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# Effects of Aromatherapy Using the Damask Rose Essential Oil on Depression, Anxiety, and Stress in Hemodialysis Patients: A Clinical Trial

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## Abstract

**Background:** Depression, anxiety, and stress are very common among hemodialysis patients. The aim of this study was to investigate effects of aromatherapy using the damask rose oil on depression, anxiety, and stress in these patients.

**Methods:** In a clinical trial that was performed in 2015, 60 patients under hemodialysis treatment were randomly allocated to two groups of control and intervention each consisting of 30 subjects. The DASS21 scale was used to measure the rates of depression, anxiety, and stress before and four weeks after intervention. In the intervention group, the patients were asked to inhale the damask rose oil with a constant density of 2% from a piece of cloth smeared with three drops for an hour. In the control group, only the usual, standard care was applied.

**Results:** The comparison of the mean scores before and after the intervention in the two groups showed that after intervention, the depression, anxiety, and stress scores significantly decreased in the damask rose group ( $P \leq 0.05$ ).

**Conclusions:** Inhalation aromatherapy using the damask rose oil can decrease depression, anxiety, and stress in hemodialysis patients.

**Keywords:** Aromatherapy, Hemodialysis, Depression, Anxiety, Damask Rose Essential Oil

## 1. Background

Anxiety and depression are among the initial disorders in end stage renal disease patients (1). On the other hand, dialysis itself is a process causing stress and anxiety followed by several psychological problems (2, 3). In such a way that in some studies, 63.9% of the hemodialysis patients suffer from anxiety, 60.5% from depression, and 51.7% from stress. In another study, the rates of depression and anxiety in patients dialyzed for more than 2.5 years were 62.8% and 83.8%, respectively (4, 5). In Knuth's study, the prevalence of depression was reported 48% (6).

Depression is an important factor in the reduction of treatment adherence. Depressed patients' refusal of cooperation in treatment increases their medical problems, endangers their health, and eventually leads to their early death (7). Moreover, in these patients, many areas of life quality have displayed significant correlations with men-

tal health. Reduction of mental health in hemodialysis patients affects their life quality and disturbs their operations in various respects (8).

Moreover, anxiety prevents from adherence to proposed diets and treatments, and it has negative effects on self-care and treatment results. Patients with higher social support and lower anxiety levels enjoy higher levels of self-care (9). Therefore, maintenance of mental hygiene and control of anxiety and depression are of great importance in these patients.

Different non-pharmaceutical methods have been examined so far as complementary medicine to reduce anxiety and depression in diseases and different situations, which include massage therapy, physical exercises, dry needling and acupuncture, music therapy, aromatherapy, yoga and tai chi, hypnosis, and prayer therapy (10-18).

Of these, aromatherapy as a plant therapy method is considered as one of the branches of alternative and

complementary medicine. Investigation of the history of medicine demonstrates that old civilizations paid great attention to aromatic plants and applied them widely in various aspects of life, from religious ceremonies to treatment and cosmetic purposes (19).

Aromatherapy denotes using essential oils extracted from plants and flowers for treatment of different diseases. These oils can be used via inhalation or bathing or during a massage. The most frequent form of using aromatherapy is via massages (20). Studies performed demonstrate efficient anti-anxiety effects of the aromatherapy method, which has not accompanied by side effects (21, 22).

Aromatherapy has been utilized in different fields such as pregnancy hygiene, pain relief, side effects of chemotherapy, skin and hair hygiene, wounds treatment, epileptic fit control, reduction of breathing problems, and reduction of anxiety and depression (23, 24).

In a study performed on dialysis patients, inhalation of the orange oil has proven effective in reducing hemodialysis patients' anxiety without significant side effects (25). In a study performed by Itai examining psychological effects of aromatherapy on hemodialysis patients, significant effects on the reduction of anxiety and depression rates were observed (26). However, some studies have demonstrated that aromatherapy is not effective in long-term. The results of Wilkinson's study demonstrated that aromatherapy using the message method did not improve the anxiety symptoms 10 weeks after intervention, even though it had positive effects in the second week (27). All methods of anxiety reduction have their own limitations despite their effectiveness. Of them, inhalation aromatherapy seems to have fewer limitations and higher applicability, and considering the specific conditions and limitations of hemodialysis patients, should it turn out to be effective, it can be utilized widely in treatment centers as a simple, low-cost method.

There are a few studies having examined inhalation aromatherapy specifically in hemodialysis patients. In addition, the effectiveness of aromatherapy in hemodialysis patients is controversial. On the other hand, not all of the studies performed confirm the effectiveness of this method, and in some studies, aromatherapy has not shown much effect. The present research was planned to examine the effects of aromatherapy on depression, anxiety, and stress in hemodialysis patients.

## 2. Methods

This was a clinical trial conducted with two groups of control and intervention for two months between May and June 2014 on patients suffering from end stage renal disease (ESRD) undergoing treatment with maintenance

hemodialysis. The required sample size was calculated using Altman's nomogram considering type I error ( $\alpha$ ) of 5%, type II error ( $\beta$ ) of 10%, and power of 90% with the standard deviation of 2 calculated from Valipour et al.'s study (28). The sample size required in this study was calculated as 30 people in each group with an attrition rate of 10%. The population under study included 60 patients undergoing hemodialysis treatment having entered the study from two dialysis centers in two hospitals in Tehran (Baqiyatallah and Shahid Chamran hospitals). The sampling method included random allocation to the two groups based on a draw. Here, the research environment of the two hospitals was divided based on even/odd days and morning/evening shifts, and then each day and shift was assigned to one of the groups under study based on the draw.

ESRD patients with following criteria were included in the study: being dialyzed three times a week on a regular basis, undergoing hemodialysis treatment for more than three months, being literate, not having allergy to aromatics, and not having proven problems with the sense of smell. Patients who missed more than three consecutive sessions during the intervention period, and those who have been undergoing treatment by a psychiatrist due to a mental disorder were excluded.

### 2.1. Ethical Considerations

The research followed the tenets of the Declaration of Helsinki. The objectives of the research were explained to the patients and informed consent was obtained. All patients took part in this study voluntary. The research was approved by the ethics committee of Baqiyatallah University of Medical Sciences, Tehran. Iran.

### 2.2. Measurement Tools and Method

Personal information including age, gender, weight, marital status, previous dialysis, and education was collected using demographic questionnaires. Depression, anxiety, and stress levels were measured using the DASS21 scale. In the case of patients who needed help in filling out the questionnaire (such as those with vision problems), the questionnaire was read and the patients' responses were recorded with no judgments or changes.

The DASS-21 scale for depression, anxiety, and stress was developed in 1995 by Lovibond and Lovibond (29). This scale comes in two versions. The short version contains 21 items evaluating each of the mental constructs including depression, anxiety, and stress using 7 different items. The long version contains 42 items, where each mental factor or construct is measured by 14 items. The validity and reliability of this tool have been proven in different studies including Iranian studies (30-33). In Iran, this questionnaire

was examined by Samani and Joukar, who reported the test-retest validity for the depression, anxiety, and stress scales as 0.80, 0.76, and 0.77, respectively, and Cronbach's alpha for the depression, anxiety, and stress scales as 0.81, 0.74, and 0.78, respectively (34). Each of the subscales of DASS contains 7 questions, and the final score of each subscale is obtained by summing the scores of the relevant questions. Each question is scored from zero (not at all true about me) to 3 (completely true about me). The depression subscale includes questions 3, 5, 10, 13, 16, 17, and 21, the anxiety subscale includes questions 2, 4, 7, 9, 15, 19, and 20, and the stress subscale includes questions 1, 6, 8, 11, 12, 14, and 18.

### 2.3. Interventions

After collecting the initial information, the intervention began. Here, once the patient was connected to the dialysis machine, a piece of cloth smeared with three drops of the damask rose oil with a constant density of 2% was attached to the patient's collar, and the patient was asked to breathe normally. The intervention was decided to last an hour. In the control group, only the usual care was taken. After a month, the patients' depression, anxiety, and stress levels were measured again using the DASS21 scale.

### 2.4. Statistical Tests

After the data collection, the statistical calculations were performed using chi-square test and independent t-test in SPSS software version 20. P values less than 0.05 were considered statistically significant.

## 3. Results

In this study, 4 patients were excluded due to hospitalization in the intensive care unit, missing more than three sessions, and transfer to another center. Finally, 56 patients (28 in each group) completed the study. 36 (64.3%) participants were men, and 53 (94.6%) were married. The mean age of the control group was  $58.2 \pm 12.6$ , and the mean age of the intervention group was  $58.9 \pm 13.4$ , which were not statistically different. Our data showed that the distribution of the demographic variables in the two groups was homogeneous (Table 1).

The DASS21 scale scores demonstrated high prevalence of depression, anxiety, and stress in the patients under study. After the intervention, a significant reduction was observed in the DASS scale scores of the damask rose group, while the scores of the control group did not show a significant difference. Moreover, among the three variables of depression, anxiety, and stress, the highest reduction was related to the variable stress, which showed a reduction of

**Table 1.** Baseline Characteristics of Hemodialysis Patients in Intervention and Control Groups

Parameter	Hemodialysis Groups		Chi-Square Test
	Damask Rose	Control	
<b>Sex</b>			P = 1.00
Male	18 (64.3)	18 (64.3)	
Female	10 (35.7)	10 (35.7)	
<b>Marital status</b>			P = 0.55
Married	26 (92.9)	27 (96.4)	
Single	2 (7.1)	1 (3.6)	
<b>previous dialysis, y</b>			P = 0.36
< 1	6 (21.4)	12 (42.9)	
1 - 2	5 (17.9)	3 (10.7)	
2 - 3	5 (17.9)	3 (10.7)	
> 3	12 (42.9)	10 (35.7)	
<b>Education</b>			P = 0.14
Primary	14 (50)	16 (57.1)	
Secondary	8 (28.6)	2 (7.1)	
College or university	6 (21.4)	10 (35.7)	

$5.7 \pm 4.9$ . Comparison of the mean scores of the DASS variables of the two groups before and after the intervention also showed a significant difference (Table 2).

**Table 2.** Changes in the DASS21 Scale Scores Before and After Intervention

Stage	Hemodialysis Groups		T Test
	Damask Rose	Control	
<b>Before</b>			
Depression	$8.2 \pm 6.6$	$7.4 \pm 6.9$	P = 0.63
Anxiety	$6.2 \pm 4.5$	$8.1 \pm 6.2$	P = 0.21
Stress	$11.2 \pm 5.9$	$9.6 \pm 6.5$	P = 0.34
<b>After</b>			
Depression	$5.1 \pm 4.5$	$7.4 \pm 7.3$	P = 0.16
Anxiety	$3.1 \pm 3.8$	$7.5 \pm 6.5$	P = 0.004
Stress	$5.5 \pm 4.6$	$9.6 \pm 7.4$	P = 0.01
<b>The differences between the means</b>			
Depression	$-3.1 \pm 4.2$	$0.0 \pm 2.6$	P = 0.002
Anxiety	$-3.1 \pm 3.4$	$-0.6 \pm 2.9$	P = 0.006
Stress	$-5.7 \pm 4.4$	$0.0 \pm 3.9$	P = 0.000

#### 4. Discussion

The aim of this study was to examine the effects of inhalation aromatherapy using the damask rose essential oil on depression, anxiety, and stress in hemodialysis patients. Our data demonstrated that the differences between the mean depression, anxiety, and stress scores before and after intervention were significant in patients who inhaled the damask rose aroma, as compared to those of the control group. Of these, the variable stress showed the highest reduction. Moreover, comparison of the mean anxiety and stress raw scores showed a significant reduction in the damask rose group, but the depression raw score after the intervention did not statistically differ, although it decreased slightly. This appears logical and acceptable considering the nature and intensity of depression in hemodialysis patients and the lengthy treatment of depression. However, comparison of the differences between the mean scores of this variable before and after the intervention also demonstrated a significant difference.

Studies that have investigated the effects of inhalation aromatherapy on dialysis patients are limited. In a study by Kanani et al., effectiveness of the orange aroma in anxiety rates in hemodialysis patients was examined (25). In this study, the patients' state anxiety rate decreased from  $46.9 \pm 9.7$  before intervention to  $35.9 \pm 8.7$  after intervention, which is in accordance with the results of our study.

Itai also examined the effects of inhalation aromatherapy on dialysis patients (26). Only 14 women participated in his study utilizing Hamilton anxiety and stress measurement scales. He examined his sample in three conditions: ordinary environment, odorless environment (using deodorants), and environment containing lavender and hiba aromas, and concluded that using the aromatic conditions significantly reduced the patients' depression and anxiety.

Mirzaei also investigated effects of lavender oil inhalation on anxiety rate (35) and reported results that are in accordance with our results.

The results of Graham's study are contrary to ours. He utilized inhalation aromatherapy on patients undergoing radiotherapy using lavender, bergamot, and cedarwood essential oils. He eventually found inhalation aromatherapy non-effective in reduction of anxiety and depression in patients undergoing radiotherapy (36). Therefore, it is suggested that more studies be performed in this area with higher sample sizes and intervention periods.

##### 4.1. Conclusions

The present study showed that depression, anxiety, and stress are very common among hemodialysis patients, and

inhalation aromatherapy using the damask rose oil significantly reduces depression, anxiety, and stress rates in these patients.

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#### Footnote

**Conflict of Interests:** None declared.

#### References

1. Cukor D, Coplan J, Brown C, Peterson RA, Kimmel PL. Course of depression and anxiety diagnosis in patients treated with hemodialysis: a 16-month follow-up. *Clin J Am Soc Nephrol*. 2008;**3**(6):1752-8. doi: [10.2215/CJN.01120308](https://doi.org/10.2215/CJN.01120308). [PubMed: [18684897](https://pubmed.ncbi.nlm.nih.gov/18684897/)].
2. Zahirodin A, Samimi Ardestani M. Anxiety and dialysis [In Persian]. *KAUMS J (FEYZ)*. 2001;**4**(4):95-8.
3. Tayebi A, Kasra Dehkordi A, Ebadi A, Sahraei H, Einollahi B. The effect of aromatherapy with lavender essential oil on depression, anxiety and stress in hemodialysis patients: A clinical trial. *Evid Based Care*. 2015;**5**(2):65-74. doi: [10.22038/ebcj.2015.4549](https://doi.org/10.22038/ebcj.2015.4549).
4. Ahmadzadeh G, Mehdi M. The prevalence of depression, anxiety and psychosis among hemodialysis patients in nour and Ali Asghar hospitals in Isfahan [In Persian]. *J Isfahan Med School*. 2012;**29**(162):1280-8.
5. Mollahadi M, Tayyebi A, Ebadi A, Daneshmandi M. Comparison between anxiety, depression and stress in hemodialysis and kidney transplantation patients [In Persian]. *Journal of Critical Care Nursing*. 2010;**2**(4):9-10.
6. Knuth B, Radtke V, Rocha P, da Silva KS, Dalsoglio F, Gazal M, et al. Prevalence of depression symptoms and serum levels of interleukin-6 in hemodialysis patients. *Psychiatry Clin Neurosci*. 2014;**68**(4):275-82. doi: [10.1111/pcn.12130](https://doi.org/10.1111/pcn.12130). [PubMed: [24372974](https://pubmed.ncbi.nlm.nih.gov/24372974/)].
7. Afshar R, Ghaedi G, Sanavi S, Davati A, Rajabpour A. Depression and related factors in patients undergoing conventional maintenance hemodialysis [In Persian]. *Daneshvar Med*. 2010;**17**(88):59-66.
8. Sharif F, Vedad F. The relationship between mental health and quality of life of hemodialysis patients referred to hospitals affiliated to Shiraz University of Medical Sciences [In Persian]. *Iran J Nurs*. 2007;**20**(51):61-9.
9. Mollaoglu M. Perceived social support, anxiety, and self-care among patients receiving hemodialysis. *Dial Transplant*. 2006;**35**(3):144-55. doi: [10.1002/dat.20002](https://doi.org/10.1002/dat.20002).
10. Kim MS, Cho KS, Woo H, Kim JH. Effects of hand massage on anxiety in cataract surgery using local anesthesia. *J Cataract Refract Surg*. 2001;**27**(6):884-90. doi: [10.1016/S0886-3350\(00\)00730-6](https://doi.org/10.1016/S0886-3350(00)00730-6). [PubMed: [11408136](https://pubmed.ncbi.nlm.nih.gov/11408136/)].
11. Kouidi E, Karagiannis V, Grekas D, Iakovidis A, Kaprinis G, Tourkan-tonis A, et al. Depression, heart rate variability, and exercise training in dialysis patients. *Eur J Cardiovasc Prev Rehabil*. 2010;**17**(2):160-7. doi: [10.1097/HJR.0b013e32833188c4](https://doi.org/10.1097/HJR.0b013e32833188c4). [PubMed: [19745744](https://pubmed.ncbi.nlm.nih.gov/19745744/)].

12. Mokhtari J, Siratinayer M, Sadeghi Shermeh M, Ghanbari Z, Haji Amini Z, Tayebi A. Effect of foot reflexology massage and benson relaxation on anxiety [In Persian]. *J Behav Sci*. 2009;**3**(2):159-65.
13. Field T, Diego M, Hernandez-Reif M. Tai chi/yoga effects on anxiety, heartrate, EEG and math computations. *Complement Ther Clin Pract*. 2010;**16**(4):235-8. doi: [10.1016/j.ctcp.2010.05.014](https://doi.org/10.1016/j.ctcp.2010.05.014). [PubMed: 20920810].
14. Sanjuan Navais M, Via Clavero G, Vazquez Guillamet B, Moreno Duran AM, Martinez Estalella G. [Effect of music on anxiety and pain in patients with mechanical ventilation]. *Enferm Intensiva*. 2013;**24**(2):63-71. doi: [10.1016/j.enfi.2012.11.003](https://doi.org/10.1016/j.enfi.2012.11.003). [PubMed: 23298702].
15. Kirkwood G, Rampes H, Tuffrey V, Richardson J, Pilkington K. Yoga for anxiety: a systematic review of the research evidence. *Br J Sports Med*. 2005;**39**(12):884-91. doi: [10.1136/bjism.2005.018069](https://doi.org/10.1136/bjism.2005.018069). [PubMed: 16306493] discussion 891.
16. Tayyebi A, Babahaji M, Sadeghi Sherme M, Ebadi A, Eynollahi B. Study of the effect of Hatha Yoga exercises on stress, anxiety and depression among hemodialysis patients. *Iran J Critical Care Nurs*. 2011;**3**(3):67-72.
17. Valcanti CC, Chaves Ede C, Mesquita AC, Nogueira DA, de Carvalho EC. [Religious/spiritual coping in people with chronic kidney disease undergoing hemodialysis]. *Rev Esc Enferm USP*. 2012;**46**(4):838-45. doi: [10.1590/S0080-62342012000400008](https://doi.org/10.1590/S0080-62342012000400008). [PubMed: 23018391].
18. Boelens PA, Reeves RR, Replogle WH, Koenig HG. The effect of prayer on depression and anxiety: maintenance of positive influence one year after prayer intervention. *Int J Psychiatry Med*. 2012;**43**(1):85-98. doi: [10.2190/PM.43.1.f](https://doi.org/10.2190/PM.43.1.f). [PubMed: 22641932].
19. Alijaniha F, Ghaffari F, Naseri M, Asghari M. Smelling drugs application, in the prevention and treatment of disease, from the perspective of Iranian traditional medicine [In Persian]. *Med Hist*. 2013;**5**(14):67-77.
20. Cooke B, Ernst E. Aromatherapy: a systematic review. *Br J Gen Pract*. 2000;**50**(455):493-6. [PubMed: 10962794].
21. 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](https://doi.org/10.1155/2013/381381). [PubMed: 23476690].
22. Lee YL, Wu Y, Tsang HW, Leung AY, Cheung WM. A systematic review on the anxiolytic effects of aromatherapy in people with anxiety symptoms. *J Altern Complement Med*. 2011;**17**(2):101-8. doi: [10.1089/acm.2009.0277](https://doi.org/10.1089/acm.2009.0277). [PubMed: 21309711].
23. Kasra Dehkordi A, Tayebi A, Ebadi A, Sahrarei H, Einollahi B. Effects of aromatherapy with lavender on sleep quality of hemodialysis patients (A Clinical Trial) [In Persian]. *J Nurs Midwifery Urmia Univ Med Sci*. 2016;**13**(11):995-1003.
24. Bahraini S, Naji S, Mannani R. Effects of Aromatherapy and Its Application [In Persian]. *J Urmia Nurs Midwifery Fac*. 2011;**9**(1):1-8.
25. Kanani M, Mazloum SAE, Mokhber N. The effect of aromatherapy with orange essential oils on anxiety in patients undergoing hemodialysis [In Persian]. *J Sabzevar Univ Med Sci*. 2012;**19**(3):249-57.
26. Itai T, Amayasu H, Kuribayashi M, Kawamura N, Okada M, Momose A, et al. Psychological effects of aromatherapy on chronic hemodialysis patients. *Psychiatry Clin Neurosci*. 2000;**54**(4):393-7. doi: [10.1046/j.1440-1819.2000.00727.x](https://doi.org/10.1046/j.1440-1819.2000.00727.x). [PubMed: 10997854].
27. Wilkinson SM, Love SB, Westcombe AM, Gambles MA, Burgess CC, Cargill A, et al. Effectiveness of aromatherapy massage in the management of anxiety and depression in patients with cancer: a multi-center randomized controlled trial. *J Clin Oncol*. 2007;**25**(5):532-9. doi: [10.1200/JCO.2006.08.9987](https://doi.org/10.1200/JCO.2006.08.9987). [PubMed: 17290062].
28. Valipour S, Kheirkhah M, Neisani L, Haghani H. Comparison of the effects of aromatherapy with essential oils of damask rose and hot foot-bath on the first stage of labor anxiety in Nulliparous women [n Persian]. *Complement Med J Fac Nurs Midwifery*. 2012;**2**(2):1-9.
29. Lovibond PF, Lovibond SH. The structure of negative emotional states: comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behav Res Ther*. 1995;**33**(3):335-43. doi: [10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U). [PubMed: 7726811].
30. Akin A, Cetin B. The depression anxiety and stress scale (dass): Study of validity and reliability. *Educ Sci Theory Pract*. 2007;**7**(1):260-8.
31. Xavier S, Bento E, Azevedo J, Marques M, Soares MJ, Freitas V, et al. Validation of the Depression, Anxiety and Stress Scale-DASS-21 in a community sample of Portuguese pregnant women. *Eur Psychiatry*. 2016;**33**:239. doi: [10.1016/j.eurpsy.2016.01.600](https://doi.org/10.1016/j.eurpsy.2016.01.600).
32. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *Br J Clin Psychol*. 2005;**44**(Pt 2):227-39. doi: [10.1348/014466505X29657](https://doi.org/10.1348/014466505X29657). [PubMed: 16004657].
33. Asghari Moghaddam MA, Saed F, Dibajnia P, Zangeneh J. A Preliminary Validation of the Depression, Anxiety and Stress Scales (DASS) in Non-clinical Sample [In Persian]. *Clin Psychol Personality*. 2008;**1**(13):23-38.
34. Samani S, Joukar B. A study on the reliability and validity of the short form of the depression anxiety stress scale (DASS-21) [In Persian]. *J Soc Sci Hum Shiraz Univ*. 2007;**26**(3):65-77.
35. Mirzaei F, Keshargar S, Kaviani M, Rajaeifard A. The effect of lavender essence smelling during labor on cortisol and serotonin plasma levels and anxiety reduction in nulliparous women [In Persian]. *J Kerman Univ of Med Sci*. 2009;**16**(3):245-54.
36. Graham PH, Browne L, Cox H, Graham J. Inhalation aromatherapy during radiotherapy: results of a placebo-controlled double-blind randomized trial. *J Clin Oncol*. 2003;**21**(12):2372-6. doi: [10.1200/JCO.2003.10.126](https://doi.org/10.1200/JCO.2003.10.126). [PubMed: 12805340].