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REVIEW: Lavender for Management Sleep Disorder in Menopausal Women with or without Hypertension: A Systematic and Meta-analysis

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ABSTRACT

Introduction: The present study was conducted to determine the effect of lavender on the sleep disorder women

Material and Methods: The following databases were selected to search systematically the effect of lavender on the quality of sleep in post-menopausal women, including PubMed, Cochrane Library, ISI Web of Science and Scopus, regardless time limit since inception to September 29, 2019. The quality of trials was investigated according to Jadad scale.

Results: After of Combination of the result of four trials, our met analysis showed that treatment with lavender was more effective than placebo in respected with improvement in quality of sleep menopausal women (Standardized Mean difference (SMD= 1.098.; Confidence Interval 95 %(CI): 0.33 -1.86; P= 0.005).

Conclusion: Considering the effects of lavender essential oil on improving the quality of sleep in postmenopausal and middle-aged women, this medication can be prescribed in the clinics of sleep problems, obstetrics and gynecology.

Introduction

Menopause is an important phenomenon in the life cycle of all women, which is associated with the gradual disappearance of fertility and the transition to a new biological condition. Life expectancy has increased in recent years around the world, as two-thirds of the world's population today experience the age of 85 years or more (1). The population of postmenopausal women had been predicted to reach one billion and two hundred thousand people in 2010, with an annual increase of 47 million new cases (1). Reduced hormonal level in the body during menopause pushes women to experience many alterations, such as hot flashes, night sweats, heart palpitations, headaches, dizziness, fatigue and irritability. Meanwhile, sleep disorders are of the most common consequences. These symptoms can occur as a minor discomfort to severe and debilitating symptoms in different people (2). The sleep

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disorder has a major negative impact on the quality of life of individuals and reduces daily functioning physically, psychologically, and socially (3-5).

The sleep disorder is one of the major risk factors for depression, and increases with age (6). The prevalence of sleep problems in postmenopausal women has been reported to be about 24-50%, while this rate is around 15% in the normal population (7, 8).

Hormone therapy (HT) is usually the first line of treatment selected by specialists to apply for treating the sleep disorders. However, many women are reluctant to use this medication because of the various complications of the HT, including breast tenderness, nausea and headache, as well as many other women may not have the condition for the HT (9).

Over the past decade, the use of complementary and alternative medicine (CAM) has increased instead of using the HT, and women are more likely to seek alternative therapies to relieve their sleep disorders. The CAM is advised by various nursing theories of holistic care not only for the cost-effectiveness, but also because of its proven efficacy. Among these, a number of aromatic herbal essential oils in the aroma, such as fennel, hogweed, common sage, bergamot orange, lavender and geranium, can be effective in reducing the symptoms such as hot flashes, sexual dysfunction and depression (10, 11). One of the CAMs is the aromatherapy whose application has shown a significant increase in recent years. This method is easy to use, safe and relatively inexpensive. The researchers found that the aromatherapy, as much as drug therapy and even better, is effective and beneficial in the treatment of the sleep disorders (12).

In fact, the aromatherapy refers to the use of volatile oils or extracts from aromatic plants for therapeutic purposes. In general, the aromatherapy runs through the inhalation and massage (12, 13). Regarding the prevalence of sexual problems during menopause and the interest of women in the use of aromatherapy in attenuating the sleep disorders, and due to the lack of comprehensive meta-analysis on the effects of aromatherapy on the sleep disorders, the present study was conducted to determine the effect of lavender on the sleep disorders in postmenopausal women.

Methods

Search strategy

The following databases were selected to search systematically the effect of lavender on the quality of sleep in post-menopausal women, including PubMed, Cochrane Library, ISI Web of Science and Scopus, regardless time limit since inception to September 29, 2019.

Inclusion criteria were all clinical trials evaluating the effect of lavender on menopausal women. The articles were reviewed only in English and Persian.

The measured outcomes: Quality of sleep reported in the article and its comparison between the intervention and control groups were considered as the main outcomes of the study.

Quality assessment

The quality of trials was investigated according to Jadad scale that contains the following domains (14): Randomization (mention randomization, appropriate or inappropriate randomization), blinding (mention blinding, appropriate or inappropriate blinding) and account of all patient, which were assessed independently by two reviewers. The Jaded scale is scored between 0 and 1. Third party addressed any disagreement through consensus or consulting.

Data extraction

Data were collected independently by two authors using a research-made checklist consisting of the name of the author, year of publication, age of participants, place of study, dosage, study duration, number of subjects in intervention and control groups.

All statistical analyzes were performed by the Comprehensive Meta-Analysis V2.0 software to determine the accuracy and validity of the method used in each study. The heterogeneity was determined between

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studies using I2 and Q tests. The random effect model was applied for studies with heterogeneity over 50%; otherwise the fixed effect model was use. Effect size was calculated with standardized Mean difference (SMD). Forrest plot displayed the meta-analysis results.

Results

In total, 356 articles were found during a preliminary search in electronic resources in English, of which 236 were excluded from the study after reviewing the title and abstracts. A full text of 15 studies were extracted and reviewed, and ultimately 4 articles had the inclusion criteria of meta-analysis. The process of selecting articles is shown in Flowchart 1.

Four studies (15-17) tested the effect of lavender on quality of life and sleep house. Ju et al (18) compared a mixture of lavender (Lavandula ofcinalis), marjoram (Origanum majorana), ylang-ylang (Cananga odorata), and Neroli (Citrus aurantium) and placebo. There was a significant improvement in the combined group compared to the placebo regarding quality of sleep (Mean Difference= 8.7; Confidence Interval 95% (CI): 1.61 to 15.78; P= 0.016)

Kamalifard et al (15) compared the efficacy of lavender with placebo on quality of sleep in postmenopausal women. Treatment with lavender was more effective than placebo in respected with improvement in quality of life in menopausal women (MD: 1.36; P=0.0041; 95% CI 0.423 to 2.27; one trial).

Gholamalian et al (17) randomized patients patient two group to receive lavender and placebo women placebo group. A significant improvement was observed in lavender Group compared to placebo (MD: 5.54; P<0.0001; 95% CI 4.48 to 6.59; one trial).

Ghien et al (16) compared the effect of lavender and placebo on quality of life in midlife women with insomnia. Lavender group showed more beneficial effect than placebo (M 0.85; P<0.0001).

Meta-analysis

After of Combination of the result of four trials, our met analysis showed that showed Treatment with lavender was more effective than placebo in respected with improvement in quality of life menopausal women (Standardized Mean difference (SMD= 1.098.; Confidence Interval 95%(CI): 0.33 - 1.86; P= 0.005) (***Figure 2***). There was a very

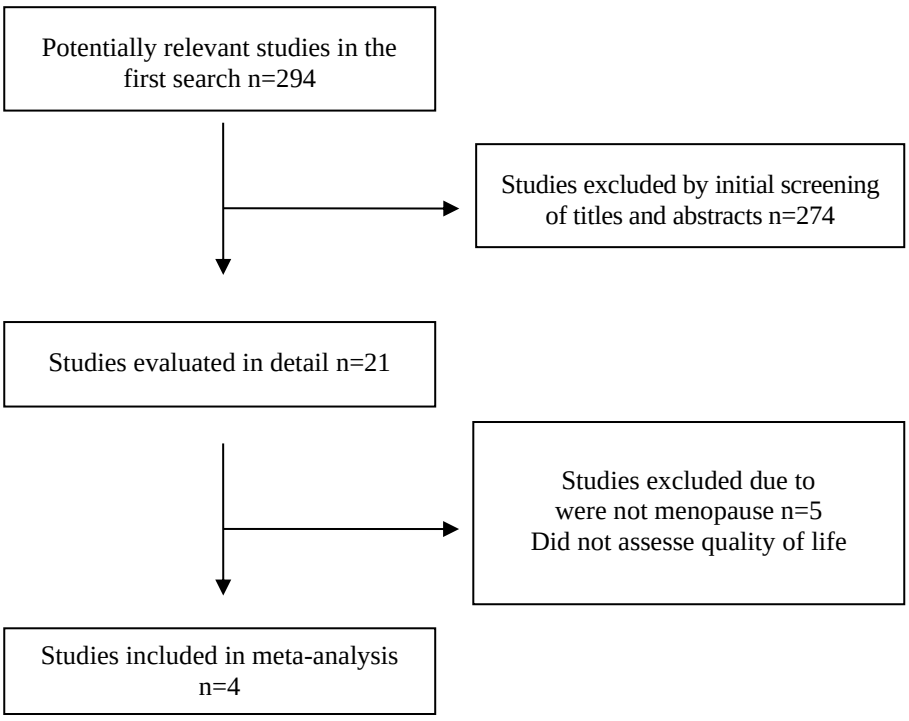

Figure 1. Search strategy of the study

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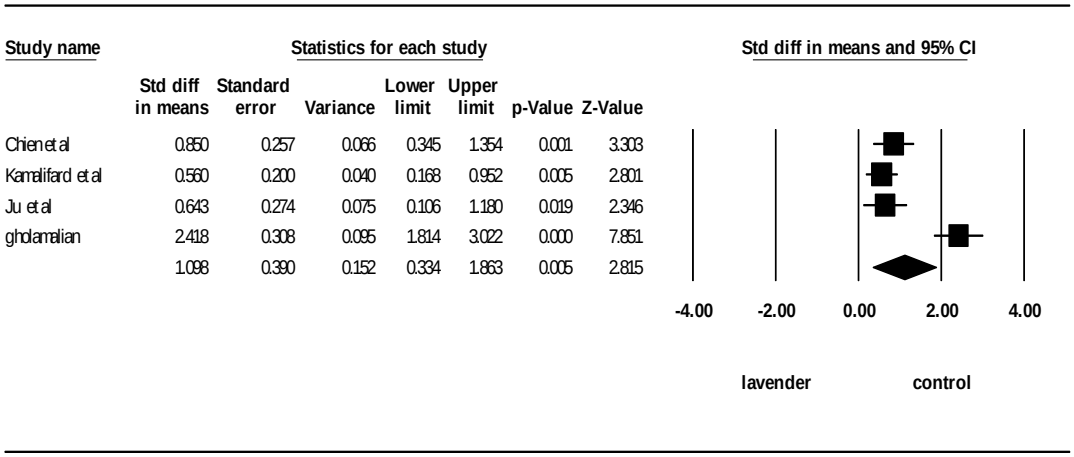

Figure 2. Lavender for management sleep disorder in menopausal women with random model

high heterogeneity (I2=89.26; p=0.001). Sensitivity analysis were performed and showed that Gholamalian et al were possible reason for high heterogeneity. After excluding Gholamalian study, heterogeneity decreased by 0% (p=0.671; ***Figure 3***).

Table 1. Characteristics of four studies

Authors, years, Country	Age	Number subjects in intervention / control	Control group	Intervention	Main outcome
Gholamalia, 2015, Iran	More than 60	n 38/38	Normal saline	lavender	A significant improvement was observed in lavender Group compared to placebo (MD: 5.54; P<0.0001; 95% CI 4.48 to 6.59; one trial)
Ju, 2013, Korea	Women between 40-60	28/28	artificial fragrance massage	lavender (*Lavandula ofcinalis*), marjoram (*Origanum majorana*), ylang-ylang (*Cananga odorata*), and Neroli (*Citrus aurantium*)	There was a significant improvement in the combined group compared to the placebo regarding quality of life (Mean Difference= 8.7; Confidence Interval 95%(CI): 1.61 to 15.78; P= 0.016)
Chien, 2012, Taipei	Between 45-55	34/33	placebo	lavender	Lavender group showed more beneficial effect than placebo (M 0.85; P<0.0001)
Kamalifard, 2017, Iran	Post menopause	52/52	placebo	lavender	Treatment with lavender was more effective than placebo in respected with improvement in quality of life in menopausal women (MD: 1.36; P=0.0041; 95% CI 0.423 to 2.27; one trial).

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Table 2. Assessment of quality of sleep

Author	Randomization			Blinding			Sample
	Mention randomization	Method: appropriate	Method: inappropriate	Mention blinding	Method: appropriate	Method: inappropriate	Account of all patients
Gholamalian	*	*	-	*	*	-	*
Ju	*	*	-	*	*	-	*
Chien	*	*	-	*	*	-	*
Kamalifard	*	*	-	-	-	-	*

Discussion

To the best of our knowledge, this is the first meta-analysis on clinical trials evaluating the effectiveness of lavender on the sleep quality in postmenopausal and middle-aged women.

The results of this study indicate that lavender contributes to the improvement of sleep quality in postmenopausal and middle aged women compared to placebo.

In general, this study examined lavender alone or in combination with oncinalis, marjoram (Origanum majorana), ylang-ylang (Cananga odorata), and Neroli (Citrus aurantium). The studies had been conducted in Iran, Taiwan and Korea, three of which used the Pittsburgh Sleep Quality Index (PSQI) and one of them utilized Verran and Synder-Halpern (VSH) Sleep Scale.

The genus Lavandula, with the common name of lavender, consists of 47 species of flowering plants belonging to mint family, Lamiaceae, which is native to the old world from Cape Verde and the Canary Islands, Europe across to northern and eastern Africa, the Mediterranean, southwest Asia to southeast India. Most of the species can grow in temperate climates as ornamental plants with broad spectrum of application in garden and landscape, culinary herbs, and the extraction of essential oils. Lavandula angustifolia, commonly named lavender, is the most widely cultivated species; and a color named for the shade of the flowers of this species is available (19, 20).

Lavender is one of the most seductive fragrances. Linalool and linalyl acetate are absorbed well through the skin during massage and reduce the activity of the nervous system. Linalool has a sedative property and linalyl acetate shows narcotic effect. Probably the reason is that lavender through reducing the level of anxiety in individuals can improve the sleep disorders (18, 19).

Conclusion

Considering the effects of lavender essential oil on improving the quality of sleep in postmenopausal and middle-aged women, this medication can be prescribed in the clinics of sleep problems, obstetrics and gynecology.

Limitations

One of the main shortcomings of this study was 90% heterogeneity, placing in the rank of high heterogeneity studies though the sensitivity analysis showed that excluding one of the studies reduces heterogeneity to zero. In spite of the significant positive effects of lavender reported in all studies on the quality of sleep, none of them examined the mechanism of action of lavender. It is suggested that future studies should focus more on this topic. Given that the studies were conducted in Iran, Taiwan and Korea, all of which are Asian, the results may not be generalizable to other countries in the world. None of the studies used intention to treat analysis. It is suggested that future studies should be designed and reported based on Consort. Also, future studies are suggested to compare the effects of lavender with other commonly used drugs for the sleep problems.

Conflicts of interest

The authors declare no conflict of interest in this study.

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Authors' contributions

All authors designed and revised the study.

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