Protocol Template Guidance
For Submissions to CORIHS

TITLE: Aromatherapy for management of back pain in the Emergency Department

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A. SPECIFIC AIMS

This study aims to research the use of aromatherapy for pain control in the emergency department, specifically, acute back pain. Aromatherapy, particularly Rose Essential Oil (Rosa damascena) has been studied in recent literature and shown to be effective versus placebos for the control of acute pain with lasting effects during burn dressing changes and post-operative pain management. These studies have been small and specific to discrete clinical conditions. Their evidence supports the use of aromatherapy for acute pain control with additional patient satisfaction benefit, but they are not yet externally validated to more common conditions facing emergency medicine physicians. We chose to study acute isolated back pain and sciatica presenting to the emergency department and the use of Rosa damascena essential oil versus a control of Almond Oil for the treatment of isolated back pain and sciatica. We will investigate the use of aromatherapy in pain management by measuring and comparing pre- and post-treatment pain levels using a 100 mm visual analog scale (VAS) for pain. A significant reduction in pain by 13 mm on the VAS has been previously demonstrated as the minimal clinically important difference for treatment of pain (). Our primary endpoint will be the evaluation of significant change in VAS score greater than 13 mm between both groups immediately following a 30 minute blinded aromatherapy treatment and again 30 minutes later. Our secondary measures include patient satisfaction, need to rescue medication (its type and dose), and subjective changes in pain.

B. Background and Significance

Aromatherapy has been hypothesized to be an effective management strategy for acute pain control. Its use has been recently demonstrated in Iran, using Rosa damascene (Damask Rose) essential oil. Rosa damascene is believed to possess anti-anxiolytic, sedative, anticonvulsive, and analgesic effect on the CNS when delivered through the olfactory system (Mohebitabar et al. 2016). This theory is believed to be in part due to the lateral gate theory of pain control and a stimulant's ability to inhibit transmission of stimuli through pain fibers. However, while any olfactory stimulant might be hypothesized to do just that, only Rosa damascena has been shown to produce significant reduction in pain on the VAS as well as patient satisfaction when compared to scented placebos like Almond Oil. Rosa damascene has been shown to improve pain control during dressing changes of second- and third-degree burns (Bikmoradi et al 2016). It has also been shown effective and equal to NSAID treatment of immediate post-operative pain in children (Marofi et al. 2015). It may be an affordable and easy-to-use modality for pain control in the emergency department. Its prior studies are small in sample size and carry little external validity that could be applied to an American Emergency Department population. We aim to assess whether aromatherapy using Rosa Damascena is reproducible in the emergency department for control of isolated and acute back pain, two common painful conditions seen with poor evidence for proper pain control. Validity of Rosa damascene aromatherapy in acute back pain and sciatica may open new doors of pain control to be researched in the emergency department and will further characterize the use of aromatherapy in modern medicine.

C. Preliminary Studies

The known external studies of Rosa damascene have been cited above and will be presented in the references section. We have not yet studied aromatherapy in the emergency department and will be completing this study fresh, based on methodology used in external aromatherapy and back pain treatment studies. Our MCID of 13 mm on the VAS has been studied repeatedly and validated as the minimal VAS change needed for a patient to express significantly subjective improvements in pain (Gallagher, Leibman, and Bijur 2001)(Jensen and Chen 2003). Successful pain treatment has been shown by using 3-5 drops of 40% Rosa damascene oil on a cotton ball or gauze pad 20-30 cm from a patients face for 30 minutes (Bikmoradi et al. 2016). Additionally, uses of rescue medications and patient satisfaction have been commonly used as secondary measures in both aromatherapy and

landmark back pain treatment studies. Patient demographics include age, gender, comorbidities, prior treatment, BMI, education, marital status, and pain identifiers have been repeatedly used to assess patient demographic distribution in many benchmark Emergency Medicine acute pain management studies (Chang et al 2015.)(Friedman et al. 2015).

D. Research Design and Methods

Rationale and Overview
Isolated acute back pain (less than 2 weeks duration) and sciatica are common complaints to the emergency department requiring acute pain management with often chronic follow-up. Their abundance in the ED as well as poorly defined treatment recommendations make them an excellent candidate to study the use of aromatherapy in the emergency department. We will replicate the Rosa damascene trials referenced above in similar protocols, patients will be recruited if they fit the attached inclusion criteria and do not meet exclusion criteria. Patients will be treated with either Almond Oil extract or Rosa damascena extract, and both the investigator and patient will be blinded to the control arm.   A VAS pain scale will be recorded before treatment, after 30 minutes of treatment, and after a following 2nd 30 minutes. Patients will additionally be asked about their satisfaction and subjective changes in pain, they will be blinded to their prior VAS line placements for proper evaluation of objective pain level changes. Demographics thought to contribute to the sensation of pain, expression of pain, and response to pain treatment will additionally be collected without entangling PHI. Finally, the use of rescue medication such as NSAIDs or Narcotics at the treating physician's discretion will be recorded as an indicator of treatment failure and complication. Pain will be qualified in its type, locations, duration, immediate episodes prior to presentation, and prior remote episodes in the patient's lifetime health history. Pain will also be quantified by attempted at-home treatments prior to presentation.

Research Site
The entirety of this prospective clinical trial will be conducted at the Stony Brook Hospital Emergency Department, an ED with over 80,000 annual visits.

Study Sample
Patients will be recruited into this study by an investigator in the Stony Brook Emergency Department. A sample size was calculated to be 30 patients for each treatment arm based on a power of 0.80, desired p value below 0.05, and 95% confidence intervals with the anticipated possibility of patient loss or desire to withdraw during treatment. Patients will be approached for recruitment after an attending or resident physician has seen them and does not anticipate immediate need for narcotic pain medication, immediate imaging, or immediate threats to life or limb. Patients will be included by the attached inclusion and exclusion criteria. Double-blinding will be ensured by block randomization of each treatment arm, performed outside of the emergency department. In the Emergency Department Research Offices, the two treatment arms will be allocated into identical, individual vessels with only a codified label applied to each. Using block randomization, 30 treatments will be distributed to each arm in secret by a clinical research assistant or Dr. Singer. Each treatment will be codified individually and recorded in secrecy and kept from the investigators, Dr. Weiss and Stephen Meigher. Randomization will then arrange the total 60 treatments in longitudinal order for sequential random treatments to be selected as each patient is recruited.

Screening
Patients will be approached in private and the name, title, and role of the investigator explained after asking permission to speak with the patient. The patient will be told that we are conducting a clinical research trial for the treatment of acute back pain and sciatica. Aromatherapy will be explained as the treatment of interest and a modality that has been tested and proven in other types of pain. The use of Almond products and Rose products will be briefly discussed with the patients. Patient's will be asked about any allergies and then asked specifically about allergies to Almonds, Roses, perfume, and ibuprofen. Patient will be informed that speaking with the investigator is entirely optional, as is participating in the study, as there may be no direct benefit to them despite disclosure of their private information to the investigator. An Inclusion and Exclusion form will be reviewed with the patient and

their chart, noting their sequential patient number in this study as the only de-identified patient ID. No PMI will be collected; no MRN, address, phone number, emails, name, SSN, DOB, chief complaint, PMH, PSH, or medications will be recorded. The risks and benefits will be explained to the patient including risk of allergy, risk of no change in pain, benefit of pain improvement, and benefit of contribution to medical research. The consent form will be reviewed in full and any questions answered. Those patients interested in participating and able to grant consent will do so.

Procedures
Rosa damascena 40% and Almond Oil 40% kept outside of the ED will be prepared each day and dispersed into identical vessels with randomized identification numbers. The coded numbers and their respective modality will be recorded by an investigator not involved in delivery and kept secured. Patients will be chosen into random treatment arms by block randomization and their coded treatment recorded on the patient data sheet. Patients will be given 4 drops of either modality (40%) on a cotton ball kept between 20 and 30 cm from their face for 30 minutes.

With regards to study blinding, the treatments will be randomly assigned and the patients will not be told which treatment they are receiving. The patients will be aware that the study involves Rose and Almond scents and will likely be able to identify the scent used in their treatment. However, at the end of the study procedures, an independent observer will assess the patient's pain after the aromatherapy has been removed from the room, and will not be aware of which patients received which treatment.

E. Statistics
VAS differences immediately after treatment and 30-minutes following will be aggregated from their respective 100 mm VAS for pain and the change calculated for each patient. One-tailed paired t-Tests will be then conducted on the means after standard deviation is calculated and compared between treatment and control groups. A chi-squared test will then be applied between both groups for analysis of significant differences in patient satisfaction and subjective reports of pre- and post-treatment pain. The use of rescue medications by type and dosage will be measured as a percentage of each group and compared via t-Test between both groups.

F. Funding
Rosa damascene and Almond Oil are affordable and readily available over-the-counter. This trial requires no significant funding to be conducted.

G. HUMAN SUBJECTS RESEARCH PROTECTION FROM RISK

Risk to Subjects
This study poses minimal risks to its enrolled subjects. Subjects will not be exposed to systemic treatments. Their anticipated risks include failure to control pain, dislike of the randomized aromatherapy agent, and (rare) allergic reaction. The former will be reduced by screening for allergies to flowers, almonds, or perfumes.

Adequacy of Protection Against Risks
Patients are well-protected against the aforementioned risks. Rescue medications will be used at the treating physician's discretion for those patients without proper pain control as a result of the trial. Patients with allergies are anticipated to be extremely rare and will be screened out by questionnaire and inclusion/exclusion criteria. The study will be conducted entirely in the Emergency Department, where physicians and nurses trained in emergency medicine are available to treat any unforeseeable risk such as anaphylaxis.

Potential Benefits of Proposed Research to the Subjects and Others
Patients may benefit directly fro this study through relief of their acute pain. The benefit to society will be that of the evaluation of aromatherapy as a pain management tool in the emergency department. This research will answer if it is an appropriate modality for the emergency department and whether its evidence elsewhere is applicable and warrants further study.

Importance of the Knowledge to be Gained
The knowledge gained in this trial may provide a groundwork for future use of aromatherapy treatment of acute pain in the emergency department. In the very least, it will demonstrate whether prior aromatherapy using Rosa damascena are externally valid and worth further research or not reproducible in the acute back pain patient.

H. Literature Cited

Bijur, Silver, and Gallagher. 2001. Reliability of the Visual Analog Scale for Measurement of Acute Pain. *Academic Emergency Medicine* 8(12): 1154-1157

Bikmoradi et al. 2016. The Effect of Inhalation Aromatherapy with Damask Rose (*Rosa damascene*) Essence on Pain Intensity after Dressing in Patients with Burns: A clinical Randomized Trial. *Iranian Journal of Nursing and Midwifery Research* 21(3):247-254

Chang et al. 2015. Comparative Analgesic Efficacy of Oxycodone/Acetaminophen Versus Hydrocodone/Acetaminophen for Short-Term Pain Management in Adults following ED Discharge. *Academic Emergency Medicine* 22(11):1254-1260

Friedman et al. 2015. Naproxen with cyclobenzaprine, Oxycodone/Acetaminophen, or Placebo for Treating Acute Low Back Pain: A Randomized Clinical Trial. *JAMA* 314(15):1572-1580

Gallagher, Liebman, and Bijur. 2001. Prospective Validation of Clinically Important Changes in Pain Severity Measured on a Visual Analog Scale. *Annals of Emergency Medicine* (38(6): 633-638

Jensen and Chen. 2003. Interpretation of Visual Analog Scale Ratings and change Scores: A Reanalysis of Two Clinical Trials of Postoperative Pain. *Journal of Pain* 4(7): 407-414

Marofi et al. 2015. Evaluation of the Effect of Aromatherapy with Rosa damascene Mill. On Postoperative Pain Intensity in Hospitalized Children in Selected Hospitals Affiliated to Isfahan University of Medical Sciences in 2013: A Randomized Clinical Trial. *Iranian Journal of Nursing and Midwifery Research* 20(2):247-254

Mohebitabar et al. 2016. Therapeutic Efficacy of Rose Oil: A Comprehensive Review of Clinical Evidence. *Avicenna Journal of Phytomedicine* 7(3):206-213