Hormozgan Med J. 2020 September; 24(3):e101124. doi: 10.5812/hmj.101124.

Published online 2020 September 1. **Research Article**

The Effect of Aromatherapy by Rose Essence on Anxiety and Physiological Indices of Conscious Patients Admitted at Intensive Care Units

Negar Zare [1], Maryam Shahabinejad [2] and Tabandeh Sadeghi [3, *]

[1]Department of Medical Surgical Nursing, School of Nursing and Midwifery, Student Research Committee, Rafsanjan University of Medical Sciences, Rafsanjan, Iran
[2]Department of Medical Surgical Nursing, School of Nursing and Midwifery, Geriatric Care Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran
[3]Department of Pediatric Nursing, School of Nursing and Midwifery, Non-Communicable Diseases Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran

[*]*Corresponding author*: Department of Pediatric Nursing, School of Nursing and Midwifery, Non-Communicable Diseases Research Center, Rafsanjan University of Medical Sciences, Rafsanjan, Iran. Emails: t.b_sadeghi@yahoo.com; t.sadeghi@rums.ac.ir

Received 2020 January 20; **Revised** 2020 April 12; **Accepted** 2020 May 05.

Abstract

Background: Anxiety in patients admitted at the Intensive Care Unit (ICU) is common and usually moderate or severe. Anxiety affects endocrine and physiological responses.
Objectives: This study aimed to determine the effect of aromatherapy by rose essence on anxiety and physiological indices of conscious patients admitted at ICU.
Methods: In this clinical trial, 60 conscious patients admitted at ICU wards in Ali Ibn Abi Talib Hospital of Rafsanjan were selected and randomly allocated into two groups of intervention and control. In the intervention group, three drops of 10% rose essence were poured on the gauze and placed 20 cm from the patients' nose on their shirt, and the patients inhaled it for 20 minutes three times a day. In the control group, three drops of distilled water were used likewise. Data collection tools included Spielberger State-Trait Anxiety Inventory (STAI) and the demographic questionnaire. Data were analyzed using SPSS V.18.
Results: According to the results, in the intervention group, the systolic and diastolic blood pressure significantly increased (paired *t*-test, $P < 0.05$) in the second time after the intervention and significantly decreased (paired *t*-test, $P < 0.05$) in the third time. The mean oxygen saturation of arterial blood also significantly increased in the second time in this group after the intervention (paired *t*-test, $P = 0.001$). However, there was no significant difference in anxiety score before and after the intervention in each group.
Conclusions: Although aromatherapy using rose essence was statistically significant on some of the physiological indices of conscious patients in ICU, these differences were not clinically significant.

Keywords: Aromatherapy, Rose Essence, Anxiety, Physiological Indices, ICU

1. Background

Intensive care units (ICUs) are stressors due to noise, unknown environment, and sleep disorder (1). Psychophysical stress in ICU is often associated with higher levels of anxiety (2). The patients admitted at ICU are usually anxious for different reasons like fear of the unknown environment, permanent noise from monitoring devices, 24-hour synthetic lighting, lack of meaningful stimuli like touch, discomfort from sickness and trauma, intubation, physiological disorders due to pain, sleep disorders and being far from the home environment (3, 4); thus, anxiety is common among these patients -often moderate or severe- and estimated to be present in 70% - 87% of the patients (5, 6).

Anxiety changes cortisol and adrenaline levels in the blood and increases the tone of the autonomic nervous system. The most important index for anxiety evaluation is the increase in heart rate, blood pressure, restlessness, respiration, and sweating. Moreover, the reduction in cardiac output and an increase in myocardial oxygen consumption are among the other consequences of anxiety (7, 8). In other words, anxiety and vital signs are mutually supportive (9), and the studies show a positive relationship between pain and anxiety in ICU patients (10).

Various approaches have been introduced to reduce anxiety so far. One of them is using anxiety-reducing drugs. Another way to control anxiety is using non-pharmacological methods, known as complementary therapies (11, 12), of which yoga (13), reflexology (14), regular physical activity (15), hypnosis (16), music (17), listening

Copyright © 2020, Hormozgan Medical Journal. This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/) which permits copy and redistribute the material just in noncommercial usages, provided the original work is properly cited.

to the Quran (18), spiritual care (19), massage therapy (20), and therapeutic touch (21) can be cited. Moreover, there are some methods to enhance physiological indices, of which listening to the Quran (22), therapeutic touch (23), music (17), and reflexology (24) can be mentioned. Besides these methods, one of the methods to control anxiety and instill relaxation is aromatherapy (25), known as a simple, accessible, and non-invasive technique needless of any special equipment (26).

Aromatherapy is using essential oils for the promotion of physical and mental health and mood (25). This method has recently grown significantly in the majority of countries as complementary medicine in reducing pain and anxiety (27), used as part of nursing interventions in many countries like Germany, England, Canada, and the United States (28).

One of the herbs used in aromatherapy is rose or Damask rose. Damask rose is one of the most important species of rosacea family, which is mainly known for its being aromatic with about 150 species (29, 30). Inhaling this flower affects the autonomic nervous system and reduces adrenaline concentration and the sympathetic nervous-system activity, ending in physical and psychological relaxation (31).

The results of studies on the compounds of this plant such as glycosides, flavonoids, and anthocyanin, have shown that its effects on human health consist of being hypnotic, analgesics, anticonvulsants, effective in respiratory and cardiovascular systems, laxative, antimicrobial, anti-inflammatory, and antioxidants (29). The results of different studies have shown the positive effects of aromatherapy by rose on anxiety (8, 32, 33), but the results of some studies have been inconsistent (18, 34). Moreover, the results of different studies have shown the significant effect of aromatherapy using rose on physiological indices (35-37), whereas this effect has been insignificant according to some studies (8, 38).

2. Objectives

According to the importance of the subject, the contradictory results of different studies on the effect of rose and the fact that in the researchers search there were no studies on the effect of aromatherapy using roses in patients admitted at ICU, the present study was conducted to determine the effect of aromatherapy by rose essence on the anxiety and physiological indices of patients admitted at ICU.

3. Methods

In this clinical trial (IRCT20170122032111N3), the research population was conscious patients admitted at ICU wards in Ali Ibn Abi Talib hospital affiliated to Rafsanjan University of Medical Sciences in 2018. The sample size was calculated based on the mean comparison formula, test power of 80%, confidence interval of 95%, and sample loss, to be 30 participants for each group.

Patient consciousness (having score higher than 12 according to the Full Outline of Unresponsiveness Score (four score) scale; this score has 4 testable responses, including eyelid opening, upper extremity motor responses, brainstem reflexes, and respiratory pattern. Each component has a maximal score of 4 and the total score is 16. This score remains testable in critically ill patients who are intubated and has important advantages over the GCS in the ICU setting, the health of the olfactory system based on the test by coffee, no history of allergy to spring floral aromas, age between 20 - 60, passage of at least 24 hours after admission to the ICU, no previous history of admission to the ICU, no underlying illness, such as epilepsy, mental disorder, and skin illness, non-use of other stress-reducing methods, including progressive muscle relaxation, music therapy, and other methods, were considered the inclusion criteria. Discharge during the day of the intervention, significant change in the vital signs during the study, change in the patient's condition, such as pain and fatigue, the patient's unpleasant sensation during the aromatherapy, and the patient's reluctance to continue to participate in the study were considered the exclusion criteria.

Random allocation of the participants was carried out using the minimization method. Initially, the patients were categorized based on key variables, such as anxiety score and gender. Afterward, from the patients who met the inclusion criteria, the first participant was

placed in the intervention or control group by the coin flip, and other participants were allocated to the study group with a lower total of variables (anxiety score and gender). In the case of equality, the random allocation was repeated.

Data gathering tools included the demographic questionnaire (age, gender, marital status, employment status, duration of hospitalization in ICU, and so on), Spielberger STAI inventory and the checklist for recording physiological indices. The STAI is a commonly used measure

of trait and state anxiety. Form Y, its most popular version, has 20 items for assessing trait anxiety and 20 ones for state anxiety. In this study, we investigated state anxiety that related to the apparent anxiety (expressing the patient's feelings at the current moment and at the time of filling in the questionnaire) by using 20 questions. Scoring

this scale includes scores

from 1 to 4. The scores were reversed for reverse questions (i.e., questions 1, 2, 5, 8, 10, 11, 15, 16, 19, 20), which ranged from never (4) to many times (1). In the standardization of the inventory in Iran, the total validity of the test was 0.94, test-retest reliability for the anxiety trait scale was 0.65 - 0.86, and the Cronbach's alpha coefficient for the anxiety state was 92% (39).

Cardiac monitoring device Alborz B9 Saadt and Q&Q chronometer -made in Japan, was used to measure the physiological indices for all of the patients. Blood pressure was measured in a non-invasive way from the left arm. The pulse oximeter probe was attached to the right hand, pointing the finger of all patients to measure the oxygen saturation. All devices were calibrated by the medical engineer at the hospital.

In the intervention group, three drops of 10% rose essence were poured on 10 × 10 gauze with a dropper and attached 20 cm from the nose of patients on their shirts, and the patients inhaled it for 20 minutes three times a day. In the control group, three drops of distilled water were poured onto the gauze with the same dimensions and attached to the shirt like the intervention group. The physiological indices were measured before and after the intervention (6 times for each indices). Anxiety questionnaire was completed before the beginning of the study and then again completed at the end of the third turn (overall, two times).

Permission for performing the study was obtained from vice-chancellor for research and technology of Rafsanjan University of Medical Sciences, the ethics code was obtained from the Ethics Committee of Rafsanjan University of Medical Sciences (IR.RUMS.REC.1397.069), informed consent was taken from the participants before the study. Moreover, an explanation to the participants about the study and its goals and keeping their information confidential were the ethical considerations of this study.

Data were analyzed by SPSS18 using chi-square, Kolmogorov-Smirnov, independent *t*-test and paired *t*-test. The significance level was considered less than 0.05.

4. Results

The two groups were homogeneous in terms of demographic characteristics (Table 1). Before the intervention, the mean score of anxiety was not statistically insignificant between the two groups (independent *t*-test, P = 0.65). After the intervention, there were also no significant differences between the mean score of anxiety between the two groups (independent *t*-test, P = 0.71). In intra-group comparison, there were no significant differences between the mean score of anxiety before and after the intervention in each group (paired *t*-test, P > 0.05).

Table 1. Comparing the Demographic Characteristics of the Patients Between the Two Groups

Variable	Intervention Group	Control Group	P-Value
Age (years), Mean ± SD	14.18 ± 40.20	11.85 ± 47.66	0.51[a]
Duration of hospitalization in ICU (day), Mean ± SD	4.02 ± 2.87	3.94 ± 3.38	0.87[a]
Cause of hospitalization in ICU, No. (%)			0.43[b]
Trauma	13	11	
Surgery	10	9	
Others (poisoning, diabetes, etc.)	7	10	
Gender, No. (%)			1[b]
Male	23 (76.7)	23 (76.7)	
Female	7 (23.3)	7 (23.3)	
Marital status, No. (%)			0.16[b]
Single	7 (23.3)	3 (10)	
Married	23 (76.7)	27 (90)	
Employment status, No. (%)			0.64[b]
Unemployed	4 (13.3)	2 (6.7)	
Self-employed	16 (53.3)	19 (63.3)	
Employee	4 (13.3)	2 (6.7)	
Housewife	6 (20)	7 (23.3)	

[a] *T*-test
[b] Chi-square test

According to the results, there were no significant differences between the two groups in terms of the mean score of physiological indices before and after each time intervention (independent *t*-test, P > 0.05). There were no significant differences between the mean score of physiological indices before and after each time of intervention in the control group (paired *t*-test, P > 0.05). But, in the intervention group, the systolic and diastolic blood pressure significantly increased (paired *t*-test, P < 0.05) in the second time after the intervention and significantly decreased (paired *t*-test, P < 0.05) in the third time. The mean oxygen saturation of arterial blood also significantly increased in the second time in this group after the intervention (paired *t*-test, P = 0.001) (Table 2).

Table 2. Comparing the Mean and Standard Deviation of the Anxiety and Physiological Indices Before and After the Intervention Between the Two Groups

Variables/Groups	Before First Time[a]	After First Time[a]	P-Value[b]	Before Second Time[a]	After Second Time[a]	P-Value[b]	Before Third Time[a]	After Third Time[a]	P-Value[b]
Anxiety									
Intervention	42.96 ± 10.69	-	-	-	-	-	-	42.66 ± 10.55	0.79
Control	44.13 ± 9.66	-	-	-	-	-	-	43.66 ± 10.78	0.65
P-value[c]	0.65	-	-	-	-	-	-	0.71	
Systolic blood pressure									
Intervention	121.61 ± 16.48	122.41 ± 16.92	0.64	124.51 ± 14.59	127.13 ± 14.35	0.03	126.21 ± 16.67	122.31 ± 17.03	0.001
Control	127.66 ± 22.35	129.21 ± 22.39	0.42	120.91 ± 28.83	128.13 ± 22.66	0.17	126.83 ± 20.18	127.26 ± 20.56	0.79
P-value[c]	0.23	0.19		0.54	0.83		0.89	0.31	
Diastolic blood pressure									
Intervention	78.06 ± 14.74	76.03 ± 13.86	0.21	77.03 ± 14.63	81.46 ± 14.11	0.01	79.13 ± 16.49	75.86 ± 15.22	0.003
Control	76.31 ± 14.51	76.53 ± 13.91	0.87	75.71 ± 17.15	73.81 ± 17.12	0.28	77.03 ± 12.88	76.61 ± 17.12	0.77
P-value[c]	0.64	0.89		0.74	0.06		0.58	0.84	
Heart rate									
Intervention	83.73 ± 21.58	83.11 ± 20.55	0.55	84.33 ± 18.98	81.91 ± 19.09	0.09	80.11 ± 16.39	80.03 ± 16.76	0.94
Control	92.66 ± 62.31	78.51 ± 20.01	0.25	79.06 ± 16.72	78.73 ± 16.74	0.76	76.71 ± 23.25	79.46 ± 16.45	0.29
P-value[c]	0.46	0.38		0.25	0.49		0.51	0.89	
Respiratory									
Intervention	19.76 ± 5.83	18.33 ± 6.52	0.12	20.13 ± 2.47	19.76 ± 6.24	0.51	19.33 ± 5.76	18.41 ± 4.92	0.14
Control	19.11 ± 6.55	19.06 ± 5.86	0.94	18.33 ± 6.28	19.03 ± 7.42	0.24	18.83 ± 5.98	18.76 ± 6.05	0.91
P-value[c]	0.67	0.64		0.27	0.68		0.74	0.79	
SPO2									
Intervention	95.73 ± 3.75	96.41 ± 3.14	0.11	95.11 ± 3.35	95.91 ± 3.08	0.001	96.13 ± 3.48	96.31 ± 3.29	0.48
Control	95.66 ± 3.54	95.43 ± 3.66	0.57	95.63 ± 3.24	96.23 ± 3.01	0.24	95.71 ± 3.23	92.63 ± 16.02	0.31
P-value[c]	0.94	0.27		0.53	0.67		0.62	0.22	

[a] Values are presented as mean ± SD.
[b] Paired *t*-test
[c] Independent *t*-test

5. Discussion

According to the results of the present study, there were no significant differences between the mean score of anxiety before and after the intervention in inter and intra group comparisons. In other words, the results showed that aromatherapy with rose did not significantly lead to significant changes in the anxiety level of the patients. Consistent with the present study, the results of the studies by Babaii et al. and Fazlollahpour et al. did not show any significant differences in the mean score of the apparent, hidden, and overall anxiety of patients in the aromatherapy group before and after the intervention (18, 34). However, the research population of both mentioned studies were cardiac patients, and the duration of aromatherapy with a rose was different from the present study.

The results of the study by Barati et al., contrary to the results of this study, showed that the inhalation of rosewater in the intervention group significantly decreased levels of state and trait anxiety compared to the control group in hemodialysis patients (40). The duration of aromatherapy (4 weeks) in this study was different from the present study and seemed that this longer time is beneficial and should be considered in the next studies.

The results of the study by Tazakori et al., inconsistent with the results of the present study, showed a significant statistical difference between anxiety before and after the intervention in the intervention group (8). The form used (oral) was not like the present study (inhaling), which could be a reason for the inconsistency of the results of that study with the present study.

Concerning the effect of this intervention on blood pressure, although in the intervention group, the increase in systolic and diastolic blood pressure in the second time and its reduction in the third time is statistically significant, these changes are not clinically significant and this effect may be due to changes in day-night rhythms (41, 42). Therefore more studies are recommended for confirmation of this result.

The mean oxygen saturation of arterial blood also significantly increased in the second time in the intervention group after the intervention. Concerning the effect of roses on oxygen saturation, one can cite the study by Ethanol et al. entitled "Aromatherapy using rose for apnea, bradycardia, Spo2 in premature babies." Owing to aromatherapy using rose, oxygen saturation, similar to our study, had increased, but the age group studied was not

consistent with our study (37). However, the results of the study by Hongratanaworakit entitled "examining the effect of sedation of roses on humans" are not in line with the present study in terms of the effect of roses on oxygen saturation and systolic blood pressure (35).

Performing the study on the patients in ICU for only one day was the limitation of this study, which would limit the generalization of results. Thus, it is recommended to perform this study with longer periods on different patients.

5.1. Conclusion

Based on the results, although aromatherapy using rose essence had statistically significant effects on some indices, these differences were not clinically significant; thus, conducting studies with more sample size or changing intervention time are recommended.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

This article was extracted from a nursing master's thesis approved by Rafsanjan University of Medical Sciences and was financially sponsored by this university. Hereby, we extend our gratitude to the authorities of the university for supporting this study. We are grateful to all of the participants who participated in our study and ICUs personnel for their collaboration.

Footnotes

Authors' Contribution: Negar Zare: designing the study, data collection, drafting the manuscript. Maryam Shahabinejad: advisor, preparation and confirmation of the manuscript. Tabandeh Sadeghi: counselor, data analysis, preparationand confirmation of the manuscript.

Clinical Trial Registration Code: IRCT20170122032111N3.

Conflict of Interests: The authors declare no conflict of interest.

Ethical Approval: The Ethics Committee of Rafsanjan University of Medical Sciences approved the study (IR.RUMS.REC.1397.069). Moreover, an explanation to the participants about the study and its goals and keeping their information confidential were the ethical considerations of this study.

Funding/Support: This study was funded by Rafsanjan University of Medical Sciences.

Informed Consent: Informed consent was taken from the participants before the study.

References

1. Gustad LT, Chaboyer W, Wallis M. ICU patient's transfer anxiety: a prospective cohort study. *Aust Crit Care*. 2008;**21**(4):181–9. doi: 10.1016/j.aucc.2008.07.002. [PubMed: 18805700].
2. Fleischer S, Berg A, Behrens J, Kuss O, Becker R, Horbach A, et al. Does an additional structured information program during the intensive care unit stay reduce anxiety in ICU patients?: a multicenter randomized controlled trial. *BMC Anesthesiol*. 2014;**14**:48. doi: 10.1186/1471-2253-14-48. [PubMed: 25071414]. [PubMed Central: PMC4113490].
3. Gallagher R, McKinley S. Stressors and anxiety in patients undergoing coronary artery bypass surgery. *Am J Crit Care*. 2007;**16**(3):248–57. [PubMed: 17460316].
4. Taheri S, Firouzkouhi M, Abdollahimohammad A, Sadegei K, Shahrakivahed A. Effect of aromatherapy massage with mint essential oil on physiological parameters of concussion patients hospitalized in intensive care unit: A clinical trial. *Der Pharmacia Lettre*. 2016;**8**(13):274–9.
5. Gustad LT, Chaboyer W, Wallis M. Performance of the Faces Anxiety Scale in patients transferred from the ICU. *Intensive Crit Care Nurs*. 2005;**21**(6):355–60. doi: 10.1016/j.iccn.2005.06.006. [PubMed: 16102967].
6. McKinley S, Stein-Parbury J, Chehelnabi A, Lovas J. Assessment of anxiety in intensive care patients by using the Faces Anxiety Scale. *Am J Crit Care*. 2004;**13**(2):146–52. [PubMed: 15043242].
7. Polikandrioti M, Olympios C. Anxiety and coronary artery disease. *Archives of Hellenic Medicine/Arheia Ellenikes Iatrikes*. 2014;**31**(4).
8. Tazakori Z, Babaee S, Karimollahi M, Ahmadian-Attari MM, Bayat F. The effect of oral damask rose extract on anxiety of patients undergoing coronary angiography. *Journal of Health and Care*. 2016;**18**(3):207–16.
9. McCaffrey R, Taylor N. Effective anxiety treatment prior to diagnostic cardiac catheterization. *Holist Nurs Pract*. 2005;**19**(2):70–3. doi: 10.1097/00004650-200503000-00007. [PubMed: 15871589].
10. Oh J, Sohn JH, Shin CS, Na SH, Yoon HJ, Kim JJ, et al. Mutual relationship between anxiety and pain in the intensive care unit and its effect on medications. *J Crit Care*. 2015;**30**(5):1043–8. doi: 10.1016/j.jcrc.2015.05.025. [PubMed: 26116140].
11. Setzer WN. Essential oils and anxiolytic aromatherapy. *Nat Prod Commun*. 2009;**4**(9):1305–16. [PubMed: 19831048].
12. Khoshkesht S, Bahrami Babahaidari T, Shiri M, Aghabarari M, Hajfiroozabadi M, Jalili HR, et al. The Effect of Aromatherapy on Level of Exam Anxiety Among Nursing Students in Alborz University of Medical Sciences. *Alborz University Medical Journal*. 2015;**4**(2):101–9. doi: 10.18869/acadpub.aums.4.2.101.
13. Rocha KK, Ribeiro AM, Rocha KC, Sousa MB, Albuquerque FS, Ribeiro S, et al. Improvement in physiological and psychological parameters after 6 months of yoga practice. *Conscious Cogn*. 2012;**21**(2):843–50. doi: 10.1016/j.concog.2012.01.014. [PubMed: 22342535].
14. Hudson BF, Davidson J, Whiteley MS. The impact of hand reflexology on pain, anxiety and satisfaction during minimally invasive surgery under local anaesthetic: a randomised controlled trial. *Int J Nurs Stud*. 2015;**52**(12):1789–97. doi: 10.1016/j.ijnurstu.2015.07.009. [PubMed: 26294281].
15. Anderson E, Shivakumar G. Effects of exercise and physical activity on anxiety. *Front Psychiatry*. 2013;**4**:27. doi: 10.3389/fpsyt.2013.00027. [PubMed: 23630504]. [PubMed Central: PMC3632802].
16. Hammond DC. Hypnosis in the treatment of anxiety- and stress-related disorders. *Expert Rev Neurother*. 2010;**10**(2):263–73. doi: 10.1586/ern.09.140. [PubMed: 20136382].

17. Wu PY, Huang ML, Lee WP, Wang C, Shih WM. Effects of music listening on anxiety and physiological responses in patients undergoing awake craniotomy. *Complement Ther Med*. 2017;**32**:56–60. doi: 10.1016/j.ctim.2017.03.007. [PubMed: 28619305].
18. Babaii A, Abbasinia M, Hejazi SF, Seyyed Tabaei SR, Dehghani F. The effect of listening to the voice of Quran on anxiety before cardiac catheterization: a randomized controlled trial. *Health, Spirituality and Medical Ethics*. 2015;**2**(2):2–7.
19. Momeni T, Musarezaie A, Moeini M, Naji Esfahani H. The effect of spiritual care program on ischemic heart disease patients, anxiety, hospitalized in CCU: a clinical trial. *Journal of Research in Behavioural Sciences*. 2013;**6**:554–64.
20. Alves da Silva T, Stripari Schujmann D, Yamada da Silveira LT, Caromano FA, Fu C. Effect of therapeutic Swedish massage on anxiety level and vital signs of Intensive Care Unit patients. *J Bodyw Mov Ther*. 2017;**21**(3):565–8. doi: 10.1016/j.jbmt.2016.08.009. [PubMed: 28750965].
21. Yucel SC, Arslan GG, Bagci H. Effects of Hand Massage and Therapeutic Touch on Comfort and Anxiety Living in a Nursing Home in Turkey: A Randomized Controlled Trial. *J Relig Health*. 2020;**59**(1):351–64. doi: 10.1007/s10943-019-00813-x. [PubMed: 30982141].
22. Aghajani M, Mirbagher N. Comparing the effect of holy Quran recitation and music on patient anxiety and vital signs before abdominal surgeries. *Islamic lifestyle centered on health*. 2012;**1**:1–4.
23. Zolfaghari M, Eybpoosh S, Hazrati M. Effects of therapeutic touch on anxiety, vital signs, and cardiac dysrhythmia in a sample of Iranian women undergoing cardiac catheterization: a quasi-experimental study. *J Holist Nurs*. 2012;**30**(4):225–34. doi: 10.1177/0898010112453325. [PubMed: 22828950].
24. Moeini M, Kahangi LS, Valiani M, Heshmat R. The effect of reflexotherapy on patients' vital signs before coronary artery bypass graft surgery. *Iran J Nurs Midwifery Res*. 2011;**16**(1):8–12. [PubMed: 22039373]. [PubMed Central: PMC3203304].
25. Steflitsch W, Steflitsch M. Clinical aromatherapy. *Journal of Men's Health*. 2008;**5**(1):74–85. doi: 10.1016/j.jomh.2007.11.001.
26. Cho MY, Min ES, Hur MH, Lee MS. Effects of aromatherapy on the anxiety, vital signs, and sleep quality of percutaneous coronary intervention patients in intensive care units. *Evid Based Complement Alternat Med*. 2013;**2013**:381381. doi: 10.1155/2013/381381. [PubMed: 23476690]. [PubMed Central: PMC3588400].
27. Kim Y, Lee MS, Yang YS, Hur M. Self-aromatherapy massage of the abdomen for the reduction of menstrual pain and anxiety during menstruation in nurses: A placebo-controlled clinical trial. *European Journal of Integrative Medicine*. 2011;**3**(3):e165–8. doi: 10.1016/j.eujim.2011.08.007.
28. Muzzarelli L, Force M, Sebold M. Aromatherapy and reducing preprocedural anxiety: A controlled prospective study. *Gastroenterol Nurs*. 2006;**29**(6):466–71. doi: 10.1097/00001610-200611000-00005. [PubMed: 17273013].
29. Boskabady MH, Shafei MN, Saberi Z, Amini S. Pharmacological effects of rosa damascena. *Iran J Basic Med Sci*. 2011;**14**(4):295–307. [PubMed: 23493250]. [PubMed Central: PMC3586833].
30. Bhattacharjee SK, Banerji B. *The complete book of roses*. Aavishkar Publishers; 2010.
31. Igarashi M, Song C, Ikei H, Ohira T, Miyazaki Y. Effect of olfactory stimulation by fresh rose flowers on autonomic nervous activity. *J Altern Complement Med*. 2014;**20**(9):727–31. doi: 10.1089/acm.2014.0029. [PubMed: 25055057].
32. Kheirkhah M, Setayesh Valipour N, Neisani Samani L, Haghani H. Effect of aromatherapy with essential damask rose oil on anxiety of the active phase of labor nulliparous women. *Nursing And Midwifery Journal*. 2013;**11**(6):0.
33. Dehkordi AK, Tayebi A, Ebadi A, Sahraei H, Einollahi B. Effects of Aromatherapy Using the Damask Rose Essential Oil on Depression, Anxiety, and Stress in Hemodialysis Patients: A Clinical Trial. *Nephro-Urology Monthly*. 2017;**9**(6). doi: 10.5812/numonthly.60280.
34. Fazlollahpour-Rokni F, Shorofi SA, Mousavinasab N, Ghafari R, Esmaeili R. The effect of inhalation aromatherapy with rose essential oil on the anxiety of patients undergoing coronary artery bypass graft surgery. *Complement Ther Clin Pract*. 2019;**34**:201–7. doi: 10.1016/j.ctcp.2018.11.014. [PubMed: 30712728].
35. Hongratanaworakit T. Relaxing effect of rose oil on humans. *Nat Prod Commun*. 2009;**4**(2):291–6. [PubMed: 19370942].
36. Hur MH, Oh H, Lee MS, Kim C, Choi AN, Shin GR. Effects of aromatherapy massage on blood pressure and lipid profile in korean climacteric women. *Int J Neurosci*. 2007;**117**(9):1281–7. doi: 10.1080/00207450600936650. [PubMed: 17654092].
37. Aghagoli S, Salimi A, Salimi M, Ghazavi Z, Marofi M, Mohammadbeigi A. Aromatherapy with rosa damascenes in apnea, bradycardia and Spo2 of preterm infants; a randomized clinical trial. *International Journal of Pediatrics*. 2016;**4**(6):1911–8.
38. Bikmoradi A, Harorani M, Roshanaei G, Moradkhani S, Falahinia GH. The effect of inhalation aromatherapy with damask rose (Rosa damascena) essence on the pain intensity after dressing in patients with burns: A clinical randomized trial. *Iran J Nurs Midwifery Res*. 2016;**21**(3):247–54. doi: 10.4103/1735-9066.180380. [PubMed: 27186201]. [PubMed Central: PMC4857658].
39. Mahram B. *Tandardization of Speilberger test in Mashhad*. Tehran: Allame Tabatabaei University; 1994.
40. Barati F, Nasiri A, Akbari N, Sharifzadeh G. The Effect of Aromatherapy on Anxiety in Patients. *Nephrourol Mon*. 2016;**8**(5). e38347. doi: 10.5812/numonthly.38347. [PubMed: 27878109]. [PubMed Central: PMC5111093].
41. Berman A, Snyder S. *Kozier & Erbs fundamentals of nursing: Nursing, process, and practice*. New Jersey: Pearson; 2014.
42. Carol T, Carol L, Priscilla L, Pamela L. *Fundamentals of nursing: The art and science of nursing care*. Walters Kluwer; 2011.