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Effect of Lavender (*Lavandula angustifolia*) on Pain and Anxiety

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ABSTRACT:-Lavender is used in traditional medicine as an essential part of phytotherapy, pharmacy, and aromatherapy in the treatment of central nervous system disorders such as anxiety, stress, depression, and insomnia due to its high concentration of linalool and linalyl acetate. Inhalation stimulates the limbic system, achieving analgesic or antinociceptive effects.Since conventional treatments for pain and anxiety cause side effects, lavender essential oil, being a medium-active extract, is safe to administer. However, there is a lack of studies that promote a broad view of its application in these ailments. Therefore, this study aimed to evaluate the available literature, on a scientific basis, to determine the effect that lavender (*Lavandula angustifolia*) has on pain and anxiety.In conclusion, most studies support its effectiveness in relieving pain and reducing anxiety. Therefore, it should be considered as a complementary therapy due to its low cost and ease of implementation.

KEY WORDS:

Lavender, *Lavandula angustifolia,* essential oil, pain, anxiety.

INTRODUCTION:

Lavender *Lavandula angustifolia* is from the Lemnaceae family, a valuable perennial plant known as therapeutic lavender, cultivated for its use as an essential oil (EO) [1] having medicinal effects such as anxiolytic, mood regulator, and analgesic; being recognized for its

security of the application [2], its low toxicity and allergy properties compared to other essential oils [3]. Having a positive effect on the body, mind, and spirit [4]; stimulating the limbic system, especially the amygdala and hippocampus [5], in addition to regulating the endocrine system and the autonomic nervous system [6].

In anxiety treatments, the first drugs to be used are benzodiazepines (BDZ) and selective serotonin reuptake inhibitors (SSRIs), which cause side effects [7], while chronic pain drugs such as opioids can cause nausea, vomiting, respiratory depression, constipation, sedation, and dependence [8]. So, it's important to discover alternative therapies to mitigate anxiety and pain to minimize risk [2]. The components of lavender EO (*Lavandula angustifolia*), such as ketone, linalool, and linalyl acetate, have sedative, pain reduction, and anti-inflammatory effects [9].

Taking this into account, lavender essential oil (*Lavandula angustifolia*) is important in the complementary medicinal area to reduce pain and anxiety, in addition to being safe because it is a medium-activity extract that does not compromise the quality of life of those who consume it. However, there is a lack of studies that promote a broad vision of its application in these physical and mental discomforts.

Therefore, this study aimed to compile the most recent literature on the effect of lavender (*Lavandula angustifolia*) on pain and anxiety.

Historical background:

Lavender belongs to the family (Laminae) and has been used in therapies and cosmetics for several centuries [10], *Lavandula angustifolia* is known as English lavender and is one of the four main lavender species, previously named L. vera or L. offinalis [1] having a wide variety of mono alcohols, sesquiterpenoids, esters, oxides, ketones [11], linalyl acetate, linalool, perilyl albohol, among 100 other compounds in its flowers and leaves [12], however,

medicinal matter such as essential oil (EO) is mainly extracted from flowers [13], being used in traditional medicine orally, topically, or inhaled [14], in addition to being recognized for having antidepressant, antiseptic, sedative, relaxing and antiemetic properties [15].

Lavandula angustifolia is popular in herbal medicine, pharmacy, and aromatherapy as a treatment for central nervous system (CNS) disorders such as anxiety, stress, depression, and insomnia [16]. Due to its high concentration of linalool and linalyl acetate, it is considered a raw material of the pharmacopeia [15]. Therefore, its same volatile components are effective through inhalation [8], stimulating the limbic system in the brain, influencing the autonomic and endocrine nervous system, entering through the capillaries through the alveoli [17].

Lavender's Effect on Pain:

Nonsteroidal anti-inflammatory drugs (NSAIDs) are used in daily pain treatment and can cause side effects including respiratory pressure, bleeding, nausea, vomiting, itching, urinary obstruction, and bowel obstruction [18]; therefore, the use of EC is used safely, easily with a low cost [4].

Inhalation exposure has been found to have mechanisms underlying analgesic or antinociceptive effects, serving as a bridge for olfactory-somatosensory processing to be involved in pain enhancement [19], through the olfactory nerve that carries immediate information to the limbic system [20], stimulating the nervous system by releasing endorphins and norepinephrine that create positive psychological effects [21].

Studies show results where the quality, severity, and intensity of postherpetic pain are reduced by lavender aromatherapy [8], In a clinical trial with 52 postoperative cardiac surgery patients, lavender oil was applied for 30 minutes, resulting in pain relief [22], while for the same exposure time it was tested in an animal model, for the improvement of orofacial

postoperative pain, proving that the AE of *Lavandula angustifolia* has antinociceptive and anxiolytic effects in orofacial pain conditions [20].

Aromatherapy was applied to 98 patients undergoing coronary surgery, who inhaled 5 drops of *Lavandula* EO through a sterile gauze collar, for 24 hours over a period of three days, showing a reduction in the patient's pain [18], in addition to decreasing postoperative pain after inguinal hernia surgery, by inhaling four drops of the EO with oxygen for 20 minutes [23].

Lavender is used in patients as an analgesic agent for post-dural puncture headache (DCC) by inhaling lavender EO for 15 minutes before puncture and five times after surgery, resulting in a reduction in the severity of DCC only after surgery [24], In the same way, this therapy has been carried out in premature babies in the heel puncture, with the inhalation of the aroma being effective to control pain [25]. In diabetic patients, the essential oil was applied topically to reduce pain from puncture by frequent insulin injections, showing that applying the essential oil topically perceived less pain after the injection [26].

While bath therapy in postoperative patients has been used, the application of the EC of *Lavandula angustifolia* by means of foot baths; is of complementary help, economical, improves the quality of sleep, and is effective in reducing pain [5]. In addition, a group of newborns tested the effect of massage and bath with lavender for stress, pain, and behavior; Aromatherapy through massage has shown that aromatherapy through massage reduces stress levels, and pain, and shows improvement in behavior compared to lavender essential oil baths [27].

However, new administrations of Lavender EO have been found by means of dermal patches with doses of ibuprofen, used to reduce gastrointestinal side effects in oral administration, achieving better permeability and showing a faster therapeutic effect [28].

Lavender's Effect on Anxiety:

The importance of addressing this therapy in anxiety derives from the problems involved in consuming anxiolytics, which are the cause of side effects, changes in concentration, delirium, amnesia, dependence, and withdrawal syndrome [29]. Lavender has been found to have anxiolytic effects like lorazepam [30]. The variety of studies credits aromatherapy for stimulating the production of endorphins that decrease anxiety levels and encourage relaxation [31]. Linalool stimulates the secretion of serotonin in the brain, acting as a sedative and improving mood in patients [32].

The *Lavandula angustifolia* EO was studied in post-cesarean women, receiving aromatherapy for 5 minutes, with two drops through a mask after giving birth, finding that the intervention reduces the need for intraoperative anxiolytic [9]. Inhalation in patients scheduled for colonoscopy turned out to be a simple therapy, increasing patient comfort with a positive, although statistically insignificant, effect on anxiety [33]. While in the preoperative room, it has been found that the complementary intervention of this extract causes a decrease in average anxiety scores [34].

In patients with cardiovascular pre-intervention anxiety, they underwent aromatherapy with *Lavandula angustifolia* oil and combined sham auricular acupuncture, resulting in this combination significantly reducing anxiety [35], the same decrease in fatigue and anxiety was found in hemodialysis patients when the oil was administered in an inhaled manner [36], while in cancer patients it was effective in relieving anxiety [37].

It was found that women who underwent intrauterine insemination were given a bag by applying a drop of lavender essential oil (*Lavandula angustifolia*), while a drop of water was used in the control group, asking the participants to inhale the bag during the intervention, arrogating as a result that the inhalation of the *Lavandula angustifolia* EO reduced anxiety and the women preferred it to use it during their fertility intervention [38]. In addition to administering 3 to 4 drops of EC diluted in a diffuser for 10 to 15 minutes for 21 days, to

nursing students, revealing that at the beginning of lavender therapy, 70% did not present anxiety, 12% mild anxiety and 18% moderate anxiety, after the intervention with aromatherapy they arrogated favorable percentages since 85% did not present anxiety, 13% had mild anxiety and 2% had moderate anxiety, finding this natural treatment favorable for social anxiety [30].

The fractions of lavender essence were studied in a rat model to relieve sleep disorders by the combination of anxiety and caffeine, yielding multifaceted results for sleep improvement in relation to the GABAergic, cholinergic system, histaminergic system, and monoamines in the limbic system [39], It also demonstrates that lavender aromatherapy treats anxiety by its sedative effects specifically in the brain, through inhibition of the GABA receptor, antagonism of neurotransmitter receptors found in the postsynaptic membrane of a neuron, inhibition of tension-dependent calcium channels, inhibition of SERT and involvement of 5HT-1 receptors [40].

In addition, a new therapeutic was found in search of bibliographies that through the steam distillation of *Lavandula angustifolia* flowers manufactured the essential oil of Silexan with 80mg of dose in a tablet, which has shown anxiolytic effects in patients with generalized anxiety disorders and subthreshold anxiety [41], showing an efficient treatment in the early or mild stages of anxiety disorder [42].

Effect of Lavender (*Lavandula angustifolia*) on Pain and Anxiety:

In dental therapy, aromatherapy therapy has been used with 175 patients to reduce the intensity of dental pain and level of anxiety, for which they were given to inhale 2% of the essence of *Lavandula angustifolia*, while the control group was given distilled water, through the intervention vital signs were measured; pain scale and anxiety score as predictable variables, finding that aromatherapy reduced pain scores by two times more than the control group and anxiety by three to four times more than the control group [32]. In the same

discipline, the study was carried out on children for tooth extraction, where they were given to inhale lavender essence for 3 minutes before the intervention, finding a reduction in anxiety levels and a decrease in pain during local anesthesia and extraction procedures [43]. In addition to being found to reduce pain and anxiety after cesarean delivery [44], improved blood pressure, pain levels, anxiety, and increased oxygen saturation in patients prior to cholangiopancreatography [3].

CONCLUSION:

Concluding that most studies justify the effectiveness of the effect that lavender essential oil (*Lavandula angustifolia*) on pain relief and reducing anxiety.

According to the exhaustive analysis, *Lavandula angustifolia* essential oil has efficacy in reducing pain and anxiety due to its volatile components such as linalyl acetate and linalool. Therefore, it should be considered in the daily practice of health personnel as a complementary therapy due to its low cost and easy performance, to help people have a better quality of life while taking into account the considerations of safety and efficacy; since it acts like any drug due to its route of administration, dose and susceptibility of the patient, it could also generate few side effects, finding that by inhalation that directly connects the CNS with the external environment, for which more research should be carried out to learn more about these adverse effects since they are not mentioned in the literature.

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