

## The Effect of Aromatherapy with Damask Rose on Anxiety, Accuracy and Job Stress in Operating Room Nurses

Hanieh Bahadori<sup>1</sup>, Meysam Hosseini Amiri<sup>2\*</sup>, Hossein Sharafi<sup>3</sup>, Ahmad Entezari<sup>4</sup>

### Abstract

**Background:** Operating room nurses are frequently exposed to high-risk physical and psychological factors leading to increased anxiety and job stress and reduced accuracy.

**Aim:** This study aimed to evaluate the effect of aromatherapy with damask rose on anxiety, accuracy and job stress in operating room nurses.

**Method:** This clinical trial study was conducted in 2021 on 60 operating room nurses in Qom, Iran. The subjects were selected by the convenience sampling method and randomly divided into two equal experimental and control groups using the random blocking method. In the experimental group, nurses were asked to inhale damask rose for 10 minutes. The control group was asked to inhale normal saline. Anxiety, accuracy and job stress were assessed before and after aromatherapy. Data were analyzed by SPSS software (version 22) and Chi-square test, Independent t-test, and paired t-test.  $P < 0.05$  was considered statistically significant.

**Results:** The mean age of nurses was  $32.21 \pm 6.17$  years. After aromatherapy, the mean scores of anxiety and job stress significantly increased to  $26.53 \pm 4.00$  ( $t=9.32$ ,  $P < 0.001$ ) and  $80.0 \pm 10.47$  ( $t=7.06$ ,  $P < 0.001$ ), respectively in experimental group. The mean score of accuracy significantly increased to  $33.56 \pm 3.69$  in the experimental group after aromatherapy ( $t=8.21$ ,  $P < 0.001$ ). The results showed statistically significant difference between the experimental and control groups in terms of anxiety ( $t=-7.29$ ,  $P < 0.001$ ), accuracy ( $t=-2.48$ ,  $P=0.016$ ) and job stress ( $t=4.14$ ,  $P < 0.001$ ) after aromatherapy.

**Implications for Practice:** It is recommended to use aromatherapy with damask rose to reduce anxiety and job stress and improve accuracy among operating room nurses.

**Keywords:** Aromatherapy, Damask Rose, Anxiety, Accuracy, Job stress

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1. Student Research Committee Center, Hamadan University of Medical Sciences, Hamadan, Iran
  2. Department of Anesthesiology, Faculty of Para medicine, Qom University of Medical Sciences, Qom, Iran
  3. Department of Operation room, Faculty of Para medicine, Qom University of Medical Sciences, Qom, Iran
  4. Department of Anesthesiology and Operation room, Faculty of Paramedicine, Shahid Sadoughi University of Medical sciences, Yazd, Iran

\* Corresponding author, Email: Hosseini\_amiri@yahoo.com

## Introduction

Nurses are one of the most important elements of the healthcare system because they are responsible for the main issue of care and medical services. Facing patients in operating rooms, responsibility for taking care of patients, performing clinical processes, and dealing with emergencies can affect the body and mind of nurses (1). Therefore, it is of great importance to evaluate the mental health of this group of healthcare staff and take improving measures. Some behavioral disorders which staff may experience are anxiety, inadequate accuracy, and job stress (2).

Anxiety is an unpleasant and vague sense of concern which is characterized by physical sensations, such as shortness of breath, palpitations, sweating, headache, and restlessness. Irregular heartbeat may also occur due to increased sympathetic nerve activity, augmented vascular reactivity, intra-tissue damage, and platelet aggregation (3). In nursing profession, accuracy is of particular importance. Ghasemi et al. in 2009 showed that working in harsh conditions leads to higher prevalence of physical diseases in nurses, reducing working capacity and tolerance which affect their accuracy (4). Moses and colleagues noted more aspects of mistakes and inaccuracies in healthcare delivery. Inaccuracy can harm patients and medical staff (5).

The National Institute for Occupational Safety and Health defines job stress as a harmful physical and psychological response, depending on lack of coordination between job requirements and abilities, support resources, and needs of the employed person (6). Job stress, similar to the factors of decreased physical activity and smoking, threatens the health of medical staff (7, 8). The most important reasons for job stress are high workload, lack of support, insufficient preparation, and conflict with colleagues (9). In addition, medical staff is influenced by various stressors because they are responsible for ensuring patients' health and treatment; 26.2% of medical staff has severe job stress (8-10). Given the importance of the operating room profession and the complications caused by reduced accuracy of staff, it is essential to reduce anxiety and job stress and improve concentration and accuracy.

Recently, non-pharmacological methods are approved and emphasized by researchers. One of the common non-pharmacological methods is complementary medicine, such as aromatherapy. Aromatherapy is a complementary medicine which uses the aroma obtained from the extracts of different parts of plants (essence) to treat body and soul, mood swings, cognitive function, and health. Essences are divided into two general categories: stimulants and sedatives, among which stimulant essences, such as damask rose, are used to reduce anxiety (11).

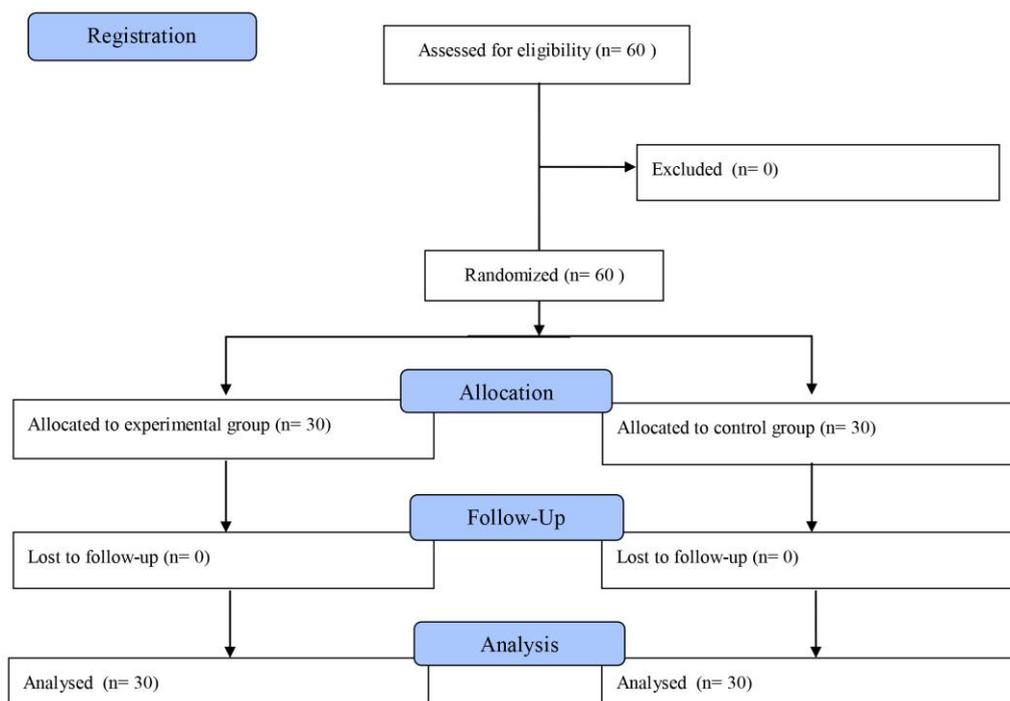
It has been shown that aromatherapy with damask rose effectively sedates the brain and nerves. There is some evidence that aromatherapy affects the brain and nervous system, similar to the influences of medications (7). There are two anti-anxiety substances of citronellol and phenylethyl alcohol in roses (8). Aromatherapy with damask rose is a cost-effective, safe, and practical intervention which may effectively reduce anxiety (7, 8, 11, 12). Moreover, some studies demonstrated that aromatherapy increased the individuals' awareness, accuracy, and attention (10, 11).

The operating room professions are of high importance. There is limited evidence which have assessed the effect of damask rose on anxiety, accuracy, and job stress in operating room nurses. Moreover, damask rose has been shown to positively affect the psyche. Therefore, the present study was conducted aimed to investigate the effect of aromatherapy with damask rose on anxiety, accuracy, and job stress of operating room nurses.

## Methods

This two-group randomized clinical trial was conducted in 2021 on all operating room nurses in Qom University of Medical Sciences, Iran. The sample size was calculated based on the study by Gholami et al. (13) considering the mean and standard deviation of anxiety of emergency ward nurses and using the formula of comparing the means, with  $\alpha=0.05$  and  $\beta=0.1$ . A sample size of 30 qualified operating room nurses was considered in each group, The inclusion criteria were: willingness to participate in the study, at least an associate degree in the operating room field, at least six months of experience working in the operating room, a healthy sense of smell, no history of allergies to plant aromas, no accident one month before the study, not taking sedatives, and no history of chronic headaches (e.g., migraines) or allergic diseases (e.g., asthma). The exclusion criteria were unwillingness to continue the study and use of perfume and cologne. In both groups, no individual was excluded during the course of follow-up. So, final analysis was done for 60 individuals (Figure 1).

The study was approved by the Committee for ethics in biomedical research of Qom University of



**Figure 1.** The flowchart of the study

Medical Sciences, and was registered in the Iranian Clinical Trial Center.

Sampling was performed under the ethical considerations of the Helsinki Declaration (12). First, the personal and professional characteristics questionnaire (including age, gender, marital status, education, and work experience) was completed for each individual by a research colleague. Next, operating room nurses were selected by convenience sampling and randomly divided into two equal experimental and control groups using the random blocking method. Allocation into the groups was concealed using sequence, uniform, opaque, and sealed envelopes which were numbered from one to end. Envelope number one was given to the first participant included in the study, and this process continued until the end.

Spielberger Inventory, Bonardell accuracy test and job stress questionnaire were used to record anxiety, accuracy and job stress, respectively in operating room nurses. In the experimental group, two drops of 40% damask rose essence (produced by Barij Essence Pharmaceutical Company of Kashan with factory registration number of 1028, which manufactures herbal medicines) were soaked in cotton, and the research units were asked to place it on the upper lip and inhale for 10 min. The same treatment protocol was also utilized in the control group using normal saline as a placebo. Anxiety, accuracy and job stress in the research units were measured again immediately after aromatherapy.

The Spielberger Inventory consists of 40 questions; 20 questions measure overt anxiety and 20 measure latent anxiety. This questionnaire is scored as a four-point Likert scale (very low, low, high, and very high). It should be noted that questions 1, 2, 5, 8, 10, 11, 15, 16, 19, 20, 21, 23, 26, 27, 30, 33, 34, 36, and 39 are given inverse points. Therefore, the scores of each of the two scales of overt and covert anxiety can be in the range between 20 and 80 (18). The validity of this questionnaire has been confirmed using concurrent criterion validity (8). Its reliability has also been confirmed with Cronbach's alpha coefficient of 0.9 (14).

The Bonardell test is a standard for determining accuracy which includes several directional circles. In this test, the participants should start crossing out the symbols similar to the three symbols at the top of the page from the left side. Three scores will be obtained, including the number marked correctly, missed, and marked incorrectly. The range of scores is 1-100, which has been used in numerous studies (15). The test reliability has been confirmed by the test-retest method with a coefficient of 0.94 (15).

The job stress questionnaire consists of 35 items with seven areas for job issues. The answers to

each item are never (0), rarely (1), sometimes (2), often (3), and always (4). In this questionnaire, the items 3, 5, 6, 9, 12, 14, 16, 18, 20, 21, 22, and 23 were scored reversely. A high score indicates low stress, while a low score indicates a high stress level. The validity of the questionnaire has been confirmed by Azad Marzabadi et al. (2010) using the Cronbach's alpha and halving method with the coefficients of 0.78 and 0.65, respectively. Moreover, its reliability has been confirmed by Azad Marzabadi et al. (14).

Data were analyzed by SPSS software (version 22). Descriptive statistics (i.e., mean, standard deviation, frequency, and percentage) and analytical tests, including the Chi-square test, independent t-test, and paired tests, were also used. A 95% confidence interval ( $\alpha=5\%$ ) was considered for the performed tests.  $P<0.05$  was considered statistically significant.

## Results

The mean age of operating room nurses in the experimental and control groups was  $31.23\pm 4.41$  and  $33.2\pm 7.49$  years, respectively. In the experimental group, 40.0% ( $n=12$ ) of participants were male, and 60.0% ( $n=18$ ) were female. In the control group, 33.3% ( $n=10$ ) of participants were male and 66.7% ( $n=20$ ) were female. The mean work experience in the experimental and control group was  $6.63\pm 4.39$  and  $7.83\pm 7.6$  years, respectively. According to the results shown in Table 1, the operating room nurses in both groups were homogeneous in terms of age, gender, marital status, level of education, and work experience ( $P>0.05$ ) (Table 1).

The results of independent t-test showed no statistically significant difference between the test and control groups in terms of mean score of anxiety before aromatherapy ( $t = -1.45$ ,  $P=0.150$ ) (Table 2). However, the findings revealed that mean score of anxiety after aromatherapy was significantly different between the two groups ( $t=-7.29$ ,  $P<0.001$ ) (Table 2). Moreover, the results of Paired t-test showed a significant reduction in mean score of anxiety in the experimental group after aromatherapy compared to before aromatherapy ( $t=9.32$ ,  $P<0.001$ ); however, this difference was not significant in the control group ( $t = 1.24$ ,  $P = 0.222$ ) (Table 2).

The results of independent t-test indicated a significant difference between the test and control groups in mean score of accuracy of operating room nurses after aromatherapy ( $t = 4.14$ ,  $P=0.001$ ). However, no statistically significant difference was observed between the two groups in terms of mean score of accuracy before aromatherapy ( $t = -0.29$ ,  $P=0.770$ ) (Table 3). Moreover, the paired t-test revealed a significant decline in the accuracy of the operating room nurses in the test group after aromatherapy

**Table 1.** Operating room nurses' demographic characteristics in experimental and control groups

Variables	Groups		Test	P	
	Experimental n (%)	Control n (%)			
Gender	Male	12 (40)	10 (33.3)	$\chi^2 = 0.28$	0.592 *
	Female	18 (60)	20 (66.7)		
Marital status	Single	17 (56.7)	14 (46.7)	$\chi^2 = 0.60$	0.438 *
	Married	13 (43.3)	16 (53.3)		
Level of education	Bachelors' degree	26 (86.7)	23 (76.7)	$\chi^2 = 1.0$	0.317 *
	Associate s' degree	4 (13.3)	7 (23.3)		
Work experience (Mean $\pm$ SD)	$6.63 \pm 4.39$	$7.83 \pm 7.60$	$t = -0.74$	$0.457^{**}$	
Age (Mean $\pm$ SD)	$31.23 \pm 4.41$	$32.20 \pm 7.49$	$t = -1.23$	$0.221^{**}$	

\* Chi-square, \*\* Independent t-test

**Table 2.** Comparison of the mean scores of anxiety before and after aromatherapy

Measurement time point	Groups		Independent t-test statistic
	Experimental (Mean $\pm$ SD)	Control (Mean $\pm$ SD)	
Before aromatherapy	$42.06 \pm 9.19$	$46.66 \pm 14.61$	$t = -1.45$ , $P = 0.150$
After aromatherapy	$26.53 \pm 4.00$	$46.30 \pm 14.30$	$t = -7.29$ , $P = <0.001$
Paired t-test statistic	$t=9.32$ , $P<0.001$	$t = 1.24$ , $P = 0.222$	

**Table 3.** Comparison of the mean scores of accuracy before and after aromatherapy

Measurement time point	Groups		Independent t-test statistic
	Experimental (Mean ± SD)	Control (Mean ± SD)	
Before aromatherapy	26.90 ± 5.51	27.40 ± 7.49	t = -0.29, P = 0.770
After aromatherapy	33.56 ± 3.69	28.03 ± 6.31	t = 4.14, P = 0.001
Paired t-test statistic	t=8.21, P<0.001	t = -1.11, P = 0.276	

**Table 4.** Comparison of the mean scores of job stress before and after aromatherapy

Measurement time point	Groups		Independent t-test statistic
	Experimental (Mean ± SD)	Control (Mean ± SD)	
Before aromatherapy	88.93 ± 16.38	85.56 ± 11.88	t = -0.91, P = 0.366
After aromatherapy	80.0 ± 10.47	88.46 ± 15.45	t = -2.48, P = 0.016
Paired t-test statistic	t=7.06, P<0.001	t = 0.49, P = 0.627	

compared to before aromatherapy (t=8.21, P<0.001) (Table 3).

The independent t-test did not demonstrate any statistically significant difference between the experimental and control groups regarding mean score of job stress pre-intervention (t = -0.91, P = 0.366). On the other hand, the two groups were significantly different regarding mean job stress after aromatherapy (t=4.14, P=0.016) (Table 4). The results of paired t-test showed a significant reduction in job stress among the operating room nurses in the test group after aromatherapy compared to before aromatherapy (t=7.06, P<0.001) (Table 4).

## Discussion

The present study investigated the effect of aromatherapy with damask rose on anxiety, accuracy, and job stress of operating room nurses. The findings indicated a significant effect of aromatherapy with damask rose on the anxiety, accuracy, and job stress of operating room nurses.

The results showed that the anxiety of participants in the group of aromatherapy with damask rose was lower than the group of aromatherapy with normal saline. Some studies have examined the impact of aromatherapy with damask rose on staff's anxiety (16, 17). Mahdood et al. (2021) reported that the anxiety of operating room nurses significantly declined after aromatherapy with damask rose essence, which is consistent with the findings of the present study (16). However, the results of Heiner et al. (2017) showed no statistically significant difference between the group of aromatherapy with damask rose and the control group, which is not consistent with the present investigation (17). This discrepancy can be explained by the different methods and populations of the studies, anxiety measurement time, aroma and manufacturing company, concentration, and duration of aromatherapy.

According to the results of the present study, the accuracy of operating room nurses in the group of aromatherapy with damask rose significantly increased compared to the control group. A psychological study by Varvani Farahani et al. (2017) revealed that aromatherapy with damask rose could reduce the fatigue of emergency ward nurses (18). Therefore, this type of aromatherapy can improve the accuracy of staff by reducing fatigue. Moreover, evidence shows that aromatherapy might raise the accuracy of staff, supporting the findings of the current study (19, 20). Quds et al. (2013) demonstrated that aromatherapy with lavender could increase the accuracy of nurses in Intensive Care Unit (19). In addition, Khodadoost et al. (2020) showed that peppermint essence compared to the placebo could increase the accuracy of nursing students (20).

The results of the current research indicated that job stress in the group of aromatherapy with damask rose was lower than the placebo group. The findings of the present study were consistent with the results of Farsi et al. (2021) concerning the effect of aromatherapy with damask rose on the job stress of nurses in the emergency ward. They showed that aromatherapy with damask rose could reduce the job stress in the nurses of emergency ward (21).

The anti-anxiety and anti-stress properties of damask rose are due to the chemical components of this plant, including 2-phenyl ethanol and citronellol, which have been introduced as active pharmaceutical compounds that play a role in the anti-anxiety effects of damask rose. In addition, this

plant contains stearic, ketone, aldehyde, and terpene compounds, all of which can reduce anxiety by stimulating the olfactory center in the brain. Furthermore, damask rose contains quercetin and kaempferol as two important flavonoids that bind to gamma-aminobutyric acid receptors and have anti-anxiety and sedative effects (22-25). Evidence has shown that the aroma of damask rose increases parasympathetic activity and decreases sympathetic activity (26, 27).

One of the strengths of the present study was extensive review of the literature to investigate the influence of aromatherapy with damask rose on the accuracy of staff. One of the limitations of this study was the small number of samples. Moreover, blinding was not possible for the study participants due to the different aromas of damask rose and normal saline.

### **Implications for practice**

The results of the present study showed that aromatherapy with damask rose can effectively reduce anxiety and job stress and improve the accuracy of operating room nurses. Further studies with large sample sizes are recommended to determine the generalizability of the results.

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### **Conflicts of interest**

The authors declared no conflict of interest.

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