Original Article

The Effects of Inhalation Aromatherapy with Rose and Lavender at Week 38 and Postpartum Period on Postpartum Depression in High-risk Women Referred to Selected Health Centers of Yazd, Iran in 2015

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Abstract

Background: Postpartum depression (PPD) is one of the most common problems in women of childbearing age. This study was conducted to evaluate the efficacy of aromatherapy on PPD. **Materials and Methods:** In this study, 105 pregnant women at 35–37 weeks of pregnancy were enrolled using convenient sampling and randomly assigned to three groups. The intervention group dropped 7 drops of lavender oil and 1 cc rose water at the concentration of 100%, and the placebo group dropped 7 drops of odorless sesame seed oil, with 1 cc of musk willow sweat at the concentration of 100% by dropper on a special cloth. They put the cloths on their mouths and took 10 deep breaths before sleeping and then placed them next to their pillows. The control group only received the routine care. The intervention lasted from 38th week of pregnancy until 6 weeks after delivery. Then depression level was determined before the intervention, 35–37 weeks of pregnancy, 2 and 6 weeks after delivery using Edinburgh questionnaire. **Results:** The mean of depression score in the intervention group decreased significantly compared to the placebo and control groups, 2 weeks ($F = 9.412$, $p < 0.001$) and 6 weeks after delivery ($F = 7.813$, $p < 0.01$). **Conclusions:** This study provides valid evidence for the effect of aromatherapy on PPD. Therefore, the use of aromatherapy can be recommended in high-risk women.

Keywords: *Aromatherapy, depression, Iran, lavender, postpartum, rose*

Introduction

Major depressive disorder (MDD) is one of the most prevalent mental disorders with a high morbidity. The lifetime prevalence in the United States is estimated at 16.2%.[1] Currently, MDD is worldwide and is the third leading cause of burden of disease and will rise to the first place in 2030.[2] In addition, it is estimated that about 20% of women will suffer from depression during some periods of their lives, and thus, it will be recognized as one of the biggest public health problems of women and families. Because mother is known as the essential element in the management and communication of family members, postpartum depression (PPD) can have a negative impact on the role of the mother, and resultantly can threaten the whole family structure.[3]

The World Health Organization (1992) classified postpartum mental disorders (ICD-10) as maternity blues (MB), PPD, and postpartum psychosis (PPS). MB with the prevalence of 50–80% is considered the mildest type of this disorder, and PPS with an incidence of 1–2 cases per 1,000 births is considered the most severe type.[4,5]

Psychological factor causing depression and the strongest predictor of the disorder is related to recent stressful events, which include death, divorce, loss of support, loss of job, financial worries, and relationship problems with spouse, parents, or children. As a result, this situation will increase the susceptibility to mental disorders and may even lead to death.[6] When the mother expects pleasant experiences in her life after childbirth, she starts to confront with unknown and unpleasant moods such as concern, anxiety, weakness, disability, lack of pleasure, sleep and appetite disorders, lack of self-confidence, and feeling inadequacy as a parent. In PPD, sometimes patient's appetite increases, which leads to weight gain. Her desire for deep sleep increases and she wakes up with the

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slightest cry of baby, and she is no longer able to sleep. Irritability, spontaneous and uncontrolled crying, explosive and aggressive behavior, severe anxiety, panic attacks, and the desire to be alone are other symptoms of PPD. One of the most prominent characteristics of PPD is rejection of baby, which is mostly due to the mother's abnormal anger and temper. Moreover, important and alarming subjects are the presence of psychological symptoms, such as suicide and infanticide thoughts.[7]

PPD is a mental disorder which comes with many complications for the mother; however, it is preventable and treatable and its timely diagnosis and treatment leads to a full recovery of the majority of depressed mothers and returns them to normal life.[8] Although the use of antidepressant medications has beneficial effects on treating PPD, it has some side effects such as drowsiness, dizziness, hypotension, and tachycardia, so their consumption is limited in this period.[9]

One effective way to relieve stress, anxiety, and depression is complementary medicine. Complementary medicine includes relaxation, yoga, massage, aromatherapy, etc., which in recent years has long been of interest to researchers.[10]

Lavender and Rosa damascena are widely used in aromatherapy. Lavender fragrance is one of the common fragrances used as a sedative in aromatherapy. Lavandula angustifolia is the scientific term of lavender. Ingredients such as linalool act as a sedative by influencing gamma-aminobutyric acid receptors in the central nervous system, while linalyl acetate has a narcotic function.[11] On the contrary, rose fragrance can influence the central nervous system with two constituents, i.e., citronellol and phenethyl alcohol, which produce antianxiety effects.[12]

There are several studies regarding the effects of aromatherapy on anxiety, pain, vital signs, sleep quality, nausea, and stress.[13-18] References suggest that combined aromatherapy is more effective than separate use.[19] Some studies suggest that aromatherapy with lavender is not useful, and this is still controversial,[20] and no research has been found to indicate antidepressant effects of Musk willow or sesame seed oil yet.

Because the maintenance and improvement of mental and physical health of mothers and children is one of the important tasks of midwives, the researcher decided to conduct a study that aimed to investigate the effect of inhalation aromatherapy with Rosa damascena and lavender during the third trimester of pregnancy on PPD in high-risk women who referred to selected health centers of Yazd.

Materials and Methods

This study is a double-blinded, three-stage clinical trial that was conducted after obtaining the approval of the Research Ethics Committee of Medical Sciences in 2015 (IRCT2016080929281N1). The sample size in each group was calculated as 31, and by taking into account the 10% loss in each group, 35 subjects were included in each group. In this formula, the probability of Type I error is ($\alpha = 0.05$), the test power is ($1 - \beta = 0.80$), the balance of the difference in average is ($\delta 1 = 1.8$), and expected average absolute deviation is ($\mu_t - \mu_s = 13$).

In this study, after explaining the objectives of the study and obtaining the written informed consents, 160 pregnant women referring for prenatal care at 35–37 weeks to selected health centers of Yazd Medical University were selected based on inclusion and exclusion criteria through convenient sampling method. Inclusion criteria were as follows: (1) being literate, (2) absence of congenital anomalies according to the conducted sonographies and the first and second trimester screening tests, (3) avoiding the use of drugs and alcohol, (4) avoiding the use of antidepressant and antianxiety medications in recent pregnancy according to history, (5) no history of asthma and allergies and diagnosed skin dermatitis, (6) no prior history of diagnosed eczema and allergies to flowers and herbs, (7) lack of mental disorders such as psychosis, bipolar disorder, and schizophrenia based on history, (8) no olfactory loss in subjects so that they were able to recognize the scent of essential oils based on history, (9) having a history of depression in their lifetime according to history, (10) family history of psychiatric disorders based on history, (11) lack of perceived social support from family and friends to get pregnant measured by the Norbeck Social Support Questionnaire (NSSQ), (12) lack of perceived social support from family and friends to get pregnant measured by the NSSQ, (13) unplanned pregnancy according to history, (14) spouse unemployment, (15) stressful life events in the last 12 months before delivery, and (16) experiencing depression or anxiety during pregnancy measured by Hospital Anxiety-Depressive Score (HADS). Having 1–9 items is essential for inclusion and having at least one of the items from 10 to 16 will suffice for inclusion. If the mothers have one of the items from 10 to 16, they are considered to be at risk of depression.

Exclusion criteria were as follows: (1) being allergic to lavender and rose essential oils in subjects during the study, (2) being allergic to lavender and rose essential oils in family members of subjects during the study, (3) personal desire of participants to withdraw from the study, and (4) women who do not regularly use aroma oils (not using aroma oils for two nights in a row). At this stage, pregnant mothers with Edinburgh questionnaire scores above 13 and also with scores above 11 on each subtest of HADS questionnaire were excluded. These scores indicate that other than coping with anxiety and depression, other therapies should be considered as well; therefore, they were referred to a psychiatrist, and 55 mothers were excluded at this stage. It is worth noting that mothers who had delivery earlier than 38 weeks were not included in the study, and

then samples were randomly assigned into three groups of intervention, placebo, and control.

Health care centers were selected by cluster sampling. To do so, Yazd was divided into four clusters and from each cluster, a health center was randomly selected, then from each center, 24 pregnant women were randomly selected and assigned to three groups of intervention, placebo, and control. Sample randomization was as follows: 105 envelopes were prepared and evenly coded as 1, 2, and 3; the codes were inside the envelopes; and the envelopes were sealed. Code 1 belonged to the intervention group, code 2 belonged to the placebo group, and code 3 belonged to the control group. The envelopes were distributed among mothers by researcher's assistant [Figure 1].

In this study, the Edinburgh PPD score was used to collect data. It includes 10 questions with 4 answers and each question is scored from 0 to 3 (based on the severity of symptoms), and overall tool score can vary from 0 to 30.

Scores 0–9 showed no depression, scores 10–12 showed risk of depression onset, and scores higher than 13 can be considered as depressed. Validity and reliability of this questionnaire have been proven in various studies in the Iranian population.[7] HADS questionnaire is a scale that measures depression and anxiety in the current pregnancy and it consists of 14 items and two subtests for anxiety and depression. Each item is rated on a four-point Likert scale. Questions 1–7 are related to the anxiety subtest and 7–14 are related to the depression subtest. In this questionnaire, the questions are scored from 0 to 3, where the maximum score on each subtest is 21 and a score of 11 has been recommended as the cut-off score.

The reliability and validity of the questionnaire have been approved by Montazeri.[21] Measuring scale of social support is NSSQ questionnaire. The questionnaire contains 40 questions, where the questions are classified based on a five-point Likert scale as: none (0), a little (1), average (2), high (3), and very high (4). The total score of questionnaire is 160. Higher scores indicate more social support. Jaliliyan *et al.* have reported that validity and reliability of the NSSQ were suitable for the Iranian society.[22]

After coordinating with the relevant authorities and gathering basic information, the following week, pregnant women were called to refer to centers and intervention was taught to mothers from week 38 of pregnancy and it began as follows: in the intervention group (rosewater + lavender), 7 drops of lavender essential oil and 1 cc of rose water at a concentration of 100%, and in the placebo group (B), 7 drops of odorless sesame seed oil and 1 cc of sweat musk

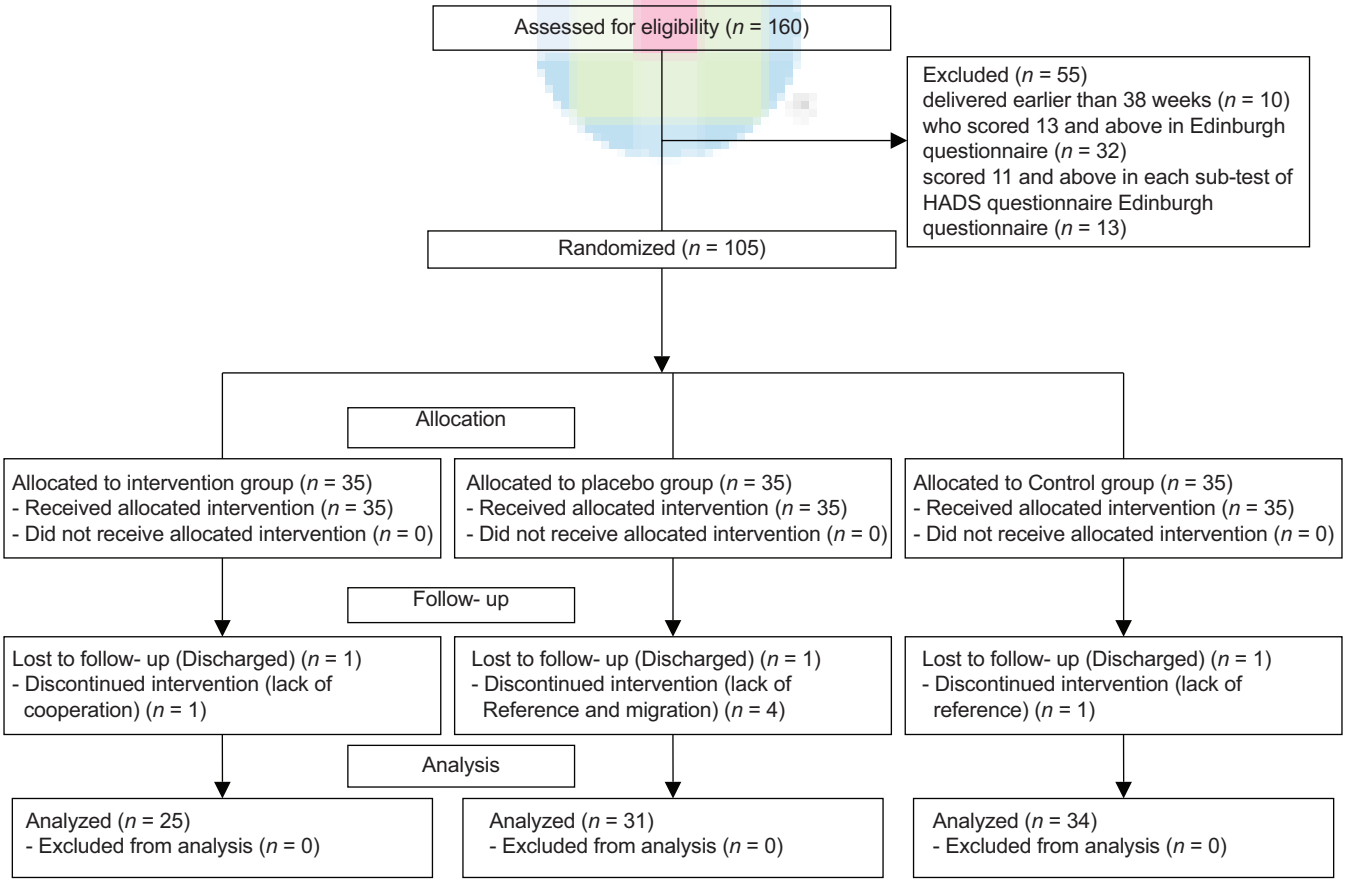

Figure 1: Consort diagram

at a concentration of 100% were dropped with the dropper on a special cloth. They put the cloths on their mouths and inhaled 10 deep breaths before sleeping and put them next to their pillows until morning. The intervention lasted from 38th week of pregnancy until 6 weeks after delivery. It should be noted that the researcher taught them how to use essential oils. The contents of the cans were quite similar in terms of appearance. In addition, doses of aromas were set according to studies conducted by Sahebalzamani *et al*., and in consultation with experts of pharmacognosy and also pharmaceutical experts of Barij Essence Company.[23]

Subjects of both groups were followed up by phone at the end of each week and they were asked if they were continuing the intervention and were not allergic to essence. Moreover, an envelope at 38th week of pregnancy (eighth visit) was given to study subjects in both groups and it contained a card in which the researcher's phone number was written, and they were asked to contact researcher if there were any problems with the use of essential oils.

In this study, ethical principles were observed by fair selections of participants, obtaining informed consent, maintaining privacy and confidentiality, estimating the risk/benefit ratio, and not forcing them to attend the research. Finally, the data were analyzed using Statistical Package for the Social Sciences, version SPSS-16 (IBM, Chicago, Illinois, USA) for descriptive and inferential statistics, analysis of variance (ANOVA) tests for quantitative variables, Chi-square for qualitative variables, and two-way ANOVA with repeated measures.

Ethical considerations

In this study, ethical principles were observed in coordination with Isfahan University of Medical Sciences with the code REC.1394.6.1 394408. For sampling, fair elections of participants, informed consent, privacy and confidentiality, estimating the risk/benefit and lack of compulsion to attend the research, having full freedom at each stage of the work to continue or withdraw from cooperation, describing objectives and the results of research to all participants, and the hospital officials were observed.

Results

In this study, 105 women referred to health care centers to get pregnancy care and those who met the inclusion criteria were included. These women were assigned to three groups of intervention (35), placebo (35), and control (35). At the first stage, one subject from the intervention group was excluded because of a lack of willingness to cooperate, four subjects of the placebo group were excluded due to unavailability and migration at the first and second stages, and one subject in the control group was excluded due to unavailability at second stage. The final analysis was conducted on 99 mothers who were referred to the centers. As a result, there were 34 subjects in the intervention group, 31 subjects in the placebo group, and 34 subjects in control group and the results were calculated statistically [Figure 1].

The results showed that the average age of the samples was 29.74, the average number of pregnancy was 2.3, and the average number of delivery was 1.11 [Table 1]. In terms of pregnancy, the highest rate related to wanted pregnancy in three groups of intervention (73.52%), placebo (74.21%), and control (67.60%), and with no history of abortion and infertility in three groups of intervention (82.40%), placebo (77.41%), and control (79.83%). Most natural deliveries were observed in three groups of intervention (70.63%), placebo (74.20%), and control (64.22%). The majority of subjects in the three groups of intervention (88.20%), placebo (87.11%), and control (82.40%) stated that they were interested to know the fetal sex. In the three groups of intervention (29.39%), placebo (35.49%), and control (23.40%), the participants had experienced a stressful event in the last 12 months and spouse employment in the three groups was as follows: intervention (88.22%), placebo (90.30%), and control (88.22%) [Table 2].

The mean difference of depression score during weeks 35–37 of pregnancy, 2 and 6 weeks after delivery was significant in the intervention group ($p = 0.001$). However, in the placebo ($p > 0.05$) and control groups ($p > 0.05$), it was not significant. The mean difference of depression score in the intervention group at weeks 35–37 of pregnancy did not significantly reduce compared to placebo and control groups ($p > 0.05$), while this mean difference had significant difference 2 weeks postpartum ($p < 001$) and 6 weeks postpartum ($p = 0.01$) in the intervention group compared to the placebo and control groups [Table 3].

Table 1: Comparison of means and standard deviations of the demographic characteristics of high-risk women in intervention (A), placebo (B), and control (C) groups

Group	Mean (SD)			*F**	df	*p*
	Intervention	Placebo	Control			
Age	1.23 (1.04)	1 (1.03)	1.08 (1.09)	0.72	2	>0.05
Number of pregnancy	2.40 (1.81)	2.25 (1.23)	2.32 (1.06)	0.15	2	>0.05
Number of delivery	27.11 (4.90)	28.51 (4.90)	28.25 (5.30)	0.42	2	>0.05

**F*, ANOVA test value

Discussion

Therefore, the present study was aimed to investigate the effect of aromatherapy on depression after delivery in women at risk in 2015. Our findings showed that the mean difference of depression score during 35–37 weeks of pregnancy, 2 and 6 weeks after delivery was significant in the intervention group; however, it was not significant in the placebo and control groups. Mean difference of depression score reduced significantly in the intervention group at 35–37 weeks of pregnancy compared to the placebo and control groups, while the mean difference at 2 and 6 weeks postpartum showed a significant difference in the intervention group compared to the placebo and control groups.

Other researchers, including Seyyed-Rasooli *et al*.,[24] Tayebi *et al*.,[25] Ali *et al*.,[26] Sahebalzamani *et al*.,[23] and Conrad and Adams,[27] have reported some evidence on the effects of aromatherapy on the reduction of depression and stress among research communities of mothers during delivery, students, patients undergoing cholecystectomy, patients undergoing hemodialysis, and the mothers after delivery. The findings suggest that like medications, the aromas could have the similar effects on the nervous system. Lavender and linalool were also able to bind the serotonin transporter (SERT), whereas they did not show affinity for GABAA-benzodiazepine receptor. In three different models of neurotoxicity, lavender did not enhance the neurotoxic insult and improved viability of SH-SY5Y cells treated with hydrogen peroxide. According to our data, the anxiolytic and antidepressant-like effects attributed to lavender may be due to an antagonism on the *N*-methyl-d-aspartate receptor and inhibition of SERT.[28]

Choi (2012) conducted a study on patients with essential hypertension in Korea entitled, "Effects of Aroma Inhalation on Blood Pressure, Pulse Rate, Sleep, Stress, and Anxiety in Patients with Essential Hypertension." These patients were using medications. Forty four patients were randomly assigned to two groups of intervention (n = 20) and control (n = 22). Subjects were intervened by a combination of lavender, Roman chamomile, and marjoram essential oils which were poured into a 10 ml bottle, and the patients placed the bottles at a distance of 10 cm and took deep breaths three times a day (10 am, 14 pm, and before bedtime) for 3 min each time. This intervention lasted for 2 weeks, and the results showed that the aromatherapy had no effect on blood pressure, pulse rate, stress, and anxiety; however, it had effects on sleep. Therefore, these results are not consistent with the results of the present study.[29] This difference is probably due to small sample size, use of medication, short duration of intervention, and the type of combined aromas.

The difference could be attributed to the type of disease. It should be noted that PPD is temporary and it is different from anxiety and depression caused by chronic hemodialysis situation.

Graham *et al*. (2003) also used inhalation aromatherapy for patients undergoing radiotherapy. A combination of lavender, bergamot, and pine-tree essential oils was used in this study. Finally, researcher indicated that inhalation

Table 2: Comparison of frequency distribution of high-risk women demographic characteristics in intervention (A), placebo (B), and control (C) groups

Group	Employment No. (%)	Wanted pregnancy No. (%)	Natural delivery No. (%)	Stress No. (%)	Interested fetal sex No.(%)	No abortion No. (%)
Intervention	30 (88.22)	25 (73.52)	24 (70.63)	24 (70.61)	30 (88.20)	30 (82.40)
Placebo	28 (90.30)	23 (74.21)	23 (74.20)	20 (64.51)	27 (87.11)	24 (77.41)
Control	30 (88.22)	23 (67.60)	22 (74.22)	23 (67.60)	30 (82.40)	27 (79.83)
F	0.198*	0.426**	0.576*	0.273*	0.711**	0.789*
df	_	2	_	2	2	2
p	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05

*Fisher's exact test, **Pearson's Chi-square, *F*, ANOVA test value

Table 3: Comparison of depression score in intervention (A), placebo (B), and control (C) groups in 35-37 weeks of pregnancy and 2 and 6 weeks after delivery

Time	Mean (SD)			Fisher	df	*p*
	Intervention	Placebo	Control			
35-37 weeks of pregnancy	10.37 (3.21)	9.71 (4.20)	10.61 (4.21)	2.214	2	>0.05
2 weeks after delivery	7.80 (3.90)	8.51 (3.61)	11.70 (4.10)	9.412	2	>0.001
6 weeks after delivery	6.80 (3.61)	7.90 (3.30)	9.50 (3.03)	7.813	2	0.01
Fisher	10.213	0.412	0.014			
df	2	2	2			
p	0.001	>0.05	>0.05			

aromatherapy was not effective in reducing depression and anxiety in patients undergoing radiation therapy, and therefore these results are not consistent with the results of the present study.[19]

The reason for this difference may be due to differences in methods.[28] Aromatherapy with lavender essential oil and rose water in this study reduced the depression in women at risk. In this study, aromatherapy was performed on women at risk of depression and this important point has not been considered in previous studies. According to the results of the present study, it seems using aromatherapy has a significant effect on reducing depression after delivery.

As the results show, its effectiveness has been confirmed for PPD and it seems that further investigation is required to explain the cause of this difference in effectiveness. There were some restrictions worth considering. In this study, personal and psychological factors, being satisfied with the fetal sex, number of pregnancies, a history of abortion and stillbirth, and employment status are effective on PPD. In addition, since this study is a randomized clinical trial, these variables are randomly distributed in these three groups; therefore, these limitations are partly controlled by random sampling. Given that the intervention was in the last month, the samples were not willing to cooperate due to the difficult situations of pregnancy and distance problems. As a result, we had to take a taxi for them, and since there were both intervention and placebo groups in this study, and it was possible that subjects who received aroma and those who did not refer on same day and the same hour, therefore, we set specific time for the two groups.

Conclusion

Aromatherapy can be a complementary method to other therapies or can even be used as an alternative. Undoubtedly, its positive effects can be regarded as a useful treatment for those who have negative attitudes toward using chemical drugs and basically for those who choose not to visit a psychiatrist. Moreover, it can reduce individual, family, educational, and social consequences caused by this disease and can prevent the progression of symptoms and severity of these disorders.

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Conflicts of interest

Nothing to declare.

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