

Effect of Lavender Oil on the Anxiety of Patients Before Breast Surgery

Ayşe Beyliklioğlu, MSc, Sevban Arslan, PhD

Purpose: Anxiety is a common problem before surgery. This study aimed to investigate the effects of inhaling lavender oil on anxiety levels in patients before breast surgery.

Design: A randomized controlled design was used.

Methods: The study was conducted in surgery clinics of a university hospital in Adana, Turkey. The study included a total of 80 patients, 40 patients in the intervention group, and 40 patients in the control group, who were scheduled for breast surgery. Lavender oil was used by inhalation. A Personal Information Form and the State Anxiety Inventory were used to collect data.

Findings: The mean State Anxiety Inventory pretest and post-test scores were 43.00 ± 11.48 and 37.28 ± 9.93 , respectively, in the intervention group, indicating a statistically significant difference ($P < .05$). The mean pretest and post-test State Anxiety Inventory scores were 44.6 ± 11.45 and 42.43 ± 11.48 , respectively, in the control group; however, the difference was not statistically significant ($P > .05$).

Conclusions: Inhalation of lavender oil before breast surgery decreased anxiety levels of patients. Our study results suggest that the inhalation of lavender oil offered by nurses has positive effects in reducing anxiety levels.

Keywords: inhalation aromatherapy, lavender oil, anxiety, breast surgery, nursing.

© 2018 by American Society of PeriAnesthesia Nurses

ACCORDING TO 2012 GLOBOCAN DATA published by the International Agency for Research on cancer and the 2013 United Database of Turkey, breast cancer with a rate of 45.9% in 100,000 is in the first rank among the first five common cancers in women in 24 members of the International Agency for Research on cancer, in 28 members of European Union, in the USA, and in Turkey.¹ Sur-

gery, radiotherapy, chemotherapy, and hormone-therapy are used in the treatment of breast cancer. However, the primary treatment of breast cancer is surgical treatment. In the literature, anxiety disorders are the most common psychological problems during the orientation period in patients with breast cancer.²⁻⁵ Presurgical patients can experience anxiety because of different reasons, such as fear of the unknown, fear of waking after anesthesia, or fear of death, loss of control, pain, isolation, separation from a loved one, and being deprived from social life. Complementary therapies are often used to reduce anxiety before surgery.⁶

Aromatherapy is one of the most widely used complementary, alternative treatment modalities in nursing.⁷⁻¹⁰ In addition, aromatherapy is one of the most commonly used methods for

Ayşe Beyliklioğlu, MSc, Faculty of Health Sciences, Surgical Nursing Department, Cukurova University, Adana, Turkey; and Sevban Arslan, PhD, Faculty of Health Sciences, Surgical Nursing Department, Cukurova University, Adana, Turkey.

Conflicts of interest: None to report.

Address correspondence to Sevban Arslan, Faculty of Health Sciences, Surgical Nursing Department, Cukurova University, Adana, Turkey; e-mail address: sevbanadana@hotmail.com.

© 2018 by American Society of PeriAnesthesia Nurses

1089-9472/\$36.00

<https://doi.org/10.1016/j.jopan.2018.10.002>

reducing anxiety with different aromas such as lavender, rose fragrance, bergamot, and mint.¹¹⁻¹³ Aromatherapy is defined as the utilization of the healing powers of plant-sourced essential oils to balance and treat the individual mentally, physically, and spiritually.¹⁴⁻¹⁶ It is well known that in addition to positive spiritual effects such as increased attention, decreased anxiety, and relaxation, inhalation oils have effects on vital signs such as pulse, respiratory rate, and blood pressure.¹⁷ Lavender oil, a commonly used substance, is said to have the lowest risk of toxicity and allergic effects among other herbal substances.^{18,19} Many studies have shown *Lavandula angustifolia* to reduce anxiety significantly,^{7-10,20} as well as to reduce perceived levels of anxiety.²¹ Many attributes of lavender oil may be beneficial before surgery. This intervention is inexpensive, easy to administer, and not overly sedating.^{21,22}

In a study by Fayazi et al,³ use of lavender oil decreased the anxiety levels of patients before surgery. Braden et al⁴ also found that inhalation of lavender oil reduced the anxiety levels of patients in the preoperative period. A randomized controlled study by Franco et al⁵ aimed to identify the effects of aromatherapy on anxiety before breast surgery, and reduced anxiety levels were achieved in the study. There are no evidence-based studies investigating the effects of inhalation aromatherapy methods on breast surgery patients in Turkey. In this context, this study has been designed to contribute to the literature and to the application to patients.

Methodology

A randomized controlled study design was used in this study. The study was conducted in surgery clinics of a university hospital in Adana, Turkey.

Before conducting the study, an ethical approval was obtained from Ethics Committee of Faculty of Medicine of Cukurova University (Decision No 44; date July 3, 2015). In addition, a written permission was obtained from the hospital where the study was conducted. Each participant was verbally informed about the study. The study was conducted in accordance with the principles of the Declaration of Helsinki.

The inclusion criteria for the study included being at least 18 years old, having breast cancer, and being scheduled for breast surgery; not having any cognitive, verbal, or hearing problems that could affect communication; not having diagnoses of psychiatric diseases, migraines, chronic headaches, or problems related to sense of smell; being conscious, and not having allergies to lavender.

Power analysis indicated that inclusion of 74 participants was sufficient for this study. The study was carried out with a total of 80 women, 40 women in the study group and 40 in the control group.

Randomization was performed by constructing two equal groups from the participants. The total sample size included in the study was determined using blocks of 10 from the random number list in the computer. The first 10 patients meeting the sample criteria were included in the study group, whereas the consecutive 10 patients were included in the control group, and the pattern was repeated until 80 patients were divided to the two groups.

Data were collected using questionnaires including items related to sociodemographic and medical variables (age, marital status, address, educational status, income status, occupation, social security, diagnosis, operability, length of hospital stay, and date of surgery), which were developed by the researcher, and the State Anxiety Scale was used to assess the level of anxiety before and after the intervention.

Personal Information Form

The form developed by the researcher in accordance with the literature included information on patients' age, marital status, address, educational status, income status, occupation, social security, diagnosis, operability, length of hospital stay, and date of surgery.^{23,24}

The Spielberger State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) is one of the most frequently used measures of anxiety in psychological studies. It is a reliable and a sensitive measurement tool for anxiety. The STAI has two

subscales, and every subscale has 20 items. The first subscale measures the state anxiety (S-STAD), which indicates how one feels at that moment. The second subscale measures trait anxiety (T-STAD), which indicates how one feels in general. The scores from the subscales range from 20 to 80. Higher scores for both subscales indicate a higher level of anxiety. A cutoff point of 39 to 40 has been suggested to detect clinically significant symptoms for the STAI.²⁵ The pretest S-STAI Cronbach's α was 0.90, the post-test Cronbach's α was 89, and the T-STAI Cronbach's α was 0.77.

Procedure

Data were collected in the general surgery clinic of a university hospital in Adana, of patients who had been scheduled for breast surgery, who met the inclusion criteria, and who accepted to participate in the research. Verbal and written consent was obtained from the patients regarding the questionnaires and the intervention before the application. The researcher conducted face-to-face interviews

6 days a week, between 6 a.m. and 9 p.m., until the sample size was reached.

The study was conducted using intervention and control groups, two groups in total.

STUDY GROUP (LAVENDER OIL INHALATION). The Personal Information Form and STAI were completed by the women 24 hours before surgery. Nurs Lokman Hekim branded lavender oil, approved by the Turkish Food Codex, was used in the study. A gauze bandage with three to four drops of lavender oil (one drop 0.1 mL in concentration of 100%) was given to the patients for a 20-minute inhalation on the day of the surgery. The State Anxiety Scale was repeated after the intervention and before transferring the patients to the operating room. After the instructions in the safe surgery control list were followed, the patients were transferred to the operating room (Figure 1).

CONTROL GROUP. The Personal Information Form and STAI were completed by the patients.

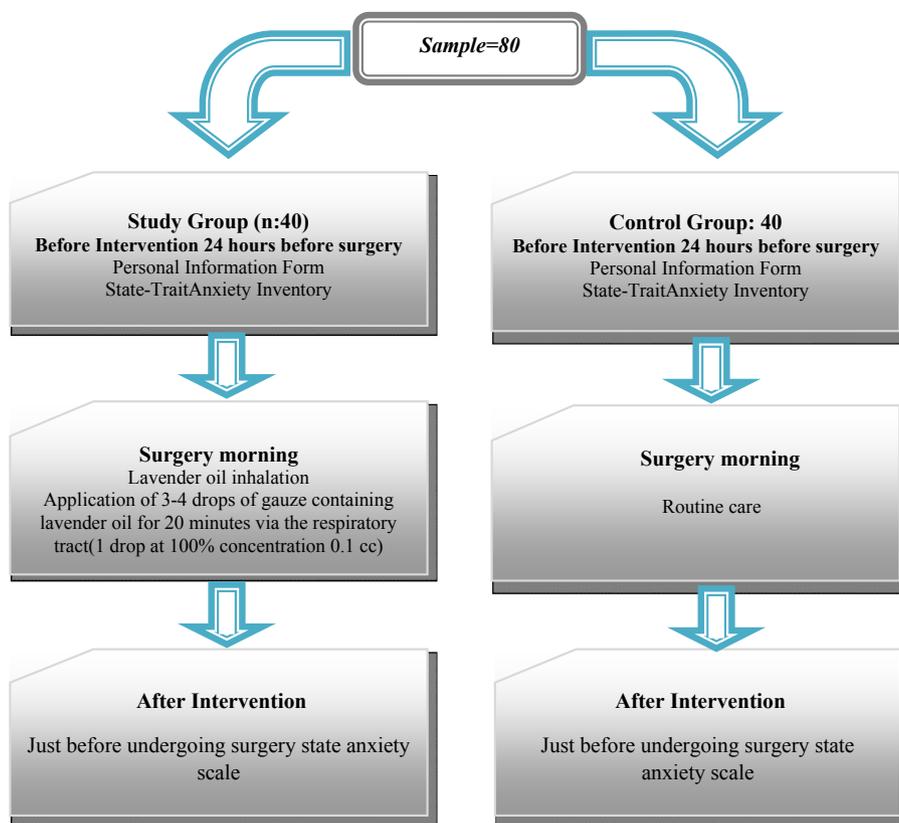


Figure 1. Study diagram. This figure is available in color online at www.jopan.org.

The instructions in the safe surgery control list were applied to the control group on the day of the surgery. The STAI was repeated before transferring the patients to the operating room (Figure 1).

Statistical Analysis

Statistical analysis was performed using the SPSS version 24.0 software (IBM Corp, Armonk, NY). Data were tested for normality using the Shapiro-Wilk test. Student's *t* test was used to compare normally distributed variables in two independent groups, whereas paired *t* test was used to compare normally distributed variables in two dependent groups. The χ^2 test was used to analyze correlation between the categorical variables. A *P* value of .05 with 95% confidence interval was considered statistically significant.

Results

Data including age, marital status, educational status, location, working status, previous experience of hospitalization, previous surgical experience, type of surgery, and previous experience of aromatherapy are presented in Table 1. There were no statistically significant differences between the two groups regarding their demographic characteristics.

Table 2 shows the distribution of the upper and lower values of the STAI in the pretest and post-test of the patients in the study and control groups. The mean pretest and post-test STAI scores were 43.00 ± 11.48 and 37.28 ± 9.93 , respectively, in the study group, indicating a statistically significant difference ($P < .05$). The mean pretest and post-test STAI scores were 44.6 ± 11.45 and 42.43 ± 11.48 , respectively, in the control group; however, the difference was not statistically significant ($P > .05$).

The mean pretest STAI scores were 43.00 ± 11.48 in the study group and 44.6 ± 11.45 in the control group, indicating that there was no statistically significant difference between the groups ($P > .05$). The mean post-test STAI scores were 37.28 ± 9.93 in the study group and 42.43 ± 11.48 in the control group, indicating a statistically significant difference between the groups ($P < .05$) (Table 3).

Discussion

In this randomized controlled study, we investigated the effects of inhalation of lavender oil on anxiety levels, and the results are discussed in light of the literature.

The study results indicated that both groups experienced anxiety in a similar level during the preoperative period. Previous studies have also demonstrated that patients experience anxiety during the preoperative period.^{2,3,5,26-29} In a study by Foley et al,²⁶ where the effects of informing patients with breast cancer about the basic biology of breast cancer before surgery using different treatment methods and surgical techniques with an Apple iPad application were investigated, the anxiety levels of patients were found to be higher before and immediately after the surgery. Findık and Yıldızeli Topçu²⁴ investigated the effects of the manner of taking the patient to the surgical intervention on the preoperative anxiety level and found that the patients experienced anxiety during the preoperative period. Similarly, in a study by Şıvgın et al,²⁷ the effects of psychological and pharmacologic premedication on the preoperative anxiety level during elective surgery were evaluated, and the results showed that patients experienced anxiety during the preoperative period. In another study, patients undergoing outpatient surgery experienced anxiety before the intervention.²⁹ According to the results of previous studies related to preoperative anxiety, the mean anxiety scores during this period are high.^{3,5,26,29-31}

In the present study, the anxiety levels of the patients in the study group significantly decreased ($P < .05$) compared with the control group. These results support the hypothesis that preoperative inhalation aromatherapy decreases anxiety levels.

Previous studies performed in several fields have demonstrated that aromatherapy is effective in reducing anxiety. In a study by Franco et al,⁵ where the effects of aromatherapy using lavender oil before breast cancer surgery on anxiety levels were investigated, a significant reduction in anxiety levels in the group undergoing aromatherapy using lavender oil was found. In another study, preoperative inhalation aromatherapy significantly

Table 1. Distributions of Patients Based on Demographic Characteristics

	Study (n = 40)	Control (n = 40)	Analysis
	$\bar{x} \pm SD$	$\bar{x} \pm SD$	
Age	51.48 ± 17.31	48.00 ± 10.63	$t = 1.267$ $P = .209$
Marital status, N (%)			
Married	5 (12.5)	6 (15.0)	$X^2 = 2.967$ $P = .397$
Single	35 (87.5)	34 (85.0)	
Education, N (%)			$t = 0.891$
Illiterate	4 (10.0)	8 (20.0)	$P = .377$
Primary	14 (35.0)	17 (42.5)	
Secondary	18 (45.0)	12 (30.0)	
University	4 (10.0)	3 (7.5)	
Living place, N (%)			$X^2 = 0.833$
Village	2 (5.0)	1 (2.5)	$P = .659$
Town	9 (22.5)	12 (30.0)	
Province	29 (72.5)	27 (67.5)	
Working status, N (%)			$X^2 = 0.949$
Yes	7 (17.5)	4 (10.0)	$P = .330$
No	33 (82.5)	36 (90.0)	
Previous hospitalization status, N (%)			$X^2 = 0.058$
Yes	28 (70.0)	27 (67.5)	$P = .809$
No	12 (30.0)	13 (32.5)	
Previous surgery status, N (%)			$X^2 = 0.058$
Yes	23 (57.5)	23 (57.5)	$P = 1.000$
No	17 (42.5)	17 (42.5)	
Surgery types, N (%)			$X^2 = 5.679$
Biopsy	5 (12.5)	6 (15.0)	$P = .128$
MRM	20 (50)	27 (67.5)	
Excision	6 (15)	5 (12.5)	
BCS	9 (22.5)	2 (5)	
Previous aromatherapy application status, N (%)			$X^2 = 1.146$
Yes	6 (15.0)	3 (7.5)	$P = .284$
No	34 (85.0)	37 (92.5)	

MRM, modified radical mastectomy; BCS, breast conserving surgery.

decreased the anxiety levels of the patients.³ In a systematic review by Boehm et al,² where the effects of adjuvant aromatherapy on patients with cancer were reviewed, the authors reported that the anxiety of the patients with cancer significantly decreased after aromatherapy. Similarly, in a study by Imanishi et al,³¹ where the anxiolytic effects

of aromatherapy massage in patients with breast cancer were investigated, a significant reduction was found in the anxiety levels of the patients in the study group who underwent aromatherapy massage for 30 minutes twice a week for 4 weeks. In another study by Ni et al²⁹ evaluating the anxiolytic effect of aromatherapy in patients undergoing

Table 2. Distribution of Lower and Upper Values Indicated by Patients in the Study and Control Groups in the State-Trait Anxiety Inventory

Scale	Scale Score Lower Upper	Pretest		Post-test	
		Study	Control	Study	Control
State Anxiety	20-80	20-67	22-67	20-65	20-67
Trait Anxiety	20-80	25-60	27-58	—	—

Table 3. Comparison of State-Trait Anxiety Inventory (S-STAI) Pretest and Post-test Averages

	Study (n = 40) $\bar{x} \pm SD$	Control (n = 40) $\bar{x} \pm SD$	Analysis	
			t	P
S-STAI pretest	43.00 \pm 11.48	44.6 \pm 11.45	-0.624	0.534
S-STAI post-test	37.28 \pm 9.93	42.43 \pm 11.48	-2.146	.035*
Analysis				
t	3.141	1.642		
P	.003*	.109		

*P < .05 statistically significant.

outpatient surgery, a significant decrease in anxiety levels was observed after aromatherapy. Similarly, Seifi et al²⁸ examined the effects of lavender oil on anxiety levels in patients undergoing coronary artery bypass grafting, and concluded that aromatherapy was effective in decreasing anxiety, although this effect was not significant.

Conclusions

Our study results show that aromatherapy before breast surgery decreases anxiety levels. On the basis of these results, it is thought that aromatherapy can be used to reduce the anxiety of patients in the

nursing profession. In addition, we suggest that different varieties of aromatherapy can be offered to take into account the patient's preference and to make them feel valuable. Among them, there are different options such as rose fragrance, bergamot, and mint for the patient to relax.

Acknowledgments

The authors are grateful to all the patients who participated in this study.

This study was conducted under the supervision of the S.A. as a Master of Science thesis in the Nursing Department of the Health Sciences Institute of Cukurova University.

References

- Şencan İ, Keskinçilic B. *Republic of Turkey, Ministry of Health Turkish Public Health Institution. Turkey Cancer Statistics*. Available at: http://kanser.gov.tr/Dosya/Kitaplar/turkce/Turkiye_Kanser_Kontrol_Program_ing.pdf; 2017. Accessed March 21, 2018.
- Boehm K, Büssing A, Ostermann T. Aromatherapy as an adjuvant treatment in cancer care descriptive systematic review. *Afr J Tradit Complement Altern Med*. 2012;9:503-518.
- Fayazi S, Babashahi M, Rezaei M. The effect of inhalation aromatherapy on anxiety level of the patients in preoperative period. *Iran J Nurs Midwifery Res*. 2011;16:278-283.
- Braden R, Reichow S, Halm MA. The use of the essential oil lavender to reduce preoperative anxiety in surgical patients. *J Perianesth Nurs*. 2009;24:348-355.
- Franco L, Blanck TJ, Dugan K, et al. Both lavender fleur oil and unscented oil aromatherapy reduce preoperative anxiety in breast surgery patients: A randomized trial. *J Clin Anesth*. 2016;33:243-249.
- Ari M, Yilmaz E. Impact of pre-operative anxiety on post-operative constipation. *Turk J Colorectal Dis*. 2016;26:39-46.
- Tahmasbi H, Mahmoodi G, Mokheri V, Hassani S, Akbarzadeh H, Rahnamai N. The impact of aromatherapy on the anxiety of patients experiencing coronary angiography. *Zabedan J Res Med Sci*. 2012;14:51-55.
- Ayık C, Özden D. The effects of preoperative aromatherapy massage on anxiety and sleep quality of colorectal surgery patients: A randomized controlled study. *Complement Ther Med*. 2018;36:93-99.
- Rajai N, Sajadi SA, Teymouri F, Zareyan A, Siavoshi S, Malmir M. The effect of aromatherapy with lavender essential oil on anxiety and stress in patients under going coronary artery bypass graft surgery. *Jundishapur J Chronic Dis Care*. 2016;5:e34035.
- Hosseini SA, Heydari A, Vakili MA, Moghadam S, Tazyk SA. Effect of lavender essence inhalation on the level of anxiety and blood cortisol in candidates for open-heart surgery. *Iran J Nurs Midwifery Res*. 2016;21.
- Rasooli ES, Amiri MR, Zamanzadeh V, Peron K, Aghakeshizadeh M. Effect of aromatherapy on anxiety and pain in patients undergoing cholecystectomy. *Adv Herbal Med*. 2014;1:1-7.
- Ni CH, Hou WH, Kao CC, et al. The anxiolytic effect of aromatherapy on patients awaiting ambulatory surgery: A randomized controlled trial. Article ID927419, 5 pages. *Hindawi Publishing Corporation Evid Based Complement Alternat Med*, <https://doi.org/10.1155/2013/927419>, 2013;2013.
- Mogharab M, Ayoubzadeh K, Sharif-zadeh GR. Effect of peppermint aromatherapy on the level of anxiety in patients undergoing colonoscopy. *Med Surg Nurs J*. 2017;6:41-46.

14. Marzouk TM, El-Nemer AM, Baraka HN. The effect of aromatherapy abdominal massage on alleviating menstrual pain in nursing students: A prospective randomized cross-over study. *Evid Based Complement Alternat Med.* 2013;4:1-6.
15. Tournaire M, Theau Yonneau A. Complementary and alternative approaches to pain relief during labor. *Evid Based Complement Alternat Med.* 2007;4:409-417.
16. Smith CA, Collins CT, Crowther CA. Aromatherapy for pain management in labour. *Cochrane Database Syst Rev.* 2011;6:2-15.
17. Setzer WN. Essential oils and anxiolytic aromatherapy. *Nat Prod Commun.* 2009;4:1305-1316.
18. Arslan S, Özer N. Touching, music therapy and aromatherapy's effect on the physiological situation of the patients in intensive care unit. *Int J Caring Sci.* 2016;9:867-875.
19. Koulivand PH, Khaleghi Ghadiri M, Gorji A. Lavender and the nervous system. *Evid Based Complement Alternat Med.* 2013;2013:1-10.
20. Cooke B, Ernst E. Aromatherapy: A systematic review. *Br J Gen Pract.* 2000;50:493-496.
21. Dunn C, Sleep J, Collett D. Sensing an improvement: An experimental study to evaluate the use of aromatherapy, massage and periods of rest in an intensive care unit. *J Adv Nurs.* 1995;21:34-40.
22. Kasper S. An orally administered lavandula oil preparation (Silexan) for anxiety disorder and related conditions: An evidence based review. *Int J Psychiatry Clin Pract.* 2013;17:15-22.
23. Tünel M, Vural A, Evlice YE, Tamam L. Psychiatric problems in patients with breast cancer. *Arch Med Rev J.* 2012;21:189-219.
24. Fındık ÜY, Topçu SY. Effect of the way of surgery on preoperative anxiety. *Hacettepe Univ Faculty Health Sci Nurs J.* 2012;19:22-33.
25. Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. *Manual for the State-Trait Anxiety Inventory.* Palo Alto, CA: Consulting Psychologists Press; 1983.
26. Foley NM, O'Connell EP, Lehane EA, et al. Patient accessed tailored information: a pilot study to evaluate the effect on preoperative breast cancer patients of information delivered via a mobile application. *Breast.* 2016;30:54-58.
27. Şivgin S. *Effectiveness of psychological and pharmacological premedication in patients scheduled for elective surgery by assessing preoperative anxiety levels.* İzmir, Turkey: Dokuz Eylül University, Faculty of Medicine, Department of Anesthesiology and Reanimation; 2013.
28. Seifi Z, Beikmoradi A, Khodayar O, Jalal P, Malihe A, Reza S. The effect of lavender essential oil on anxiety level in patients undergoing coronary artery bypass graft surgery: A double-blinded randomized clinical trial. *Iran J Nurs Midwifery Res.* 2014;19:574-580.
29. Ni CH, Hou WH, Kao CC, et al. The anxiolytic effect of aromatherapy on patients awaiting ambulatory surgery: A randomized controlled trial. *Evid Based Complement Alternat Med.* 2013;2013:1-5.
30. Başgöl Ş, Aslan E. Complementary and alternative medicines in gynecologic cancers: The evidence-based approach. *Yıldırım Beyazıt Univ J Nurs.* 2014;2:51-62.
31. Imanishi J, Kuriyama H, Shigemori I, et al. Anxiolytic effect of aromatherapy massage in patients with breast cancer. *Evid Based Complement Alternat Med.* 2009;6:23-128.