

The Use of Aromatherapy in Postoperative Nausea and Vomiting: A Systematic Review

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Purpose: To evaluate the following question: In adult surgical patients, does the use of aromatherapy affect the incidence of nausea and vomiting postoperatively?

Design: Systematic review of research focusing on aromatherapy and the effect on postoperative nausea and vomiting (PONV) in adult surgical patients.

Methods: A search of Medline, PubMed, Cumulative Index of Nursing and Allied Literature, and Cochrane Database of Systematic Reviews using specific inclusion and exclusion criteria yielded five randomized controlled trials.

Findings: The overall synthesis of evidence supports the use of aromatherapy in PONV. Aromatherapy has a positive effect on PONV, and therefore should be considered as a complementary therapy or as an adjunct to antiemetic medications.

Conclusions: Aromatherapy is one modality that should be considered as treatment for PONV in adult surgical patients. More research should be conducted to provide additional support in the use of aromatherapy for PONV. Future research could aim at standardizing a nausea scale that would provide more reliable and valid results in studies that research PONV.

Keywords: aromatherapy, postoperative, nausea, vomiting, surgical patient, PONV.

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POSTOPERATIVE NAUSEA AND VOMITING (PONV) is the leading postoperative complication among all surgical patients.¹ According to the

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American Society of PeriAnesthesia Nurses, nausea or vomiting that takes place within the first 24 hours after surgery should be considered PONV.¹ Annually 20% to 30% of all patients, or nearly 75 million Americans, suffer from PONV.^{1,2} Aside from PONV as an unpleasant and uncomfortable experience, it may lead to dehydration, electrolyte imbalances, airway compromise, stress on suture lines or incision dehiscence, esophageal tears, hypotension, and increased length of stay in postanesthesia care units (PACUs).^{1,2} Traditionally, providers use antiemetic medication to treat PONV. However, antiemetic medications can be expensive and may come with unwanted sedative effects or place a patient at risk for cardiac dysrhythmias.³ Alternative and complementary therapies to

medications are being more routinely used in the treatment of PONV.⁴

Aromatherapy is an alternative, complementary, nonpharmacologic nursing intervention that can be used alone or in conjunction with other modalities to treat PONV. Kolcaba's theory of comfort supports the use of comfort interventions to meet basic human needs.⁵ Katharine Kolcaba theorized that comfort is a fundamental human need that is essential to the relief from stressful situations and as an immediate, holistic state of experience by patients receiving comfort interventions.⁵ Aromatherapy treatment requires a patient to inhale an essential oil or other substance, which has a distinct scent.³ Aromatherapy is inexpensive, easy to administer, noninvasive, and has a rapid onset while having minimal to no adverse effects.³ In addition, many interventions to treat PONV are physician driven. Aromatherapy is a nursing intervention that does not require a physician order and can be provided without a delay in care. The purpose of this study is to evaluate the following question: In adult surgical patients, does the use of aromatherapy affect the incidence of nausea and vomiting postoperatively?

Design

A systematic review was performed using the current literature and research on the effectiveness of aromatherapy on PONV in adult surgical patients. Each study was individually analyzed and then synthesized collectively for problem and purpose, literature review, design, ethical issues, sample and setting, measurement tools, data collection, and data analysis.

Methods

A matrix table was used to assist in synthesis of the evidence. Medline Complete, PubMed, Cumulative Index of Nursing and Allied Literature (CINAHL), and Cochrane Database of Systematic Reviews were databases searched for the purpose of this review. Search terms were identified in accordance with the purpose statement and entered into each of the chosen databases. The search terms are presented in [Table 1](#).

A final search of all the terms generated 60 articles. Of these 60 articles, the limiters of the last 5 years (2012) and in the English language were applied

Table 1. Search Terms

PICO(T)	Search Terms
P (population)	Adult, surg* patients
I (intervention)	Aromatherapy, essential oils
C (comparison)	No search terms used
O (outcome)	Nausea, vomiting, PONV
T (time)	Post* (postoperative, postsurgical, postanesthesia, postdischarge), recovery, an*esthesi* (anesthesia, anesthesia, anesthesiology)

PONV, postoperative nausea and vomiting.

to generate 47 articles. Cochrane produced 1 result, Medline 14 results, PubMed 12 results, and CINAHL 20 results. These 47 articles were each individually reviewed by the contributors of this article according to specific inclusion and exclusion criteria. Inclusion criteria included patients 18 years or older, written in English, and were published in the last 5 years (2012 or later). In addition, only studies that were considered a systematic review or randomized controlled trial (RCT) were included. Exclusion criteria were pediatric patients aged less than 18 years and those studies that performed the intervention either preoperatively or intraoperatively. Studies that did not specifically focused on surgical patients or PONV were also excluded. After implementation of these criteria, the search yielded five RCTs, which answered the research question and were analyzed for this systematic review ([Tables 2 and 3](#)). The search flow diagram demonstrates how the search was conducted and the number of results for various search combinations that were used in each database ([Figure 1](#)).

Findings

Analysis of the literature suggests that aromatherapy can reduce PONV and therefore should be considered as a complementary therapy or as an adjunct to antiemetic medications for treatment of PONV ([Table 4](#)). Specifically, aromatherapy with the use of peppermint, ginger oils, or the combination of lavender, peppermint, ginger, and spearmint oils (QueaseEase) was reported to have a positive effect on PONV.^{4,6-9}

Of the five RCTs reviewed, three studies indicated that aromatherapy had a positive effect on PONV

Table 2. Included Studies

Study	Purpose	Sample	Design	Intervention	Measurement Tool(s)
Adib-Hajbaghery and Hosseini ⁹	<p>The study aimed to evaluate the effect of ginger essence on postnephrectomy nausea and vomiting</p> <p>The study was conducted to address the existing knowledge gap identified by the researchers to evaluate the effect of ginger essence on postnephrectomy nausea and vomiting</p>	<p>n = 120</p> <p>A convenience sample of 120 patients who had referred to the hospital from April 3 to October 1, 2014</p>	Randomized controlled trial	<p>Patients within the study received the same anesthesia protocol including fentanyl, midazolam, isoflurane, and thiopental sodium</p> <p>On admission to the recovery room, two drops of ginger essential oil (treatment group) were placed on a gauze pad and attached to the patient's collar to allow the patient to inhale it with room air. This was repeated every 30 min for 2 h. Nausea assessment was performed every 30 min for 2 h and at 6 h postoperatively. After 2 h, the patient was transferred from the recovery room to the floor. Participants in the control group received the same treatment except normal saline was applied to the gauze pad. In addition, all patients, regardless of the group, with moderate to severe nausea were seen by the attending physician and may have received an antiemetic if prescribed by the physician</p>	<p>The visual analog scale was used to measure the intensity of nausea. It is a 10-cm scale commonly used to objectively analyze subjective experiences</p> <p>0 = No nausea 10 = Most severe nausea</p> <p>Vomiting was assessed by counting the number of vomiting episodes during the first 6 h postoperatively</p>

Hodge et al ⁶	Compare the effectiveness of aromatherapy delivered by handheld inhaler to an unscented inhaler for reducing PONV in patients who were admitted to a surgical unit for at least 24 h postoperatively	n = 339 121 Experienced PONV 94 Patients received the inhaler, 54 patients received treatment, and 40 patients received a placebo 27 Patients were not offered the inhaler; 1 patient chose not to use the inhaler	Prospective randomized two-group design	Patients were recruited and enrolled 1-5 d before surgery from the preadmission surgery center. The patient was instructed on the use the inhaler. The patient can use the inhaler as often as needed and the product is effective for up to 6 mon if the cap is replaced tightly after each use. With the first complaint of nausea, the procedures of the study were initiated on the postoperative inpatient unit. Patients completed two Likert-type scales at baseline and after 3 min and completed questionnaires addressing satisfaction with the treatment and perceived effectiveness of aromatherapy. Ten percent of the patients were asked to participate in a brief interview about their attitude toward aromatherapy at 24 h or on discharge, whichever came first	Two 10-point Likert-type scales (0 = none, 10 = worst possible) for nausea at baseline and after 3 min Questionnaires addressing satisfaction with treatment for nausea and perceived effectiveness of aromatherapy
Hunt et al ⁷	The problem stated was that it is unknown what aromas or combination	n = 301 1,190 Patients met initial inclusion criteria	A prospective 4-arm placebo-	Patients who reported nausea were asked to rank their nausea on the	A 4-point VDS 0 = No nausea 1 = Mild nausea

(Continued)

Table 2. Continued

Study	Purpose	Sample	Design	Intervention	Measurement Tool(s)
	of aromas are known to reduce PON. The purpose statement was identified as aromatherapy will reduce PON	Exclusion criteria reduced the number of eligible participants to 1,151 303 of these 1,151 subjects reported PON Two Patients were additionally excluded after receiving the ginger blend because of the potential for bias. Final total number of participants 301	controlled clinical trial	0-3 VDS (as described previously) and then were randomly assigned to one of four groups: (1) placebo (normal saline), (2) 70% isopropyl alcohol, (3) ginger essential oil, or (4) a blend of ginger, spearmint, peppermint, and cardamom oil Subjects were then given a 2 × 2 gauze pad with 1 of the 4 preassigned "aromas" saturated on it. Subjects were told to inhale deeply three times and exhale through their mouth. After 5 min of inhaling a scent the patients were asked to rate their nausea on the 0-3 VDS again and aromatherapy was then discontinued. Each gauze pad contained 1 mL of the aroma Each treatment was stored in a plastic bottle that was labeled 1-4 and kept in a locked cart	2 = Moderate nausea 3 = Severe nausea Patients rated their nausea on the VDS initially and then 5 min after the aromatherapy intervention
Sites et al ⁴	This study evaluated controlled breathing with peppermint aromatherapy and controlled breathing alone for PONV relief	n = 42 196 Subjects met inclusion criteria 103 in the control group; 93 in the experimental group 42 of 196 eligible subjects	Single-blind, parallel-group, randomized controlled trial	On initial complaint of PONV in the PACU the patient was asked to rate their nausea on the 0-10 scale and then told to inhale through their nose to the count of 3,	A 0-10 Descriptive Ordinal Scale was used. 0 = no nausea, 10 = worst nausea the patient could imagine No descriptive terms were

		complained of PONV (n = 42) 16 in the control group; 26 in the experimental group		hold their breath for 3 s, and exhale to the count of 3. This was repeated twice to serve as a single treatment. Those who were in the treatment group received a vial with a “peppermint spirit” impregnated cotton braid and those in the control group received the same type of vial with no scent. The vial was placed in the mid septum of both groups. The patients’ PONV was reassessed 5 min later and if it persisted they were given another treatment. PONV was again reassessed at 10 min and if patients’ PONV still continued they were offered antiemetic medication and aromatherapy was discontinued	included with the numbers 1-9
Stallings-Welden et al ⁸	The purpose is to determine effectiveness of aromatherapy compared with standard care for postoperative nausea and vomiting in ambulatory surgical patients	n = 221 A convenience sample of ambulatory surgical patients expected to be discharged home on the same day. Of 804 eligible patients, 254 were recruited but 33 were excluded because of admissions, voluntary withdrawal, or reporting	A prospective randomized study	Preadmission followed a preapproved script. Preoperatively, all patients were handed an informational form and those patients interested received further information. If patients willingly agreed to participate, the nurse retrieved the next	A 5-point Likert scale was used to measure PONV 0 = None 1 = Not sure 2 = Mild nausea 3 = Moderate nausea 4 = Severe nausea or frank vomiting On discharge, a patient satisfaction survey was administered with a

(Continued)

Table 2. Continued

Study	Purpose	Sample	Design	Intervention	Measurement Tool(s)
		errors; 221 patients were enrolled (113 in the standard care group and 108 in the treatment group)		sequential folder to review consent and initiate the study. Patients were randomly assigned a group and their assigned folder accompanied them throughout the perioperative phases. In PACU, the nurse identified which group the patient belonged to and filled in the information and nausea was treated according to their group. Nausea was assessed the same for each group	6-point Likert scale 0 = Strongly disagree 1 = Disagree 2 = Somewhat disagree 3 = Somewhat agree 4 = Agree 5 = Strongly agree

PACU, postanesthesia care unit; PON, postoperative nausea; PONV, postoperative nausea and vomiting; VDS, Verbal, Descriptive Scale.

Table 3. Study Quality

Study	Threats to Validity	Explanation
Adib-Hajbaghery and Hosseini ⁹	Theoretical base	Although previous studies were reviewed and identified a knowledge gap, no conceptual framework was provided
	Data collection	There is a lack of information surrounding data collection. Bias cannot be ruled out in the application of the control and/or intervention
	Researcher credentials	The study researchers and writers did not include their credentials to enhance the confidence in the findings and interpretation of the results based on their qualifications
Hodge et al ⁶	Design	The study did not report how the treatment group and the placebo group were selected. The lack of details makes it difficult to determine if there was selection bias
	Sample	The sample size was smaller than the recommended number for enrollment per power analysis; however, statistical significance was still achieved
	Data collection	There was no mention of how the staff were trained on data collection. The lack of information presents potential concerns about data collection
Hunt et al ⁷	Theoretical base	The literature review was lacking and no theoretical framework, conceptual framework, or concept definitions were provided
	Sample	The researchers did not account for attrition to maintain an adequate sample size. Because all four groups did not achieve the number of participants needed, a type I error could be present
Sites et al ⁴	Theoretical base	The literature review is missing a conceptual framework and concept definitions. A clear theoretical base was not identified
	Sample	A convenience sample was used and is less likely to produce a representative sample A power analysis was done to determine the sample needed. A 40% attrition was allotted to allow for subjects who did not experience PONV. However, only 42 of the 196 eligible subjects complained of PONV and n was far less than the sample size provided by the power analysis needed to make this study statistically significant We cannot rule out bias in the sample because it was an inadequate sample number and a convenience sample was used, both of which could result in a type I error
	Data collection	It was not stated what type of education or training the bedside staff received and if education was ongoing for the 17 months the trial ensued. Leaving staff nurses in charge of collecting data and administering the intervention creates an opportunity for performance bias and may threaten the study integrity
	Measurement	The measurement tool used was nonvalidated and could affect the reliability of the study results
Stallings-Welden et al ⁸	Sample	The attrition rate and low sample size reduce the confidence in the internal validity of the study. Research with a larger sample size is needed to determine the efficacy of aromatherapy as a treatment option
	Measurement	The measurement tool used was nonvalidated and could affect the reliability of the study results

PONV, postoperative nausea and vomiting.

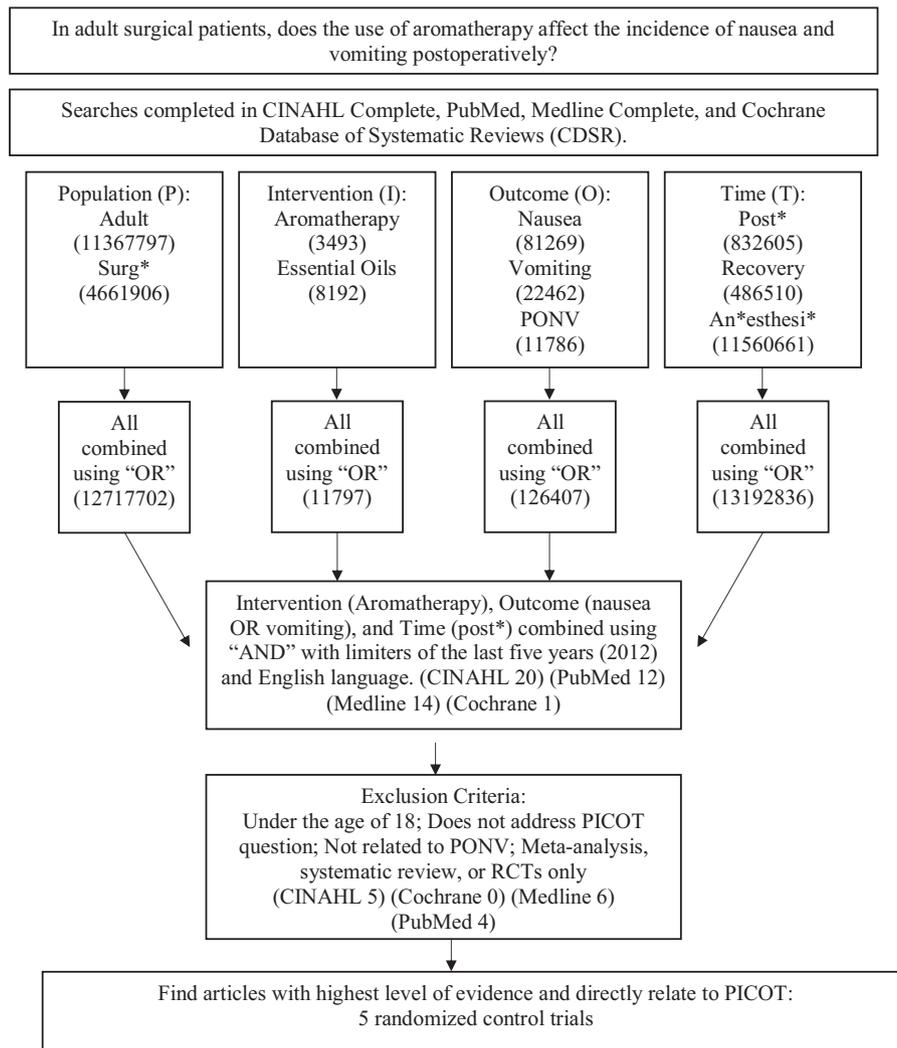


Figure 1. Search flow diagram for the PICOT. CINAHL, Cumulative Index of Nursing and Allied Literature; PICOT, population, intervention, comparison, outcome, time; PONV, postoperative nausea and vomiting; RCT, randomized controlled trial.

and the results were statistically significant for the use of aromatherapy to decrease the incidence of PONV.^{6,7,9} Lack of statistically significant results in the remaining two studies reviewed may have been because of inadequate sample sizes and attrition of subjects, and therefore further research is warranted to accept these results as valid and reliable.^{4,8}

All the studies reviewed indicated the negative effects that PONV can have for patients.^{4,6,9} PONV is an undesirable experience for the patient and may lead to postoperative complications. In addition, all the studies agreed that aromatherapy

is a readily available, low cost, noninvasive nursing intervention that has no known adverse effects.^{4,6,9} Three studies also discuss high patient satisfaction with the use of aromatherapy.^{4,6,8} Moreover, aromatherapy helps provide a holistic approach to comfort and relief from noxious stimuli that causes PONV.⁸ The overall synthesis of the evidence supports that aromatherapy can have a positive effect on PONV.

Limitations

There were several limitations noted in this evidence-based review. First, the search was

Table 4. Study Results

Study	Data Analysis	Results
Adib-Hajbaghery and Hosseini ⁹	The data were analyzed using the Statistical Package for Social Sciences. Ratio and interval data were presented using the mean and SD. Nominal and categorical data were described in percentage and frequency formats. Study groups were compared with χ^2 and the Fisher exact tests. Paired and independent <i>t</i> tests and RM-ANOVA were used for within and between group comparisons	<p>The means of nausea intensity scores in the control group T1-T4 were unchanged (7.40 ± 1.71)</p> <p>Nausea intensity decreased at T5 in the control group (6.50 ± 1.98)</p> <p>The within-subjects RM-ANOVA indicated that nausea intensity in the control group did not differ significantly across T1-T5.</p> <p>The mean nausea score in the treatment group decreased from T1 to T5 (7.09 ± 1.59 to 1.11 ± 0.97)</p> <p>The within-subjects RM-ANOVA indicated that there was a statistically significant difference in nausea intensity in the treatment group across T1-T5.</p> <p>The between-subjects RM-ANOVA indicated there was a statistically significant difference between the study groups regarding nausea intensity across measurement time points.</p> <p>The vomiting episodes in the treatment group at T4-T5 were 0.88 ± 0.78 and 2.58 ± 1.35.</p> <p>The vomiting episodes in the control group at T4-T5 were 4.80 ± 1.87 and 2.58 ± 1.35.</p> <p>Independent <i>t</i> test indicated that there were statistically significant differences between the two groups in reference to the number of vomiting episodes at T4-T5 ($P < .001$)</p> <p>According to the results, there were no significant differences between the two groups in nausea intensity at T1. Researchers indicated this could be related to the shallow breathing related to anesthesia in the first 30 min after surgery decreasing the patient's ability to inhale the ginger aroma deeply. Pain, decreased bowel motility, and delayed onset of ginger may have also contributed to this finding</p> <p>In the treatment group, nausea intensity from T2 to T5 was significantly lower in the treatment group</p> <p>The number of vomiting episodes was significantly lower in the treatment group</p> <p>Patients in the control group received higher doses of ondansetron</p> <p>121 Experienced PONV</p> <p>94 Patients received the inhaler, 54 patients received treatment, and 40 patients received a placebo</p> <p>27 Patients were not offered the inhaler; 1 patient chose not to use</p>
Hodge et al ⁶	Unpaired <i>t</i> tests were used to compare nausea scores at initial and 3-min postaromatherapy interval between groups whereas paired <i>t</i> tests were used for within group comparisons at two time points. Independent <i>t</i> tests were used to compare scores on the patient	

(Continued)

Table 4. Continued

Study	Data Analysis	Results
Hunt et al ⁷	<p>satisfaction question with 0 = “completely dissatisfied” and 10 = “completely satisfied” and perceived effectiveness of aromatherapy question with 0 = “completely ineffective” and 10 = “completely effective.” Statistical analyses were performed using SPSS, v 14.0 with significance set at $P < .05$</p> <p>Researchers used descriptive statistics that included means, standard deviations, counts, and percentages. P values were determined using ANOVA and Kruskal-Wallis tests. ANOVA was used for determining P values for demographics because age was the only variable on an interval scale</p>	<p>the inhaler</p> <p>Nausea scores in the treatment group and placebo group decreased significantly, $P < .01$, respectively. There was a significant difference between the two groups, $P = .03$</p> <p>Perceived effectiveness—scores for the treatment group were higher than placebo group. Three-point difference between means was statistically significant. Independent sample t test showed no difference between groups on their rating of overall satisfaction with nausea management</p> <p>For patients who had orders for intravenous or oral antiemetic medication, there was no attempt to collect information regarding use and effectiveness of rescue medications when aromatherapy was ineffective</p> <p>It does not state how the patients were randomly selected for the treatment or control group, therefore selection bias cannot be ruled out</p> <p>67.1% of patients who used ginger and 82.4% of patients who used the blend reported a reduction in their PON, whereas only 39.7% of patients who used normal saline and 51.3% of patients who used isopropyl alcohol reported a reduction in their PON; 80.8% of patients who used normal saline and 71.8% ($P = .58$) of patients who used isopropyl alcohol requested antiemetic medication and only 55.5% ($P = .002$) of patients who used ginger and 40.5% ($P < .001$) of the patients who used the blend requested antiemetic medication</p>
Sites et al ⁴	<p>Descriptive statistics were used to organize data and consisted of using means, standard deviations, and frequencies. A χ^2 test was used to compare categorical data (male or female), a t test was used to compare age, and multiple regression was used to determine statistical significance for risk factors-associated PONV. Statistical significance was determined to be $P \leq .05$</p>	<p>These P values lead to rejection of the original null hypothesis ($P = .63$) and prove these values are statistically significant. Both ginger and the ginger blend reduced PON</p> <p>Intervention efficacy was defined as “no antiemetic medication required after aromatherapy and controlled breathing intervention”</p> <p>Of the patients in the control group 10 of 16 (62.5%) did not request antiemetic medication and in the experimental group 15 of 26 (57.7%) did not request antiemetic medication after use of aromatherapy. Statistical significance was not found ($\chi^2 = 0.09$; $P = .76$), and therefore efficacy of the intervention was not found</p> <p>Intervention effectiveness was defined as “a score of 0 on the DOS at the endpoint of 10 minutes.” Only 37 of 42 subjects had DOS scores available and of the 37 patients only 13 (31.8%) rated their end point DOS at 0. The remaining 24 patients (40%) rated their</p>

Stallings-Welden et al ⁸	<p>Data were deidentified, and χ^2 tests and ANOVA tests were conducted in R using RStudio open-source statistical analysis tools</p> <p>Machine learning methods were used to evaluate whether literature-based risk factors and/or other perioperative and IO variables predict PONV</p>	<p>end point DOS anywhere from 2 to 10. Again, statistical significance was not found ($\chi^2 = 0.26$; $P = .61$) and aromatherapy was not proven to be effective</p> <p>Gender, age, history of smoking, motion sickness, and PONV were the most important predictive factors of PONV</p> <p>Of the algorithms used to evaluate, the cforest algorithm was used to develop a model for predicting PONV with literature-based risk factors (0.69 area under the curve)</p> <p>A limitation of the study is the imbalance of these risk factors among the treatment and control group</p> <p>No significant differences noted in the distribution of PONV was determined between groups</p> <p>No significant differences were determined between groups in the satisfaction of the timeliness and effectiveness of treatment</p> <p>The number of analgesics and antiemetics administered to patients that reported PONV was significantly higher ($P < .001$ and $P < .001$, respectively)</p> <p>Of the patients that experienced PONV, 75% were able to be contacted; 23% of these patients experienced PDNV. Of these, 100% in the treatment group indicated that aromatherapy was effective in relieving their nausea; 67% in the standard care group were able to manage their nausea with soda, acetaminophen, antacids, crackers, and/or lying quietly. Therefore, aromatherapy was found to be effective in the treatment group in PDNV; however, the sample size was too small to determine significance</p> <p>Patient population data showed limited evidence that aromatherapy reduces PONV</p> <p>Aromatherapy was associated with high patient satisfaction, but there was no significant difference between groups</p>
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DOS, Descriptive Ordinal Scale; IO, intraoperative; PDNV, postdischarge nausea and vomiting; PON, postoperative nausea; PONV, postoperative nausea and vomiting; RM-ANOVA, repeated measures analysis of variance.

limited to only the online resources available to the authors, which included the databases of Medline Complete, PubMed, CINAHL, and the Cochrane Database of Systematic Reviews. In addition, although all five studies reported randomization of participants into groups, participants would potentially be aware of whether they received the aromatherapy intervention because of the scent.^{4,6-9} Sites et al⁴ described the design as single-blinded; however, because of the aromatic nature of the intervention blinding may not be ensured. Another limitation was only three of the five RCTs found statistical and clinical significance in support of the research question.^{6,7,9} The RCTs that did not achieve statistical significance did not have adequate sample sizes, which limited the validity of the study results.^{4,8} Furthermore, it became apparent that there is not a best practice recommendation for a standardized nausea scale. Various scales were used by all five studies and may have led to differences, affecting the validity and reliability when trying to compare the results.^{4,6-9}

These limitations also force the consideration of the generalizability of the study results to other populations and settings. Could the study results reviewed be replicated outside the environments and circumstances in which they were created? Type of surgery, duration, anesthesia type, medications, gender, individual genetic differences, oral intake, obesity, smoking, and dehydration are merely some of the differences between patients that increase their risk for PONV.^{10,11} Because all these variables cannot be controlled and the relationship between any number of these components can easily change the outcome of whether the patient experiences PONV, it is reasonable to question the external validity of the results. Some of the studies reported more control over some of these variables, for example, the study by Sites et al⁴ administered the same anesthesia protocol. However, none of the studies could account for all these factors and may lead to the decreased probability of the results being generalizable to all surgical patients, settings, and populations. In essence, it is the very complex nature of PONV that makes it both difficult to treat and for an effective standardized protocol to be developed.

Impact of Evidence

SETTING. PACUs, postdischarge, observation units, and inpatient surgical floors were the units examined for this project. The evidence shows the use of aromatherapy can reduce PONV and therefore should be considered as a complementary therapy or as an adjunct to antiemetic medications as treatment for PONV.

STAKEHOLDERS. The stakeholders with the most benefit from the use of aromatherapy for PONV are the patients who experience PONV. From a patient perspective, nausea and vomiting is a primary concern when undergoing surgery.⁶ In recent years, Medicare has begun to provide hospital reimbursement based on patient satisfaction scores acquired from the Hospital Consumer Assessment of Healthcare Providers and Systems survey.¹² Increased patient satisfaction with the use of aromatherapy was noted in three of the five studies reviewed. If patients feel safe and cared for, they are more likely to be satisfied with their care.

COST BENEFIT AND EFFECTIVENESS. PONV can lead to longer recovery times in the PACU and can delay transfer to the floor or discharge home. The longer recovery times lead to a significantly greater cost to both the patient and surgical facilities.¹³ This could translate into the addition of hundreds of dollars to the overall cost of care. Antiemetic medications are \$0.30 to \$1.00 more than the cost of essential oil on cotton ball, and this price only reflects the medication and not the additional cost of administering, supplies needed, or time it takes by the nurse to administer.^{13,14} In addition, PONV can lead to dehydration, electrolyte imbalances, airway compromise, stress on suture lines or incision dehiscence, esophageal tears, and hypotension.^{1,2} Treatment of these complications can further increase health care costs to the patients and is yet another reason for nurses to consider the use of aromatherapy as a treatment modality for PONV.

Future Recommendations

NURSING RESEARCH. Future research should ensure adequate sample sizes to assure the validity of the study results. Researchers also need to make

certain that all staff participating in the research study have been adequately trained on aromatherapy and the details of the research study to minimize errors in administration and data collection. In addition, it is evident from the research that there is not a best practice recommendation for a standardized nausea scale because various scales were used. Future research could be focused on creating a standardized nausea screening tool. Screening tools can help equip nurses with a reliable way to identify patients at risk for PONV and eliminate a variable between research studies.⁴ Nurses can then work with the interdisciplinary team to deliver multiple interventions, which may include aromatherapy, to provide the patient with the best overall relief from PONV.

NURSING EDUCATION. Aromatherapy delivery and products may differ from institution to institution. Nursing educators should provide education to staff on the product, delivery method, and use of aromatherapy as a new or complementary intervention that may positively affect PONV. Nurses in PACUs, observation units, inpatient surgical units, and any areas that care for postoperative patients should be included in the education. In addition, nursing is expected to grow faster than any other occupation in the United States in the coming years, which makes nursing students potential catalysts in disseminating aromatherapy education.¹⁵

NURSING PRACTICE. None of the studies reviewed recommended aromatherapy as a replacement for other treatment options of PONV.^{4,6-9} However, aromatherapy was used in conjunction with alternative treatment methods. Nurses can

use aromatherapy as an alternative or complementary method to treat PONV and a way to provide additional comfort to patients. Aromatherapy is also a nursing intervention that does not require a physician order and can be provided immediately without a delay in care. In patients that are considered high risk for PONV, additional measures could be taken by the nurse to work with the interdisciplinary team members to provide the best outcome for the patient in prevention of PONV.

Conclusions

PONV is a significant problem for many patients undergoing surgical procedures. Every effort should continue to be made to aid in finding ways to reduce the prevalence of this problem. After close examination of the research pertinent to this review, it is evident that in adult surgical patients, aromatherapy has a positive effect on nausea and vomiting postoperatively. Nurses should work with all members of the interdisciplinary team to provide individualized plans for each patient to reduce PONV. Aromatherapy is one modality that should be considered in treatment. Future quality studies should continue to be conducted to determine a standardized nausea scale, to identify a screening tool to predict high-risk patients of PONV, and to provide more evidence on the use of aromatherapy.

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References

1. Collins A. Postanesthesia care. Postoperative nausea and vomiting in adults: Implications for critical care postanesthesia. *Crit Care Nurse*. 2011;31:36-45.
2. Hudgens A, Hunt R, Dienemann J, Norton H, Hartley W. Postoperative nausea and vomiting rescue using aromatherapy. *J Perianesth Nurs*. 2013;28:e46-e47.
3. Ferruggiari L, Ragione B, Rich E, Lock K. The effect of aromatherapy on postoperative nausea in women undergoing surgical procedures. *J Perianesth Nurs*. 2012;27:246-251.
4. Sites D, Johnson N, Tart R, et al. Controlled breathing with or without peppermint aromatherapy for postoperative nausea and/or vomiting symptom relief: A randomized controlled trial. *J Perianesth Nurs*. 2014;29:12-19.
5. Alligood MR. *Nursing Theorists and Their Work*, 8th ed. St. Louis, MO: Elsevier Mosby; 2014.
6. Hodge NS, McCarthy MS, Pierce RM. A prospective randomized study of the effectiveness of aromatherapy for relief of postoperative nausea and vomiting. *J Perianesth Nurs*. 2014;29:5-11.
7. Hunt R, Dienemann J, Norton HJ, et al. Aromatherapy as treatment for postoperative nausea: A randomized trial. *Anesth Analg*. 2012;117:597-604.
8. Stallings-Welden L, Doerner M, Ketchem EL, et al. The effectiveness of aromatherapy compared to standard care for

the relief of PONV/PDNDV in ambulatory surgical patients. *J Peri-anesth Nurs*. 2018;32.

9. Adib-Hajbaghery M, Hosseini F. Investigating the effects of inhaling ginger essence on post-nephrectomy nausea and vomiting. *Complement Ther Med*. 2015;23:827-831.

10. Kovac A. Update on the management of postoperative nausea and vomiting. *Drugs*. 2013;73:1525-1547.

11. Lee Y, Shin H. Effectiveness of ginger essential oil on post-operative nausea and vomiting in abdominal surgery patients. *J Altern Complement Med*. 2017;23:196-200.

12. Letourneau R. *Better HCAHPS Scores Protect Revenue*. Health Leaders. Available at: <http://www.healthleadersmedia.com/finance/better-hcahps-scores-protect-revenue>. Accessed April 14, 2018.

13. Parra-Sanchez I, Abdallah R, Sessler D, et al. A time-motion economic analysis of postoperative nausea and vomiting in ambulatory surgery. *Can J Anaesth*. 2012;59:366-375.

14. Stoicea N, Gan TJ, Joseph N, et al. Alternative therapies for the prevention of postoperative nausea and vomiting. *Front Med*. 2015;2:1-5.

15. Occupational Outlook Handbook: Registered Nurse. U.S. Bureau of Labor Statistics. Available at: <https://www.bls.gov/ooh/healthcare/registered-nurses.htm>. Updated 2018. Accessed April 14, 2018.

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