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The Effect of Inhalation Aromatherapy with Essential Oils of Various Plants on Anxiety and Sleep Quality in Diabetic Patients: A Review Study

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Abstract

Anxiety, sleep quality deterioration and depression are among the disorders that diabetic patients encounter. Today, non-drug methods have grown significantly in an effort to reduce anxiety and improve sleep quality. One of these methods is aromatherapy, which uses various plant essential oils. The present study was conducted to study the effect of inhalation aromatherapy with essential oils of various plants on the anxiety and sleep quality of diabetic patients.

The results of this study indicate that aromatherapy with lavender, rosemary, bitter orange blossom, and orange essential oils can reduce anxiety levels. Additionally, using lavender, rosemary, sandalwood, and bitter orange blossom essential oils helps improve the sleep quality of diabetic patients. This study highlights the beneficial effects of aromatherapy using essential oils in reducing anxiety levels and improving sleep quality among diabetic patients. As the trend towards complementary medicine continues to grow, integrating aromatherapy into patient care represents an accessible and effective non-pharmacological approach to enhance mental well-being and sleep among this population. Implementing these findings in practice may lead to improved patient outcomes and a holistic approach to diabetes management.

Keywords: Aromatherapy, Essential oil, Anxiety, Sleep quality, Diabetes mellitus

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Introduction

Diabetes is the most common chronic metabolic disease in humans and a significant cause of mortality and disability in many countries; referred to by the World Health Organization as a silent epidemic (1,2). Due to lifestyle, the incidence of diabetes has increased dramatically in recent years. According to the International Diabetes Federation's report, over five million people worldwide currently have diabetes, and it is projected that this number will exceed seven million in the next two decades (3,4). It has been proven that diabetes is directly related to the increase in the prevalence of cardiovascular diseases, cerebrovascular diseases, retinopathy, neuropathy, nephropathy, anxiety, depression and many other disorders (5,6). In a systematic review of the role of social media in diabetes management in the Middle East region, Alanzi stated that diabetes increases the cost of health care and causes an increase in mortality (7).

Among the common problems of diabetic patients, we can mention disorders such as anxiety, poor sleep quality, and depression. These patients usually face psychological symptoms after the diagnosis of the disease, during the treatment process and adapting to the disease for them is accompanied by anxiety (8,9). Besides the negative effects of diabetes on the function of the central nervous system and endocrine glands can cause sleep disturbances (10). In Young Hyman et al.'s research on psychosocial care for people with diabetes, they reported the risk of psychological symptoms in diabetic patients compared to patients without diabetes; They stated that diabetes can cause various mental disorders in people (8). Other studies have also considered the negative effects of high anxiety levels in diabetic patients on the process of effective sugar control (11).

Diabetic patients are also faced with sleep disorders, which not only affect their quality of life but also affect their metabolic and endocrine function, influencing general health (10). According to the research by Saadati et al. on the effects of sleep deprivation on learning and memory, with a focus on the role of sex hormones, sleep deprivation or disturbance can lead to consequences such as pathological anxiety (12). Sleep disorders are significantly more common in people with diabetes compared to those without the disease and several factors contribute to this. For example, the risk of depression is higher in individuals with diabetes than in healthy individuals, and depression is one of the key factors leading to sleep deprivation in this group (10). There are also reports that sleep duration is related to blood sugar control in type 2 diabetes (13).

Currently, techniques such as acupuncture, heat and cold therapy, massage therapy, meditation, yoga and aromatherapy are widely used to alleviate stress symptoms (14,15). Drug treatments often cause side effects such as low blood pressure, weakened physiological functions, drowsiness, nausea and vomiting, constipation and occasionally allergic reactions. In addition to these numerous physical and mental side effects, they can also lead to drug dependence and tolerance in patients (16). In contrast, non-drug or complementary methods generally have fewer side effects and risks and can be used alone or in combination with other treatments. Many non-pharmacological interventions used recently fall under the category of complementary medicine. Complementary medicine, which has seen significant growth in most countries in recent years, includes practices such as aromatherapy (17,18).

Aromatherapy is a non-pharmacological intervention and the second most common complementary therapy used by nurses. It is often applied at the bedside through various methods, such as applying essential oils on the patient's clothing or pillows. Lately, this treatment has been introduced as a part of holistic nursing and nurses in more than 30 countries are licensed to use this treatment

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(19,20). In inhalation aromatherapy, volatile essences derived from plants are used to promote health and improve the treatment of diseases. According to some researchers, the plant's scent can stimulate the olfactory nerve during aromatherapy, ultimately affecting the limbic system. It triggers the release of various neurotransmitters, such as enkephalin, endorphins, noradrenaline and serotonin, depending on the type of odor. It is worth noting that these processes can have rapid effects in reducing anxiety levels and enhancing patients' comfort (21,22).

A review of the available databases reveals that numerous studies have demonstrated the positive effects of inhaling herbal essential oils during aromatherapy in reducing anxiety and improving patients' sleep quality (23). However, no study has been found that takes an integrative approach to research and clinical findings regarding the effects of inhalation aromatherapy with various plant essential oils on anxiety and sleep quality in diabetic patients. Additionally, the increasing prevalence of diabetes in society and the significant impact of reducing anxiety and improving sleep quality on the treatment process of patients is noteworthy. Considering the points mentioned, the need for a review study to summarize and comprehensively evaluate the results of research on the effects of inhalation aromatherapy with various plant essential oils on anxiety and sleep quality in these patients has been identified. Therefore, the present study was conducted during a narrative review to the effect of inhalation aromatherapy with essential oils of various plants on the anxiety and sleep quality of diabetic patients.

Lavender

Lavender, a plant from the mint family, is very fragrant and one of the essential oils used in aromatherapy, which the European Medical Agency has approved as a medicinal plant effective in reducing anxiety (24). This plant has approximately 39 species, of which three species are used for synthesizing essential oils, namely lavendula angustifolia, L. latifolia and lavandin, which are used to prepare essential oils. Among these species, the most prevalent one is lavendula angustifolia, mainly cultivated to produce lavender essential oil. Lavender essential oil is a greenish-yellow liquid with a pleasant smell. The linalyl acetate and linalool present in the essential oil of this plant stimulate the parasympathetic system, and it relaxes the body by reducing the heart rate and blood pressure level and improving breathing (25).

The reviewed studies included clinical trials and all studies reported the positive effect of inhalation aromatherapy with lavender essential oil on reducing anxiety and increasing the quality of sleep of diabetic patients. Also, in these studies, the positive effect of aromatherapy with this plant extract on improving cognitive function, amount of sleep, quality of life, and mood of diabetic patients has also been mentioned. There has been no report of side effects, and it can be said that lavender essential oil can have positive effects without significantly affecting the metabolic state (26-30).

Rosemary

Rosemary is also an aromatic plant from the mint family that has anti-anxiety and antioxidant properties and strengthens memory. The biological activity of this plant is mainly related to its volatile and phenolic compounds, such as carnosol, carnosic acid, and rosmarinic acid found in the extract, and alpha-pinene, bornyl acetate, camphor, and eucalyptol found in its volatile oil (31).

According to a clinical trial, Sati Can et al. found aromatherapy using rosemary extract effective in reducing anxiety and increasing sleep quality in diabetic patients. In this research, no specific side effect was mentioned for aromatherapy with the essential oil of this plant (26).

Bitter orange

Bitter orange tree blossoms are called C. aurantium blossoms (32). Bitter orange

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blossom is one of the widely used and native medicinal plants in Iran, and it grows in different regions of Iran. Several studies have confirmed the anti-anxiety effect of bitter orange blossom (32,33). Citrus aurantium oil contains alkaloids, linalool, linalyl acetate, serine, limonene, limonoids, and flavonoids, each of which is the source of different properties of this plant (33,34).

Abdollahi and colleagues, in studies involving a total of 120 patients with type 2 diabetes, reported anti-anxiety effects, improved sleep quality, and reduced fatigue through aromatherapy with bitter orange blossom (C. aurantium) essential oil without any significant side effects ($P< 0.001$) (35,36).

Sandalwood

Sandalwood is a semi-parasitic tree belonging to the Santalaceae family and is highly aromatic. It derives its nutrients from a host tree. Sandalwood grows in tropical regions of Asia, Australia, and the Pacific islands. Sandalwood products have various applications. One of these products is sandalwood essential oil, which is extracted from the heartwood and roots of this tree. There are various elements and chemical substances in the composition of this essential oil, which are mainly terpenoids (37).

Wijayanti and colleagues, based on their study conducted on 60 patients with type 2 diabetes, reported relaxation and improved sleep quality through sandalwood aromatherapy ($P< 0.05$). Also, in this research, aromatherapy with sandalwood was claimed as a useful intervention, especially for people with type 2 diabetes (38).

Orange

Orange, scientifically known as *Citrus sinensis*, belongs to the citrus family and is one of the essential oils commonly used in aromatherapy (39,40). This plant is also used as a supplement to treat colds, liver disorders, gallbladder problems, rheumatism, depression, and stress (41,42). Some clinical studies have reported the anti-anxiety effects, mood improvement, and enhanced sleep quality associated with inhaling orange essential oil, with no side effects reported to date (43,44).

Mottaqi and colleagues, in a study conducted on 60 schoolchildren with diabetes, reported the positive effects of aromatherapy with orange essential oil in reducing anxiety in diabetic patients. They stated that this non-drug and non-invasive method could be a useful complementary treatment for managing anxiety in children with diabetes ($P< 0.05$) (45).

Conclusion

According to the results of this study, aromatherapy with lavender, rosemary, bitter orange blossom (C. aurantium), and orange essential oils reduces anxiety levels. Additionally, aromatherapy with lavender, rosemary, sandalwood and bitter orange blossom essential oils improves sleep quality in patients with diabetes. Collectively, these findings suggest that aromatherapy with these essential oils can serve as a safe and beneficial complementary approach in the holistic management of anxiety and sleep disturbances in diabetic populations. Given the growing shift towards complementary medicine in today's society and the ongoing efforts to alleviate anxiety and improve sleep quality in diabetic patients using non-pharmacological methods, training and applying this approach at the bedside is an affordable and recommended complementary treatment for patients. Further research to identify essential oils with greater efficacy in this area and determine the effective dosage for each plant's essential oil could maximize the effectiveness of this method.

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Conflict of Interest

No conflict of interest

Authors' contributions

A.G. and F.M.S. conceived and designed the study. F.M.S. and E.M. extracted literature and prepared the draft. F.M.S. and E.M. did critical review of the paper. A.G. did the final review. All authors read and approved the final manuscript.

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