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LAVENDER AROMATHERAPY IN PAIN MANAGEMENT: A REVIEW STUDY

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ABSTRACT

Introduction: Aromatherapy is a complementary medicine that has a range of applications. Lavender is an evergreen flowering plant from the Lamisil family native found in the western Mediterranean, growing up to 3 feet and having flowers similar to purple lilac. This study was intended to investigate and discover the role of Lavender Aromatherapy in pain management.
Materials and Methods: In this review study, an online search among articles published between 2000 to 2016 was done through CINAHL, PubMed, Science Direct, Elsevier, SID, Iran Medex, Magiran and Google scholar databases using key words; "Lavender Aromatherapy", "Pain Management". And the protocol of York University Guide was used to select the articles.
Results: 12 articles from 35 articles originally from the search were used, from which, 8 were Iranian papers and the others were foreign papers. The articles indicated that, lavender aromatherapy has a positive impact on the pain. Aromatherapy is a technique that unlike other non-pharmacological methods does not require specialized qualification. There are different manners of necessary oil administration including: topical application, inhalation, bath and compression.
Conclusion: Today, aromatherapy is considered as a complementary medicine method with the positive effects, which has been tested in many studies. Aromatherapy with lavender helps to manage pain in different patients. However, further studies are needed to be conducted to substantiate this claim.

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Introduction

The word "aromatherapy" is derived from two words "aroma" and "therapy" [1]. Aromatherapy means using concentrated essential oils elicited from plants and flowers to treat different diseases. Proponents of aromatherapy claim that there has been an ancient tradition of herbal treatment in countries such as ancient Egypt and India several years ago. The term "aromatherapy" was published for the first time in a book by a French chemical expert Gattefossé in 1936 [39]. Aromatherapy is pleasant and relatively safe, and it has become increasingly popular [2]. Aromatherapy is the second complementary medicine [3] which has a wide range of applications. It is expanding rapidly, and recently, it has attracted a lot of attention. Nursing profession has been actively trying to show aromatherapy acts as a comprehensive sedative intervention and mediation. Aromatherapy can be used continuously for patients who are not sensitive to smell. Aromatherapy has many

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benefits for instance being easy to use, fast responsive and non-invasive. It can also be used in independent nursing interventions [4]. Aromatherapy is a technique that unlike other non-pharmacological methods such as acupuncture, pressure therapy, and hypnosis is cheaper and does not require specialized qualifications [5]. Today, aromatherapy is considered in the US Nursing Board as a kind of holistic nursing, and in the UK aromatherapy has been proven effective by nursing profession. Lavender oil is one of the essential oils that is widely used in aromatherapy [6].

Lavender:

Lavender is an evergreen flowering plant [7] from the Lamisil family native found in western Mediterranean [8], which grows up to 3 feet (1 meter) and has flowers similar to purple lilac [7]. Lavender is a plant that has been used in traditional medicine belonging to Lamiaceae family [6]. Lavender has a long list of applications [9] and a long history of medical use [10]. Lavender is the most widely used unmixed essential oil [11] and the best essential oil used for pain relief and relaxation [9]. It is a traditional herbal remedy that has been used for many years [12], and has been shown to be anti-seizure, anti-depressants, anti-anxiety, sedative and tranquilizer. Many medieval physicians such as Ibn-e Sina and Razi used lavender to treat migraine and epilepsy attacks. Furthermore, it is used to treat pain and tremor [10].

Phytology:

Lavender is grown all over the world and has 39 species, which are mostly native to the Mediterranean [13]. It is divided into four main categories: L. angustifolia known as English Lavender, L. stoechas sometimes known as French Lavender, L. latifolia, and L. intermedia. Essential oil and carbon dioxide are obtained from the flowers [7]. The important components of lavender are linalool, linalool acetate, 1 & 8-Sinlool B-ocimene, terpinene-4- ol, camphor [10], alcohol, ketones, aldehydes and teamsters [14]. The main ingredients of lavender are linalool and Linalool acetate. These compounds can be rapidly absorbed into the body by inhalation and almost 7 minutes after administration, they achieve the highest possible peak action. Linalool acetate has narcotic effects, and linalool acts as a sedative [15]. Also, linalool and linalool acetate have sedative and local anesthetic effects. Following the topical application of lavender, linalool acetate and linalool enter the bloodstream within 5 minutes, and are filtered out of the blood stream after 90 minutes [16]. Ketones existing in Lavender causes relief of pain and inflammation, and the progression of sleep [14]. The lipophilic part of the plant reacts to cell membranes and alters the function of ion channels, carriers and nerve receptors. This property can explain the anti-bacterial and soothing effects of the lavender oil [8]. Human's brain emotionally responds to odors, and when the odor is inhaled, odor molecules pass through the olfactory system and reach the limbic system. This area is directly linked with other systems that control memory, emotions and hormones, and trigger the release of neurotransmitters such as encephalin, endorphins, noradrenaline, and serotonin [6].

The mechanism of aromatherapy's action:

A number of theories have attempted to explain the action mechanism of aromatherapy and essential oils. The suggestion of the dominant theory is that there is a relationship between the limbic system and smell in the brain [17]. The action mechanism of aromatherapy begins with inhalation by which the molecules of essential oils are absorbed by the membrane of the nose. Olfactory molecules are transferred into chemical signals, and travel to other parts of the limbic system such as olfactory bulb [18], and stimulate the brain to release a powerful neurochemical into the blood flow [19]. This creates social biological and psychological effects [18]. Odor could relieve pain by making some changes in the brain activity in areas associated with pain. Odor is a unique sensory process. Limbic system includes the amygdala which is a region associated with pain processes. Entry of odor into the limbic areas can be associated with pain relief. Other analgesic effects of aromatherapy include changing the breathing pattern caused by stimulating smell. Every inhalation transfers the odor's molecules to the olfactory nerve receptors, and activates the limbic olfactory regions. Breathing pattern unconsciously is changed by stimulating the limbic system. Pleasant odors increase tidal volume, and reduce respiratory rate. Therefore, deep and slow breathing pattern caused by aromatherapy can be a mechanism to reduce pain [20]. Inhaling lavender acts through limbic system [10]. Pain and olfactory pathways in humans have been demonstrated to be related. In a study that included gene SCN9A, lack of gene's function led to the loss of sense of perceived smell and pain [21].

Practical applications:

There are different methods of essential oil administration including topical application, inhalation, bath and compression [22]. Inhalation and dermal applications are two effective methods of using essential oils in aromatherapy [23]. In skin application, when essential oils are diluted and used as carrier oils, creams, ointments, they are able to slowly penetrate through the skin or through inhalation and enter the body. Inhalation is the fastest and the most effective way to use essential oils [24]. When lavender oil is inhaled, it starts to act fast as the chemical ingredients of the essential oil takes only a few seconds to reach the brain [25].

Pain management by aromatherapy with lavender:

World Health Organization (WHO) recommends that every human being has a right to take advantage of the most effective, least costly, the safest and easiest methods to treat diseases [26]. A study by [27] investigating the effects of inhaling lavender on pain of needle insertion in arteriovenous fistulas in hemodialysis patients found that inhalation of lavender (3 drops of 10% lavender extract) for 5 minutes significantly reduces the pain intensity. Their results also showed the analgesic effects of lavender. In a study of [28] on the effect of lavender on pain relief after knee arthroscopy, the patients were divided into two groups. In the experimentation group, 28 patients were given a necklace containing a bottle filled with 0.5 ml of 2% lavender, and 32 patients in control group were given a necklace containing an empty bottle. The pain was effectively decreased by lavender in the long run (72 hours), and there was a significant difference in the degree of pain relief between the two groups. There was no significant difference in the pain intensity between the two groups at 15 minutes, and 4, 8, 24, and 48 hours, although the pain score at 72 hours in the intervention group significantly decreased comparing to the control group. The pain score declined from 6.9 to 1.8 in the intervention group, while it decreased from 6.4 to 3.5 in the control group. The results showed that, this approach is not recommended for immediate reduction of pain, but it is effective in long-term use. The results of study by [29] showed that the average severity of pain through Visual Analogue Scale of the pain before the intervention in both groups were 3.78± 0.24 and 4.16 ±0.32 respectively, and after 3 interventions, the pain score changed to 2.36 ± 0.25 and 3.43±0.31 respectively (p=0.009). The results indicated a significant decrease in pain associated with needle insertion in the arteriovenous fistula in hemodialysis patients after aromatherapy with lavender.

Another study was conducted by [8] on the Effects of inhalation of lavender on pain after cesarean section, which was a triple blind clinical trial conducted on 60 women who were hospitalized for cesarean section. The participants were divided randomly into two groups, and 4, 8 and 12 hours after the onset of pain after cesarean section operation, lavender and placebo were inhaled by the participants. In one group, 3 drops of 10% lavender extract was applied on a ball of cotton and was placed in a container and the attendees were asked to open the cover of the container and smell the content for 5 minutes from 10cm distance. Then the pain intensity of the participants was analyzed and recorded by VAS. The same action was performed on the placebo group. The consent level was 90% in the lavender group, while in the placebo group 50% consent was reported. The utilization of Diclofenac Sodium Suppository as an analgesia was 43.3% in the lavender group, and 76.7% in the placebo group. The results revealed that the pain significantly decreased in the intervention group after cesarean section in 4, 8 and 12 hours after the onset of symptoms following inspiration of lavender essential oil. Results of the study of [30] also showed that smelling lavender extract for 15 minutes reduced migraine pain in the intervention group, so that the decrease was statistically significant (P=0.001). Also in the intervention group, 71.31% of the participants responded to lavender and their pain reduced [30]. In another study by [31] on the impact of lavender on pain intensity of venipuncture, it was found that stress level, the spectral index (STI to monitor sedation), and the pain of needle insertion in a group that received oxygen mixed with lavender for 5 minutes was significantly decreased comparing with the inspection group that took only pure oxygen [31]. Furthermore, [32] examined reducing the need for drug therapy by lavender aromatherapy in 54 obese patients who had undergone laparoscopic gastric banding surgery in post-anesthesia care unit. Lavender essential oil was used through oxygen mask in the intervention group, while the control group received baby oil without perfume through their oxygen mask. Postoperative pain was managed by morphine. The pain score of 0-10 was used to measure the severity of pain in 5, 30 and 60 minutes after the procedure. The placebo group reported considerably more pain compared to the lavender group. Furthermore, the patients' need for morphine after surgery in the lavender group was significantly less compared to placebo group. The result of the study showed that lavender is used to change the requirement for opioids during the postoperative period. In another study done by [33] to assess the effect of lavender on pain reduction, pain management satisfaction and the need for opioid in patients undergoing breast biopsy procedure, 25 patients in the experiment group received 2% lavender extract through oxygen mask, and the controls received only pure oxygen. The servility of pain was measured in 5, 30 and 60 minutes after lavender inhalation. The results showed that, lavender neither reduced the pain caused by breast biopsy, nor reduced the need for opioid, but increased the patients' satisfaction in controlling the pain. Another study was conducted by [34] investigating the effects of lavender on the severity of pain by IUD insertion, which was conducted on 135 women undergoing IUD insertion. The samples were randomly divided into three groups (lavender, sesame seed oil and control groups). The essential oil of lavender (10%) was dissolved in sesame oil. The sesame oil was used as a placebo. In the two lavender and placebo groups, three drops of lavender essential oil or sesame seed oil were applied on cotton ball and placed in closed containers marked with letters A and B. The participants were asked to open the container's cover and smell the content from 7-10 cm distance for 5 minutes. After the intervention, the intensity of pain was immediately measured by Visual Analogue Scale and was recorded. The average pain score in lavender, sesame seed, and control groups were (2.60±2.71), (4.57±2.71), and (3.82±2.08), respectively (P<0.001). The results demonstrated that the mean score of pain in the three groups was significantly different after the intervention, and lavender breathing reduces pain of IUD insertion. In the study by [25] that examined the effect of lavender breathing on the amount of pain severity during insertion of vascular needles in hemodialysis patients, at first, the severity of pain caused by needle insertion was measured without any interference. Then, the measurement of pain after lavender inhalation was carried out. The results indicated that there was no significant difference in pain intensity between those patients who were inhaling lavender and those who received no intervention. In the study of [35], both groups of intervention and control smelled a towel paper containing 1.0 ml of lavender oil mixed with 1 ml of distilled water while it was attached to their

clothes. The results of their study showed that, lavender aromatherapy prevented the severity of pain in primiparous women in the intervention group compared to the control group. In a study by [36] on the pain of natural birth, 120 nulliparous women were selected by conventional sampling method and were divided randomly into two groups. In the intervention group, the cold lavender inhaler was used and in the control group, a cold water inhaler was used. Then, the pain severity was measured by visual analog scale before and after the intervention in dilatations of 4-6, 6-8 and 8-10 cm. The results indicated that, aromatherapy is the main complementary medicines. The results of the study by [37] revealed that, lavender massage is effective in relieving pain and psychologically support during labor. In the study of [38] on the effect of lavender on the severity of headache caused by infusion of nitroglycerin in patients admitted to the CCU, 135 patients were accidentally divided into 3 groups (lavender, acetaminophen and placebo). The samples in the lavender and placebo groups smelled lavender extract and liquid paraffin for 30 minutes respectively. Acetaminophen tablet (325 mg) was given to the samples in the acetaminophen group, and then, before the intervention, and 15, 30 and 60 minutes after the end of the intervention, the headache severity was measured by visual analog scale. Significant differences ($p = 0.001$) were observed between the pain intensity in the three groups. A significant difference was found between the pain intensity of the headaches of the lavender group participants and acetaminophen group was significant ($p = 0.001$), and also the acetaminophen group and the placebo group ($p = 0.001$).

Conclusion

Nowadays, aromatherapy is known as a medical procedure supplementing positive effects which have been tested in many studies. As a result of rapid growth of aromatherapy in the world and the great interest in this therapy, and also considering aromatherapy studies have been conducted on various diseases, it has been suggested that, nurses should use this therapy at their workplace and homes. According to the studies, the most commonly used application of aromatherapy is through inhalation, as it is easy, quick and effective. Aromatherapy with lavender helps to manage pain in different patients through inhalation. However, further studies are required to be conducted to substantiate this claim.

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