Original Article

Effects of Aromatherapy With Citrus Aurantium Lavender on Sexual Function of Postmenopausal Women: A Randomized Controlled Trial

Zahra Abbaspoor; Ph.D.[1], Foruzan Sharifipour; M.Sc.[1], Amir Siahposh; Ph.D.[2], Roghayeh Nazaralivand; M.Sc.[3], Zeynab Mohaghegh; M.Sc.[4], Shahla Faal Siahkal; M.Sc.[4]

1 Department of Midwifery, Menopause Andropause Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
2 Medical Plants Research Center, Department of Pharmacology, School of Pharmacy, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran
3 Romeshgan Health Network, Lorestan University of Medical Sciences, Ilam, Iran
4 Midwifery Department, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Received January 2022; Revised and accepted April 2022

Abstract

Objective: The purpose of this study was to explore the effectiveness of aromatherapy with Citrus aurantium Lavender on the sexual function of postmenopausal women.

Materials and methods: A randomized controlled trial with single-blind design was conducted on eighty postmenopausal women in Ahvaz, Iran from January to December 2019. The women were randomly assigned to the Citrus aurantium group (n=40) and placebo group (n=40). The intervention group received two drops of Citrus aurantium essential oil twice a day, for four consecutive days a week, for four weeks as inhalation. Similarly, placebo was received by the control group.

Results: The results of this study revealed that in the intervention group, the FSFI total score and all of its dimensions were significantly improved compared to the control group.

Conclusion: Aromatherapy using Citrus aurantium can be used as an alternative or complementary method for improvement of sexual function in postmenopausal women. It is recommended that the postmenopausal women suffering from sexual dysfunction be informed on the aromatherapy by Citrus aurantium essential oil.

Keywords: Aromatherapy; Citrus; Sexual Behavior; Postmenopause

Introduction

Menopause is a natural biological process affecting the lives of all women (1). Due to science and medical advances average life expectancy is rising. It is well known that women live longer than men, and the average life span of women in developed countries is more than 80 years (2). In the world, the population of menopausal women will reach to 1,200,000,000 by the year 2030, with an annual increase of 47 million new cases per year (3). After menopause, women due to lack of sexual hormones experience many changes such as hot flashes, palpitations, depression, anxiety, sleep disturbances,

Correspondence:
Foruzan Sharifipour
Email: sharifipour_fr91@yahoo.com

sexual problems, myalgia and cardiovascular diseases. The most common issue among them is that of sexual disorders (4). The prevalence of sexual dysfunction among postmenopausal women is 4 times of women of childbearing age (5). A dramatic decline in both circulating estrogen and androgen levels during natural menopause period led to decrease vaginal blood flow that can render vaginal dryness, dyspareunia, and decreased mental-sexual energy (6). In Iran, it was reported that the rate of sexual dysfunction in postmenopausal women is 72.4 percent (7). Vulvar and vaginal atrophy (VVA) has negative impact on quality of life and sexual function in postmenopausal women (8). In earlier times, one of the prevalent recommended remedies was hormone replacement therapy (HRT) to relieve the observed menopausal signs. Despite significant evidence of the benefits of HRT, common reportedly adverse effects such as breast cancer, thrombosis, stroke (9) led to the switch to complementary and alternative medicine including music therapy, touch therapy, aromatherapy, sedation, and acupuncture, have been proposed to remove sexual dysfunction problems that are less expensive, have no side effects, or have few side effects (10). One of these treatments is aromatherapy, which is simple, safe and inexpensive. Aromatherapy is the practice of using extracted aromatic plant oils and materials through inhalation or oral and topical administration by bathing, compressing and massaging (11). A number of herbal aromatic essential oils such as fennel, angelica, sage, Citrus aurantium, lavender, and geranium contains phytoestrogens release various neurotransmitters (endorphins, noradrenalin and serotonin) by activating nerve cells, which affect human emotions. It can be effective in reducing climacteric symptoms such as hot flashes, sexual dysfunction and depression (12, 13). Citrus aurantium essential oil belongs to the family of citrus, is one of the forms of aromas with sedative properties and widely used properties and is today known as neroli oil (14). It has antidepressant, antiseptic, antispasmodic, sexual desire enhancing and sedative properties, and no specific side effects have been reported (15). According to the findings of multiple researches, lavender aromatherapy improves sexual function and quality of life among postmenopausal women (16-18). Also, a systematic review reported that Lavender alone or in combination with other aromas may lead to improve the physical and psychological symptoms of menopausal (19). The result of a study showed that sexual function in lactating women improved 40 days after aromatherapy with rose, fennel, lavender, geranium and orange essential oil (20). In another study, it was found that the aromatherapy with Citrus aurantium improves quality of life and reduces postmenopausal women's stress (21).

Given the growing population of postmenopausal women and the relatively high prevalence of sexual dysfunction among them, it is necessary to use non-pharmacological interventions to manage sexual dysfunction due to their low side effects. To the best of our knowledge, no study has yet assessed the effects of Citrus aurantium aroma on the sexual function in postmenopausal women. Therefore, this study designed to investigate the effect of aromatherapy using Citrus aurantium on postmenopausal women's sexual function.

Materials and methods

Design study: A single-blind RCT

Participants and setting: Postmenopausal women who met the acceptance criteria and referred to two health centers in Ahvaz, Iran were recruited from Feb to Dec 2019. The inclusion criteria were; age of 45- 60 years, menstrual cessation for at least 12 months, the score ≤ 28 from the sexual function questionnaire, ability to read and write, be married and living with a spouse, no mental and physical diseases, no smoking, no drinking alcohol, no history of allergic rhinitis or a known respiratory problem such as asthma, no experience of stressful events (divorce, death of first-degree family members, etc.) during the 6 months prior to the study, and available health records in the health care center. The exclusion criteria were being unwilling to continue participation, and not completing the intervention course for any reasons.

Defining sample size: The sample size was estimated based on a previous study in which the effect of combined inhalation aromatherapy (Lavender, fennel, geranium and rose) on sexual function of menopause women was investigated. The after intervention mean and standard deviation of sexual function total score in the control and the intervention groups were 17.2 ± 4.2 and 22.9±0.4 respectively (17). Considering β= 0.1, α= 0.01, $\mu1$= 1.4, $\mu2$= 4.4, S1= 4.2, and S2 = 0.4, 31 participants in each of the Citrus aurantium and placebo groups was planned to provide 80% power to detect a mean difference in the primary outcome (FSFI score).

$$N = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2 \times (s_1^2 + s_2^2)}{(\mu_1 - \mu_2)^2}$$

With adding 20% attrition size, a total of 40 participants were estimated for each group. During the intervention period, 5 participants dropped out of this study. Therefore, a total 75 participants successfully completed this study. The reasons for withdrawing are listed in Figure 1.

Randomization and Blinding: The block randomization method was used in the study. A statistician determined the allocation sequence to generate random serial numbers by computer using a table of random numbers with a block size of 6 and a 1:1 allocation ratio. Each serial number was put in an opaque envelope, and the participants who signed the consent form obtained an envelope and opened it alone, which determined if the participant was in the intervention or the control group. The research assistant who assisted in the production of serial numbers was not involved in recruitment, intervention, or data collection. In addition, the statistician who performed the data analysis did not participate in recruitment, intervention or data collection.

Measures

1- Socio-demographic data: The socio-demographic data included age, age of menopause, the duration of menopause, educational level, body mass index, monthly income, number of children and occupational status.

2- Female Sexual Function Index (FSFI): The FSFI questionnaire consisted of 19 questions, each rated on a scale ranging from 0 to 5 or 1 to 5, with 0 indicating no sexual activity in the past month (Table 1) (22). Scores were measured in standard fashion for each of the six domains by adding individual domain query scores and multiplying by the domain factor. For example, 0.6 for desire, 0.3 for arousal and lubrication, and 0.4 for orgasm, satisfaction, and pain. The total FSFI score is the sum of the scores for the six individual domains. In a population of premenopausal and postmenopausal women, a cumulative potential score of 36, 26.55 or less is known to represent sexual dysfunctions (23). Rosen et al verified the validity and reliability of the FSFI questionnaire that average scale reliability was 0.88, and 0.79 to 0.8620 for subscales (22).

Procedure: After receiving approval from the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences, the researcher referred to two health centers for data collection. Eligible postmenopausal women were randomly assigned in to Citrus aurantium (n = 40) and placebo (n = 40) groups and completed questionnaires to build the baseline data. Women were taught how to use aromatherapy .One of the researchers made phone calls to the participants to make sure of the correct usage and check for any adverse effect.

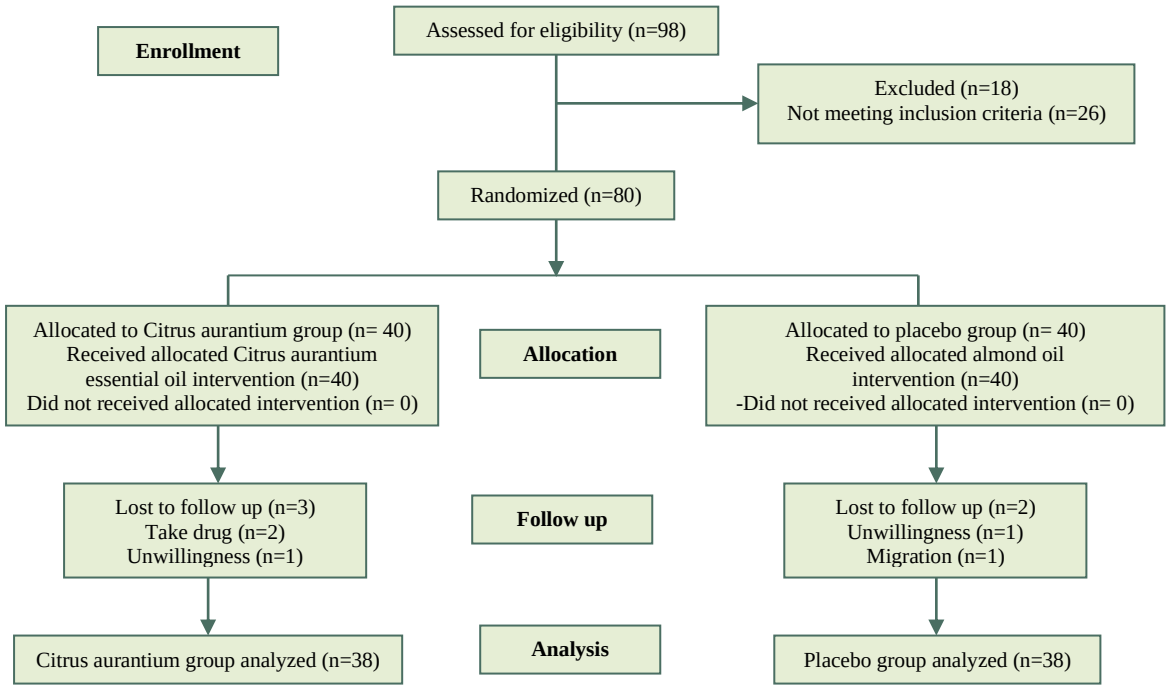

Figure 1: The CONSORT chart of the study

Table 1: Female Sexual Function Index scoring system[a]

Domain	Questions	Score range	Factor	Minimum score	Maximum score
Desire	1,2	1-5	0.6	1.2	6
Arousal	3,4,5,6	0-5	0.3	0	6
Lubrication	7,8,9,10	0-5	0.3	0	6
Orgasm	11,12,13	0-5	0.4	0	6
Satisfaction	14,15,16	0 (or1)-5	0.4	0	6
Pain Reduction	17,18,19	0-5	0.4	0	6
Full scale score range	-	-	-	2	36

a: A domain score of zero indicates that no sexual activity was reported during the past month.

After the four-week intervention, post-tests were conducted to collect the same data as the baseline test to understand the effects of the intervention. Resulting in a total of two data collection time points.

Aromatherapy intervention: Women in the Citrus aurantium and placebo groups were requested to put 2 drops of essential oil of Citrus aurantium 10% or almond oil on their (left or right) forearm skin to receive it as inhalation, twice a day (10 a.m. and 10 p.m.), for 4 consecutive days per week, and continued it for 4 weeks. Each woman was instructed to be in a comfortable position and place her forearm 30 cm away from her nose and inhale the fragrance for five minutes with normal breathing as reported by Malakuty et al. (17). Essential oil of Citrus aurantium 10% was purchased from a pharmaceutical research center in Tehran (Iran) and approved by the Faculty of Pharmacy of Ahvaz Jundishapur University of Medical Sciences. Odorless almond oil, diluted with propylene glycol was purchased from a medicinal herbs market in the city of Kermanshah (Iran). Based on previous studies, almond oil was used in the control group (24, 25).

The Citrus aurantium and almond oil were kept in identical containers by a pharmacist. The concentration of essential oil was 10%, namely 10 mg of Citrus aurantium essential oil in 100 ml of odorless almond oil and diluted with propylene glycol. Propylene glycol maintained the stability of the essential oil. The amount of essential oil required for a 4-week intervention was provided to the participants at the beginning of the study and stored in the containers like dropper.

Statistical analyses: The data analyses were performed using the SPSS software, version 22 (SPSS, Chicago, Illinois, USA). The statistical level of significance was set at $p<0.05$. The mean and standard deviation were used to describe the quantitative variables, whereas percentages and frequency were used to describe the qualitative variables. Using Kolmogorov Smirnov test, normality of distribution of numeric variables was calculated. An independent t-test or Mann-Whitney U test was used to determine the differences between the two groups. Paired t-test was used for assessing within-group changes for values with normal distribution. Since confounding factors (i.e., age, before intervention values, menopausal age, the duration of menopause, educational level, body mass index, monthly income, number of children and occupational status) could affect the results, we adjusted the analysis for these parameters by analysis of covariance (ANCOVA) test. Socio-demographic characteristics of the study population were compared using an independent t-test, Mann-Whitney and fisher's exact test.

Ethical consideration: Written and verbal consent from the individuals after explaining the aim of the study were obtained in order to perform the study. The participant is informed about the aromatherapy and her consent is obtained. Researcher emphasized that all participants should report any adverse effect either by telephone.

Results

Socio-demographic characteristics of the study population are listed in Table 2. There was no significant difference between the two groups in terms of socio-demographic characteristics.

As shown in table 3 and figures 2 and 3, FSFI total and domains scores were significantly upper in the intervention group than in the placebo group ($P<0.001$). Women who received Citrus aurantium aroma had a significantly greater improvement in the FSFI total score and all six its domains compared to women who received placebo. A significant increscent was also observed in the Citrus aurantium aroma group, compared to the placebo after intervention after adjusting for the potential confounders.

Table 2: Socio-demographic characteristics of Citrus aurantium and placebo groups

Characteristics of participants	Placebo (n=38) M±SD Or N(%)	Citrus aurantium (n=37) M±SD Or N(%)	P -value
Age(year)	54.9±4.41	53.75±4.19	P=0.236*
Menopausal age (year)	51.85±2.85	51.07±2.59	P= 0.207*
The duration of menopause (month)	34.4±36.53	31.62±31.75	P=0.424**
BMI(cm/m²)	28.08±3.93	27.39±5.1	P=0.496*
Education level			P=0.369***
Less than diploma	60 (23)	23(62)	
Diploma	13(34)	9(2)	
University	2(5)	5(13)	
Number of children			P=0.696***
0-2	5(13)	3(8)	
3-4	23(60)	28(75)	
>5	10(26)	6(16)	
Monthly income			P= 0.588***
Weak	5(13)	4(10)	
Moderate	21(55)	25(67)	
Good	12(31)	8(75)	
Occupational status			P=0.309***
Employee	3(8)	6(16)	
Homemaker	35(92)	31(84)	

Note: M: mean; SD: standard deviation; BMI: body mass index.
* Independent t-test, **Mann-Whitney U test, ***fisher's exact test

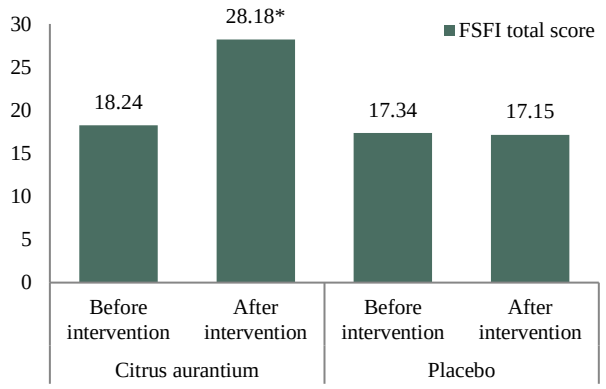

Figure 2: Change from before intervention to after intervention in the Female Sexual Function Index (FSFI) total score in the Citrus aurantium and placebo groups. *P< 0.0001 compared with placebo. Values are expressed as mean ± SEM.

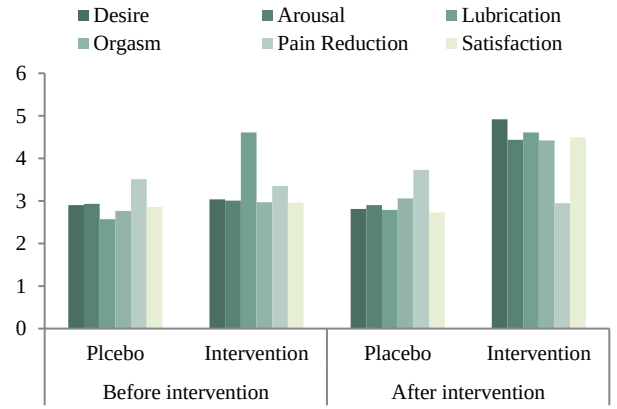

Figure 3: Change from before intervention to after intervention in the Female Sexual Function Index (FSFI) domains score in the Citrus aurantium and placebo groups. Values are expressed as mean ± SEM.

After 4-week intervention according to paired t-test results, there was no significant difference before and after intervention in the placebo group (P=0.225) whereas, there was a significant difference before and after intervention in the Citrus aurantium group (P<0.001). The Citrus aurantium aroma group did not show critical adverse effects compared with the placebo group.

Discussion

In this study, the effect of Citrus aurantium on the sexual function of postmenopausal women was examined and it was shown that using Citrus aurantium essential oil can increase the overall score of sexual function and improve all its dimensions, including the desire to have sex, vaginal lubrication, sexual arousal, sexual satisfaction and pain reduction during intercourse in postmenopausal women.

Table 3: Mean of FSFI total and domains score in the Citrus aurantium and placebo groups at before and after intervention

Variables		Citrus aurantium (n=37) M±SD	Placebo (n= 38) M±SD	P – value	Adjusted MD(CI95%),P
FSFI total	Before	18.24±1.75	17.34±1.89		10.51(9.7-11.33), P<0.001***
	After	28.18±2.34	17.15±1.68		
Desire	Before	3.04±0.8	2.9±0.53	P = 0.38	1.98(1.35-2.6)), P<0.001***
	After	4.92±1.14	2.81±0.67	P < 0.0001*	
Arousal	Before	3.01±0.52	2.93±.053	P=0.34**	1.44(0.976-1.91)), P<0.001***
	After	4.44±0.96	2.9±.061	P<0.0001*	
Lubrication	Before	2.72±0.55	2.57±0.46	P=0.26**	1.73(1.35-2.12)), P<0.001***
	After	4.61±0.95	2.79±0.34	P<0.0001**	
Orgasm	Before	2.97±0.6	2.77±0.47	P=0.124*	1.37(0.879-1.88)), P<0.001***
	After	4.42±0.89	3.06±0.61	P<0.0001**	
Pain Reduction	Before	3.35±0.76	3.51±0.74	P=0.139*	1.42(0.932-1.91)), P<0.001***
	After	2.95±0.58	3.73±1.02	P<0.0001**	
Satisfaction	Before	0.45± 2.96	2.86±0.45	P=0.33*	1.71(1.28-2.14)), P<0.001***
	After	0.91±4.5	2.73±0.43	P <0.0001**	

Note: M: mean; SD: standard deviation.
* Independent t-test, **Mann-Whitney U test, ***ANCOVA test, adjusted for age, before intervention values, menopausal age, duration of menopause, education level, BMI, monthly income, number of children and occupational status.

Limonen and Mycrene in Citrus aurantium, reduces anxiety by having inhibitory effects on the central nervous system (26) and Linalool increases dopamine and noradrenaline levels (27). Linalol and Linanil acetate are also able to stimulate the parasympathetic system (28). This can be the mechanism of its possible effect on sexual function. Aromatherapy increases sexual desire, reduces anxiety and depression by reducing the release of stress hormones and increasing beta-endorphins in the body (29). There were few studies in the literature where aromatherapy was applied to sexual function. Hur et al. by studying 25 postmenopausal women in Korea have showed that aromatherapy massage decreases menopausal symptoms including hot flashes, depression, and pain (30). In this study, the aromatherapy was applied topically to subjects in the form of massage on the abdomen, back and arms using lavender, rose geranium, rose and jasmine in almond and primrose oils once a week for 8 weeks. The researchers suggested that aromatherapy massage may be an effective treatment of menopausal symptoms such as hot flushes, depression and pain in climacteric women. However, it could not be verified whether the positive effects were from the aromatherapy, the massage or both. This result is consistent with the findings of the present study; despite the differences in the type of questionnaires used, and differences in the type and manner of drug administration, aromatherapy improved the menopausal symptoms.

In a study on 120 postmenopausal women, the intervention group inhaled 2-3 drops of aroma solution (lavender, fennel, geranium and rose) three times a day for 6 weeks on the forearm and the control group also used a placebo containing propylene glycol in the same way as the intervention group. The findings showed that the overall score of sexual function in the two intervention and control groups was 18 ±5.4 and 15.8 ± 5.7, respectively, which increased to 22.9±0.4 after the intervention group and to17.2 ± 4.2 in the placebo group (P>0.001). Based on the results of this study, there was a statistically significant difference in the overall score of sexual function in the aromatherapy group compared to the control group (17), which was consistent with the results of the present study. However, in our study, the Citrus aurantium essential oil was used.

The odor of essential oil is believed to activate olfactory neurons that stimulate the limbic system, and neurons release various neurotransmitters such as enkephalin, endorphins, noradrenaline, and serotonin, depending on the type of aroma (30).

In a study conducted on 63 healthy postmenopausal women, the effect of aromatherapy with Citrus aurantium on menopausal symptoms, stress and estrogen levels were determined (21). In this study, the two intervention groups received one milliliter Citrus aurantium essential oil 0.5% and

0.1%, respectively for 5 consecutive days, twice a day, on a pad and inhaled it, and the control group used a placebo containing the almond oil in the same way as the intervention groups. Menopause-related symptoms, as determined by the Menopause-Specific Quality of Life Questionnaire (MENQOL); sexual desire visual analog scale (VAS); serum cortisol and estrogen concentrations, and stress (VAS), were measured before and after inhalation. According to their results, compared with the control group, the two neroli oil groups showed significant improvements in the physical domain score of the MENQOL and in sexual desire. Although, the serum cortisol and estrogen levels between the three groups were not significantly different. The final result of this study was that aromatherapy could increase sexual desire and improve the quality of life of postmenopausal women, which is consistent with the results of the present study, with the difference that in this study the MENQOL questionnaire was used to determine the quality of life of postmenopausal women and VAS was used to determine stress and sexual desire, but in the present study, researchers examined the effect of Citrus aurantium on the sexual function of postmenopausal women with the FSFI questionnaire.

The results of another study showed that inhalation of lavender, for 20 minutes twice a day for 12 weeks, improved the sexual desire in among the menopausal with complaint of hot flash. This result is in line with those of the present study; however, the participants in the present study did not suffer from any mental or physical diseases and inhaled 2 drops of essential oil of Citrus aurantium, twice a day for 4 consecutive days in a week, and continued it for 4 weeks (16).

The first limitation of this study was that we did not assess the causes and duration of sexual dysfunction that could affect the sexual function of women. Furthermore, we studied only the short-term effects of aromatherapy. On the other hand, this study was the first to assess the effect of Citrus aurantium aroma on the sexual function in postmenopausal women. Also, the random allocation of subjects to avoid selection bias and the use of blinding method to reduce the risk of bias during data collection were the other strengths of the study.

Conclusion

The results showed that the aromatherapy with Citrus aurantium improves sexual function of postmenopausal women. Health care providers should be aware of the benefits of Citrus aurantium in reduction of sexual dysfunction, so that they can recommend its use while counseling postmenopausal women. However, further clinical trials with longer follow-up periods and on participants with physical diseases are needed to confirm these findings.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

This article is the result of a research project with number MARC-9801 and is financially supported by Ahvaz Jundishapur University of Medical Sciences. It registered in the Iranian registry for randomized controlled Trials (Ref No: IRCT20160427027633N5). We would like to thank all of the participants in the study.

References

1. Ghazanfarpour M, Kaviani M, Abdolahian S, Bonakchi H, Najmabadi Khadijeh M, Naghavi M, et al. The relationship between women's attitude towards menopause and menopausal symptoms among postmenopausal women, Gynecol Endocrinol 2015; 31: 860-5.
2. Comhaire FH, Depypere HT. Hormones, herbal preparations and nutriceuticals for a better life after the menopause: part I. Climacteric 2015; 18: 358-63.
3. Geller SE, Studee L. Contemporary alternatives to plant estrogens for menopause. Maturitas. 2006;55 Suppl 1: S3-13.
4. Collins Fantasia H, Sutherland MA. Hormone therapy for the management of menopause symptoms. J Obstet Gynecol Neonatal Nurs 2014; 43: 226-35; quiz E18-9.
5. Blumel JE, Castelo-Branco C, Binfa L, Gramegna G, Tacla X, Aracena B, et al. Quality of life after the menopause: a population study. Maturitas 2000; 34: 17-23.
6. Brizendine L. Managing menopause – related depression and low Libido, OBG Manage 2004; 16: 29-42.
7. Beygi M, Fahami F, Hasan zahraei R, Arman S, Associative factors to sexual dysfunction in menopause women. Iran J Nurs Midwifery Res 2008; 13: 32-5.
8. Pinkerton JV, Bushmakin AG, Komm BS, Abraham L. Relationship between changes in vulvar-vaginal atrophy and changes in sexual functioning, Maturitas 2017; 100: 57-63.
9. Kim MY, Choi SD, Ryu A. Is complementary and alternative therapy effective for women in the

climacteric period? J Menopausal Med 2015; 21: 28-35.
10. Gooneratne NS. Complementary and alternative medicine for sleep disturbances in older adults. Clin Geriatr Med 2008; 24: 121-38, viii.
11. Taavoni S, Darsareh F, Joolaee S, Haghani H. The effect of aromatherapy massage on the psychological symptoms of postmenopausal Iranian women. Complement Ther Med 2013; 21: 158-63.
12. Buckle J. Clinical aromatherapy, Clinical Aromatherapy: Essential Oils in Healthcare, Second Edition, Philadelphia, Elsevier Health Science 2003.
13. Bagetta G, Morrone LA, Rombolà L, Amantea D, Russo R, Berliocchi L, et al. Neuropharmacology of the essential oil of bergamot. Fitoterapia 2010; 81: 453-61.
14. Abbasnejad M, Keramat B, ESmaili Mahani M, Rezaeezade-Roukerd M. Effect of Hydro-Methanolic Extract of Sour Orange Flowers, Citrus Aurantium, on Pentylen tetrazole Induced Seizure in Male Rats, Journal of Babol University of Medical Sciences 2012;14: 20-8.
15. Leite MP, Fassin Jr J, Baziloni EMF, Almeida RN , Mattei R, Leite JR. Behavioral effects of essential oil of Citrus aurantium L. inhalation in rats, Rev Bras Farmacog 2008; 18: 661-6.
16. Nikjou R, Kazemzadeh R, Asadzadeh F, Fathi R, Mostafazadeh F. The Effect of Lavender Aromatherapy on the Symptoms of Menopause. J Natl Med Assoc 2018; 110: 265-9.
17. Malakouti J, Farshbaf Khalili A, Asghari Jafarabadi M, Jabbari F. Effect of combined inhaler aromatherapy on sexual function of menopause women, The Iranian Journal of obestetrics, Gynecology and Infertility 2016; 19: 9-15.
18. Bakhtiari S, Paki S, Khalili A, Baradaranfard F, Mosleh S, Jokar M. Effect of lavender aromatherapy through inhalation on quality of life among postmenopausal women covered by a governmental health center in Isfahan, Iran: A single-blind clinical trial. Complement Ther Clin Pract 2019; 34: 46-50.
19. Salehi-Pourmehr H, Ostadrahimi A, Ebrahimpour-Mirzarezaei M, Farshbaf-Khalili A.Does aromatherapy with lavender affects physical and psychological symptoms of menopausal women? A systematic review and meta-analysis. Complementary Therapies in Clinical Practice 2020; 39: 101150.
20. Malakoti J, Zamanzadeh V, Maleki A, Farshbaf Khalili A. Sexual function in breastfeeding women in family health centers of tabriz, iran, 2012. J Caring Sci 2013; 2: 141-6.
21. Choi SY, Kang P, Lee HS, Seol GH. Effects of Inhalation of Essential Oil of Citrus aurantium L. var. amara on Menopausal Symptoms, Stress, and Estrogen in Postmenopausal Women: A Randomized Controlled Trial. Evid Based Complement Alternat Med 2014; 2014: 796518.
22. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, D'Agostino R Jr. The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther 2000; 26: 191-208.
23. Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. J Sex Marital Ther 2005; 31: 1-20.
24. Darsareh F, Taavoni S, Joolaee S, Haghani H. Effect of aromatherapy massage on menopausal symptoms: a randomized placebo-controlled clinical trial. Menopause 2012; 19: 995-9.
25. Samadi Z, Jannati Y, Hamidia A, Mohammdpour RA, Hesamzadeh A.The effect of aromatherapy with lavender essential oil on sleep quality in patients with major depression. Journal of Nursing and Midwifery Science 2021;8 : 67-73.
26. de Moraes Pultrini A, Galindo LA, Costa M. Effects of the essential oil from Citrus aurantium L. in experimental anxiety models in mice. Life Sciences 2006; 78: 1720-5.
27. Sköld M., Hagvall L, Karlberg AT, Autoxidation of linalyl acetate, the main component of lavender oil, creates potent contact allergens. Contact Dermatitis 2008; 58: 9-14.
28. Oliveira C, Nobre PJ. The role of trait-affect, depression, and anxiety in women with sexual dysfunction: a pilot study. J Sex Marital Ther 2013; 39: 436-52.
29. Tiran D, Chummun H. Complementary therapies to reduce physiological stress in pregnancy. Complement Ther Nurs Midwifery 2004; 10: 162-7.
30. Hur MH, Yang YS, Lee MS. Aromatherapy massage affects menopausal symptoms in korean climacteric women: a pilot-controlled clinical trial. Evid Based Complement Alternat Med 2008; 5: 325-8.

Citation: Abbaspoor Z, Sharifipour F, Siahposh A, Nazaralivand R, Mohaghegh Z, Faal Siahkal S. **Effects of Aromatherapy With Citrus Aurantium Lavender on Sexual Function of Postmenopausal Women: A Randomized Controlled Trial.** J Family Reprod Health 2022; 16(2): 147-54.