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# Effects of blended aromatherapy using lavender and damask rose oils on the test anxiety of nursing students

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## Abstract:

**BACKGROUND:** People experience extreme anxiety in testing situations, so it considers as a psychological condition and can actually impair learning and hurt test performance. People experience some degree of stress and anxiety before and during examinations. This study aimed to investigate the effect of blended aromatherapy using lavender and damask rose oils on the test anxiety of nursing students.

**MATERIALS AND METHODS:** The present study was a single-blinded clinical trial study. Seventy nursing students were selected and randomly assigned to two experimental and sham groups. For the experimental group, seven droplets of lavender, 10%, and three droplets of damask rose oil, 10%, and for the sham group, ten droplets of sesame oil were poured on a nonabsorbent pad which was placed within a 20-cm distance from the students' noses on their chairs' handles. The data were collected by using a two-part questionnaire including demographic information and State-Trait Anxiety Inventory 1, before, 15 min after the intervention, and immediately at the end of the test. Data were analyzed using descriptive (frequency, mean, and standard deviation) and inferential (independent *t*-test, ANOVA with repeated measure, Fisher's exact test, and least significant difference *post hoc* test) statistics.

**RESULTS:** It was found that no significant difference between the two groups in terms of age, the number of credits, Semester Grade Point Average and, gender, place of residence and marital status and the two groups were almost identical in regard of the above variables ( $P > 0.05$ ). State anxiety mean scores of the experimental group were lower than the mean scores of the sham group, 15 min after the intervention and at the end of the test, and the difference between the groups was statistically significant ( $P < 0.05$ ).

**CONCLUSIONS:** Blended aromatherapy is effective in improving the test anxiety of nursing students. Therefore, it can be used as a therapeutic approach to reduce test anxiety.

## Keywords:

Aromatherapy, complementary therapy, essential oils, nursing, palliative care, test anxiety

## Introduction

Anxiety has been studied as one of the most common psychiatric disorders in many societies, and their results indicate that these disorders allocate high levels of health-care services to themselves annually.<sup>[1]</sup>

Spielberger divides anxiety into two types: state and trait anxiety. In the state anxiety,

an emotional response is shown by the person temporarily, and the cause of this reaction is the situation that confronts it, but the trait anxiety indicates that the person is susceptible to anxiety. One of the types of state anxiety is test anxiety, which is considered as anxiety that is related to the situation.<sup>[2]</sup>

Test anxiety is experienced by all the people all over the world and in all socioeconomic classes

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and is more prevalent among women and adolescents.<sup>[3]</sup> In North America, about 30%–52% of students often experience test anxiety. Of these, 16%–20% have high test anxiety, 16% have moderate test anxiety, and about 18% of students have suffered from severe test anxiety.<sup>[4]</sup>

In a study, the frequency of anxiety in students of Tehran University was reported as 11.5%, state anxiety (7.5%), and trait anxiety (6%).<sup>[5]</sup>

In the Yazdani research, the mean test anxiety score of female nursing students of Najafabad University was 18.6%, and the mean score of the anxiety of students in Shiraz and Isfahan University was 25.25% and 25.5%, respectively.<sup>[6]</sup>

In general, the methods used for treating the anxiety symptoms in individuals are divided into two categories of drug based and nondrug based, and complementary medicine is known as a nondrug-based method.<sup>[7]</sup> Aromatherapy is a branch of complementary medicine, and it is very popular.<sup>[8]</sup>

When essential oils being inhaled, the odorant molecules enter the limbic system through the cavities in the olfactory mucosa and they influence the hypothalamus, the autonomic nervous system, and the endocrine system and lead to improvement of peripheral blood circulation, respiratory rate, heart rate, and blood pressure.<sup>[9,10]</sup>

Lavender is commonly known as *Lavandula angustifolia* and *Lavandula stoechas*, and it is from the Labiatae family.<sup>[11]</sup> The most important compounds of lavender include linalool and linalyl, which bind to glucuronic acid, and after 15 min of inhalation, its effects are shown not only on the blood but also on the brain and act as a sedative in the body.<sup>[12]</sup>

Studies have shown that the rose and its derivatives include rose water, rose oil, and dried aromatic flowers that the main ingredients of which are pentyl alcohol, citronellol, linalool, and geraniol, which have anti-inflammatory, anti-acne, antioxidant, anticancer, and antimicrobial effects.<sup>[13]</sup> The aroma of this flower suppresses the sympathetic system and reduces the level of adrenaline and has very strong effects on feelings and is used as an analgesic and antidepressant.<sup>[14]</sup>

The results of the two studies showed that aromatherapy with lavender oil stabilizes vital signs and reduces anxiety.<sup>[15,16]</sup> However, in the other study, the mean scores of anxiety did not change after the aromatherapy with lavender oil.<sup>[17]</sup>

Therefore, according to the results of the studies and considering the prevalence of test anxiety among

students and its vital role on the student's performance and safety and cost-effectiveness and satisfactory results from complementary therapies and according to the resources of the aromatherapy, which consider the blended of essential oils more effective than their separate use, this study aimed at investigating the effect of blended aromatherapy using lavender and damask rose oils on the test anxiety of nursing students.

## Materials and Methods

### Study design and setting

This was a single-blinded randomized clinical trial study conducted in 2019, and the population included all the nursing bachelor's students of the nursing and midwifery department of Hormozgan University of Medical Sciences.

### Study participants and sampling

Seventy-five students were selected as the study sample volume by taking advantage of  $N = \frac{2\sigma^2(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{(\mu_1 - \mu_2)^2}$  in

a 95% confidence interval, test power of 80% (equal to 1.96 and 84%), and effect size of 30.4 through considering a 10% dropout rate because of the past history of heart diseases, pulmonary diseases, and allergy to flowers and plants, eight individuals were excluded from the study [Figure 1].

### Data collection tool and technique

The samples were selected through continuous convenience sampling method and randomly assigned to the experimental and sham groups randomly by using a table of random numbers. Inclusion criteria were as follows: having no olfactory dysfunction based on self-expression; having no past history of flowers and plants eczema and allergies, having no past history of heart and respiratory diseases, epilepsy, and skin irritations, having no psychological-mental diseases, self-report of the samples that no terrible accident occurred in the 6 months before or during the examination. Not using aromatherapy and other complementary therapies including progressive muscle relaxation, music therapy, and antianxiety and herbal drugs to reduce the test anxiety during the 6 weeks before the examination. Exclusion criteria were as follows: participation unwillingness to continue, observation of sensitivity to oil essence of damask rose and lavender, and unpleasant feelings and any physical symptoms during the intervention.

A two-part questionnaire was used for data collecting and was completed before, 15 min after students entered the examination room, and immediately after the end of the examination by both of the experimental and sham groups.

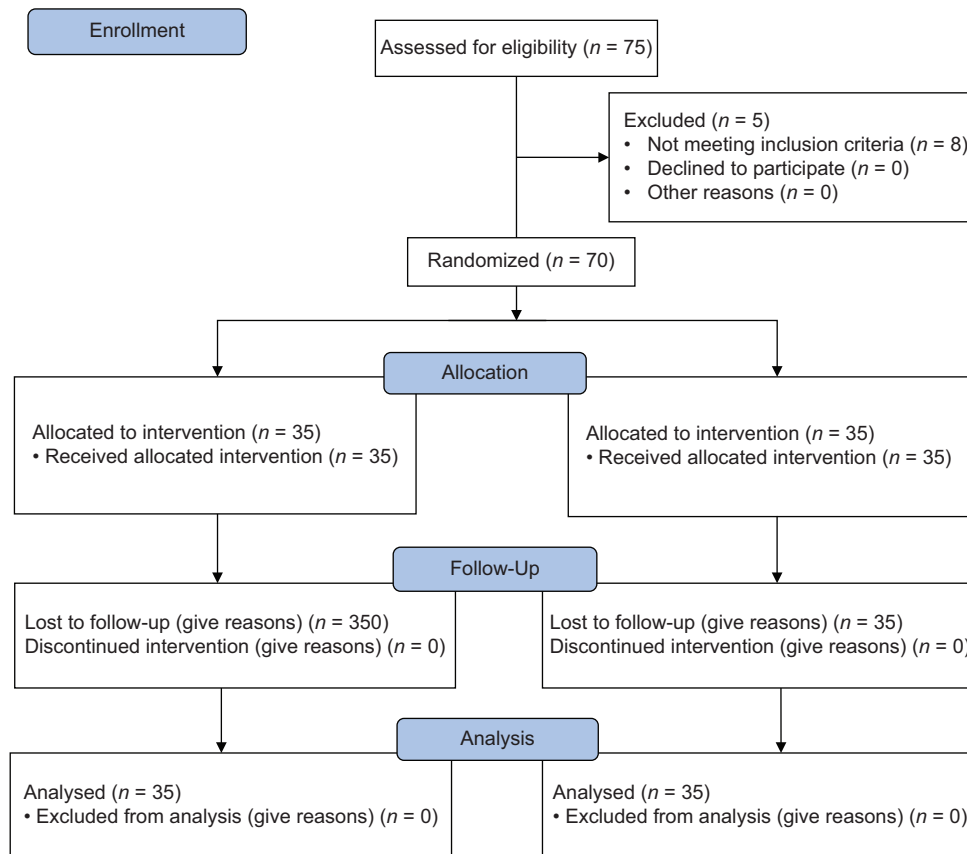


Figure 1: CONSORT flow diagram of participant allocation, follow-up, and analysis

The first part of the questionnaire was the demographic characteristics and contained eight questions such as age, gender, marital status, place of residence, the number of lesson units to pass during the semester, the average marks of the past semesters, the use of alternative medicine methods, and medicinal or herb drugs for reducing anxiety during the past 6 weeks.

The second part of the questionnaire was the State Anxiety Inventory. The State-Trait Anxiety Inventory was originally developed by Cattell and then completed by Spielberger in 1970 and its reliability has been reported 95% for State Anxiety Inventory.<sup>[18]</sup> Furthermore, the validity of this questionnaire was calculated at 87% in researches.<sup>[19,20]</sup> A simultaneous observation by researcher and researcher assistance was used for the reliability of the data record sheet.

Students were asked to not use any perfume, spray, etc., on the test day. Students who did not enter or leave the study were transferred to a separate hall for the examination. The examinations were held on the same date in two separate halls, and both of them have the same environmental and temperature conditions (quiet places with appropriate light and heat and free of any environmental stimulants).

After the explanation of the research process, the demographic characteristics and state anxiety questionnaire was given to all the participants then, The researcher placed non-absorbent pads soaked with three droplets of damask rose essence, 10%, and seven droplets of lavender essence, 10% on the handles of the chairs about 20 cm away from the student's noses in the sham group and in the control group non-absorbent pads soaked with ten droplets of sesame oil were placed on the handles of the chairs, about 20 cm away from the student's noses.

Fifteen minutes were allowed for the homogeneity of the smell in the hall after the placement process, and then, the students were asked to enter the halls. The state questioner was completed by students 15 min after their entry and inhaling the scent. There are no researches that indicate the antianxiety effect of sesame oil. Furthermore, the state questioner was filled at the end of the examination. Lavender and damask rose essence had been purchased from Kashan's Barij Essence Company with a 100% concentration, and they were diluted in the Molecular Medicine Research Center of Hormozgan University of Medical Sciences to a 10% concentration. The data were analyzed by SPSS (version 18.0, SPSS Inc., Chicago, IL, USA) and descriptive (frequency, mean, and

standard deviation) and inferential (independent *t*-test, ANOVA with repeated measure, Fisher’s exact test, and least significant difference [LSD] *post hoc* test) statistics.

**Ethical consideration**

This study has been approved by the Ethics Committee of HUMS (ethics code: HUMS.REC.2017.005) and a clinical trial code (IRCT2017041533430N1); acquired and written informed consent letters were obtained.

**Results**

The data analysis showed that there was no significant difference between the two groups in terms of age (*P* = 0.69), the number of lesson units (*P* = 0.55), and average marks of the previous semester (*P* = 0.53) and there was no significant difference between the two groups in terms of gender (*P* = 0.34), place of residence (*P* = 0.23), and marital status (*P* = 0.39) and the two groups were almost identical in regard of the above variables [Tables 1 and 2].

The results showed that there was no significant difference between the state anxiety mean scores of the two groups before intervention (*P* = 0.83). However, 15 min after the intervention and immediately after the end of the test, there was a significant difference between the state anxiety mean scores in the two groups of the experimental and sham (*P* < 0.01). Furthermore, the results of ANOVA with repeated measure indicated

that the state anxiety mean scores in the experimental group were significantly different between the time before the intervention, 15 min after the intervention, and at the end of the test (*P* = 0.001), but in the sham group, between the three times, there was no significant difference (*P* = 0.88) [Table 3]. The LSD *post hoc* test showed that in the experimental group, there was a significant difference (*P* = 0.009) between the mean of state anxiety scores before and 15 min after the intervention, as well as 15 min after the intervention and immediately at the end of the test (*P* = 0.003), but there was not a significant difference (*P* = 0.38) between the state anxiety mean scores before and 15 min after the intervention, as well as 15 min after the intervention and immediately at the end of the test in the sham group (*P* = 0.45) [Table 4].

**Discussion**

The results of this study showed that aromatherapy has an effect on the test anxiety of nursing students. Aromatherapy decreased significantly the state anxiety mean scores, 15 min after the intervention and immediately at the end of the examination in the experimental group compared to the sham group. Kavurmaci *et al.* have identified that the state anxiety mean scores significantly decreased in the experimental group compared to the control group after using lavender oil.<sup>[20]</sup>

Khanavi *et al.* found that blended aromatherapy using lavender and damask rose oils decreased significantly female students’ anxiety and depression who are settling in the dormitory of Tehran University of Medical Sciences after the intervention.<sup>[21]</sup> Jung *et al.* found that the experimental group treated with aromatic inhalation scored significantly lower for test anxiety (*t* = -2.330, *P* = 0.023) compared to the control group.<sup>[22]</sup> The results of the study by Bekhradi and Vakilian also showed that aromatherapy with lavender could increase the number of anxiety-free students. However, no significant difference was found in the severity of test anxiety between the two groups.<sup>[23]</sup> Khoshkasht *et al.* (2015) in their randomized, controlled study detected that lavender inhalation was not decreased test anxiety in nursing students.<sup>[16]</sup> According to the researchers’ opinion, the conflict between this study and the present study in terms of reducing the anxiety mean score after the intervention is because of the different methods of applying the aromatherapy technique and the duration of the intervention and different essential oil that was used. In this study, the lavender essential oil was poured into the lacquered glass, and the students were asked to keep it at a distance of 5 cm from their nose for 10 min, but in the present study, nonabsorbent pads were soaked with lavender and damask rose essential oils and were

**Table 1: Comparing the mean values of age, number of units, and average marks of the study students from the two groups**

Variable	Experimental group		Sham group		Independent <i>t</i> -test	
	Mean	SD	Mean	SD	<i>T</i>	<i>P</i>
Age (years)	20.30	1.31	20.49	2.34	0.39	0.69
Number of lesson units	19.67	0.84	19.54	0.85	0.60	0.55
Average mark	14.78	1.34	14.52	1.56	0.63	0.53

SD=Standard deviation

**Table 2: Study participants’ demographic characteristics**

Variable	Group		$\chi^2$	<i>P</i>
	Experimental group, <i>n</i> (%)	Sham group, <i>n</i> (%)		
Gender				
Male	18 (51.4)	15 (42.8)	0.89	0.34
Female	17 (48.6)	20 (57.14)		
Residence status				
In dormitory	27 (77.1)	24 (68.6)	1.44	0.23
At home	8 (22.8)	11 (31.4)		
Marital status				
Married	4 (11.4)	5 (14.3)	-	0.39
Single	31 (88.6)	30 (85.7)		



**Table 3: Comparing the mean scores of state anxiety in different times (before intervention, 15 min after intervention, and immediately at the end of the examination) of the experimental and sham groups**

Time	Group				Independent t-test	
	Experimental group		Sham group		t	p
	Mean	SD	Mean	SD		
Before intervention	42.68	9.87	43.20	9.94	0.22	0.83
15 min after intervention	37.83	8.89	43.03	8.29	2.56	0.01
Immediately at the end of the examination	33.19	9.22	42.36	11.10	3.75	<0.001
ANOVA with repeated measure						
F	13.22		0.12		-	
P	<0.001		0.88			

SD=Standard deviation

**Table 4: Comparing the mean scores of state anxiety in different times (before intervention, 15 min after intervention, and immediately at the end of the examination) of the experimental group**

State anxiety	Time		
	LSD post hoc test (P)		
	Before and 15 min after intervention	Before and immediately at the end of the examination	15 min after intervention and immediately at the end of the examination
Experimental group	0.009	<0.001	0.003

LSD=Least significant difference

placed on the handles of the student chairs. Therefore, it seems that this technique has been more effective in decreasing students’ anxiety.

**Limitation and recommendation**

The findings of the current study have some limitations, for example, possibility of an anxious incident occurrence for students on the examination day or the control of consuming any smoking on the examination day, and we just assessed nursing students at semesters 2 and 3. Despite these limitations, the current study provides important new information about the association between blended aromatherapy and reduced test anxiety, especially among nursing students. Furthermore, according to the study results, it is suggested here that further researches can be carried out within the format of a comparative study of the inhalation aromatherapy and massage-aromatherapy effects on the test anxiety; also the impact of inhalation aromatherapy with other essential oils, like rosemary, citrus aurantium, pelargonium graveolens on the test anxiety of nursing students or Students of other fields could be evaluate.

**Conclusions**

According to the results, it can be said that inhalation aromatherapy improves the test anxiety. Since complementary medicine is a comprehensive approach and nursing is a holistic professional, the application of complementary medicine methods in nursing can take place an important role in the nursing care of the patient. Aromatherapy is used to resolve the problem of any part of the body. Therefore, the researcher believes that the aromatherapy technique can be used as a useful and cost-effective complementary therapy, along with

other treatments.

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**Conflicts of interest**

There are no conflicts of interest.

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