



Original Contribution

# Both lavender fleur oil and unscented oil aromatherapy reduce preoperative anxiety in breast surgery patients: a randomized trial



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## Abstract

**Study objective:** The objective of this study was to determine whether lavender fleur oil (LFO) aromatherapy would reduce anxiety when administered to women before undergoing breast surgery.

**Design:** This was a single-site, randomized study comparing the effect of LFO to unscented oil (UO).

**Setting:** The study was conducted in the preoperative holding area of the ambulatory surgery department of NYU Langone Medical Center.

**Patients:** Ninety three women, 18 years and older, scheduled for breast surgery. Women meeting inclusion/exclusion criteria were randomized to either LFO or UO aromatherapy and were blind to their assigned treatment.

**Outcome measures:** Subjects completed a Spielberger State Anxiety Inventory for Adults (STAI) before and after aromatherapy. Vital signs were recorded before and after aromatherapy.

**Results:** STAI-State questions were divided into positive and negative emotions for analysis. Before aromatherapy, there was no significant difference between groups by individual questions or overall average answer of either positive or negative questions. The use of both LFO and UO increased the positive STAI score totals, with the LFO group having a slightly, but statistically significant, greater increase. Both resulted in a statistically significant decrease in the negative score totals after treatment. There were no differences in vital signs between groups for either treatment. Following the conclusion of the trial LFO was analyzed and found to contain a very low content of the 2 major *Lavandula angustifolia* constituents.

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**Conclusions:** Both LFO and UO aromatherapy treatments lowered anxiety before surgery despite no significant changes in vital signs. LFO treatment generated a slight but statistically significant increase in positive feelings compared with UO treatment. It is probable that the beneficial effect observed was due to both aromatherapy with LFO and a placebo effect related to the added attention given to the patients.

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## 1. Introduction

Perioperative anxiety is considered to be a normal part of the surgical experience. It is a pervasive problem, affecting health outcomes [1]. Anxiety triggers the physiologic stress response, which can impede healing [2–4]. Anxiety can also increase anesthetic requirements, which increases anesthetic risks. Many of the medications used to treat anxiety produce excessive and prolonged amnesia, sedation, and, infrequently, respiratory depression [5]. Because patients need to give informed consent and medical history, these medications are inappropriate preoperatively. An ideal anxiolytic would have minimal adverse effects and relax and reduce patient's anxiety.

Lavender oil has been used as a therapeutic agent since ancient Rome and Greece [6]. Its use in aromatherapy is one possible method for anxiolysis with few adverse effects. Many studies have shown *Lavandula angustifolia* to reduce anxiety significantly [7], as well as to reduce the perceived levels of anxiety [8]. Lavender oil's many attributes may be beneficial prior to surgery. It is inexpensive, easy to administer, not too sedating, and one of the least toxic and least allergenic of the essential oils [6,8–11]. Clinical studies also suggest that after lavender treatment, there is a reduction in pain and unpleasantness of pain [12–14]. Earlier work by our group found that although postoperative aromatherapy in the postanesthesia care unit with 2% lavender purchased from Witchcraft, an herbal product company, in an oxygen face mask did not change pain scores or analgesic use in breast biopsy patients, it did lead to higher levels of patient satisfaction regarding their pain control, thereby improving the subjective patient experience [13]. Furthermore, in morbidly obese patients who had laparoscopic gastric banding, lavender fleur oil (LFO) aromatherapy postoperatively reduced the use of opioids compared with placebo treated patients [14].

We hypothesized that the use of LFO aromatherapy would reduce preoperative anxiety as assessed by Spielberger State Anxiety Inventory (STAI) questionnaires and simultaneously decrease heart rate and blood pressure. We undertook an examination of LFO's anxiolytic effect and randomized patients to either LFO or unscented oil (UO) aromatherapy.

## 2. Materials/methods

Ninety-three female, American Society of Anesthesiologist (ASA) I-III patients undergoing breast surgery were randomized

to receive LFO or UO in the preoperative holding area. Subjects completed an STAI survey and vital signs were recorded. Two drops of 2% LFO or UO were then applied to the inside of a plastic oxygen mask, and subjects inhaled the scented or unscented oils for 10 minutes. After aromatherapy, vital signs were checked again and subjects completed another STAI survey. STAI questions were divided into positive and negative emotions for analysis.

### 2.1. Study population

This study was approved by the institutional review board of New York University School of Medicine and adhered to the guidelines of the Helsinki Declaration of 1975.

Patients were identified for eligibility the day before, from the surgery schedule, as well as the day of surgery. With the surgeons' and anesthesiologists' approval, patients were approached in the preoperative area and told about the study. If the patient was interested and inclusion criteria were met, written informed consent was obtained.

Ninety-three female patients 18 and older, with ASA physical status of I to III, and who were scheduled for elective breast surgery were recruited to participate. Exclusion criteria included history of pulmonary disease (asthma, chronic obstructive pulmonary disease, or bronchitis), contact dermatitis upon exposure to cosmetic fragrances, significant laboratory abnormalities, and vulnerable populations such as pregnant women and the cognitively impaired.

### 2.2. LFO and UO

LFO was purchased from Aveda marketed under the name *Singular Note Lavender Fleurs Oil*. The ingredients are as follows: caprylic/capric, triglyceride, *L. angustifolia* oil, linalool, coumarin, limonene, tocopherol, and LIN28258. Adverse effects of lavender aromatherapy were recorded, as well as any problems with administering the full protocol. The UO, also from Aveda, *All Sensitive body formula*, contained unscented mineral oils: sunflower seed oil and safflower seed oil; evening primrose oil; and jojoba oil, *Glycine soja* (soybean) oil, and tocopherol. After completion of the trial, AVEDA LFO was sent to Tampa Bay Analytical Research, Inc (Clearwater, FL) for quantitative analysis of the content of linalool and linalyl acetate. The linalool and linalyl acetate content of the AVEDA LFO and of the UO were determined by gas chromatographic analysis. Standards for linalool and linalyl acetate were purchased from Sigma-Aldrich Co and provided to Tampa Bay Analytical Research. Linalool and linalyl acetate

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