name to the Iowa Model of Evidence-Based Practice to Promote Quality Care (see Figure 1). This model serves as a guide for the process of translating evidence gathered from research into clinical practice (Buckwalter et al., 2017). Today, the Iowa Model remains one of the most frequently used evidence-based practice frameworks by nurses (Speroni et al., 2020).

DNP Project Planning Using the Iowa Model

The cause issue for the EBP project is postoperative nausea and vomiting (PONV) in pediatric patients. Following the steps of the Iowa Model, the project lead formed an evidence-based practice team of doctorally prepared nurses to further explore and synthesize the evidence involving aromatherapy in the treatment of PONV. The team met to discuss the evidence and conclude whether the EBP project should be pursued or if more research was needed. Arriving at

the second decision point of the Iowa Model, the team agreed enough quality evidence existed to pursue the evidence-based practice change.

Project Design

This was an evidence-based practice project designed to assess perceived barriers identified by perioperative nurses to incorporating adjunctive aromatherapy into clinical practice to treat patients with PONV. To achieve this objective, the project employed a mixed-methods approach. A pre-post design was used, collecting data before and after an educational in-service on the use of aromatherapy. This design facilitated the evaluation of the effectiveness of the in-service in reducing perceived barriers among nurses.

Methodology

Population and Sample Size

The target population for the project was pediatric nurses working in three perioperative settings, the post-anesthesia care unit (PACU), day surgery, and a general postoperative surgical floor. Participants were recruited by convenience sampling. Specifically, the perioperative unit managers notified nursing staff of the in-service that would take place during the shift huddle and requested their attendance. There were no inclusion criteria outside of the participant having to be an employed nurse of the facility and work in the perioperative areas for which the in-service was held. A total of 27 participants was achieved. Demographic data were collected from the participants and included years of nursing experience, current nursing license, and the highest level of education achieved.

Setting

The project was implemented across three perioperative units at a large, 280-bed urban pediatric hospital in Georgia. The involved units were the PACU, day surgery, and general

postoperative surgical floor. The typical patient population within these units consists of pediatric patients undergoing a surgical procedure. Common surgeries for patients in these areas are orthopedic, neurologic, and surgeries involving the head, eyes, ears, nose, throat, or sinuses. We selected these units for their diverse patient population and high volume of surgical procedures performed. The nurses were not offered any incentive for their participation. At the time of project implementation, there was no procedure in place for administering adjunctive aromatherapy.

Project Implementation

Perioperative nurses were asked by their unit managers to attend an in-service on the clinical use of aromatherapy for PONV. The project lead delivered the in-service using a brochure created for the nurses (see Figure 2). Dr. Margaret Gettis, a project team member and an expert in EBP, assisted in introducing the project lead and handing out the brochure and surveys to the participants. Participants were asked to complete a pre-and post-in-service survey. Both surveys were administered in a paper format and there was no identifying information of the participants included; instead, a unique participant ID number was written on each paired pre and post-survey to compare responses. The nurses were instructed to complete the pre-in-service survey before the presentation and the post-in-service survey immediately following the presentation. The surveys were collected and stored in a secure location until data analysis. Data were transcribed from the written surveys into an Excel document for organizational and storage purposes. Once this was completed the data were transferred from Excel into another software system designed for analyzing data, Statistical Package for the Social Sciences (SPSS) version 28.

Measures

We received permission to customize a survey created by Michlig et al. (2021). We carefully reviewed the original survey questions and determined which questions were most relevant to our project and added new questions that were considered crucial to the success of the project. This comprehensive review resulted in the development of two surveys: a pre-in-service survey and a post-in-service survey. These surveys were tailored to the unique demands of the project, ensuring the data collected would accurately reflect the current state of affairs and any gaps in knowledge or practice. We used these surveys to conduct a thorough gap analysis, which helped to identify the specific areas where future interventions were needed. By customizing the surveys in this way, we were able to gather targeted and relevant data, which will inform the development of strategies and interventions to promote the future use of adjunctive aromatherapy in clinical practice.

The pre-in-service survey consisted of 11 items, 9 quantitative questions, and two qualitative questions. The Likert scale was used in several questions on the pre and post-surveys. As illustrated in Table 1, three of the questions asked participants to provide demographic information, including years of nursing experience, highest level of education, and current license. The post-in-service survey included 8 items, 6 quantitative questions, one qualitative question, and an option to add additional comments.

Data Analysis

Components of the data analysis included demographic characteristics of the perioperative nurses and data obtained from the pre-and post-in-service surveys. Quantitative analysis was conducted using SPSS version 28 and consisted of frequency and descriptive analyses along with paired-samples t-tests. An alpha level of 0.05 was used for each paired-

samples t-test. We used thematic analysis to categorize the qualitative data from the open-ended survey questions.

Ethical Considerations

The project underwent a review by the institutional review board at the organization where it was conducted. The board deemed the project did not involve human subjects research and approved it accordingly. To protect participant privacy, the collected surveys did not contain any identifying information and were kept in a secure, locked office until the time of data transcription. Once transcribed, all data were stored on a password-protected computer with shared access only granted to those involved in data collection and analysis.

Results

Participant Demographics

The sample included 27 respondents (see Table 1). All participants were registered nurses (RNs). The highest level of education achieved by most participants was a Bachelor of Science in Nursing (BSN) degree (n = 23; 85%). There were 4 (15%) nurses whose highest level of education was an Associate of Science in Nursing degree. Most respondents (n = 19; 66%) had more than 10 years of nursing experience.

Pre-In-Service Findings

Current Clinical Practice for Treating PONV

The perioperative nurses (n = 27) described several treatment modalities for PONV on the pre-in-service survey with a total of 54 therapies listed. Categorical variables are reported as n throughout. The most frequently utilized therapy for treating PONV was medication, most notably ondansetron or Zofran (n = 24). Participants also reported using other medications, such as Phenergan and Benadryl (n = 11). Some participants (n = 4) placed a cold rag on a patient's

head or neck to alleviate nausea. Other responses included having the patient inhale an alcohol pad (n = 3), and effective intraoperative medications like propofol or Decadron (n = 11). The other responses listed had an n <2 and are not described herein.

Familiarity with Aromatherapy

Before the in-service, 5 out of 27 participants identified a lack of knowledge about aromatherapy as a barrier to incorporating it into their clinical practice. Some of the noted concerns surrounded the efficacy, safety, and administration of adjunctive aromatherapy. Nurses had concerns about the lack of scientific evidence supporting the use of aromatherapy for PONV and were uncertain of how to properly administer it. Nurses also expressed unease about the potential adverse effects of essential oils and the lack of standardization in the use of aromatherapy.

A Chi-square test was performed to assess for any association between familiarity with aromatherapy and years of nursing. There was no significant difference in the distribution between nurses who are familiar with aromatherapy and their years of nursing experience. The association between the years of nursing experience and the nurse's familiarity with aromatherapy was x^2 (9) = 21.64, p = 0.10. There was a limitation of the Chi-square test given the small sample size, there were two cell counts present with a count of less than one.

Perceived Barriers to Adjunctive Aromatherapy Use

There were 37 responses from 27 participants documented on the pre-in-service survey as perceived barriers to incorporating adjunctive aromatherapy into clinical practice. Common themes from the pre-survey identified by the nurses as barriers to incorporating adjunctive aromatherapy into practice included a lack of knowledge about aromatherapy (n = 5) and patient-specific concerns (n = 6) such as age, type of surgery, medical history, sensitivity to the scent,

uncooperativeness, and level of arousal following surgery. Caregiver and provider resistance to using aromatherapy was also identified as a barrier (n = 12). Other barriers included the availability or location of the aromatherapy inhaler which could inadvertently increase staff workload (n = 8).

Post-In-Service Findings

Familiarity with Aromatherapy

A paired samples t-test was performed to assess for a difference in the nurses' familiarity with aromatherapy pre and post-in-service. On average, the nurses' familiarity with aromatherapy following the in-service presentation (M = 3.04, SE = 0.183) was significantly higher than their familiarity before the in-service (M = 2.22, SE = 0.166), t (23) = -4.22, p = .000, d = 0.937, 95% CI [-1.23, -.421].

Perceived Barriers to Adjunctive Aromatherapy Use

There were 30 responses from 27 participants documented on the post-in-service surveys as perceived barriers to incorporating aromatherapy into clinical practice. The post-in-service survey results identified similar barriers to the pre-in-service survey responses like the availability and location of the aromatherapy inhaler (n = 7) and caregiver resistance to the aromatherapy (n = 5). There were participants (n = 8) who responded that no barriers were present after listening to the in-service presentation. Other listed responses had an n <2.

Future Aromatherapy Use

A paired samples t-test was performed to assess for a difference in the nurses' likeliness to use aromatherapy pre and post-in-service. On average, the nurses' inclinations towards incorporating adjunctive aromatherapy into clinical practice after the in-service (M = 4.48, SE =

0.124) was significantly higher than it was before the in-service (M = 3.70, SE = 0.230), t (23) = -4.72, p = <.001, d = 0.795, 95% CI [-1.126, -0.439]

A paired samples t-test was performed to assess for a difference in the nurses' feelings towards their organization offering aromatherapy inhalers pre-in-service and post-in-service. On average, following the in-service the nurses' feelings towards their organization offering the aromatherapy inhalers (M = 4.43, SE = 0.138) was moderately higher than it was before the in-service (M = 4.13, SE = 0.170), t ((23) = -2.612 p = <.016, d = 0.559, 95% CI [-0.546, -.0.063].

Discussion

Summary

This project investigated the impact of educational interventions on pediatric perioperative nurses' familiarity with and attitudes towards adjunctive aromatherapy for PONV management, as well as the potential barriers to its implementation in clinical practice. The results highlighted a significant association between the educational intervention and nurses' familiarity with aromatherapy and their inclination toward incorporating it into their clinical practice. Nurses' reluctance to use adjunctive aromatherapy in clinical practice was primarily due to their perceived lack of knowledge, concerns about increased workload, and interruption in workflow. Additionally, the results suggested increasing nurses' familiarity with aromatherapy through education and training can potentially address these barriers and enhance nurses' willingness to use aromatherapy as a treatment option for patients with PONV.

Interpretation of Barriers

Ease of Administration

The location, accessibility, and ease of administration of the aromatherapy product were integral in nurses' willingness to use it. When aromatherapy is not readily available or easily

accessible, nurses are less likely to use it in their practice as it can increase their workload or cause a delay in patient care. However, when the aromatherapy product is readily available and located steps away from the bedside, nurses are less likely to perceive its use as adding to their workload.

Antiemetic Medications

Though the nurses did not consider antiemetic medications a barrier to using aromatherapy, we identified the long-standing use of antiemetic medications to treat PONV as a potential barrier to using aromatherapy. This was consistent with the literature as antiemetic medications are the first line of treatment for patients with PONV (Gan et al., 2020), so nurses are more familiar and comfortable with this therapy. An unexpected project finding was some participants reported they were using complementary therapies in practice already like placing a cold rag on a patient's head or neck, or using improvised aromatherapeutic practices such as wafting an alcohol pad beneath the patient's nose.

Need for Education

Our project aligns with the growing body of literature emphasizing the importance of education and training in promoting the successful integration of complementary therapies in clinical settings (Allard & Katseres, 2018; Boyce & Natschke, 2019; Conlon et al., 2017; Michlig et al., 2021; Czarnecki et al., 2022). The lack of knowledge about aromatherapy was identified as a significant barrier to its incorporation into clinical practice, with nurses expressing concerns about its efficacy, safety, and administration. These concerns can make it difficult for nurses to feel confident in using aromatherapy. Our project further supports the notion that targeted educational interventions can effectively address concerns and barriers related to the adoption of evidence-based non-pharmacological symptom management. Healthcare systems

may benefit from the integration of non-pharmacological interventions, potentially reducing the reliance on medications and their associated costs and side effects. The project also supports the need for standardization of aromatherapy use across perioperative settings to facilitate consistency and sustainability in clinical practice.

Lack of Guidelines

Nurses are more likely to feel confident in using complementary therapies, such as aromatherapy, when their state nurse practice acts include specific language and guidelines pertaining to these therapies. This regulatory support provides nurses with a clear understanding of their scope of practice, ensuring that their actions are legally recognized and professionally endorsed. Furthermore, the inclusion of complementary therapies in nurse practice acts emphasizes the importance and legitimacy of such approaches, encouraging nurses to integrate them into their routine patient care with greater confidence and assurance. At the time of project completion there was no language in the Georgia Nurse Practice Act surrounding complementary therapies (Georgia Board of Nursing, 2019).

Limitations

The project had several limitations that may impact the generalizability and internal validity of the findings. First, the project's focus on barriers to using aromatherapy in perioperative settings might not be applicable to other clinical areas. Consequently, the results may not be generalizable to other settings or healthcare professionals who might encounter different challenges or opportunities for incorporating aromatherapy into their practice.

Second, the study involved only one in-service presentation in each perioperative area, which may not be representative of all nurses in those settings or their usual practices. This limitation could introduce selection bias or confounding factors, as the nurses who attended the

in-service presentation might have different characteristics, experience levels, or interests in aromatherapy compared to those who did not attend. Additionally, the single in-service presentation might not have been sufficient to capture the full range of barriers and facilitators to aromatherapy use in perioperative settings. Despite the project limitations, disseminating the lessons learned will be beneficial for the development of future quality improvements surrounding complementary therapies and enhanced use of adjunctive aromatherapy by clinicians.

Implications for Clinical Practice and Future Initiatives

Results from this project demonstrate a clear need for education, training, and a streamlined workflow design for the successful integration of aromatherapy into clinical practice. Several institutions have published studies and projects detailing their process and success in introducing aromatherapy to clinical practice (Allard & Katseres, 2018; Boyce & Natschke, 2019; Conlon et al., 2017; Czarnecki et al., 2022). Common themes from the literature suggest including guidelines for the safe and effective use of essential oils, as well as protocols for selecting, purchasing, storing, and administering the oils. Institutional policies should address issues such as patient selection, monitoring, and documentation, and reporting any adverse reactions or outcomes.

It is also important to have a designated person or team responsible for overseeing the integration of aromatherapy, who can provide education and training for staff, as well as ongoing evaluation and quality improvement. With all the above measures in place, there will be consistency and standardization of aromatherapy use across the perioperative settings, hopefully eliminating many of the perceived barriers to its integration into clinical practice and thus promoting its use in the treatment of PONV. Once staff are proficiently trained, they can

confidently endorse aromatherapy products to patients. To cultivate acceptance among patients and caregivers, it could be advantageous to supply them with accessible and informative educational resources about aromatherapy. Such materials would illustrate the benefits, applications, and workings of this therapy. Nurses could incorporate these resources into discussions related to symptom management with patients and their caregivers.

Additionally, the lack of guidelines, opinions, or mentions of alternative, complementary, or integrative therapies in states' nurse practice acts may cause uncertainty and reluctance among organizational leaders and practitioners in the healthcare field to utilize such therapies. To promote the wider adoption of aromatherapy, state boards of nursing that currently lack guidelines on the use of complementary therapies by healthcare professionals may benefit by looking to states that have already established such regulations. An example of such a state is Minnesota, which can serve as a model for other states looking to establish similar guidelines and oversight for the safe and effective use of complementary therapies (Allard & Katseres, 2018). By having these guidelines in place, healthcare institutions and clinicians may be more inclined to integrate complementary therapies into their regular clinical practices.

Costs and strategic trade-offs should be considered when implementing adjunctive aromatherapy into clinical practice. While the integration of aromatherapy may lead to improved patient outcomes and satisfaction, there may be costs associated with staff training and purchasing essential oils. When evaluating these costs, it is crucial to weigh them against the potential advantages of adjunctive aromatherapy, including diminished reliance on medications, decreased medication-associated side effects, and the promotion of a comprehensive care model that addresses patients' physical, mental, and emotional health, ultimately enhancing patient

health outcomes. Considering the potential long-term benefits, the investment in aromatherapy education and resources may prove to be a valuable addition to healthcare systems.

Plan for Dissemination of Information

I intend to present the outcomes of my project to nursing leadership in the perioperative units, as well as other clinical departments, to influence the practice and policies regarding the incorporation of adjunctive aromatherapy within our organization. To maximize the impact and reach a broader audience, I will disseminate the project findings through presentations at nursing and allied health conferences, and by sharing project details with pertinent nursing journals.

Conclusion

This project has shown that targeted educational interventions can help increase perioperative nurses' openness and familiarity with using aromatherapy alongside other treatments for managing PONV in children. By identifying and addressing the barriers to aromatherapy use in practice, our work contributes to promoting evidence-based holistic approaches to patient care. To ensure the long-term use of aromatherapy in clinical practice, it's important to develop and implement clear workflows, guidelines, and protocols in hospitals. By implementing these measures, healthcare institutions can establish consistent and standardized utilization of aromatherapy across perioperative settings, leading to improved outcomes for patients suffering from PONV.

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Appendix

Search Strategy

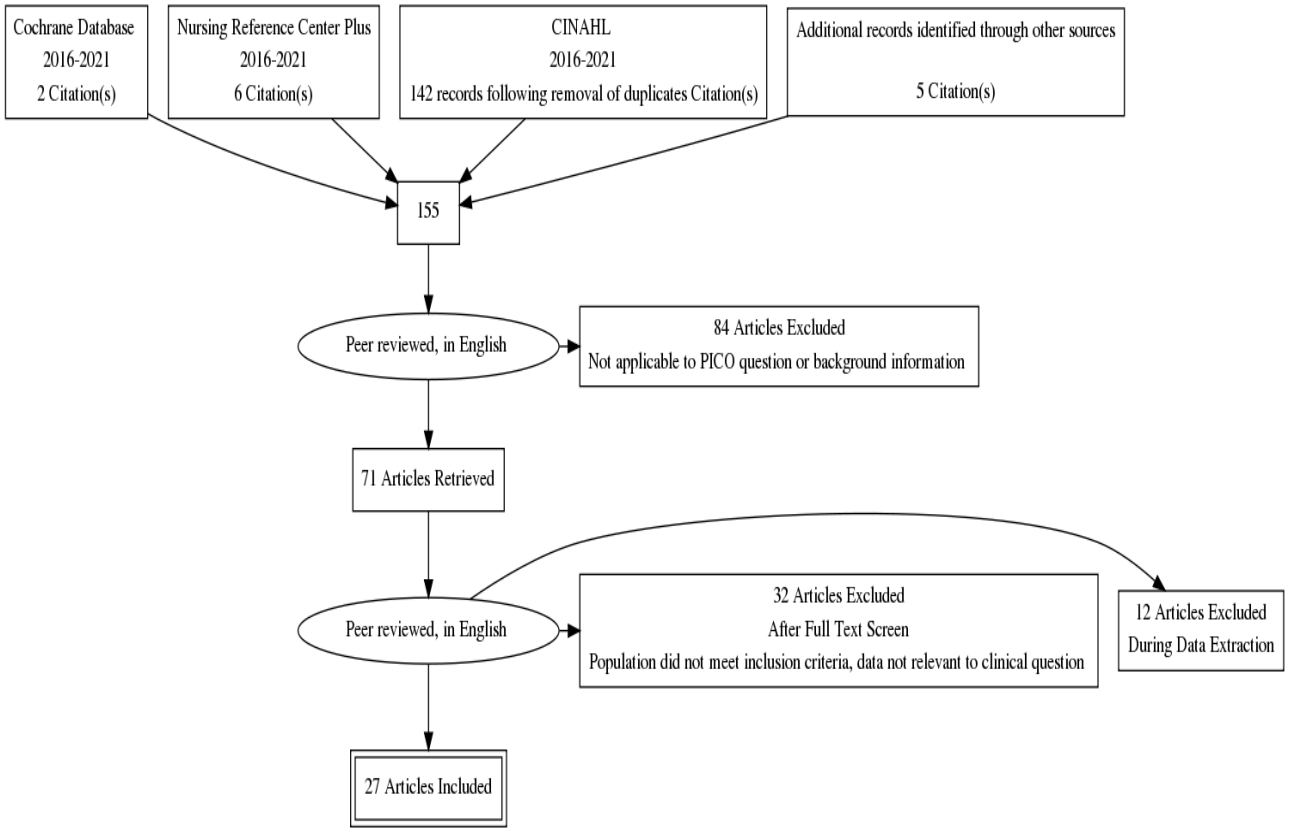


Table 1

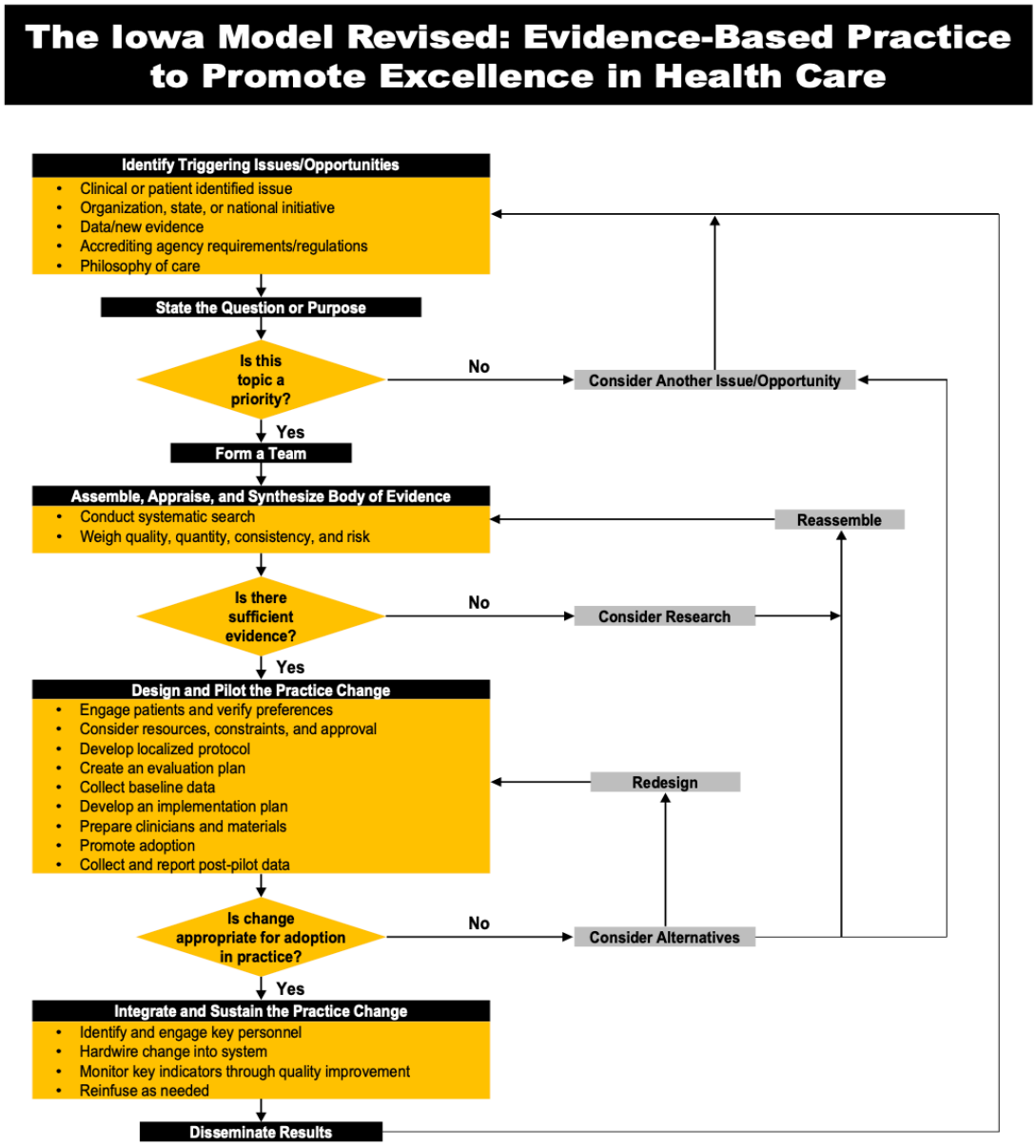
Demographics of Perioperative Nurses

Characteristic	n	(%)
Years of Nursing Experience		
0-2 years	1	4%
3-5 years	5	19%
6-10 years	3	11%
10+ years	19	66%
Highest Level of Education		
ASN	4	15%
BSN	23	85%
MSN	0	0%
Doctoral degree	0	0%
Current Nursing License		
LPN	0	0
RN	27	100%
APRN	0	0

Note. n= number of participants

Figure 1

Steps Involved in the IOWA Model



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