Use of Aromatherapy to Reduce Symptom Burden in Patients Receiving Stem Cell Transplantation

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1.0 Background & Rationale

Symptom burden is a challenge for patients receiving chemotherapy, with nausea/vomiting and anxiety being some of the most common symptoms causing distress. In particular, the burden experience by patients receiving hematopoietic stem cell transplant (HSCT) may far exceed symptom burden experienced by the general oncology population due to extremely high doses of chemotherapy. Hematopoietic stem cell transplant (HSCT), also call bone marrow transplant, is the process of infusing healthy stem cells into the human body to replace damaged cells caused by disease or cancer ("Stem Cell Transplantation", n.d.). Prior to receiving a HSCT, patients must receive high doses of chemotherapy and/or radiation in order to help decrease the amount of damaged or cancerous cells in the body leaving room for the new cells to reach the bone marrow and grow into cancer free blood cells. Due to high doses of treatment patients receive prior to HSCT, greater than 90% are likely to experience emesis despite the use of anti-emetics (Faiman, 2016).

Chemo-induced nausea, vomiting, and retching (CINVR) is the most severe and interfering symptom experienced by patients (Stricker & Wesmiller, 2015) and affects treatment-related quality of life (Wood, Chapman, & Eilers, 2011). High dose conditioning regimens damage the gastrointestinal mucosa and activate brain receptors, causing impulses to increase heart rate, respiratory rate, and saliva to cause CINVR (Faiman, 2016). CINVR may be more severe in the

delayed phase for patients receiving HSCT, defined as 24 hours after chemotherapy and lasting up to 7 or more days (Flank, 2017). Anxiety and depression are also common symptoms (Seo et al., 2019), due to prolonged hospitalization (4 weeks or more) separating patients from the comfort of their home and social network. Additionally, HSCT may be anxiety provoking as a last-option treatment for some patients that have experienced several treatment failures and cancer relapse(s).

Alternative therapies may be a promising approach to decrease symptom burden post HSCT. A systematic review evaluating effects of alternative therapies in HSCT patients found that mind and body interventions could aid in reducing anxiety, fatigue, and pain (Chakraborty, Savani, Litzow, Mohty, & Hashmi, 2015). Systematic and narrative reviews found that use of inhaled aromatherapy with essential oils decreased nausea/vomiting (Farahani et al., 2019; Keyhanmehr et al., 2018; Toniolo et al., 2021) and anxiety (Boehm et al., 2012; Farahani et al., 2019; Kayhanmehr et al., 2018) in several studies in the general oncology population. Peppermint was a common essential oil used for nausea/vomiting symptoms (Farahani et al., 2019; Keyhanmehr et al., 2018) and lavender was used most frequently for anxiety symptoms (Farahani et al., 2019). Additionally, randomized controlled trails have found statistically significant improvements in anxiety symptoms in participants that received inhaled essential oils compared to control (Blackburn et al., 2017; Ozkaraman et al., 2018). Only one aromatherapy study involving HSCT was identified, which was a randomized controlled trial that did not find aromatherapy benefit in hospitalized children newly diagnosed with acute leukemia (Ndao et al., 2012). Due to the lack of research, there is limited understanding of aromatherapy efficacy in the HSCT population. Research is needed to expand translation of aromatherapy as an evidence-based practice to populations at high risk for treatment-related complications, such as HSCT. Findings from this study will enhance understanding of the efficacy of aromatherapy on symptom burden in the HSCT population.

2.0 Objective(s)

2.1 Primary Objective

The purpose of this study is to evaluate the efficacy of aromatherapy on symptoms of CINVR and anxiety for patients hospitalized for hematopoietic stem cell transplant. The primary aim will be to evaluate the effect of inhaled aromatherapy on CINVR and anxiety symptoms compared to control for 48 hours.

2.2 Secondary Objective

- Evaluate patient satisfaction with aromatherapy at completion of study.
- Evaluate the antiemetic administration between nausea/vomiting symptom intervention and control groups during the 48-hour intervention time span.
- Evaluate the number and incidence of unit falls pre and post intervention.

3.0 Outcome Measures

3.1 Primary Outcome Measures

Chemotherapy-Induced Nausea, Vomiting and Retching (CINVR)
CINVR involves three distinct gastrointestinal symptoms (nausea, vomiting, retching) influenced by administration of chemotherapy. Nausea is expressed as an unpleasant

feeling in the throat/epigastrium that can result in expulsion of stomach content, known as vomiting (Rhodes VA, 2001). Retching is the effort to expel stomach contents without success (Rhodes VA, 2001). A review of CINVR instruments identified the Rhodes Index of Nausea, Vomiting and Retching (INVR) was the only instrument that separately assesses all three symptoms (Wood et al., 2011). The INVR will be used to measure CINVR and includes 8 Likert-type items on a 5-point scale, with evidence supporting reliability (Spearman correlation 0.87) and validity (Rhodes & McDaniel, 1999). Completion of the tool will occur at baseline, 24 hour, and 48 hours of intervention.

The primary endpoint for CINVR is the mean INVR score change from (1) baseline to 24 hours and (2) baseline to 48 hours. We anticipate a 30% reduction in the INVR mean score for participants randomized to the intervention group who indicated nausea/vomiting as primary symptom of concern.

Anxiety
Anxiety is excessive or persistent worry about aspects of life ("Understanding the Facts of Anxiety Disorders and Depression is the First Step," n.d.). Anxiety will be measured using a shortened version of Spielberger's State Anxiety Inventory (SAI). The original SAI contains 20 items to measure state anxiety and items are scored using a 4-point Likert-type scale (almost never-almost always) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The SAI instrument has good internal consistency (.86-.95), test-retest reliability (.65-.75) (Spielberger et al., 1983), and evidence supporting construct and concurrent validity (Spielberger et al., 1983). The shortened SAI retains 6 items (from the original 20) and has evidence supporting good internal reliability consistency (Cronbach's alpha .84) and strong construct validity (Abed, Hall, & Moser, 2011). Completion of the tool will occur at baseline, 24 hours, and 48 hours of intervention.

The primary endpoint for anxiety is the mean shortened SAI score change from (1) baseline to 24 hours and (2) baseline to 48 hours. We anticipate a 30% reduction in the SAI mean score for participants randomized to the intervention group who indicated anxiety as their primary symptom of concern.

3.2 Secondary Outcome Measures

Patient Satisfaction with Aromatherapy
A brief semi-structured questionnaire will also be administered to evaluate patient satisfaction with the intervention at the 48-hour completion time.

Evaluate the antiemetic administration between nausea/vomiting symptom intervention and control groups
Data will also be collected from the electronic medical record related to antiemetic medications administered (dose, route, frequency) during the 48-hour intervention.

Evaluate the number and incidence of unit falls pre and post intervention
Fall rates will also be evaluated using the total number of falls reported to the National Database of Nurse Quality Indicators during the baseline and intervention timeframes. Demographic data will be collected including age, gender, and race/ethnicity.

4.0 Eligibility Criteria

Eligibility criteria will be confirmed through review of the electronic medical record and/or patient self-report. Pregnancy tests are standardly completed prior to stem cell transplant and result will be available prior to study enrollment (if applicable).

4.1 Inclusion Criteria

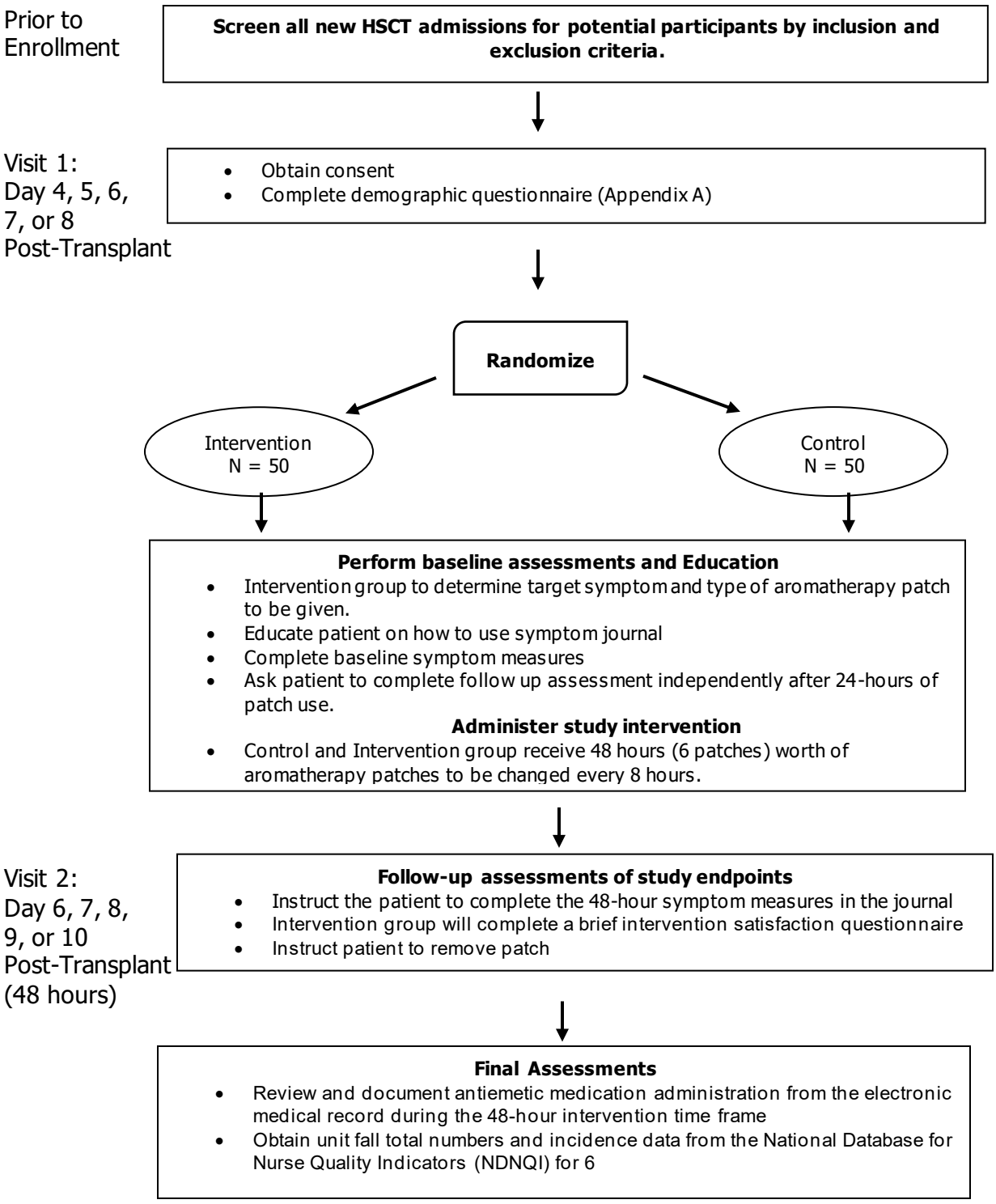
- Patients from a bone marrow transplant unit or hematology/oncology unit within an adult academic health center in the Midwest.
- Adult stem cell transplant inpatients that have received autologous or allogeneic transplant and are actively going through therapy.
- Patients must also be alert and oriented, able to interact with the study team, and able to read and write English.

4.2 Exclusion Criteria

- Under 18 years of age
- Currently receiving another form of essential oils (e.g., diffuser, essential oil roller, lotion with essential oils) within 24 hours of enrollment
- Intubation
- Medical sedation
- Receipt of chimeric antigen receptor T (CAR-T) cells
- History of atrial fibrillation
- History of seizures/epilepsy
- Adhesive allergy or sensitivity
- Currently pregnant
- Prisoner
- Inability to smell

5.0 Study Design

This study will be a randomized controlled trial. Prior to randomization, participants will be asked which symptom, nausea/vomiting or anxiety, is most burdensome for them. Participants will be stratified based on their identified symptom of burden (nausea/vomiting or anxiety) and will then be randomized to either the intervention or control group, with a target of 50 participants in the nausea/vomiting symptom group (25 intervention and 25 control) and 50 participants in the anxiety symptom group (25 intervention and 25 control). Intervention and control groups will receive Wyndmere Naturals, Inc. aromatherapy patches and a symptom journal. Participants in the intervention group indicating that nausea/vomiting is the primary symptom of concern will receive peppermint inhaled aromatherapy patches (or mandarin if peppermint intolerance indicted). Participants in the intervention group indicating that anxiety is the primary symptoms of concern with receive lavender inhaled aromatherapy patches. The control group will receive non-scented aromatherapy patches (i.e., blank hydrogel adhesive patches without essential oil infusion), so it will not be feasible to blind participants to group assignment. The control group will have the same interactions with the study team as the intervention group and will complete patch changes and a symptom journal to serve as an attention control.



6.0 Enrollment/Randomization

Potential participants will receive an information flyer and brief description of the study in clinic prior to stem cell transplant. Flyers will also be available in stem cell transplant classes. The

research team will evaluate the electronic medical record daily for patients meeting inclusion criteria for enrollment into the study on admission. Eligibility will be confirmed on admission and patients meeting inclusion criteria will be approached by the research team for potential study enrollment on post-transplant day 4, 5, 6, 7 or 8. Patients will be approached for potential study enrollment and if interested, will consent and begin study interventions post-transplant day 4, 5, 6, 7, or 8 (depending on day research team approaches). This timeframe will allow the team to observe for delayed CINVR and allow for flexibility in the study schedule to account for patient or study team member unavailability. The study team will provide a summary of the study and will review informed consent and HIPAA authorization documents. Patients that agree to participate in the study will sign a consent and HIPAA authorization. Consented participants will then be randomly assigned using a random number table generated in Microsoft Excel to allocate patients to the intervention or control group.

7.0 Study Procedures

Materials

Participants will receive Wyndmere Naturals, Inc. aromatherapy patches. The hydrogel adhesive patches are infused with essential oil for inhaled aromatherapy treatment. Wyndmere Naturals aromatherapy patches were chosen for the study because the produce (1) is not absorbed into the skin and (2) can be applied and changed by users. The aromatherapy patches provide an occlusive barrier that is hypoallergenic, allowing essential oils to be inhaled without coming in direct contact with the skin. Additionally, patches are easy to apply and change for users and the product has been used in a randomized control trial in which participants completed patch changes and documented in a symptom journal (Lillehei et al., 2015), similar to our protocol procedures. The patch manufacturer (Bioesse Technologies, LLC, Minnetonka, MN) recommends patch changes every 8 hours because the patch is time-released and can last for up to 8 hours.

Procedures

After consenting to study participation, patients will complete a brief demographic questionnaire (see Appendix A). Additional patient data (cancer type, chemotherapy regimen, transplant type, unit of hospitalization) will be collected from the electronic medical record by a study team member. Patients will be asked what symptom they find most concerning (nausea/vomiting or anxiety) and will then be randomly assigned to the intervention or control group using a random number table based on symptom of concern. After random assignment, the patient will be educated on how to use a symptom journal (Appendix B) by a study team member and will be asked to complete the baseline symptom measures in the journal. Patients will be instructed to complete the same symptom measures on the following day independently (24 hour follow up). Patients assigned to the intervention group will receive 48 hours (6 patches) worth of essential oil infused (lavender, peppermint, or mandarin) patches. Aromatherapy patches will be applied to the patient's skin containing peppermint, mandarin, or lavender essential oils. Patient indicating that nausea/vomiting is their symptom of concern will receive peppermint as the default oil or mandarin oil if they have a known intolerance to peppermint. Patients indicating that anxiety is their symptom of concern will receive lavender oil. Patients assigned to the control group will receive 48 hours (6 patches) worth of non-scented patches (i.e., blank hydrogel adhesive patches without essential oil infusion). Patients in both groups will be instructed to change the aromatherapy patch (essential oil infused [intervention group] or non-scented [control group]) every 8 hours, as recommended by manufacturer, and document the

patch change in the symptom journal. Patients in both groups will also be instructed to remove the aromatherapy patch and contact the study team with and signs/symptoms of sensitivity to the patch adhesive or essential oil. The study team will post an "aromatherapy in use" sign inside the patient room to notify clinicians that the patient is on study, with instructions to remove the aromatherapy patch before a MRI test.

The study team initial visit will be at 0 hours (visit 1) and follow-up visits will be completed at 24 hours (visit 2) and 48 hours (visit 3). During visit 2 (Monday-Friday only), the study team will remind participating patients to complete their symptom journal, will answer any study-related questions, and will inquire about any aromatherapy side effects. During visit 3, a study team member will instruct the patient to complete the 48-hour symptom measures in the journal and will complete a brief intervention satisfaction questionnaire (Appendix C) with the patient (intervention group only). Patients will be provided a $25 gift card to show appreciation for their time in the study. After symptom data collection is completed, a study team member will review and document antiemetic medication administration from the electronic medical record during the 48-hour intervention time frame. Antiemetic administration will be captured on an Excel spreadsheet on a secure Microsoft Team for intervention and control participants in the nausea/vomiting sypmtom group. Included medications are scopolamine, lorazepam, promethazine, prochlorperazine, olanzapine, dexamethasone, Marinol, and ondansetron indicated for nausea/vomiting. Medication type, dose, order type (scheduled vs. PRN), and number of doses will be documented for antiemetics administered during the study timeframe. Concomitant medications (e.g., antiemetic medications, steroids, benzodiazepines) will not be controlled as part of the study as the intent is not to alter standard practice for symptom treatment, but rather to provide an adjuvant to help reduce symptom burden. However, it is reasonable to expect that the need for PRN (available as needed) medications prescribed for nausea/vomiting or anxiety may be less in the treatment group compared to control during the 48 hours of inhaled aromatherapy. Because antiemetic and benzodiazepine medications may contribute to an increase in fall risk (Seppala et al., 2018; Wildes et al., 2018), we also plan to observe fall events during the study timeframe. Unit fall total numbers and incidence data will additionally be obtained from data reported to the National Database for Nurse Quality Indicators (NDNQI) for 12 months prior to implementation and 12 months during study implementation.

8.0 Study Calendar

	Screening	Visit 1	Visit 2 *M-F only	Visit 3	Secondary Data
	Day-Admission	Day 4-8 (0-hours)	Day 5-9 (24-hours)	Day 6-10 (48-hours)	Post Study
STUDY PROCEDURES					
Screen new admissions for inclusion/exclusion criteria	**x**				
Consent		**x**			
Demographic Questionnaire		**x**			
Symptom Assessment Tools		**x**	**x**	**x**	
Apply Patch		**x**			
Satisfaction Questionnaire-Intervention Group				**x**	
Remove Patch				**x**	
Evaluate Antiemetic Use					**x**
Evaluate Falls					**x**

9.0 Reportable Events

Inhaled essential oils including lavender, peppermint, and mandarin are generally considered safe if used as indicated. The essential oils used in this study are infused within an adhesive patch, so will not come in direct contact with the skin. However, if the essential oil patch is used not as indicated (e.g. oil applied directly to the skin, oil ingested), the risk of adverse event occurrence may increase.

Adverse Event: Defined as any problematic medical occurrence in a study participant who has received the intervention including inhaled lavender, peppermint, or mandarin essential oil, regardless of possibility of a causal relationship. Adverse events will be documented after the participant begins receiving the intervention.

The occurrence and nature of each participant's medical condition will be documented by study personnel prior to enrollment. Study personnel will document any changes in medical condition and/or the occurrence and description of any adverse event during the study. Events that occur from inhaled essential oil administration up to 72 hours after will be recorded (allows for 24 hours of monitoring after intervention ends). Events will be reviewed during data safety monitoring to determine causality.

Significant Adverse Event: Defined as a life-threatening condition (i.e. immediate risk of dying); severe/permanent disability; a significant hazard, contraindication, side effect, or precaution as deemed by the Data Safety Monitoring team to be caused by the intervention. Investigators will determine causality based on the participant's clinical course, medical history, and administered medications.

Adverse and Significant Adverse Events will be reported to the IRB within 5 business days from discovery if they are determined to be (1) unexpected; (2) related or possibly related to participation in the study; (3) finding suggests that the research procedures involve a greater harm risk than previously anticipated; (4) occurrence of unanticipated adverse device effects.

10.0 Data Safety Monitoring

The study investigator will meet with study key personnel to review data quality, subject recruitment, accrual, retention, and outcome and adverse event data. Study team review will occur on a weekly basis to provide monitoring updates and discuss safety/quality concerns. If an adverse event occurs in which causality cannot be determined by the research team, the study investigator will consult with the patient's medical team to clarify/confirm event causality. Based on findings from the weekly review, considerations for protocol adjustment will be made in the event that opportunities are identified to improve participant safety and/or data quality.

This study will be conducted in accordance with the IU Simon Cancer Center Institutional DSMP for **Low Risk Trials**.

Investigators will conduct continuous review of data and subject safety. Quarterly review meetings for low risk trials are required and will include the principal investigator, clinical

research specialist and/or research nurse (other members per principal investigator's discretion). Quarterly meeting summaries should include review of data, the number of subjects, significant toxicities as described in the protocol, and responses observed. Study teams should maintain meeting minutes and attendance for submission to the DSMC upon request.

Data and Safety Monitoring Committee

The IUSCC Data and Safety Monitoring Committee (DSMC) is responsible for oversight of subject safety, regulatory compliance, and data integrity for this trial. The DSMC will review this study annually to review overall trial progress, toxicity, compliance, data integrity, and accrual per the Institutional DSMP.

Furthermore, the DSMC conducts an administrative review of serious adverse events (SAEs), deviations, reportable events, and any other outstanding business. Major issues may require further DSMC review or action.

At any time during the conduct of the trial, if it is the opinion of the investigators that the risks (or benefits) to the subject warrant early closure of the study, the DSMC Chair and Compliance Officer must be notified within 1 business day via email, and the IRB must be notified within 5 business days. Alternatively, the DSMC may initiate suspension or early closure of the study based on its review.

Study Auditing and Monitoring

All trials conducted at the IUSCC are subject to auditing and/or monitoring per the Institutional DSMP. Reports will be reviewed by the full DSMC at the time of study review.

Data Management/ Oncore Reporting Requirements

The DSMC reviews data and study progress directly from Oncore; therefore, timely data entry and status updates are vital. Study data must be entered within Oncore promptly, no later than one week from study visit occurrence. Subject status in Oncore will be updated in real time, as this may affect overall trial enrollment status. Global SAEs and deviations will be reviewed on a monthly basis by the DSMC Chair directly from Oncore.

Study Accrual Oversight

Accrual data will be entered into the IU Simon Cancer Center OnCore system. The Protocol Progress Committee (PPC) reviews study accrual twice per year, while the PPC coordinator reviews accrual quarterly.

Oncore Safety Reporting

In addition to protocol- and regulatory-required safety reporting, all serious adverse events (SAEs) will be captured in the Oncore system within 1 business day of notification. Initial SAE reporting will include as much detail as available, with follow-up to provide complete

information. Attributions will be assessed to study drugs, procedures, study disease, and other alternate etiology.

Protocol Deviation Reporting

Protocol deviations will be entered into OnCore within 5 days of discovery and reviewed by the DSMC Chair on a monthly basis. Findings will be reported to the full DSMC at the time of study review. For serious or repetitive protocol deviations, additional action may be required by the DSMC.

11.0 Study Withdrawal/Discontinuation

Participants may withdrawal anytime by notifying the principle investigator (Monica Bates) or any other member of the study team. Choosing not to participate or withdrawal from the study will not influence relationships or patient status at IU Health.

12.0 Statistical Considerations

SAS and/or R statistical packages will be used to analyze primary outcomes, secondary outcomes, and demographic sample data.

Primary Outcomes

Comparisons between the intervention and control groups for differences in the CINVR and anxiety tools will be analyzed using mixed-model ANOVA, with time (baseline, 24 hours, 48 hours) repeated within subject. Chi-square tests will be used to compare the groups for differences in the proportions of patients prescribed medications for nausea/vomiting or anxiety. Separate analyses will be performed for the two symptom groups. A two-sided 5% significance level will be used for all tests.

Sample size justification: With sample sizes of 50 patients within each symptom group, 25 intervention/25 control within each symptom group, the study will have 80% power to detect an effect size of 0.81 between intervention and control within each symptom group, based on a two-sample t-test calculation and a two-sided 5% significance level. The recruitment target will be 112 participants (56 per symptom group) to account for a 10% drop out rate.

Secondary Outcomes

Descriptive statistics will be used to analyze frequencies and percentages of the patient satisfaction questionnaire responses, documented antiemetic administration, and number of unit falls. The number of (1) total antiemetic medication doses and (2) doses for each individual medication (i.e., Ativan, promethazine) will be compared between the control and intervention groups for the nausea/vomiting sypmtom group. The percentage change for number of falls will be calculated by comparing number of falls 12 months prior to intervention implementation to 12 months during implementation.

Descriptive statistics will be used to summarize the demographics of the study sample (frequencies and percentages for categorical variables, means and standard deviations for continuous variables).

13.0 Data Management

Patient data collected from the electronic medical record will be documented in a secure electronic REDCap database. Paper signed informed consents and HIPAA authorizations will be stored in a file in a locked office. Demographic data, data from the symptom journal, and intervention satisfaction responses will be transferred from paper by a study team member into REDCap and paper documents will be stored in a secure, locked office. This study involves minimal risk for participants. All data will be stored via secure REDCap database, which is backed up automatically every day. Only study team members will have access to the data. All computers used for data storage and analysis will be password protected. Only aggregated data will be disseminated, and raw data will be destroyed after data analysis is complete.

14.0 Privacy/Confidentiality Issues

All data will be stored on a secure REDCap database. All computers used for data storage and analysis will be password protected and only trained study personnel will have access to data. A unique blinded identifier will be assigned to each participant record prior to analysis. The results of the study will be analyzed and reported as aggregate data and no participant or individual responses will be identified.

15.0 Follow-up and Record Retention

Study duration including data collection and analysis will take approximately eighteen months. Once data collection has been completed and data analyzed, completed assessments will be stored on a secure REDCap database. Once it has been determined that original data is no longer needed, data files will be secured with password protected computer, and all paperwork associated with the study will be discarded via a security container. Data, analysis, and consent forms will be secured for the required length of time required by the IRB and then will be destroyed appropriately.

16.0 References

Abed, M. A., Hall, L. A., & Moser, D. K. (2011). Spielberger's State Anxiety Inventory: Development of a Shortened Version for Critically Ill Patients. Issues in Mental Health Nursing, 32(4), 220-227. doi:10.3109/01612840.2010.546493

Blackburn, L., Achor, S., Allen, B., Bauchmire, N., Dunnington, D., Klisovic, R. B., … Chipps, E. (2017). The effect of aromatherapy on insomnia and other common symptoms among patients with acute leukemia. *Oncology Nursing Forum*, *44*(4), E185–E193. https://doi.org/10.1188/17.ONF.E185-E193

Boehm, K., Bussing, A., & Ostermann, T. (2012). AROMATHERAPY AS AN ADJUVANT TREATMENT IN CANCER CARE – A DESCRIPTIVE SYSTEMATIC REVIEW. Retrieved from https://www.ulib.iupui.edu/cgi-bin/proxy.pl?url=https://search.ebscohost.com/login.aspx?direct=true&db=edsbas&AN=edsbas.DD131E03&site=eds-live

Chakraborty, R., Savani, B. N., Litzow, M., Mohty, M., & Hashmi, S. (2015). A perspective on complementary/alternative medicine use among survivors of hematopoietic stem cell transplant: Benefits and uncertainties. Cancer, 121(14), 2303-2313. doi:10.1002/cncr.29382

Faiman, B. (2016). BMTCN certification review manual Pittsburgh, PA: Oncology Nursing Society

Farahani, M. A., Afsargharehbagh, R., Marandi, F., Moradi, M., Hashemi, S.-M., Moghadam, M. P., & Balouchi, A. (2019). Effect of aromatherapy on cancer complications: A systematic review. doi:10.1016/j.ctim.2019.08.003

Keyhanmehr, A. S., Kolouri, S., Heydarirad, G., Mofid, B., & Mosavat, S. H. (2018). Aromatherapy for the management of cancer complications: A narrative review. Complementary Therapies in Clinical Practice. doi:10.1016/j.ctcp.2018.02.009

Lillehei, A.S., Halcón, L.L., Savik, K., Reis, R., 2015. Effect of inhaled lavender and sleep hygiene on self-reported sleep issues: A randomized controlled trial. J. Altern. Complement. Med. 21, 430–438. https://doi.org/10.1089/acm.2014.0327

Ndao, D. H., Ladas, E. J., Cheng, B., Sands, S. A., Snyder, K. T., Garvin, J. H., Jr., & Kelly, K. M. (2012). Inhalation aromatherapy in children and adolescents undergoing stem cell infusion: results of a placebo-controlled double-blind trial. Psycho-Oncology, 21(3), 247-254. doi:10.1002/pon.1898

Özkaraman, A., Dügüm, Ö., Yılmaz, H. Ö., & Yeşilbalkan, Ö. U. (2018). Aromatherapy: The effect of lavender on anxiety and sleep quality in patients treated with chemotherapy. *Clinical Journal of Oncology Nursing*, *22*(2), 203–210. https://doi.org/10.1188/18.CJON.203-210

Rhodes, V. A., & McDaniel, R. W. (1999). The index of nausea, vomiting, and retching: a new format of the index of nausea and vomiting Oncology Nursing Forum, 26(5).

Rhodes VA, M. R. (2001). Nausea, vomiting, and retching: complex problems in palliative care A Cancer Journal for Clinicians 51, 232-248.

Seo, H. J., Baek, Y. G., Cho, B. S., Kim, T. S., Um, Y. H., & Chae, J. H. (2019). Anxiety and Depression of the Patients with Hematological Malignancies during Hospitalization for Hematopoietic Stem Cell Transplantation. Psychiatry Investig, 16(10), 751-758. doi:10.30773/pi.2019.07.12

Seppala, L.J., Wermelink, A.M.A.T., de Vries, M., Ploegmakers, K.J., van de Glind, E.M.M., Daams, J.G., van der Velde, N., 2018. Fall-Risk-Increasing Drugs: A Systematic Review and Meta-Analysis: II. Psychotropics. J. Am. Med. Dir. Assoc. 19, 371.e11-371.e17. https://doi.org/10.1016/j.jamda.2017.12.098

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). Manual for the State-Trait Anxiety Inventory. Palo Alto, CA.

Stem Cell Transplantation (n.d.). Leukemia & Lymphoma Society Retrieved from https://www.lls.org/treatment/types-of-treatment/stem-cell-transplantation

Stricker, C. T., & Wesmiller, S. W. (2015). Chemotherapy-Induced Nausea and Vomiting In C. G. Brown (Ed.), A Guide to Oncology Symptom Management (2 ed., pp. 171-202). Pittsburgh, PA: Oncology Nursing Society

Toniolo, J., Delaide, V., & Beloni, P. (2021). Effectiveness of Inhaled Aromatherapy on Chemotherapy-Induced Nausea and Vomiting: A Systematic Review. *The Journal of Alternative and Complementary Medicine*, *00*(00), 1–12. https://doi.org/10.1089/acm.2021.0067

Understanding the Facts of Anxiety Disorders and Depression is the First Step. (n.d.). Anxiety & Depression Association of America. . Retrieved from https://adaa.org/understanding-anxiety

Wildes, T.M., Maggiore, R.J., Tew, W.P., Smith, D., Sun, C.-L., Cohen, H., Mohile, S.G., Gajra, A., Klepin, H.D., Owusu, C., Gross, C.P., Muss, H., Chapman, A., Lichtman, S.M., Katheria, V., Hurria, A., 2018. Factors Associated with Falls in Older Adults with Cancer: A Validated Model from the Cancer and Aging Research Group. Support Care Cancer 26, 3563–3570. https://doi.org/10.1007/s00520-018-4212-3

Wood, J. M., Chapman, K., & Eilers, J. (2011). Tools for assessing nausea, vomiting, and retching. Cancer Nursing, 34(1), E14-24. doi:10.1097/NCC.0b013e3181e2cd79

17.0 Appendix

Appendix A: Demographic Questionnaire

1. What is your age in years? (or prefer not to say)
2. What gender do you identify with?
    a. Woman
    b. Man
    c. Transwoman
    d. Transman
    e. Genderqueer
    f. not listed
    g. prefer not to say
3. What race do you most closely identify with?
    a. White/Non-Hispanic
    b. Latino
    c. Black or African American
    d. Native American or American Indian
    e. Asian or Pacific Islander
    f. Other
    g. Prefer not to say

Appendix B: Sample of Journal

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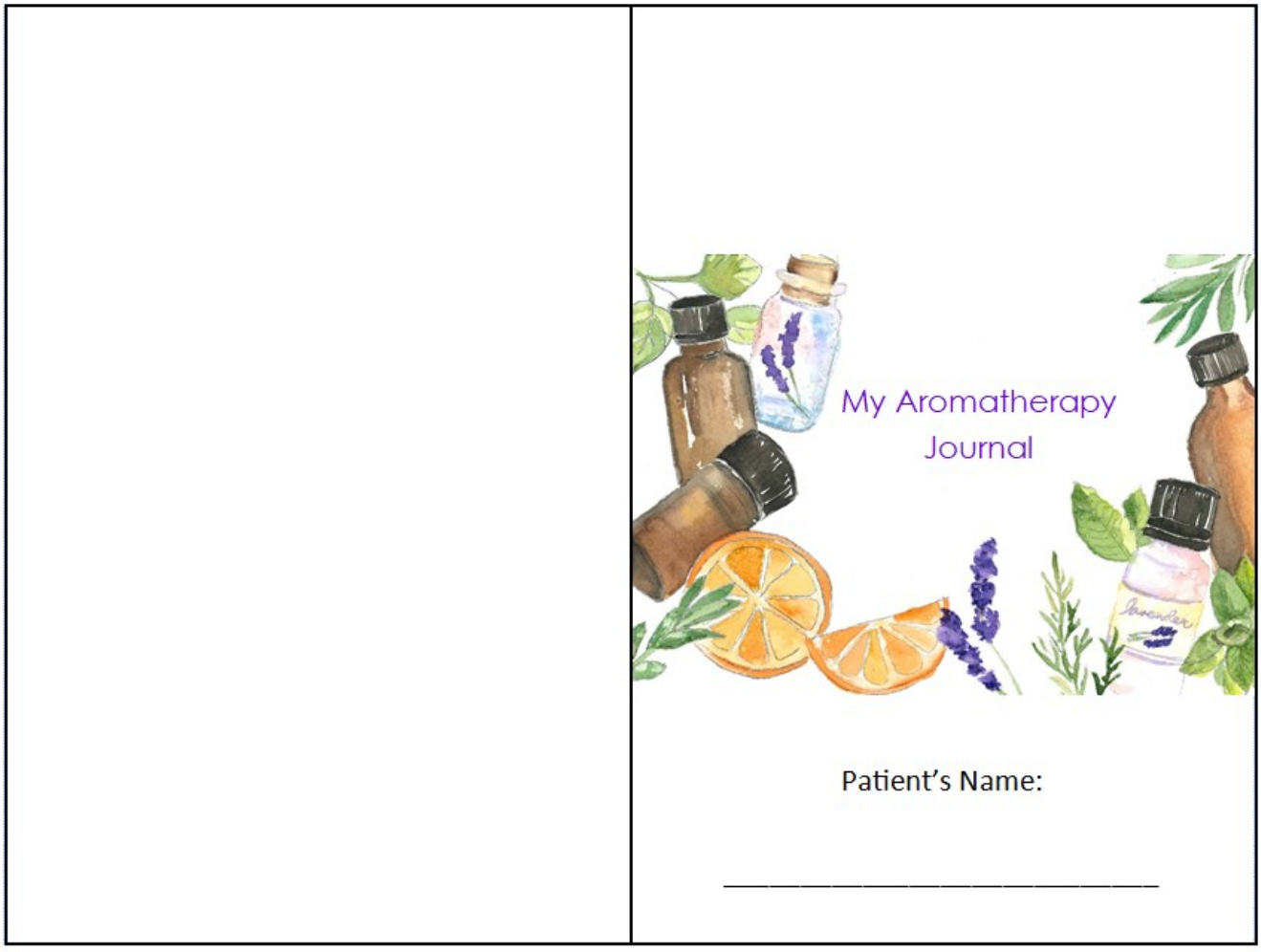

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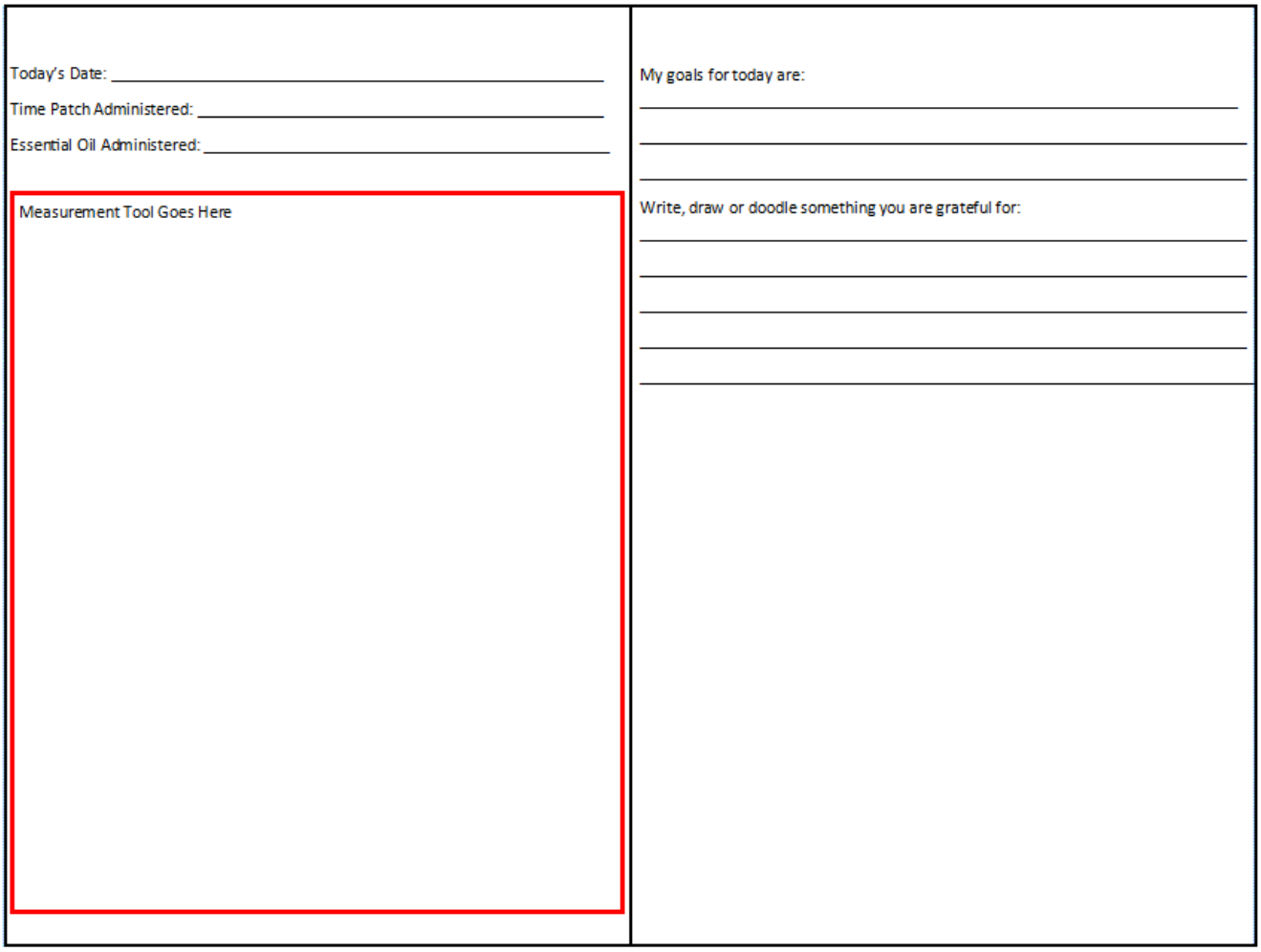

Appendix C: Aromatherapy Experience/Satisfaction Questionnaire

1. Tell me about your experience with aromatherapy in the hospital.
2. What was your satisfaction with aromatherapy on a scale of 1-10 (10 being extremely satisfied)?
3. How likely are you to use aromatherapy again in the hospital on a scale of 1-10 (10 being extremely likely)?