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# A comparison of the effect of aromatherapy with Jasmine (Jasminum) and clary sage (Salvia officinalis) on sexual dysfunction in women of reproductive age: A randomized controlled clinical trial

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**Abstract:**

**BACKGROUND:** Sexual dysfunction affects various aspects of life. Aromatherapy is easier and less risky than other methods of taking herbal medicines. Against this backdrop, this study aims to compare the effect of aromatherapy with Jasminum and Salvia officinalis on sexual dysfunction in women of reproductive age.

**MATERIALS AND METHODS:** This triple-blind randomized clinical trial was conducted on 168 women aged 15 to 45 who were referred to Rafsanjan Comprehensive Health Services Center no. 1 from February 2022 to June 2022, using a systematic sampling method. Individuals with an FSFI (Female Sexual Function Index) score of less than 28 were randomly assigned to 4 aromatherapy groups of Jasminum and Salvia officinalis as well as sweet almond (placebo) and control. The aromatherapy groups used the relevant aroma twice a day for 6 weeks, yet the control group received no intervention. After the completion of the intervention, the FSFI questionnaire was filled in once again by all participants. Besides, data analysis was conducted using the SPSS software, Chi-squared test, Fisher's test, ANOVA, Kruskal–Wallis test, Wilcoxon test, and a paired samples *t*-test. In addition, a *P* value less than 0.05 was considered statistically significant.

**RESULTS:** The median (IQR) score of sexual function before the intervention in Jasminum, Salvia officinalis, sweet almond, and control groups was 25.50 (21.27-82.25), 25.80 (20.27-57.50), 25.00 (23.27-10.10), and 25.90 (23.26-92.42), respectively. After the intervention, the score was 28.30 (25.30-60.45), 28.45 (25.31-90.12), 29.00 (27.30-10.80), and 25.35 (23.26-27.32) in the abovementioned groups, respectively. The comparison of the median score of sexual function in the four groups after the intervention showed a statistically significant difference between Jasminum, Salvia officinalis, and sweet almond groups with the control group ($P < 0.001$). Additionally, the effect of Salvia officinalis was higher than that of Jasminum in the domains of mental arousal, lubrication, and sexual pain ($P < 0.0125$).

**CONCLUSIONS:** Both aromas, i.e., Jasminum and Salvia officinalis, were effective in improving sexual dysfunction in women of reproductive age. The effect of Salvia officinalis was better than that of Jasminum in the domains of mental arousal, lubrication, and sexual pain. More studies are recommended to be conducted in this field.

**Keywords:**

Aromatherapy, Jasminum, Salvia officinalis, sexual dysfunction, sweet almond



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## Introduction

Satisfactory sex life is one of the major components of public welfare.[1] Sexual dysfunction is a common medical problem that includes a set of psychological and sexual disorders in women, being related to sexual desire, arousal, orgasm, dyspareunia, and vaginismus.[2-4] Wheeler and Guntupalli[5] estimated its prevalence in women at 20-40%. Likewise, Ghiasi and Keramat (2018)[6] estimated the prevalence of these disorders among Iranian women of reproductive age at 52%. Sexual disorders can have destructive effects on the quality of life, self-confidence, as well as couples' mood and relationships; in addition, the treatment of these disorders will result in more stability of couples' marital life, reduced likelihood of divorce, and increased likelihood of having children.[6,7] The treatment of sexual disorders can be generally classified into general measures, including sex education and relaxation exercises; besides, it can be classified into specific measures, including pharmaceutical measures, non-pharmaceutical measures, or a combination of both. Psychological interventions and various psychotherapies are among the non-pharmacological measures that are likely to be hindered by difficult access to the right therapist, social stigma, and the time-consuming process of consultation.[8,9] Pharmaceutical treatments include systemic or vaginal estrogen, oral ospemifene, bupropion, topical testosterone, and the like, whose effectiveness is not fully known, and their side effects prevent proper acceptance of these treatments among most people.[10-12] Complementary and alternative medicines, including herbal medicines, food supplements, acupuncture, aromatherapy, massage, and acupressure, as well as mind and body techniques, such as meditation, yoga, and the like, are used to prevent diseases and promote individuals' health.[13-15]

Aromatherapy is the targeted use of aromatic oils to promote health,[16] which is used through massage, inhalation, and bathing with mineral and herbal substances.[17] Aromatherapy, compared to other methods of taking herbal medicines, is easier and less risky. Besides, it is used in much smaller volumes, has fewer side effects, and has had higher acceptability in recent years.[18-20] Recent research indicates the positive effect of pleasant aromas on sexual behavior and fertility among humans.[21]

Due to the presence of linalool in its main chemical composition, Jasminum can cause relaxation in the body and mind of an individual.[22,23] Benzyl benzoate, being one of its main compounds, can increase estrogen receptors, thereby leading to increased libido, arousal, pleasure, orgasm, and reduced pain. In fact, Jasminum oil is one of the safest oils.[23-29] According to traditional medicine sources, Salvia officinalis can cause hormonal balance, improve sexual relations, increase desire and arousal, reduce sexual dysfunction, and cause euphoria as it contains phytosterols and bioflavonoids.

Jasminum and Salvia officinalis have a warm nature and enhance sexual desire as well as instincts as they are aphrodisiac.[24,30-34] Due to the effectiveness of Salvia officinalis in reducing depression, regulating hormones, as well as reducing premenstrual syndrome, pain stress, problems, and menstrual cramps, it can be effective in improving sexual performance as well.[35-37] Since there exist different types of Jasminum and Salvia officinalis in Iran, they can be used for these purposes.[38,39] Nsirilari *et al.* (2018),[21] in a review study on aromatherapy in sexual disorders, reported the effectiveness of Jasminum aroma in enhancing sexual desire and potency. Research on the effect of other aromas on sexual performance in postmenopausal women confirms improved sexual performance.[40,41] In the study conducted by Jafari *et al.* (2021), aromatherapy was confirmed to have positive effects on pain during sexual relationships and sexual satisfaction among women of reproductive age.[42]

In the search conducted by the researchers of the present study, no study was found to have investigated the effect of Jasminum and Salvia officinalis on sexual dysfunction among women of reproductive age. Therefore, given the importance of sexual disorders and to provide evidence on recommendations and treatments of traditional medicine, this study was conducted to compare the effect of aromatherapy with Jasminum and Salvia officinalis on sexual dysfunction in women of reproductive age.

## Materials and Methods

### Study design and setting

This triple-blind randomized clinical trial study, with four groups, was conducted from February 2022 to June 2022 on 168 women aged 15 to 45 who were referred to Rafsanjan Comprehensive Health Services Center no. 1.

Taking into account similar studies,[40,43,44] using the formula of the difference of means, given the correction of four 35-participant groups, and considering the possibility of 20% attrition, the sample size was considered at 168 (42 individuals in each group). The inclusion criteria were having Iranian nationality, being married and monogamous, being 15-45 years old, not being pregnant or breastfeeding, having a score less than 28 on the FSFI,[45] having vaginal sex at least once a week, not using narcotic drugs by any of the spouses, having no mental problems or known systemic diseases affecting sexual function in the couples according to the individual's own statement, being healthy regarding the

sense of smell, and having no severe marital conflicts. In the event of unwillingness to continue the study, sensitivity to the aromas, lack of sexual intercourse during the study, contraction of diseases affecting the sense of smell (cold, seasonal sensitivity, and a stuffy nose), occurrence of sudden accidents, and pregnancy during the study, the participants would be excluded from the study [Figure 1].

### Study participants and sampling

Sampling was performed systematically among the women's names registered at the centralized, comprehensive system of Sib and at an interval of 10. The participants were briefed on the purpose of the study via phone call. In case they were eligible and willing to participate in the study, after obtaining their informed consent, they would be randomly assigned to one of the four groups of A, B, C, and D, using randomization. com. Besides, numbers 1 to 168 and the corresponding groups were placed on folded papers inside a box, with each person entering one of the groups by choosing one of the papers. The aromas included Jasminum 50% with a sweet almond base and Salvia officinalis 45% with a sweet almond base. Given the base of the two aromas and to control its effect, sweet almond was used as a placebo in the third group. Although the aromas were not named, they were coded as A, B, and C, which were provided by Dr. Oil Isfahan Company [Figure 1]. Thus, neither the participants, the researcher, nor the statistical consultant was aware of the type of the aroma. The aromas used were not traditional aromas with which people are familiar, which included cinnamon, cardamom, and other typical aromas.

### Intervention

The participants were asked to put two drops of the aroma under their nose twice a day, once in the morning after waking up and once again at night before going to bed for 6 weeks. In addition, they were asked not to wash their face for at least 20 minutes. However, the control group (D) received no intervention. To ensure regular use of the aroma by the participants, they were contacted twice a week; besides, a daily checklist was given to them to put a checkmark each time and hand it in after the intervention. Additionally, at the end of the sixth week, all participants completed the FSFI once more [Supplementary Figure 1].

### Data collection tool and technique

The checklist of demographic characteristics included the participants' age, the spouse's age, the participants' education, the spouse's education, the participants' occupation, the spouse's occupation, the participants' weight, the participants' height, the participants' family income, the length of marriage, the number of children, and the last child's age.

The FSFI questionnaire measured the women's sexual performance regarding the six independent domains of sexual desire, sexual arousal, lubrication, orgasm, satisfaction, and sexual pain, which included 19 questions. The questionnaire was scored on the Likert scale, with scores 0-5 or 1-5 considered for the options of each. The maximum score for each domain was 6, 36 for the whole scale.[46] Besides, the cut-off point for the whole scale was 28, with scores higher than the cut-off point indicating good performance.[45]

Rosen *et al*. reported a Cronbach's alpha coefficient of 0.89 or higher for each of the domains and the whole scale, which is in line with the results of the study conducted by Mohammadi *et al*. in Iran (0.70 or higher).

### Data analysis

After statistical analysis, it was determined that code A was Jasminum, code B was sweet almond (placebo), and code C was Salvia officinalis. The data were analyzed using SPSS software. In addition, qualitative variables were described as frequency and percentage, with quantitative variables being described as mean (SD) or median (IQR). Besides, Chi-squared and Fisher's tests were used for qualitative variables. Furthermore, ANOVA and Kruskal–Wallis tests were used for quantitative variables and intergroup comparisons. Additionally, a paired samples *t*-test and the Wilcoxon test were used for intragroup comparisons. The significance level of the tests was considered at 0.05.

### Ethical consideration

This study is the result of a master's thesis in midwifery. The research plan was approved by the research vice-chancellor of Rafsanjan University of Medical Sciences. The study was registered under code IRCT20160308026971N13 at the Iranian Registry of Clinical Trials. In addition, it was registered under code IR.RUMS.REC.1400.229 at the Ethics Committee of Rafsanjan University of Medical Sciences. All the participants were fully briefed on the study process and were assured that their information would remain completely confidential. In addition, written informed consent was taken from the participants. Furthermore, they were informed that they were free to withdraw from the study at any time they wished.

## Results

Out of the 168 participants who entered the study, 159 people finished it [Figure 1].

To compare the four groups in terms of their age, educational level, occupation, duration of marriage, number of children, and family income, a Chi-squared test was used in case the assumptions were

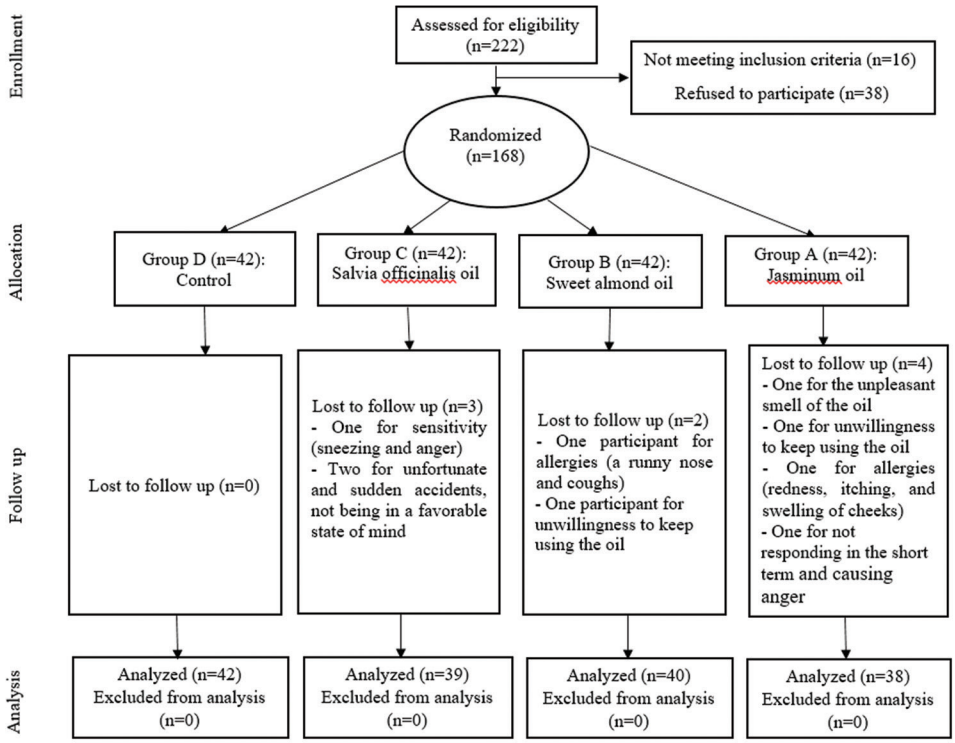


**Figure 1:** The CONSORT flow chart of the study

established (over 20% of the squares might not include a number less than 5); otherwise, a Fisher's test was used. The mentioned tests showed that the four groups were homogeneous in terms of the demographic variables before the intervention ($P > 0.05$) [Table 1].

The pre- and post-intervention scores of sexual function were compared in the four groups. Accordingly, if the assumption of normality was established, the one-way ANOVA would be used; otherwise, if the assumption was not established, the Kruskal–Wallis test would be used. These tests indicated that before the intervention, there was no difference in the mean or median scores in all domains and the total score among the four groups ($P > 0.05$). However, after the intervention, there was a statistically significant difference in the mean or median scores in all areas and the total score among the groups ($P < 0.05$) [Table 2 and Figure 2].

In the comparison between the four groups using the Bonferroni post-hoc test, taking into account the multiple comparison among the four groups, the significance level was considered at 0.0125 instead of 0.05. Accordingly, the comparison results showed a significant difference between the Salvia officinalis group and the control group ($P = 0.005$ and $P = 0.001$) in the domains of mental arousal and lubrication. In addition, there was a difference in the domain of sexual pain between the Salvia officinalis group and the sweet almond group with the control group ($P = 0.001$ and $P = 0.010$). Furthermore, there was a difference between the Jasminum, sweet almond and Salvia officinalis groups with the control group in the domains of desire, orgasm, satisfaction, and total score.

The score of sexual function was compared before and after the intervention in each group. Accordingly, in case the assumption of normality was established, the paired samples *t*-test would be used; otherwise, the Wilcoxon test would be utilized. These tests showed a statistically significant difference in the mean or median score in all domains as well as in the total score in the three groups of Jasminum, sweet almond, and Salvia officinalis after the intervention compared to before it ($P < 0.05$). In the control group, there was no statistically significant difference in the mean or median score in all domains and in the post-intervention total score compared to that in the pre-intervention period ($P > 0.05$) [Table 3 and Figure 3].

## Discussion

This study aimed to compare the effect of aromatherapy with Jasminum and Salvia officinalis on sexual dysfunction in women of reproductive age. Since the two mentioned aromas were based on sweet almond oil, to control the sweet almond effect, the third group received a sweet almond aroma as well. The results indicated that aromatherapy with all three aromas of Jasminum, Salvia officinalis, and sweet almond improved sexual

**Table 1: The studied samples' demographic characteristics**

| Variable | Group A (Jasminum) | Group B (sweet almond) | Group C (Salvia officinalis) | Group D (control) | *P* |
|---|---|---|---|---|---|
| Age (year): Mean±SD | 34.23±7.25 | 35.55±6.42 | 35.48±5.95 | 34.40±6.32 | 0.716* |
| Spouse's age (year): Mean±SD | 39.02±8.61 | 40.05±8.59 | 40.28±6.33 | 39.88±6.97 | 0.900* |
| Duration of marriage (year): Mean±SD | 13.18±8.53 | 13.31±7.75 | 12.60±7.63 | 13.13±7.09 | 0.979* |
| Number of children: Mean±SD | 1.42±1.00 | 1.72±0.90 | 1.74±0.96 | 1.54±0.96 | 0.399* |
| BMI median (IQR) | 27.38 (24.15-29.98) | 25.90 (22.36-29.31) | 25.00 (22.94-27.88) | 25.24 (23.12-28.59) | 0.425** |
| The last child's age: Median (IQR) | 7.00 (4.00-14.00) | 7.00 (4.00-11.50) | 6.00 (3.75-10.50) | 7.00 (4.00-12.00) | 0.839** |
| Educational level no. (%) | | | | | |
| High school diploma and lower | 21 (55.3%) | 15 (37.5%) | 20 (51.3%) | 16 (38.1%) | 0.267*** |
| University degree | 17 (44.7%) | 25 (62.5%) | 19 (48.7%) | 26 (61.9%) | |
| Souse's educational level | | | | | |
| High school diploma and lower | 27 (71.1%) | 23 (57.5%) | 23 (59%) | 25 (59.5%) | 0.591*** |
| University degree | 11 (28.9%) | 17 (42.5%) | 16 (41%) | 17 (40.5%) | |
| Occupation | | | | | |
| Housewife | 22 (57.9%) | 16 (40%) | 21 (53.8%) | 21 (50%) | 0.824**** |
| Office worker | 13 (34.2%) | 19 (47.5%) | 15 (38.5%) | 17 (40.5%) | |
| Self-employed | 3 (7.9%) | 5 (12.5%) | 3 (7.7%) | 4 (9.5%) | |
| Spouse's occupation no. (%) | | | | | |
| Office worker | 14 (36.8%) | 15 (37.5%) | 16 (41%) | 17 (40.5%) | 0.975*** |
| Self-employed | 24 (63.2%) | 25 (62.5%) | 23 (59%) | 25 (59.5%) | |
| Family income no. (%) | | | | | |
| Poor | 2 (5.3%) | 2 (5%) | 2 (5.1%) | 3 (7.1%) | 0.246**** |
| Average | 24 (63.2%) | 21 (52.5%) | 14 (35.9%) | 17 (40.5%) | |
| Good | 12 (31.6%) | 17 (42.5%) | 23 (59%) | 22 (52.4%) | |

*ANOVA, **Kruskal–Wallis test, ***Chi-squared test, ****Fisher's test

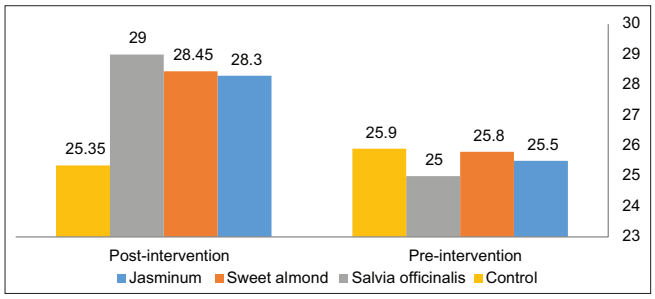


**Figure 2:** Comparison of the sexual function score in the studied groups before and after the intervention

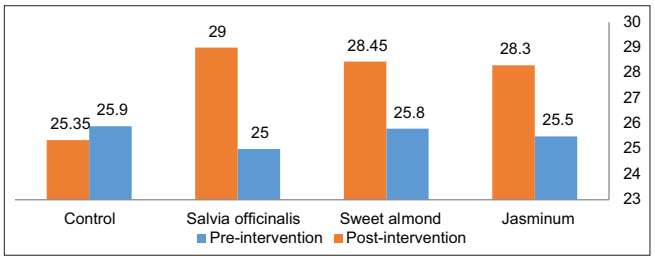


**Figure 3:** Comparison of the sexual function score in the studied groups before and after the intervention

function and all its domains in contrast to the control group ($P < 0.05$). In addition, Salvia officinalis was more effective than Jasminum in terms of mental arousal, lubrication, and sexual pain. Therefore, it can be stated that Salvia officinalis was more effective than the other two aromas in improving sexual dysfunction.

Salvia officinalis has been one of the herbal medicines used for thousands of years to treat various diseases, including female diseases and sexual dysfunction.[47] Linalool, being one of the main compounds of Salvia officinalis,[48] can increase the level of dopamine in the body,[49] with this increase being likely to affect sexual function.[40] Sexual problems cause personal distress and interpersonal problems.[50] In addition, pain associated with sexual intercourse can cause discomfort. Furthermore, women with sexual pain are at an increased risk of sexual dysfunction, relationship distress, reduced quality of life, as well as anxiety and depression.[51] Thus, Salvia officinalis can be used for Jasminum and sweet almonds as it is less expensive than both of them.

In the study conducted by Zeidabadi *et al.* (2020), Salvia officinalis extract was effective in relieving menopausal symptoms, including sexual problems,[52] being in line with the results of the present study. In the study conducted by Kusuma *et al.* (2022), the effect of aromatherapy with Jasminum on reducing labor pain was investigated.[53] Similarly, in the study of Nourimonfared *et al.* (2022), the effect of aromatherapy with Salvia officinalis essential oil on reducing labor pain was studied.[54] In the study conducted by Ghiasi *et al.* (2017), the effect of Salvia officinalis and Jasminum essential oil on reliving labor pain was investigated.[55] In the present study, Jasminum and Salvia officinalis

**Table 2: Comparison of the sexual function score and its domains in the studied women before and after the intervention (intergroup comparison)**

| Variable | Pre-intervention | | | | | Post-intervention | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean±SD/ Median (IQR) Jasminum group | Mean±SD/ Median (IQR) Sweet almond group | Mean±SD/ Median (IQR) Salvia officinalis group | Mean±SD/ Median (IQR) Control group | *P* | Mean±SD/ Median (IQR) Jasminum group | Mean±SD/ Median (IQR) Sweet almond group | Mean±SD/ Median (IQR) Salvia officinalis group | Mean±SD/ Median (IQR) Control group | *P* |
| Desire | 3.12±0.93 | 3.07±0.75 | 3.26±0.92 | 3.22±0.73 | 0.735* | 3.90 (3.45-4.35) | 3.60 (3.60-4.65) | 3.60 (3.60-4.80) | 3.60 (2.40-3.60) | <0.001** |
| Arousal | 3.41±0.82 | 3.42±0.96 | 3.46±0.93 | 3.63±0.90 | 0.672* | 4.12±0.83 | 4.12±0.73 | 4.19±0.80 | 3.60±0.69 | 0.002* |
| Lubrication | 4.23±0.72 | 4.13±0.91 | 4.33±0.86 | 4.44±0.66 | 0.338* | 4.80 (4.42-5.40) | 4.80 (4.20-5.10) | 5.10 (4.50-5.40) | 4.50 (3.90-4.80) | 0.001** |
| Orgasm | 4.80 (3.90-5.20) | 4.40 (3.60-4.80) | 4.40 (3.60-4.40) | 4.40 (4.00-4.80) | 0.070** | 5.20 (4.80-6.00) | 4.80 (4.40-5.60) | 5.20 (4.80-5.60) | 4.40 (4.00-4.80) | <0.001** |
| Satisfaction | 4.20 (3.60-4.80) | 4.60 (3.60-4.80) | 4.40 (3.60-4.80) | 4.20 (3.60-4.80) | 0.616** | 4.96±0.78 | 5.11±0.68 | 5.02±0.77 | 4.07±0.63 | <0.001* |
| Pain | 4.80 (4.00-6.00) | 5.20 (4.00-6.00) | 5.20 (4.00-6.00) | 4.80 (4.40-5.60) | 0.775** | 5.60 (4.70-6.00) | 5.80 (4.80-6.00) | 6.00 (5.20-6.00) | 5.20 (4.70-5.60) | <0.001** |
| Total score | 25.50 (21.82-27.25) | 25.80 (20.57-27.50) | 25.00 (23.10-27.10) | 25.90 (23.92-26.42) | 0.998** | 28.30 (25.60-30.45) | 28.45 (25.90-31.12) | 29.00 (27.10-30.80) | 25.35 (23.27-26.32) | <0.001** |

*One-way ANOVA, **Kruskal–Wallis test

**Table 3: Comparison of the sexual function score and its domains in the studied women before and after the intervention (intragroup comparison)**

| Variable | Group A Jasminum (38 participants) | | | Group B Sweet almond (40 participants) | | | Group C Salvia officinalis (39 participants) | | | Group D Control (42 participants) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre-intervention Mean±SD/ Median (IQR) | Post-intervention Mean±SD/ Median (IQR) | *P* | Pre-intervention Mean±SD/ Median (IQR) | Post-intervention Mean±SD/ Median (IQR) | *P* | Pre-intervention Mean±SD/ Median (IQR) | Post-intervention Mean±SD/ Median (IQR) | *P* | Pre-intervention Mean±SD/ Median (IQR) | Post-intervention Mean±SD/ Median (IQR) | *P* |
| Desire | 3.00 (2.40-3.60) | 3.90 (3.45-4.35) | <0.001** | 3.00 (2.40-3.60) | 3.60 (3.60-4.65) | <0.001** | 3.60 (3.00-3.60) | 3.60 (3.60-4.80) | <0.001** | 3.60 (2.85-3.60) | 3.60 (2.40-3.60) | 0.609** |
| Arousal | 3.60 (2.92-4.20) | 4.20 (3.60-4.80) | <0.001** | 3.30 (2.70-4.20) | 4.05 (3.60-4.80) | <0.001** | 3.90 (2.70-4.20) | 4.20 (3.60-4.80) | <0.001** | 3.60 (3.00-4.50) | 3.60 (3.30-3.90) | 0.828** |
| Lubrication | 4.23±0.72 | 4.73±0.75 | <0.001* | 4.13±0.91 | 4.71±0.67 | <0.001* | 4.33±0.86 | 4.96±0.72 | <0.001* | 4.44±0.66 | 4.37±0.68 | 0.447* |
| Orgasm | 4.45±0.96 | 5.11±0.84 | <0.001* | 4.08±0.98 | 4.90±0.69 | <0.001* | 3.96±0.95 | 5.00±0.86 | <0.001* | 4.25±0.87 | 4.24±0.70 | 0.924* |
| Satisfaction | 4.18±0.79 | 4.96±0.78 | <0.001* | 4.31±0.88 | 5.11±0.68 | <0.001* | 4.09±0.85 | 5.02±0.77 | <0.001* | 4.11±0.81 | 4.07±0.63 | 0.605* |
| Pain | 4.80 (4.00-6.00) | 5.60 (4.70-6.00) | 0.001** | 5.20 (4.00-6.00) | 5.80 (4.80-6.00) | <0.001** | 5.20 (4.00-6.00) | 6.00 (5.20-6.00) | <0.001** | 4.80 (4.40-5.60) | 5.20 (4.70-5.60) | 0.056** |
| Total score | 25.50 (21.82-27.25) | 28.30 (25.60-30.45) | <0.001** | 25.80 (20.57-27.50) | 28.45 (25.90-31.12) | <0.001** | 25.00 (23.10-27.10) | 29.00 (27.10-30.80) | <0.001** | 25.90 (23.92-26.42) | 25.35 (23.27-26.32) | 0.484** |

*Paired sample *t*-test, **Wilcoxon test

reduced sexual pain, and regarding their effect on pain, the aforementioned studies were in line with the present one.

Regarding the mechanism of the effect of good aromas on sexual function, it has been stated that chemicals in aromas bind with the receptor of the olfactory bulb, thereby affecting the limbic system.[56] The follow-up release of neurotransmitters, such as enkephalin and endorphins, leads to reducing pain and anxiety.[57] Besides, they are likely to affect sexual performance in this manner. Additionally, according to the literature, endorphins can affect sexual function as they may play a role in regulating the secretion of sex hormones, prolactin, and growth hormone.[58]

In a review study conducted by Nsirilari *et al.* (2018) on the effect of aromatherapy in Iranian medicine on sexual function, the positive effect of warm scents, such as Jasminum, on sexual desire was reported; accordingly, it was concluded that the recommendations of Iranian medicine on the use of aromatic substances in treating disorders of the reproductive nervous system could be regarded as the basis of clinical studies in this field.[21] The present clinical study was consistent with the aforementioned one; besides, its results confirmed the findings of the review study conducted by Nsirilari and other sources of Iranian medicine on the effect of the Jasminum aroma as a warm scent on sexual function.

Research indicates an increase in the concentration of saliva oxytocin, known as the love hormone, following aromatherapy with Jasminum and Salvia officinalis essential oils in postmenopausal women[59]; furthermore, they were reported to have positive effects on sexual function.[58]

In the study conducted by Jafari *et al.* (2021), the effect of inhaling the essential oil of silver berries on reducing dyspareunia and increasing sexual satisfaction was reported.[42] In the study conducted by Malakouti *et al.* (2016), combined aromatherapy improved all domains of sexual function, except pain.[40] In the systematic review by HW Lee *et al.* (2021), the effectiveness of aromatherapy with lavender, Neroli, and a combination of both in improving menopausal symptoms, including libido, was reported as well.[60] Linalool is the common compound in the aromas used in the aforementioned studies and Jasminum; in addition, the sedative, anti-depressant, and immune-boosting properties of linalool could be the cause of the effectiveness of these herbs in improving sexual problems.[22,27,61,62] Accordingly, the findings of these studies were consistent with those of the present one. However, in the present study, in contrast to the study conducted by Malakouti *et al.* (2016), all domains of sexual disorders improved. This difference could have been due to the difference in the study population.

Sexual satisfaction and proper sexual function play a critical role in improving women's health and quality of life.[63] Sexual disorders are common among women, which apart from leading to individual and interpersonal stress, they can cause other medical, psychological, or social problems significantly affecting women's health.[64] Thus, it is necessary to conduct studies in this field. Aromatherapy is a rapidly growing complementary therapy worldwide, and recent scientific findings confirm the positive effect of pleasant aromas on sexual behavior among humans.[21,65]

The positive effect of Jasminum and Salvia officinalis aromas on the sexual cycle has been mentioned theoretically in several sources.[15,21] However, no study was found on this subject in clinical trials. Therefore, this study was innovative in providing evidence on recommendations and treatments of traditional medicine concerning the effect of Jasminum and Salvia officinalis aromas on sexual disorders, which is considered its strength.

### Limitation

One of the limitations of this study was the inability to control multiple individual, mental, and psychological factors affecting sexual function. We tried to minimize these factors by performing random allocation and meeting the inclusion criteria. Another limitation of this study was the inability to blind the control group to receive no intervention.

## Conclusions

Both Jasminum and Salvia officinalis aromas were effective in improving sexual dysfunction among women of reproductive age. The effect of Salvia officinalis was better than that of Jasminum in the domains of mental arousal, lubrication, and sexual pain. It is recommended that further studies be conducted on this subject.

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### Ethics approval and consent to participate

Ethics approval and consent to participate. The research plan was approved by the research vice-chancellor of Rafsanjan University of Medical Sciences. The study was registered under code IRCT20160308026971N13 at the Iranian Registry of Clinical Trials. In addition, it was

registered under code IR.RUMS.REC.1400.229 at the Ethics Committee of Rafsanjan University of Medical Sciences. All the participants were fully briefed on the study process and were assured that their information would remain completely confidential. In addition, written informed consent was taken from the participants. Furthermore, they were informed that they were free to withdraw from the study at any time they wished.

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## Conflicts of interest

There are no conflicts of interest.

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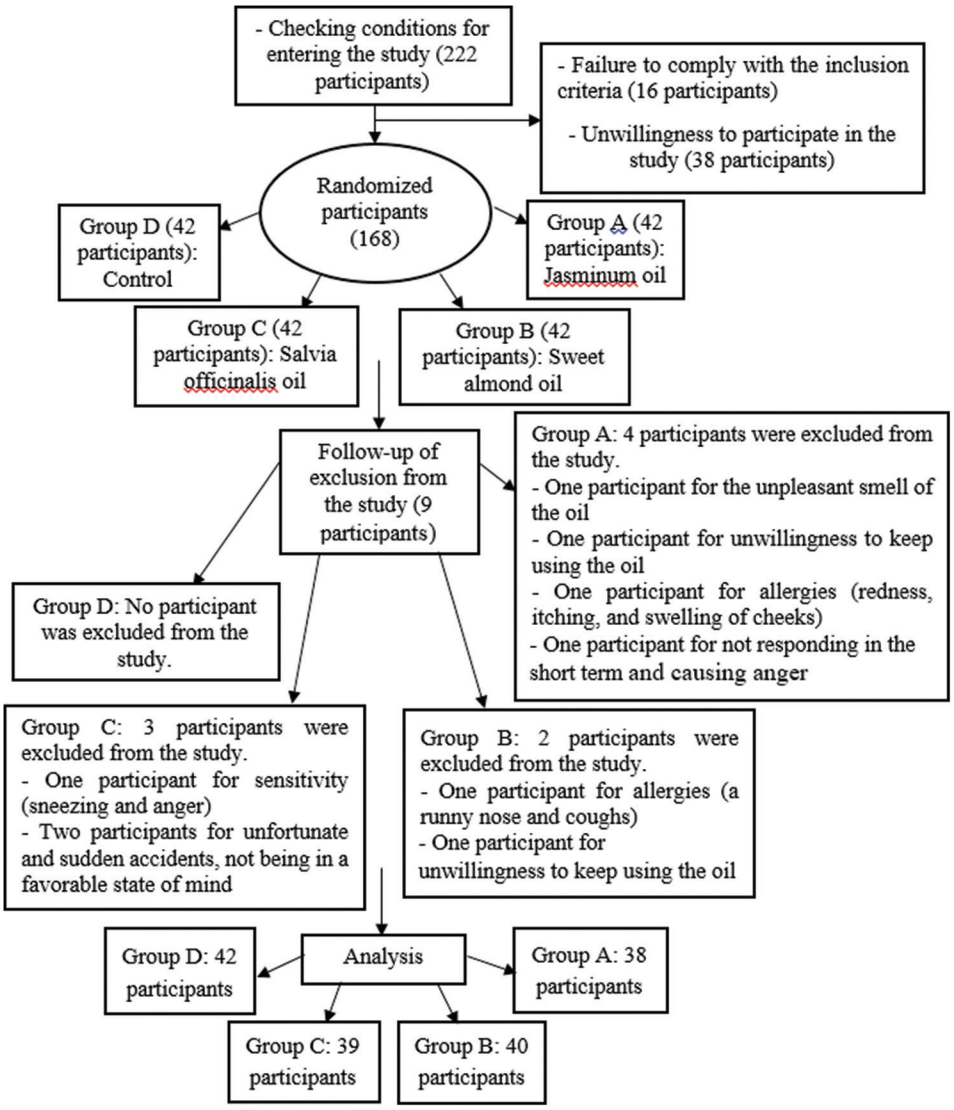


**Supplementary Figure 1:** The CONSORT flow chart of the study