



Effect of Lavender on Sleep, Sexual Desire, Vasomotor, Psychological and Physical Symptom among Menopausal and Elderly Women: A Systematic Review

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Objectives: The present systematic review was conducted to compare the effect of lavender on the quality of sleep, sexual desire, and vasomotor, psychological and physical symptoms among menopausal and elderly women.

Methods: There were five electronic databases which selected to search respective articles which included were Scopus, PubMed, Web of Science, Google Scholar, and the Cochrane Library without any language restriction since the study inception to March 10, 2018. The quality of studies was assessed in accordance with a jaded scale.

Results: According to three trials, the lavender as utilized in a capsule form or aromatherapy could significantly improve the measured Pittsburgh Sleep Quality Index score ($P < 0.05$) in the menopausal and elderly women. The aromatherapy with lavender improved sexual function ($P < 0.001$), depression ($P < 0.001$), anxiety ($P < 0.001$), and physical ($P < 0.001$) symptoms. Based on a trial, 66.7%, 70.0%, and 53.3% of subjects reported feelings of relaxation, happiness, and cleanness effects of having used lavender respectively.

Conclusions: The results suggested the effectiveness of the use of lavender either in capsule form or aromatherapy on the improved quality of sleep, depression, anxiety, sexual desire, and psychological and physical symptoms. These results, however, should be interpreted with caution considering the limitations of the study.

Key Words: Hot flashes, Lavandula, Libido, Menopause, Systematic review

INTRODUCTION

Menopause is a natural life cycle of all females [1] that occurs following the estrogen deficiency, probably resulting in insomnia, irritability, and depression [2]. Reportedly, the menopausal symptoms ranging from mild to severe are found in 65% to 68% of females [3], among which hot flashing is the most frequent complaint stated [4].

Over one-third of the life of females is spent after menopause. Hence, the welfare and health needs of menopausal females must be met to prevent socio-economical harms and improve the life expectancy and the stability of menopause age [5,6].

The vasomotor symptoms and other menopause-related complications can be attenuated by hormone therapy (HT). However, HT was associated with some side effect such breast cancer, coronary heart disease

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and pulmonary embolism [2,7]. Therefore, non-hormonal substances, like phytoestrogens, as a safe remedy have been attracted further attentions of postmenopausal women [8]. Approximately, 80% of peri- and postmenopausal females have been consuming dietary supplements, of which 60% to 70% reported these beneficial for health. Most women believe that these natural and safe herbal products as alternatives to traditional medicine are in line with their values and lifestyle [5]. Lavender, *Lavandula angustifolia*, because of having linalool, linalyl acetate, ocimenem caryophyllene oxide, local anesthetic tannins, coumarin, flavonoid, and phytosterol [9] have several positive and active effects, such as sedative [10], antidepressant [11], and antioxidant [12] properties, without any determined side effects, except for vomiting and skin dermatitis in topical form [1]. The female life can be affected by adverse effects of menopausal symptoms, highlighting the importance of appropriate treatment of these symptoms. Regarding the menopausal and elderly women tendency towards herbal supplementation and no review on the effect of lavender on menopausal symptoms, a comprehensive systematic review is required to investigate the efficacy of this supplement. Accordingly, the current systematic review was designed to assess the effectiveness of lavender in either capsule form or aromatherapy lavender on quality of sleep, sexual desire, psychological and physical symptom among menopausal and elderly women.

MATERIALS AND METHODS

Search strategy

The five electronic databases selected to search the relevant articles were Scopus, PubMed, Web of Science, Google Scholar, and Cochrane Library without any language restriction since inception to March 10, 2018. Inclusion criteria in this systematic review were all clinical trials with control group assessing the efficacy of lavender on the menopausal or elderly women.

The articles, regardless of the type of active ingredients used for aromatherapy, the method of using aromatherapy (massage and inhalation) and the type of treatment used for the control group were enrolled in the study.

The measurement outcomes were at least one of the symptoms including anxiety, depression, and hot flash, psychological, physical and sexual functions. The study design was pre/post trials with or without control group. Search keywords was (lavender OR *Lavandula*)

AND (menopause OR elderly).

Quality assessment

The quality of studies was evaluated in accordance with the Jaded scale consisting of randomization (mentioned randomization, appropriate or inappropriate randomization), blinding (mention blinding, appropriate or inappropriate blinding) and account of all patient [13]. The quality of studies was examined independently by two authors. Third party resolved any disagreement between assessors. Other two important items included by research team to jaded scale were intention to treat and baseline comparability.

Data extraction

Data were collected independently by two authors using a research-made checklist consisting of demographic characteristics such as name of authors, year of publication, age of participants, location of study, type of study, type of treatment and dosage, duration of treatment, percentage of drop out, assessment tool used, number of subject, intervention and control groups, and summary of result.

RESULTS

Figure 1 showed the process of selection of studies included into systematic review. Table 1 showed characteristics of 4 randomized placebo-controlled trials included to systematic. Table 2 showed the risk of bias assessment using Cochrane Collaboration's tool.

Vasomotor symptoms

Nikjou et al. [14] conducted a double-blinded cross-over clinical trial. The menopausal women with complaint of hot flash were randomized into two equal

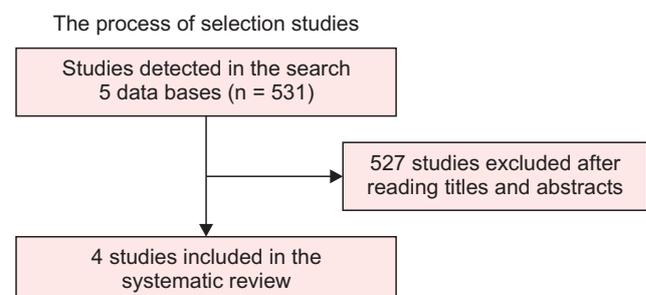


Fig. 1. The process of selection of studies to include into systematic review.

Table 1. Characteristics of 4 randomized placebo-controlled trials included to systematic review

Study, year (country)	Age	Study design	Outcome	Number of subjects (intervention/control)	Type of intervention	Control group	Drop out (%)	Assessment tool	Results	Adverse effect
Nikjou et al., 2018 [14] (Iran)	I = 51.5 Co: 52.24	Cross over	Vasomotor, sexual desire and depression, anxiety and physical symptoms	50/50	Lavender/inhalation of lavender for 20 min twice a day for 12 wk	Diluted milk	0	Green questionnaire	Comparison of two groups showed significant difference regarding vasomotor ($P < 0.001$) and frequency of hot flashing ($P < 0.001$), sexual desire ($P < 0.001$) and depression ($P < 0.001$), anxiety ($P < 0.001$) and physical symptoms ($P < 0.001$)	Not mentioned
Gholamalian et al., 2015 [15] (Iran)	I = 55.67 Co: 56.91	Parallel	Quality of sleep	38/38	2 drops of lavender placed cotton hung around the neck for three consecutive for 1 mo	Normal saline	4	PSQI	Comparison of two groups were significant regarding quality of sleep ($P < 0.001$)	No adverse effects
Kamalifard et al., 2018 [16] (Iran)	I = 54.21 Co: 52	Parallel	Quality of sleep and hot flash	52/52	500 mg capsule contain lavender 8 wk	Placebo	0	PSQI	Adjusted mean difference between two groups showed a significant difference ($P = 0.003$)	No serious side effects
Faydali and Çetinkaya, 2018 [17] (Turkey)	30% < 65 y 70% ≤ 65 y	Pre-posttest design	Quality of sleep Percentage of feel happiness and feeling cleanness	30	Inhaled lavender oil drops on the pillows every evening for a week before sleeping	-	0	PSQI	Total score of PSQI and all its subscale with exception score duration of sleep ($P = 0.083$)	Mentioned

PSQI: Pittsburg Sleep Quality Index.

Table 2. The risk of bias assessment using Cochrane Collaboration's tool

Variable	Kazemzadeh	Gholamalalian	Nikjou	Faydali
Randomization				Pretest-posttest design
Mention randomization	*	*	*	
Method: appropriate	*	*	*	
Method: inappropriate	-	-	-	
Blinding				
Mention blinding	*	*	*	
Method: appropriate	*	*	*	
Method: inappropriate	-	-	-	
Sample				
Account of all patients	*	*	*	
Intention to treat	No	No	No	
Baseline comparability	Yes	Yes	No	

groups to receive aromatherapy with lavender and diluted milk as control. The comparison of treatment groups using Student *t* test showed significant improvement in lavender group than placebo group ($P < 0.001$) regarding vasomotor symptoms.

Quality of sleep

Two trials assessed the effect of lavender on the quality of sleep. In first trial, Gholamalalian et al. [15] evaluated the efficacy of aromatherapy with lavender compared to normal saline as control regarding quality of sleep on 76 postmenopausal women. The pre/post comparison of total Pittsburgh Sleep Quality Index score (PSQI) showed a statistically significant improvement in the lavender group ($P < 0.001$). However, total PSQI score was slightly worst in control group (normal saline). The comparison of two groups indicated significant difference ($P < 0.001$).

In second trial, Kamalifard et al. [16] in duplicate publication published in Persian databases randomized 104 patients to two groups to receive 500-mg lavender capsule ($n = 52$) or 500-mg placebo capsule ($n = 52$). Demographic characteristics of the menopausal subjects, such as the mean age and years since menopause were significantly different between groups. Adjusted mean difference between two groups showed a significant difference, with an improvement in total PSQI score in lavender group compared to placebo group ($P = 0.003$). In third study, Faydali and Çetinkaya [17] conducted a pre- and posttest design to assess the effect of aromatherapy with lavender on the quality of sleep

in elderly people. Total score PSQI ($P = 0.001$) and its subscales of sleep disturbance ($P = 0.018$), sleep latency ($P = 0.002$), day of dysfunction due to sleepiness ($P = 0.026$), sleep efficiency ($P = 0.018$), overall sleep quality ($P = 0.03$), and need meds to sleep ($P = 0.033$) showed a significant improvement, except for duration of sleep ($P = 0.083$). Additionally, 93 patients believed that treatment with lavender was effective in promoting sleep quality, and 80.0% mentioned that they woke up rested in the morning.

Sexual function

Nikjou et al. [14] conducted a double-blinded cross-over clinical trial to evaluate the efficacy of aromatherapy with lavender ($n = 50$) compared to placebo ($n = 50$) on the sexual desire among the menopausal with complaint of hot flash. The comparison of treatment groups using *t*-student test showed significant improvement in lavender than placebo group regarding sexual desire ($P < 0.001$).

Psychological symptoms

In the first study, Nikjou et al. [14] conducted a double-blinded cross-over clinical trial. The menopausal women with complaint of hot flash were randomized into two equal groups to receive aromatherapy with lavender and diluted milk, as control. The comparison of two groups using Student *t* test indicated a significant decrease in both anxiety ($P < 0.001$) and depression ($P < 0.001$) in lavender groups compared to placebo. In second study, Faydali and Çetinkaya [17] conducted

a pre- and posttest design to assess the effect of aromatherapy with lavender on the quality of sleep in elderly people. Secondary outcome was feelings of relaxation, happiness and cleanness. 66.7%, 70.0%, and 53.3% of subjects reported feelings of relaxation, happiness, and cleanness effects of lavender, respectively.

Physical signs

According to second study, Nikjou et al. [14] conducted a double-blinded cross-over clinical trial. They menopausal women with complaint of hot flash were randomized into two equal groups to receive aromatherapy with lavender and diluted milk, as control. The comparison of treatment groups using t-student test showed significant improvement in lavender group than placebo group regarding physical signs ($P < 0.001$).

DISCUSSION

Menopause is a natural life cycle of all females that occurs following the estrogen deficiency, probably resulting in insomnia, irritability, and depression [1,2]. Nanomedicine can be used in treatment of menopausal symptoms [2]. Lavender has a beneficial effect on some menopausal symptoms. To the best of our knowledge, this is the first systematic review aiming to assess the efficacy of lavender on quality of sleep, sexual desire, psychological and physical symptoms among menopausal and elderly women. The results suggested the effectiveness of lavender on all above symptoms.

Lavender may have both direct and indirect effect on the quality of sleep. Indirect effect may be related to other properties of lavender as previous studies showed the efficacy of lavender for sexual function [14,18], hot flash [4], physical [14], and psychological [14,19] symptoms.

The main compounds in lavender (*L. angustifolia*) are linalool (38.6%–76.9%), followed by lavandulol (4.1%–8.6%), coumarin (2.2%–21.8%), and terpinen-4-ol (0.3%–14.3%) [20]. The lavender plays a sedative role similar to narcotic materials. There are several mechanisms of action for lavender to improve the sleep disorders, such as the acetylcholine secretion blocking and gamma-aminobutyric acid receptors interaction in the CNS [16]. The mechanism of action of lavender in alleviating hot flash can be attributed to a decrease in stress hormone and stimulation of beta-endorphin secretion [4].

The lavender was administered in capsule form and

aroma in this systematic review. Psychological and physiological functions of aromatherapy have been shown. The olfactory nerve cells activated by odors releasing from aromas transmitted signals to the limbic system. Depending on the type of aroma, neuro messengers such as enkephalin, noradrenalin and serotonin are released by the brain. These neuro messengers related with nervous and other body system [21].

One of the main limitations of this study was small sample size. Future study should, therefore, be performed on larger sample size to achieve subgroup analysis. Almost all of the studies compared the effect of lavender with placebo, so the comparison of the lavender effect is suggested with other conventional treatment. None of the studies assessed the intention to treat analysis. Future works should be designed and described based on consort guidelines. Confounding factors such as body mass index, stress level and diet may affect the sleep function [15,16], which should be controlled in future investigations. Validity and reliability of PSQI were not reported in none of the studies included in the systematic review. It is impossible to consider the blinding method in aromatherapy; however, size, color and shape of control and treatment groups were identical in the included trials.

The present results suggested the effectiveness of lavender in capsule form or aromatherapy on the quality of sleep, sexual desire, depression, anxiety and physical symptoms in among menopausal and elderly people. These results should be interpreted with caution in light of mentioned limitations. The well-designed studies are required with larger sample size to draw the definite conclusion.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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