



THE EFFECT OF LAVENDER AROMATHERAPY IN REDUCING PREOPERATIVE ANXIETY IN PATIENT UNDERGOING ELECTIVE SURGERIES.

Anaesthesiology

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ABSTRACT

Background And Aim: Pre-operative anxiety is one of the most common mental problems and disorders before surgery. pre-operative anxiety stimulates the sympathetic, parasympathetic, and endocrine systems, which result in various intraoperative and postoperative complications. Aromatherapy is the controlled use of aromatic oils to maintain and promote physical and mental health which is widely practised in many countries. The Aim of this study was to evaluate the effect of lavender aromatherapy in reducing preoperative anxiety in patient undergoing elective surgical procedures. **Materials And Methods:** This prospective study was conducted between the age of 18 to 65 years of either sex, undergoing elective surgical procedures belonging to ASA 1 or 2. All patient received inhalation lavender aromatherapy in the preoperative area. Anxiety score was calculated using Amsterdam Preoperative Anxiety and Information Scale questionnaire (APAIS) upon arriving to the preoperative waiting area and 15 min following aromatherapy. **Results:** All the demographic were recorded. Hemodynamic variable such as Heart rate, Blood pressure, mean arterial pressure, SpO₂ were recorded on arrival to PACU and 15 min following aromatherapy which is comparable. The mean reduction in anxiety score was statistically seen in the patient following aromatherapy with the significant p value of <0.05. **Conclusion:** Thus, concludes that the preoperative use of lavender aromatherapy in elective surgery can be considered as one of the cost effective and safe method in the reduction of preoperative anxiety with no side effects.

KEYWORDS

pre-operative anxiety, Aromatherapy, Amsterdam Preoperative Anxiety and Information Scale questionnaire (APAIS).

INTRODUCTION:

Anxiety can be defined as feelings of tension, uneasiness, nervousness, fear and high autonomic activity with varying degree of intensity^[1]. Preoperative period is worrying events that generate specific emotional, cognitive, and physiological responses of a patient^[2,3]. The overall prevalence of preoperative anxiety as reported in some studies is in range of 60–80% in western populations^[4].

Types of interventions for preoperative anxiety are identified pharmacological and non-pharmacological. Pharmacological interventions include sedatives and anti-anxiety drugs^[5]. Non-pharmacological interventions include music therapy, hypnosis, aromatherapy, behavioral therapy, acupuncture and massages have also been identified.

Aromatherapy, a form of complementary and alternative medicine (CAM), may offer a simple, low risk and cost-effective method of reducing preoperative anxiety. It is fast acting, noninvasive, has minimal side effects, and can be applied in multiple forms, including massage, inhalation, compress, and baths with mineral and herbal substances^[6]. Lavender is an important essential oil with a wide range of applications and few reported sensitivities.

It is known for its sedative and relaxing effects. Two components of the lavender plant, linalool and linalyl acetate, have been shown to stimulate the parasympathetic nervous system. Linalyl acetate is recognized as a narcotic while linalool is known to act as a sedative^[7]. Other reported mechanisms include interaction with NMDA or GABA_A receptors, voltage-dependent sodium channels, voltage-dependent calcium channels, and glutamatergic and cholinergic neurotransmission^[8]. In light of these findings, it was decided to conduct this pilot study to investigate the efficacy of lavender aromatherapy in reducing preoperative anxiety in a elective surgery.

METHODOLOGY:

Study design and participants:

A prospective and controlled pilot study was conducted with 100 patients who were admitted to Saveetha medical college for elective surgery from May 2022 to July 2022. Inclusion criteria includes age more than 18 years, able to communicate with the researchers, and agreeable to receiving aromatherapy before surgery. Exclusion criteria includes Severe acute pain at the time of completing the questionnaire,

taking benzodiazepines, analgesics opioids, history of eczema and allergy to plants, migraine, chronic headaches, acute mental illness according to physician diagnosis and olfactory disorder.

Procedure:

A convenience sampling method was used to select and enroll patients for the study. Upon arrival to the preoperative waiting area, the aims and methods of the study were explained to patients who met the inclusion criteria and monitors were connected, vitals recorded. Consent was obtained in writing and subjects were assured of data confidentiality.

Data collection method was based on completing the questionnaire called APAIS scale (Amsterdam preoperative anxiety and information scale). Questionnaire consists of six questions, each carrying a point from 1 to 5 in which question 1 and 2 is for anxiety towards anesthesia, question 4 and 5 for anxiety towards surgery whereas question 3 and 6 for anxiety towards information.

The researcher measured the anxiety level according to APAIS scale, score higher than 25 were considered as high and were excluded from the study in initial period itself. The intervention was performed as follows: Three drops of lavender oil (0.1 cc per drop with 100% concentration) was rubbed on a gauze and inhaled by the patient for 15 minutes at 10 cm distance from the nostrils and patient was asked to lie down comfortably. Thereafter, post therapy anxiety score and vital sign were also recorded.

The primary outcome includes SUM A- adding score of question 1 and 2, SUM S- adding score of question 4 and 5, SUM I- adding score of question 3 and 6, SUM A+SUM S, Total anxiety score (SUM A+SUM S+SUM I) before and after the therapy were recorded.

The secondary outcome includes whether the patient feel calmer after the therapy, whether it produces pleasant smell and whether the patient has a previous history of aromatherapy and any other adverse effects.

Data Analysis:

The collected data were analyzed with IBM SPSS Statistics for Windows, Version 23.0. (Armonk, NY: IBM Corp). To describe about the data descriptive statistics frequency analysis, percentage analysis were used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in Paired groups the Paired sample t-test was used.

To find the significance in categorical data Chi-Square test was used. In all the above statistical tools the probability value 0.05 is considered as significant.

RESULTS:

Considering demographic characteristics such as age and sex there was no statistically significant differences.

Table 1 exhibits hemodynamic parameters such as Heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP), oxygen saturation before and after the therapy and also calculated variables of anxiety score according to the APAIS scale such as SUM A (anxiety pertaining to anesthesia), SUM S (anxiety pertaining to surgery), SUM A+ SUM S (anxiety pertaining to both anesthesia and surgery) and SUM I (anxiety pertaining to information). All the above mentioned parameters has been recorded and calculated in all individuals both pre and post therapy.

Table 1: Hemodynamics and various Anxiety scores recorded before and after aromatherapy.

Paired Samples Statistics				
		Mean	N	SD
Pair 1	ON ARRIVAL HR	80.60	100	16.03
	POST THERAPY HR	79.22	100	16.74
Pair 2	ON ARRIVAL SBP	120.51	100	12.23
	PT-SBP	118.85	100	13.10
Pair 3	ON ARRIVAL DBP	78.19	100	8.89
	PT-DBP	79.44	100	10.15
Pair 4	ON ARRIVAL SPO2	99.340*	100	0.76
	PT-SPO2	99.340*	100	0.76
Pair 5	OA- SUM A	5.89	100	1.88
	PT-SUM A	5.49	100	1.69
Pair 6	OA- SUM S	5.29	100	1.85
	PT-SUM S	5.11	100	1.86
Pair 7	OA- SUM A+S	11.18	100	3.08
	PT- SUM A+ SUM S	10.60	100	2.90
Pair 8	OA- SUM I	5.83	100	1.68
	PT- SUM I	5.81	100	1.65
Pair 9	TOTAL SCORE- PRE	17.01	100	4.20
	TOTAL SCORE- POST	16.41	100	3.98

Table 2 shows no statistically significant difference between the mean heart rate, Systolic and diastolic blood pressure pre and post therapy. Sum A (anxiety pertaining to anesthesia) showed a significant differences in mean value of 5.89 ± 1.88 pre therapy and 5.49 ± 1.69 post therapy with a significant p value of 0.0005. similarly, SUM S, SUM A+SUM also shows a significant difference with a p value of 0.002 and 0.0005 respectively. Overall score of pre and post therapy also shows mean values of 17.01 ± 4.20 and 16.41 ± 3.98 with a significant p value of 0.005. (Figure 2)

According to figure 1 response to aromatherapy is 46.7% in female gender than 16.4% in male gender which shows female are better responsive to aromatherapy than the male gender.

Table 2: P value calculated for various variables

	Variables	P VALUE
PAIR 1	On arrival HR – Post therapy HR	0.351
PAIR 2	On arrival SBP- Post therapy SBP	0.331
PAIR 3	On arrival DBP- Post therapy DBP	0.853
PAIR 4	On arrival SUM A- Post therapy SUM A	0.0005
PAIR 5	On arrival SUM S- Post therapy SUM S	0.002
PAIR 6	On arrival SUM A+ SUM S- Post therapy SUM A + SUM S	0.0005
PAIR 7	On arrival SUM I- Post therapy SUM I	0.158
PAIR 8	Total score Pre and Post therapy	0.0005

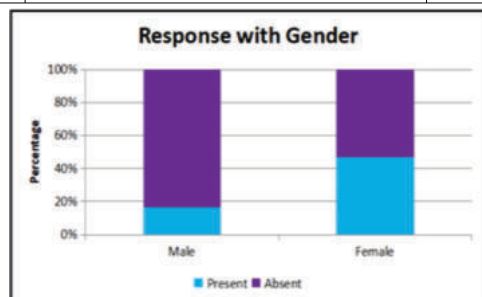


Figure 1: responses to therapy with respect to gender.

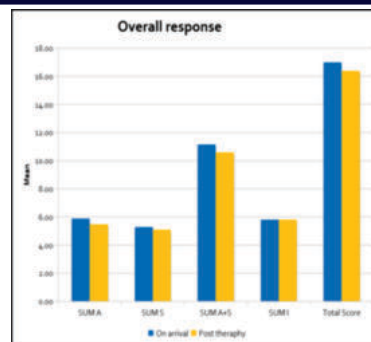


Figure 2: Responses to aromatherapy in various components of anxiety scale.

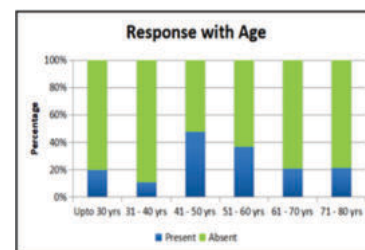


Figure 3: Overall responses to aromatherapy with respect to each age group.

Out of 100, 30% felt calmer post therapy. 43% perceives the smell as a pleasant one. No patient has the previous history of aromatherapy. Nil adverse effects were seen during study period.

DISCUSSION:

Anxiety is an emotional state characterized by apprehension and fear resulting from the anticipation of a threatening event. The Incidence of preoperative anxiety ranges from 11% to 80% in adult patients and varies among different surgical groups.

Physiological responses such as Tachycardia, hypertension, elevated temperature, sweating, nausea and a heightened sense of touch, Smell or Hearing. Psychological responses such as increased tension, apprehension, nervousness, and aggression. Anesthetic concerns such as difficult venous access due to peripheral vasoconstriction, autonomic fluctuations, delayed jaw relaxation and coughing during induction of anesthesia, and increased anesthetic requirement. In Postop period there will be increased pain, nausea, and vomiting, prolonged recovery and increased the risk of infection. High preoperative anxiety levels are related to an altered neuroendocrine response which might be deleterious in the postoperative period.

Asres Bedaso et al conducted a comprehensive review on preoperative anxiety among adult patients undergoing elective surgery the prevalence of preoperative anxiety was high (47%). Various factors contributing to the preoperative anxiety was found to be unexpected result of operation, harm from doctor or nurse mistake, need of blood transfusion, and unable to recover. Henok Mulugeta et al done a study on preoperative anxiety and associated factors among adult surgical patients in northwest Ethiopia and found that the level of preoperative anxiety significantly associated with sex, preoperative information provision, and previous surgical experience.

Lavender oil has in recent times been frequently used in inhalation aromatherapy and massage therapy There are many types of lavender. Among these species, *Lavandula officinalis* and *Lavandula angustifolia* have medicinal effects and are often used. With their inhalation, linalyl acetate and linalool are released in the body, thereby suppressing anxiety. For this reason, lavender oil is used to diminish pain, reduce concern and depression levels, and relieve preoperative anxiety.

Toda and Morimoto studied the effectiveness of lavender aromatherapy on chromogranin and cortisol degrees in the body and found that lavender had a stress-reducing effect on the body. Umezu et al. examined the effects of the ingredients in lavender oil. aromatherapy on anxiety and concluded that this effect was with the

help of linalool. In the review conducted by Boehm et al. the effectiveness of adjuvant aromatherapy on cancer patients were investigated, and the authors concluded that cancer patients' anxiety was significantly reduced after aromatherapy.

Similarly in our study we observed changes in anxiety level after the aromatherapy intervention with respect to APAIS scale which showed a significantly statistical difference with p value of 0.0005 (table 2). Study of Lehner et al.^[9] indicated that inhalation aromatherapy with lavender essence could reduce anxiety level before the dental procedure ($p = 0.039$), which was in accordance with the results of this study and the length of inhalation in both study was 20 minute. Study conducted by Lee et al.^[10]. Age is one of the main factors influencing anxiety. Here in our study sample sizes are almost equal from the age group of 40-70 years out of which good response for aromatherapy is seen in 41-60 years of age. A cross sectional study conducted by L Eberhart on preoperative anxiety in adult stated that Female gender had the strongest impact on all three APAIS anxiety subscales similarly here in our study anxiety score was more with female gender and response of aromatherapy was also more when compared to male which is statistically significant of p value 0.001. (Figure 1). Maheshwari et al.^[11] evaluated preoperative anxiety in patients selecting either general or regional anesthesia for elective cesarean section. The overall rate of anxiety was observed in 72.7% (112/154) patients. The rate of anxiety was significantly high in patients of general anesthesia group as compared to regional anesthesia group (97.2% [69/7] vs. 51.8% [43/83]; $P < 0.01$). In our study we compared the effect of aromatherapy in accordance to the type of anesthesia in which patient we is going to underwent surgery under monitored anesthesia care responded well to the aromatherapy than spinal or general anesthesia. All results support the hypothesis that aromatherapy with essential oil inhalation reduces pre-operative anxiety levels. As a conclusion of our study managed to investigate the effect of lavender oil on preoperative anxiety levels of participants undergoing elective surgeries.

The three main limitations of the study are as follows: being a non-blinded study results can be easily influenced by the various factors, second being convenience sampling method was utilized in this study hence subjected to selection bias and may limit the generalizability of the results and hence a larger study utilizing a random sampling method should be used in further investigations and finally it does not provide information on anxiety towards different type of surgeries.

Overall, as reported in this study, the application of aromatherapy *Lavandula angustifolia* helps in decreasing anxiety for patients undergoing elective surgeries. Statistically significant results were seen preoperatively and led to anxiety decline. Future research is needed to confirm the clinical efficacy of lavender aromatherapy.

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