Aromatherapy Blend for Postoperative Nausea in Ambulatory Surgery Patients

by

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Abstract

Problem and Purpose: Postoperative nausea (PON) is one of the most undesirable outcomes after surgery, affecting 30% of surgical patients nationwide. PON increases patient dissatisfaction and risk for postoperative complications such as hematoma and dehiscence. In the Post-Anesthesia Care Unit (PACU) at an urban hospital outpatient surgery center, PON occurs in about a third of postoperative patients. Use of alcohol swab inhalation is ineffective and pharmacological methods can lead to prolonged PACU stays, decreased patient satisfaction and increased hospital costs. The purpose of this project was to implement and evaluate the effect of an aromastick on nausea in post-operative patients at a surgery center. *Method:* Implementation occurred over twelve weeks in the Fall of 2019. The first two weeks PACU RNs were educated and completed a competency around aromatherapy, aromastick use, and documentation. For the following ten weeks, PACU RNs offered aromasticks to patients with PON upon arrival to the PACU as a non-pharmacological means to mitigate nausea; anti-emetic medication was not withheld. The quantity of aromasticks provided and baseline and post-intervention PON scores were obtained to determine the effect of aromastick on PON. *Results*: 100% of PACU RNs (n=20) were educated and demonstrated competence in aromatherapy intervention, 70.6% of patients with PON utilized an aromastick for PON treatment, and of those patients who received an aromastick for PON 94.4% had improved PON scores. *Conclusion*: Aromatherapy is an effective non-pharmacological treatment in reducing PON score for patients recovering from surgery. These results offer support for nursing practice to utilize aromatherapy as an additional method to enhance patient experience, improve outcomes, and reduce cost in recovery rooms. Utilization of aromatherapy for nausea in other areas should be explored to enhance available non-pharmacological treatment methods for nursing practice.

Aromatherapy Blend for Postoperative Nausea in Ambulatory Surgery Patients

Introduction

Postoperative nausea (PON) occur in up to 30% of postoperative patients, lasting 24-48 hours (Brown, Danda, & Fahey, 2018). Nausea is a subjective feeling of upset stomach (Becker, 2010). PON risk factors are: young age, female, non-smoker, history of motion sickness or PON, prolonged surgery, and type of anesthesia and surgery (Brown et al., 2018).

PON is an undesirable surgical outcome that creates patient dissatisfaction and increases risk of recovery complications and costs an additional $75 per patient (Hodge, McCarthy, Pierce, 2014; Karaman et al., 2019; Parra-Sanchez et al., 2012). Antiemetic medication (i.e. promethazine) can reduce PON, yet may become ineffective upon movement and have side effects (Karaman et al., 2019). A safe, effective, inexpensive, and non-invasive treatment is needed to address PON (Hall et al., 2017).

In the Post-Anesthesia Care Unit (PACU) at an outpatient surgery center in an urban hospital, about 30% of patients suffered from PON. Antiemetic medications were often provided in the operating room. However, many patients developed PON upon awakening, dressing, and transporting to their car. To prevent prolonged PACU turnover over and enhance quicker, safer patient discharge, nurses in the PACU would withhold doses of antiemetic medication. Instead, registered nurses (RN) followed normalized practice and offered alcohol swab inhalation, a method not supported by the literature to relieve PON. This resulted in poor patient satisfaction and nausea outcomes, and prolonged, rather than shortened, PACU stay (Hunt et al., 2013).

Literature supports aromatherapy inhalation with a blend of essential oils as an effective method to reduce PON (Hodge et al., 2014; Hunt et al., 2013; Brown et al., 2018; Karaman et al., 2019), see Appendix H for further details. Given nausea severity, in this project setting, it was only realistic to offer aromatherapy blend first to patients with PON and if not adequately relieved, medication was given. The purpose of this project was to implement and evaluate the effect of aromatherapy blend on patients with PON in a surgery center PACU. The RNs were educated on aromatherapy, offered aromasticks to patients with PON in the PACU, and assessed PON scores pre- and post-intervention.

Literature Review

This review focuses on integrating aromatherapy blend for patients with PON. The review includes evidence supporting aromatherapy as means to mitigate PON using: 1) a blend on inhalation patches, 2) a blend via an inhaler, 3) a blend and ginger alone, and 4) specific oils.

In a pre-post experimental design, Brown et al. (2018) provided 50 patients with PON aromatherapy patches (orange and peppermint essential oil blend) in a PACU of a large urban hospital. Using a validated 5-point Likert scale, self-reported nausea scores were statistically lower ($p<0.001$) after 30 minutes which supports aromatherapy blend in improving PON.

In a Pacific northwest postoperative inpatient care unit, Hodge et al. (2014) in a prospective randomized two-group study randomized 121 patients with PON into a group using: 1) no scent or 2) aromatherapy blend (lavender, peppermint, ginger, and spearmint) inhaler for 24 hours. Compared to no scent, a blend of aromatherapy had statistically higher perceived effect ($p<0.001$) and lower PON scores ($p=0.03$) using a 10-point Likert scale. Interviews revealed perception of aromatherapy as a more effective treatment for minimal nausea.

In a randomized control trial, Hunt et al. (2013) evaluated the effect of 70% isopropyl alcohol, ginger oil, or blend of ginger, spearmint, peppermint, and cardamom versus normal saline on a saturate pad for 301 patients with PON in the PACU. Compared with normal saline: (1) alcohol was ineffective ($p=0.76$), (2) ginger and oil blend significantly reduced nausea ($p=0.002$ and $p<0.001$ respectively), and (3) nausea odds were higher in the alcohol pad than the blend group. Compared to normal saline, antiemetic medication administration was significantly lower for patients in the ginger and blend groups ($p=0.0002$ and $p=0.001$ respectively).

In the PACU of an urban hospital, in a blinded randomized control trial Karaman et al. (2018) evaluated 184 patients with PON using impermeable gauze pad of either pure water (control) or lavender, rose, or ginger to address PON. Compared to pure water, lavender ($p=0.00$) and ginger ($p=0.00$) reduced post-operative patient nausea levels at 15 and 40 minutes. Overall, patients who received the lavender ($p=0.00$) and ginger ($p=0.04$) experienced significant improvements in PON. Use

of antiemetic drugs (p=0.00), along with vomiting scores (p=0.00) and nausea severity (p=0.00) were significantly lower in treatment groups compared to control groups.

Whether inhaled via gauze, inhaler, or patch, collectively Brown et al. (2014), Hodge et al. (2014), Hunt et al. (2013), and Karaman et al. (2018) concluded that aromatic therapy has positive effects on reducing PON. Brown et al. (2014), Hodge et al. (2014), and Hunt et al. (2013) support an essential oil blend for aromatherapy in reducing PON. Karaman et al. (2018) concluded that both lavender alone and ginger alone were equally as effective in reducing PON, suggesting combining oils in a blend may be beneficial. Karaman et al. (2018) and Hunt et al. (2013) found antiemetic medication use was lower when combined with inhalation of a blend of essential oils. Hodge et al. (2014) determined that patients perceived aromatic effects were higher with blends of essential oils.

All reviewed studies utilized inpatient settings except Hunt et al. (2013), who examined outpatient post-operative patients. Brown et al. (2014) employed convenience sampling while all other studies randomized patients into groups to minimize selection bias. Karaman et al. (2018) and Brown et al. (2014) reduced type 1 errors with large sample sizes while Hunt et al. (2013) and Hodge et al. (2014) risk this error with a small sample size potentially impacting the validity of the results. Moreover, all studies evaluated PON using a patient self-reported Likert scale. Outcome measurements determined effectiveness in the studies, yet none evaluated sensitization with repeated measurement use. Finally, articles never controlled confounding variables that may impact PON such as pain and lasting surgical aromas. Overall, in regards to the question on the impact of aromatherapy on PON, the evidence supports it is beneficial method to utilize and implement for patient’s suffering from PON.

Theoretical Framework

The Lewin Change theory (LCT), developed by Kurt Lewin (1947), was one of the earliest change theories created. The purpose is to understand the process of creating permanent change. LCT is a linear three step process progressing from phases of unfreezing, changing, and to refreezing. The unfreezing phase requires evaluating current practices, identifying practice gaps and barriers to change, evoking urgency for change, selecting desired change, and planning for change. Unfreezing sets the foundation for changing, the next phase in the theory, that activates the plan through obtaining participation in change and opening communication to overcome change barriers. After plan implementation, the final phase, refreezing, attempts to sustain change by incorporating it as a practice norm.

LCT provided a framework and plan for implementing the use of aromatherapy blend use to reduce PON in the PACU. Setting the atmosphere for change, unfreezing, and discrepancies in patient care/outcomes were assessed (i.e. poor nausea ratings), an evidence-based intervention was identified (i.e. aromatherapy blend), and intervention accessibility was determined (i.e. aromastick available in PACU supply cart). Meeting with stakeholders including nurses, manager, integrative medicine program director, anesthesia director, and pharmacy fostered the opportunity to discuss discrepancies and evidence on the ability of the intervention to improve outcomes. Training was provided to all RNs (n=20) about the need for and use of the device; how to instruct patients in the use of the device; and how to document measurement of outcomes. A paper checklist was created and utilized to evaluate the training content given to the RNs. These actions allowed for change, the next phase, in promoting participation and compliance with implementation (i.e. aromatherapy use to patients with PON). Barriers to providing and utilizing aromatherapy were examined. Feedback through group discussions with RNs suggested improvements in the plan such as documentation reminders to enhance RN utilization and sustainability. The last LCT phase, refreezing included utilizing this feedback to overcome barriers and sharing aromatherapy results to unit/hospital via their newsletter to promote acceptance of aromatherapy for PON as a practice norm for permanent change.

Methods

The setting of this project was the PACU of an ambulatory surgery center in a small urban hospital in the U.S east coast, averaging 300 patients per month. The population was post-anesthesia adult surgical patients. Patients allergic to inhalation agents or those who had nasal surgeries were not included in this project. Prior to implementation, leadership support was gathered to financially support initiative and encourage nursing staff's engagement in practice change. Additionally, the project received a Non-Human Subjects Research determination from the Institutional Review Board at the University of Maryland Baltimore and the organization of the project setting. Implementation of the change took place over the course of twelve weeks.

During weeks one and two, the project leader educated the PACU RNs (n=20) on aromatherapy use and how to document its use and effect in the electronic health record (EHR). An education lesson plan, brochures, algorithm, simulations, and copies of the competency checklist were provided to each RN (see Appendixes A, B, C, and D respectively). At the end of the education sessions, the PACU RNs completed a competency checklist to validate their knowledge and increase self-confidence in implementing and documenting the new intervention in their practice.

During weeks three through twelve, the PACU RNs offered aromatherapy to patients with PON during their stay in the PACU. Prior to use, PACU RNs assessed the patient's nausea score utilizing a pre-existing Likert scale (0-3) in the EHR and educated the patient on aromatherapy use. After utilizing the aromastick, the PACU RNs reassessed the patient's PON 30 minutes after and documented the score along with the intervention in the patient's EHR. The project leader provided bi-monthly email reminders and weekly in-person reminders to RNs regarding importance of educating patients on the aromastick use and documenting its use and effect in the EHR. Additionally, the project leader spoke weekly with the nurses during huddle to hear personal and patient comments on the aromastick use.

Measures collected included attendance at the education program and the use of the aromastick and its effect. To determine the percent of RNs educated, the number of PACU RNs educated (n=20) and the number of PACU RNs employed at the time of implementation (n=20) was collected.

Aromastick use and effect was obtained through an audit created by the EHR IT for the project leader. Data was collected weekly and provided the PON intervention and score (see Appendix G). Data was collected with no patient identifies and stored on a password protected computer.

The number of aromasticks used for PON was measured by counting the number of times PACU RNs documented aromastick use for the patient. The effect of aromastick use required capturing the PON score prior to nausea intervention and the score after utilization of the aromastick. In addition, the project leader recorded PACU RNs comments and reported patient remarks discussed in huddle and during in-person conversations on the unit.

These measures were analyzed using basic statistics. The percent of PACU RNs educated was determined utilizing the ratio between the number RNs who attended education session and number of employed PACU RNs. To determine the percent of patients with PON who received an aromastick, the number of patients who received aromasticks was divided over the number of patients with PON. Finally, to determine the effectiveness of the aromastick, the pre-intervention nausea Likert score was subtracted from the post-intervention PON score. The number of patients who experienced a reduction by one-point over the number of patients who received an aromastick indicated the percent of patients who experienced a reduction in PON with aromastick use.

Results

Structure and process changes from project implementation are reflected in the following results. The knowledge of the RNs about aromatherapy, aromastick use, and documentation in EHR were structural changes which were achieved with two weeks of in-person education sessions. All (n=20, 100%) of the PACU RNs were educated and completed a competency check-off.

This structural change enabled PACU RNs to implement process change by altering practice to provide aromatherapy to patients as a non-pharmacological PON treatment method. During the ten weeks of aromatherapy implementation, 70.6% or 36 of 51 patients experiencing PON were provided aromasticks. As a result of embracing the process change, the outcome measure reflected the impact of using aromastick on patients experiencing PON. Specifically, of the 36 patients who received aromasticks for PON, 34 or 94.4% experienced a reduction in PON by at least one point 30 minutes after use.

During in-person huddle and personal conversations with the project leader, verbal comments provided by RNs noted limitations and benefits to aromastick use. These qualitative comments provide additional insights to the quantitative measures. Limitations included patient status and documentation. Specifically, patients either refused use of an aromastick or the patient was sufficiently sedated, unable to follow instructions on use. Additionally, RNs admitted to occasionally failing to document use and effect.

RNs noted benefits of use which included patient satisfaction, ease of use, and quicker patient discharge. RNs remarked on patient's enthusiasm for: 1) relief of nausea symptoms, 2) pleasant smell, and 3) option to take home and utilize as needed for 3 months. RNs also noted the aromastick was easy to open and use as well as allowed the patient to utilize the aromastick independently as often as needed. Finally, RNs noted practice alteration of substituting the alcohol inhalation for aromatherapy and thereby reducing use of antiemetics. RNs commented this assisted in improving the patient condition and aided in quicker, safer discharge.

Unexpected facilitators and barriers impacted the aromatherapy implementation process and outcomes. Facilitators to enhancing implementation and thus outcomes included: PACU RNs willing to accept the new intervention and adopt into practice, ease of use, IT willingness to create personal audit for data gathering, and the documentation process similar to the established policy. Unit leadership changed mid-implementation unexpectedly, however support for project remained. Barriers to project implementation included aromasticks and antiemetics provided at the same time and forgetfulness of the RNs to utilize aromastick and document use and effect.

Utilizing aromasticks as a non-pharmacological means to assist in treating PON led to unintended consequences around the number of antiemetics pulled from the automated medication dispenser and additional supply cost for the unit. The number of antiemetics utilized for the one month prior to implementation was 36.5% (119 antiemetics pulled from automated medication dispenser with 326 patient cases/month). During implementation the number of antiemetics utilized for the following two months was 26% (89 antiemetics removed with 378 patient cases/month) and 21.1% (80 antiemetics removed for 378 patient cases/month) respectively. The costs of aromasticks was an unintended consequence on the unit budget. Aromasticks were $3.15 per stick which resulted in costing the unit budget $315. Prior to aromastick implementation, the alcohol swabs utilized cost $3.50 per box of 200 packets. Additionally, antiemetic medication costs between $0.18 and $1.89 per dose. In comparison to the costs of the alcohol swabs and medication, utilization of aromasticks was an additional cost for the unit.

Discussion

Implementing use of an evidence-based aromatherapy essential oil blend on a PACU of an ambulatory surgery center provided support for treatment methods that improve PON outcomes. All PACU RNs were educated and trained to integrate aromatherapy into practice. The RNs confirmed their knowledge by passing a competency to increase performance proficiency in the use of and implementation into practice. This result suggested RNs altered their practice, as the majority of patients with PON received an aromastick. A positive association was found between patients with PON and use of an aromastick as almost all experienced reduced PON scores after aromastick use.

Offering the aromastick to patients allowed the PACU RNs to see a positive impact on patient outcomes. Comments expressed by RNs on benefits of use, noted above, were positive reinforcements for their continued implementation. Increased satisfaction with aromastick use may assist the patient's autonomy in their care and ability/confidence to manage their recovery after discharge. Faster discharge fostered aromastick use in this setting due to the high patient volume and limited space. Despite bi-monthly email and in-person reminders, RNs did not always document the use and effect of the aromastick provided to the patient. This confounds data collection on aromastick use and effect. The RNs noted aromasticks were beneficial for a majority of patients except for those heavily sedated or refused the option. Aromatherapy is beneficial for many patients with PON.

The literature supports the use of inhaled aromatherapy essential oil blend as an effective method to reduce PON using: 1) similar measurement methods (i.e. Likert scale for PON), 2) different inhalation methods (i.e. pad, inhaler), and 3) various recovery settings (i.e. in or outpatient PACU) (Hodge et al., 2014; Hunt et al., 2013; Brown et al., 2018; Karaman et al., 2019). Therefore, the results of this project were anticipated with the collective literature supporting the findings in this setting utilizing the same measurement tool. Moreover, unintended reduction in number of antiemetic medications pulled per month was observed during implementation. Coincidentally, this reduction aligns with the self-reported RNs remarks that suggested aromastick use reduced antiemetic medication needs. Enhanced patient satisfaction, noted above, and the unintended consequence of reduced antiemetic medication findings are

supported by literature (Karaman et al., 2018; Hunt et al., 2013). Aromasticks may have led to a reduction in the need for antiemetics. While aromasticks cost more than other interventions, the additional costs incurred from antiemetic use is still significantly higher (Hodge et al., 2014).

The project strength included sustainability methods. From the start of implementation, methods for persistent long-term change included ensuring: the current annual budget includes aromastick costs, the method for restocking, ordering, and storing, as well as continual audit analysis. The project leader spoke with new management to advocate for the future budget to include aromastick cost. The unit's inventory management specialist took initiative to order and restock aromasticks in the future. When aromasticks arrive, the charge RNs will place aromasticks on the unit in the designated spot and PACU RNs will restock their supply cart with aromasticks as needed. Finally, the project leader added audits to full-time PACU RNs to continue monthly analysis on aromastick use and effect on PON. Sustainability methods in place will allow for the continued use of aromatherapy for PON.

Project limitations that threaten internal validity include: lack of consistent documentation of aromastick use and effect, confounding variables (i.e. anesthesia type), dual treatment with antiemetics, and specific implementation methods (i.e. education method). While RNs were provided reminders, the high volume of patients required efficient documentation and often resulted in failure to record use and PON score. This resulted in incomplete data collection. Confounding variables such as the type of anesthesia provided during surgery or the delivery of antiemetics or narcotics prior to transferring to PACU by the doctor or nurse anesthetist, were not included in the project development therefore limiting the ability to decipher the aromastick's true effect on PON. Although the provided algorithm indicated aromatherapy as an optional first line PON treatment, PACU RNs occasionally provided antiemetics with aromasticks confounding the true effect of the aromastick on PON. Specific implementation design including methods of education, placement of aromastick, and EHR audit were unique to this unit, affecting the ability to generalize the results of the aromastick use/effect from this setting. However, implementation success and positive outcomes in education, use, and outcomes offer suggestive implementation methods to be considered for use in other surgical areas.

Conclusion

The positive outcomes of this project and the literature support aromatherapy as an effective non-pharmacological treatment in reducing PON score for patients recovering from surgery. Therefore, these results support aromatherapy as a therapeutic means to improve care that may be used alone or complementary to alternative methods. Initial buy-in through successful education efforts around the use and implementation in addition to sustainability measures will forward the movement of aromasticks as the status quo non-pharmacological treatment method for PON in this PACU. Project results will be shared with hospital RNs and leadership to continue support.

In respect to the implementation methods tailored to fit the departments needs and the convenience sampling, adoption as quality improvement projects across other PACUs should be considered. However, the multiple benefits including the ease of use, minimal cost, and successful improvement in patient outcomes should encourage implementation in other settings. This will provide an opportunity for RNs to have additional non-pharmacological treatment methods to enhance patient outcomes and satisfaction.

Quality improvement projects and future research should investigate the impact of limiting factors on aromastick use and PON outcomes. Research would assist in identifying different factors that may impact and interact with the effect of aromastick use on PON to determine which population would benefit. In addition, the cost-benefit of aromastick use on nursing resources, recovery time, and antiemetic use should be investigated. Given successful use of aromatherapy in this project, additional research should investigate aromatherapy as an alternative treatment method for other patient conditions such as pain in the PACU and anxiety in the pre-operative area.

This project along with current literature support aromatherapy as an innovative approach to improving patient outcomes. Further research and additional quality improvement projects will enhance awareness of and knowledge around aromatherapy influence on patient outcomes. This is particularly important in the current healthcare climate of identifying cost-effective treatment approaches, increasing number of outpatient surgeries, and importance of patient satisfaction.

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Appendix A
Aromastick Implementation Lesson Plan

Lesson Overview

Learning Objectives	Content Outline	Method of Instruction	Time Spent	Method of Evaluation
Describe the purpose of aromatherapy for postoperative nausea in PACU	Overview of aromatherapy and purpose of aromatherapy	Review and discuss the education flyer	2 minutes	Discussion. Checklist competency
Identify where to retrieve the aromastick for patient use on the unit	Overview of the aromastick algorithm	Review and discuss the education flyer. Participate in the demonstration of the use of the aromastick	3 minutes	Demonstration. Checklist competency
Demonstrate how and when to use the aromatherapy device	Demonstration of aromastick use with review of aromastick algorithm	Review and discuss the education flyer. Participate in the demonstration of the use of the aromastick	10 minutes	Demonstration. Checklist competency
Provide patient education on the purpose and use of aromatherapy device	Review purpose of aromatherapy and demonstration of use of aromastick	Review and discuss education flyer. Demonstrate patient education and use of aromastick.	5 minutes	Discussion. Checklist competency
Demonstrate when to document the postoperative nausea scores at baseline and reassessment (every 30 minutes until discharge) in the patient's chart	Review postoperative nausea assessment and documentation	Review and discuss education flyer. Participation in demonstration of postoperative nausea assessment.	2 minutes	Demonstration. Checklist competency
Demonstrate where to document postoperative nausea scores in the patient's chart	Review postoperative nausea assessment and documentation	Review education flyer. Demonstrate postoperative nausea assessment on patient's chart.	3 minutes	Demonstration. Checklist competency
Demonstrate where to document the use of aromatherapy device in the patient's chart	Review postoperative nausea assessment and intervention documentation	Review education pamphlet, open discussion, and demonstration of documentation	5 minutes	Demonstration. Checklist competency

Lesson Outline

1) Overview of Aromatherapy
    a. Definition of aromatherapy
        i. Aromatherapy therapy defined as art and science of using naturally extracted aromatic essences from plans to balance, harmonize, and promote health of body, mind, and spirit (NAHA, 2018).
    b. Review literature to support aromatherapy for postoperative nausea.
    c. Review use and results of use for this aromastick for nausea in chemotherapy patients at same hospital.
2) Review purpose of aromatherapy
    a. Discuss the practice gap in PACU for non-pharmacological methods to reduce postoperative nausea.
    b. Discuss literature to support aromatherapy blend for postoperative nausea.
3) Review postoperative nausea assessment
    a. How to use the postoperative nausea Likert scale available in the patient's chart.
    b. Where to document the postoperative nausea score in patient's electronic chart.
    c. When to assess postoperative nausea.
4) Demonstrate the use of the aromasticks
    a. Utilize the Aromastick algorithm
        i. Note when the aromastick is warranted
        ii. Demonstrate where aromastick will be stored
        iii. How to open and use aromastick
        iv. How to educate patient on purpose and use
        v. Documentation of use and effect on postoperative nausea in patient's chart
5) Practice time for:
    a. Aromastick
    b. Patient education
    c. Aromastick documentation
6) Questions
7) Competency checklist

Appendix B
Education Handout – Front Page

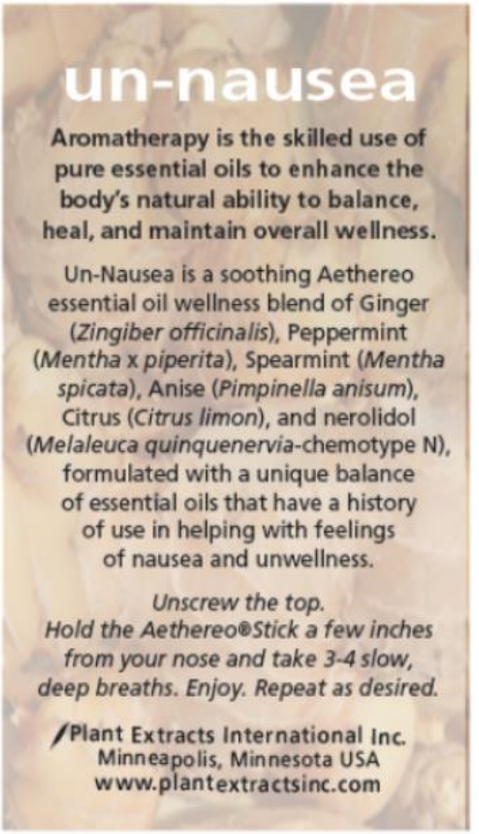
AROMATHERAPY

Aromastick for postoperative nausea in PACU

Aromatherapy is the art and science of using naturally extracted aromatic essences from plans to balance, harmonize, and promote health of body, mind, and spirit (NAHA, 2018).

Current alcohol swab inhalation practices is not supported as an effective antinausea technique

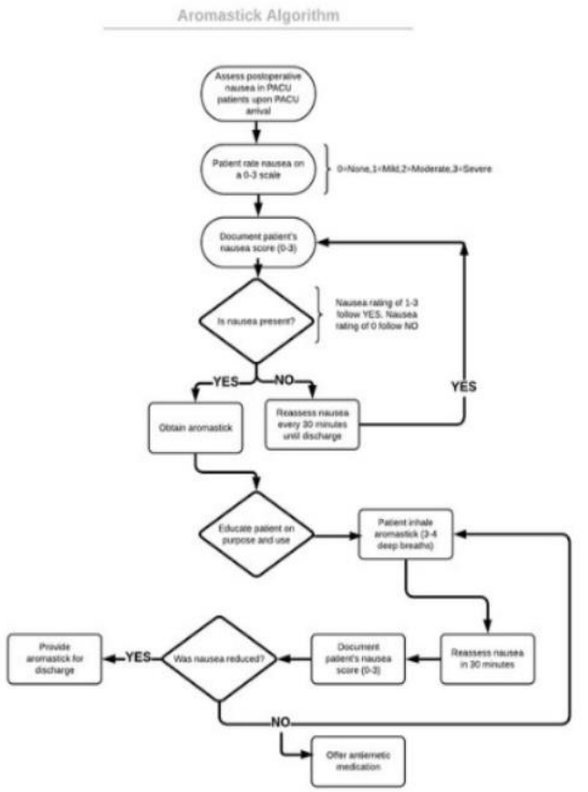
Literature supports the use of aromatherapy blend for postoperative nausea. Statistical significance was found for aromatherapy blends when compared to alcohol and saline inhalation for reduction in postoperative nausea



Contraindications and Safety:

- Patients with nasal surgery.
-Allergies to smells including ginger, peppermint, spearmint, anise, citrus, and nerolidol

Appendix B
Education Handout – Back Side



Replace aromastick for alcohol swab for postoperative nausea

Instruct the patient to hold the aromastick below nose and take 3-4 deep breaths

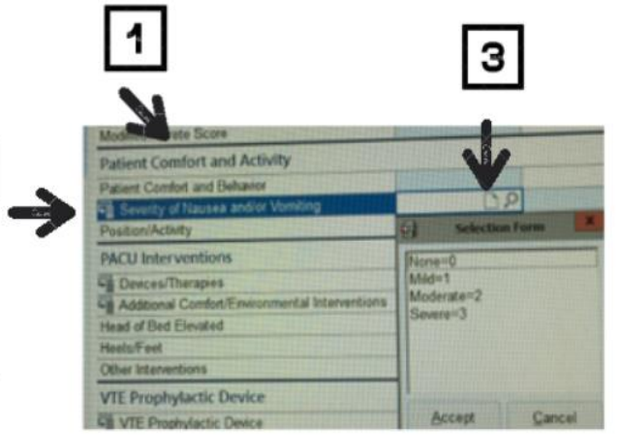
Aromastick available in PACU supply chart

Steps for Documentation of Postoperative Nausea Scores and Intervention

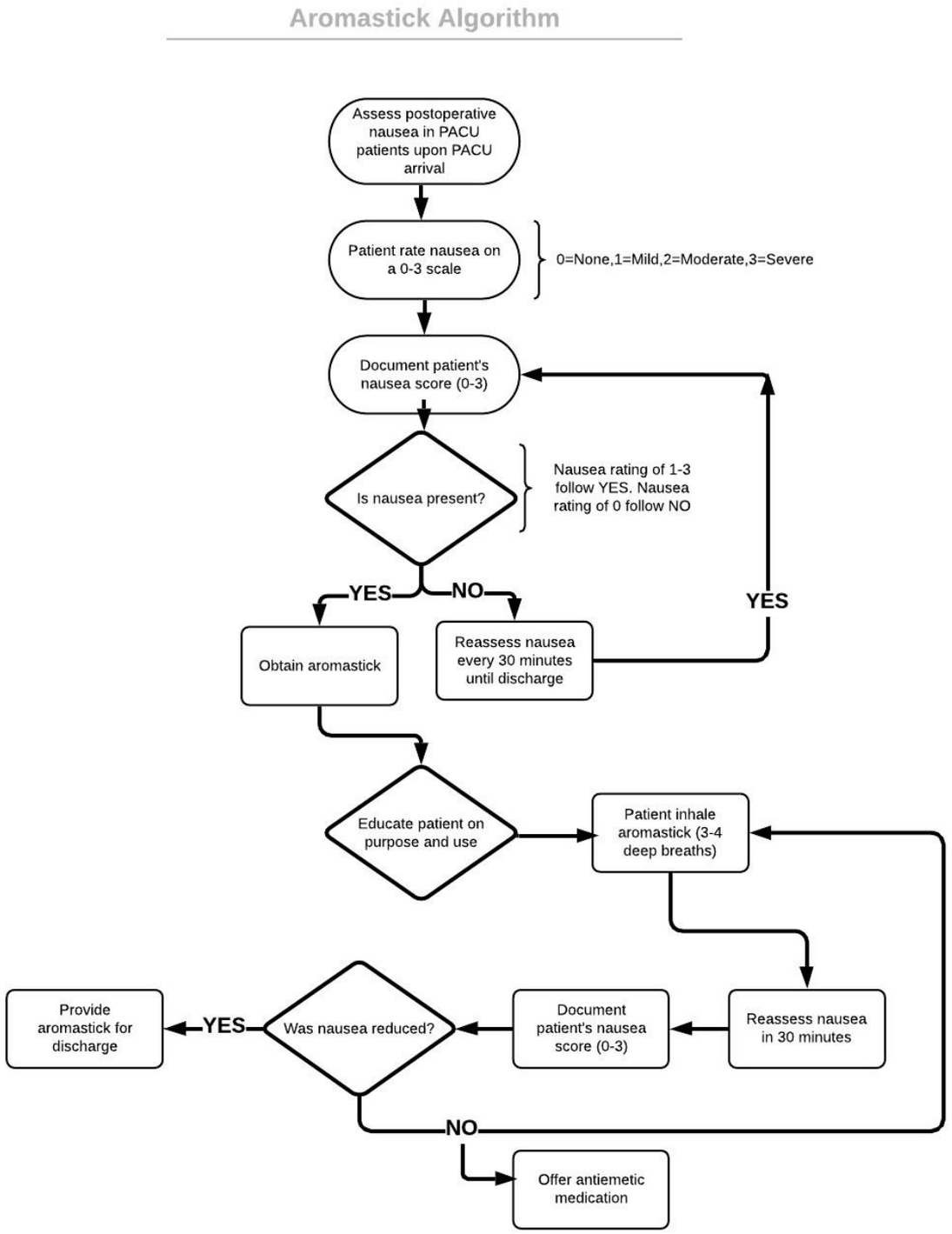
1.Under "Flowsheets" go to "Patient Comfort and Activity" in patient's chart

2. Likert scale for Postoperative Nausea is documented under "Severity of Nausea and/or Vomiting" upon entry to PACU and 30 minutes after device use

3. Document intervention under note section of the nausea score



Appendix C
Aromastick Algorithm



Appendix D
Aromastick Checklist for Competency

Aromastick Checklist			
Validation Method	KEY D – Discussion	O – Observe	R – Return Demonstration

Name:	Title:	JHED ID:
	Unit: SASC	

Procedure	Validation Method	Date Complete	User Initials	Validator Initials
Purpose of aromastick for postoperative nausea	D			
How to assess postoperative nausea using Likert scale	O			
When to use aromastick for PACU patient	D			
How to use aromastick for PACU patients	R			
Contraindications for and safety of aromastick use in PACU patients	D			
Provide patient education on: - How to aromastick - Purpose of aromastick - Safety of use - When to use aromastick - How to rate postoperative nausea severity	R			
Where to obtain aromastick on the unit	O			
Who to contact for lack of device availability	D			
When to assess postoperative nausea	D			
Documentation: - Where to document initial postoperative nausea score - Where to document aromastick use - Where to document postoperative nausea reassessment score after provided intervention	R			

PRINT NAME	SIGNATURE	INITIALS	DATE
Validator (Champion or Lead):			
Orientee:			

Appendix E
Plant Extract Inc. Information Sheet Approval for Use

Good morning,

Yes, of course you may use the information we sent you. I'm assuming you are referring to the two insert graphics attached.

We wish you well with your project!

Sincerely,

Appendix F
Supporting Letter

MEMORANDUM

TO: [redacted]

FROM: **Clinical Pharmacy Service**

DATE: **May 20, 2019**

SUBJECT: **Essential Oils- Aromatherapy for PONV in Ambulatory Surgery Patients**

Our pharmacy department as well as the Pharmacy and Therapeutics Committee have considered the use of essential oils as aromatherapy as part of a hospital- based, nurse- managed quality improvement program. While the essential oil products your plan to use are not medications, we have explored and found no specific safety concerns with this initiative. As discussed originally at our February 20, 2018 meeting of the Pharmacy and Therapeutics Committee, we expect that you will provide the staff and patient education for use of these aromatherapies. We look forward to gaining from you additional information on our patients and staff experiences as the program progresses.

If you have any questions or comments, please contact me at [redacted]. Thank you.

Appendix G
Data Collection Tool

Item	PACU Nurses on Unit	PACU Nurses Attendance At Education Sessions	PACU Nurses Completed Competency
Number			

De-Identified Patient ID	**Baseline Postoperative Nausea Score**	**Post-Intervention Postoperative Nausea Score**	**Difference between Baseline and Post-Intervention Score**	**Type of Intervention Documented**
1				
2				
3				
4				
5				
6				
7				

Appendix H
Evidence Rating Table

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	Level and Quality Rating[a]
Hunt, Dienemann, Norton, Hartley, Hudgens, Stern, & Divine, 2013	To evaluate the effect of and determine the best type of aromatherapy on postoperative nausea.	Randomized control trial	Three hundred and one (n=301) nauseated postoperative adult patients in a urban post-operative care unit in a ambulatory surgery center. Participants were randomly assigned into one of the three treatment groups (70% isopropyl alcohol, ginger oil, blend of ginger, spearmint, peppermint, and cardamom) or control (normal saline) group.	1)Participant demographics and risk factors were collected. 2) Nausea rated using a 0-3 Likert scale (0= no nausea, 1 = some, 2 = a lot, and 3=severe) collected at baseline and 5 minutes post intervention. 3) Antiemetic medication use captured through electronic health record.	1) No difference was found between groups. 2) Initial nausea levels were similar between groups (p=0.951). Compared to the control, ginger and blend significantly reduced nausea levels (p=0.002 and p<0.001 respectively). The odds of having nausea was 2 to 1 with alcohol than ginger and 3 to 1 with alcohol than blend. Nausea was lower in blend compared to ginger alone (p=0.03). Alcohol did not reduce nausea when compared to control (p=0.76). 3)Of the patients requesting antiemetic medication with aromatherapy intervention, 61.5% was from control and alcohol groups. Antiemetic medication was statistically significant lower in ginger and blend groups when compared to control (p=0.0002 and p=0.001 respectively).	2 B
Brown, Danda, & Fahey, 2018	To determine the effect of aromatherapy on PONV in surgical patients.	Pre-post experimental design	Convenience sample of postoperative short-stay adult patients in PACU with PONV (n=50) in a large urban hospital. Participants provided aromatherapy (blend of orange and peppermint oils) inhalation patch.	1) Nausea using the Ambulatory Surgery Index of Nausea, Vomiting, and Retching (AS-INVR) 5-point Likert scale measured at baseline and 30 minutes post intervention.	1) A significant decrease in nausea with use of aromatherapy was found between nausea levels at baseline and 30 minutes post treatment (Z=-5.23, p<0.001). At 30 minutes, 70% reported lower nausea rating and 30% reported same rating pre and post intervention.	4 B
Karaman, Karaman, Tapar, Dogru, & Suren, 2018	To evaluate the effect of different aromatherapy treatment on PONV	Randomized control trial	One hundred and eighty four (n=184) post operative adult patients with PONV in the post-operative recovery room randomly assigned to one of 3 treatment (lavender, rose, or ginger	Outcomes were collected by a blinded investigator: 1) Nausea and vomiting. Nausea measured on a 0-3 Likert scale (0 = no nausea, 1 = some nausea, 2 = a lot of nausea, and 3 = severe). Vomiting	1)At baseline, nausea scores were similar between groups (p=0.21). Nausea scores were significantly lower at 40 minutes when compared to 15 minutes (p=0.00 and p=0.00, respectively). At 15 minutes: nausea scores were statistically significant between treatment groups ($x^{2(3)}$ = 44.89, p=0.00), lavender	2 B

			oil) or control group (pure water) at a urban health research hospital from April 2016 to November 2018.	measured on a 0-3 Likert scale (0=no vomiting, 1 = vomited once, 2 = vomited 2 or 3 times, and 3 = vomited more than 3 times). Measurements taken before aromatherapy treatment, 15 and 40 minutes post treatment intervention 2)Antiemetic drug use captured by visualization of medication 3)Demographic data captured from patient chart.	(p=0.00) and ginger (p=0.00) were significantly lower from control, and rose and control group nausea scores were similar. At 40 minutes: nausea scores was significantly lower between treatment groups ($x^{2(3)}$=44.86, p=0.00) compared to control and lavender (p=0.00)and rose (p=0.00) was significantly lower from control. Overall, nausea scores improved in 43.5% of placebo, 82.6% of lavender, 47.8% rose, 65.2% of ginger group, and significantly lower between treatment groups compared to control (Chi-squared test, $x^{2(3)}$=18.36, p=0.00). Lavender and ginger groups showed significant improvement in nausea scores (p=0.00 and p=0.04 respectively). Vomiting score and severity scores between treatment groups when compared to control (p=0.00, p=0.00). 2)Antiemetic drug use were significantly lower between groups (p=0.00). 3)No significant difference was found between groups demographic or PONV risk factors.	
Hodge, McCarthy, & Pierce, 2014	To evaluate the effect of aromatherapy on PONV.	Prospective randomized two-group design	One hundred and twenty one (n=121) surgery patients admitted to a postoperative inpatient care unit in the Pacific Northwest. Patients were randomly assigned to treatment (a QueaseEase with blend of lavender, peppermint, ginger, and spearmint) or control (unscented inhaler) and if ineffective after a few deep breaths, antiemetic medications were provided.	1) Nausea measured by a 10-point Likert scale with (0= non and 10 = worst). Participants rated nausea at baseline and three minutes post intervention. 2)Patient satisfaction measured on a 0-10 Likert scale (0=completely dissatisfied and 10-completely satisfied) was provided to patients to capture patient treatment	1)Nausea scores were statistically significant in reducing PONV for treatment rather than control (p=0.03). 2)Perceived intervention effect was significantly higher in the treatment than control (t=4.27, df=84, p<0.001). No difference on nausea management or satisfaction was found between groups. 3)Interview comments included aromatherapy was more effective for minimal nausea and acupressure bracelets, and own personal oils.	3 C

				satisfaction and perceived aromatherapy effect. 3)Individual interviews on aromatherapy attitudes were conducted with 10% of patients.		

Note. PONV = Postoperative nausea and vomiting. PACU = post-anesthesia care unit. [a] = using the Rating System for Hierarchy of Evidence (Melnyk & Fineout-Overholt, 2014) and Rating Scale for Quality of Evidence (Newhouse, 2006).