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Healing through scent: A review of aromatherapy's effects on anxiety

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Abstract

Purpose of review: Anxiety issues like panic disorder, social anxiety, general anxiety, and specific fears are super common all over the world. They often pop up with depression, which can make treatment tricky and adds to health problems. Anxiety seems to mess with emotional circuits, causing too much activity of one thing, not enough of another, and shortages of certain chemicals in the brain. The purpose of this review is to find suitability of aromatherapy for health to deal with anxiety.

Sources of information: Reviews, trials, and other studies were checked to find the help of aromatherapy in different cases who felt anxious, such as patients before surgery, those on dialysis, and women giving birth.

Key findings: Aromatherapy affects anxiety by using oils like lavender, sweet orange, rose, peppermint, chamomile, and bergamot. The results suggest that breathing in these oils, especially lavender and sweet oranges, can lower anxiety, boost mood, and calm things like heart rate and blood pressure. It means lavender assists release a feel-good chemical, which helps with relaxation and pain with mixed results.

Conclusion: In general, aromatherapy is a safe, cheap, and gentle way to help manage anxiety. The first signs are good, but more studies are needed to find the best oils, how to use them, and how they work.

Keywords: Anxiety disorders; Aromatherapy; Essential Oils; Lavender; Citrus aurantium; Complementary therapy

1. Introduction:

Anxiety disorders are super common. They include things like panic attacks, separation anxiety, phobias, social anxiety, and just feeling generally anxious all the time. It's also common for people with anxiety to have other mental health issues too, like depression, which can make things tougher to treat. In general, anxiety and depression can really get into the way of daily life and cause health problems. Basically, anxiety is an awful feeling associated with the brain's threat response system going haywire. It might be due to an imbalance in brain chemicals like glutamate (too much) or GABA (not enough). These chemicals are important for keeping anxiety in check, can be often good targets for medications. Anxiety can also be related to low levels of other brain chemicals like dopamine, noradrenaline, and serotonin, and extent of issues for usage of them in brain [1].

Aromatherapy is a type of alternative medicine where scents and oils are used to help with things like anxiety, kidney dialysis, and heart issues. It involves using plant extracts called essential oils to bring the body and mind back into balance. The term aromatherapy came from a French chemist named Gattefosse in the 1930s. But people have been using plant oils for healing for ages. In fact, essential oils are the plant's secret weapon for survival. They're naturally made by plants mostly on their surface. These oils are located from all sorts of plant parts like flowers, leaves, seeds,

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and even roots. They're made of complex stuff like hydrocarbons and other compounds. Scientists have been studying essential oils a lot because they can get into cells and do all sorts of things and have found that they can fight germs, reduce inflammation, and even combat tumors [2,3,4,5].

2. History of aromatherapy for anxiety:

Aromatherapy is becoming more popular as an alternative treatment and is sometimes used with regular medicine. Using plant oils for healing has been around for ages, with ancient Greeks, Indians, and Egyptians using it. The industrial revolution saw essential oils produced for sale in the early 1800s. Then, in the 1960s, these oils were sold for aromatherapy in Britain, and holistic treatments became trendy in Europe. Since then, alternative medicine has become a major part around the globe, sparking the interest of psychology researchers who started checking applicability of aromatherapy claims.

Initial studies showed that oils impact mood, with rosemary and lavender making people feel good. Burnett, Solterbeck, and Strapp reported different effects on mood. These effects have been confirmed in formal tests, too. Campenni, Crawley, and Meier showed that heart rate went down with a relaxing smell but went up with a stimulating one. The results by Burnett et al. and Campenni et al. suggest that the oil's outcome can switch with the session of their usage [6].

Lehrner, Marwinski, Lehr, Johren, and Deecke looked at anxiety in patients in a dentist's office. Two hundred people sniffed lavender, orange, or nothing. The people who inhaled lavender felt less anxious. Another study at a dentist's office showed the same results. Braden, Reichow, and Halm found that lavender oil could ease anxiety in surgery patients. McCaffrey, Thomas, and Kinzelman also found that breathing in lavender lowered physiological signs of anxiety, like pulse rate, in nursing students before an exam [7].

Many times, ICU patients get anxious and agitated. Babatabar Darzi et al. checked how rose and lavender affected anxiety, pain, and recovery time after heart surgery, while Akbari et al. studied peppermint oil for catheter pain and anxiety in heart patients. The results didn't reveal any real difference in anxiety among the groups. Mashouf et al. looked at the lavender's effect on agitated patients on ventilators in the ICU. They found that lavender helped calm the patients compared to those who got nothing. Karadag et al. checked that lavender could ease anxiety in heart ICU patients, and Cho et al. studied its effects on anxiety and vitals in patients getting a heart procedure in the ICU. The results suggested that aromatherapy might lower anxiety [3].

3. Key findings:

3.1. Marketed Products Using Lavender Oil

One well-known product is Silexan, like a special lavender oil that can be taken as a pill. Studies show it can really help with general anxiety, so lavender might be more than just a nice smell. Lavender oil (*Lavandula angustifolia*) is a popular aromatherapy choice that's been studied a lot. It is available as pure oil, in roll-ons, sprays, or diffusers. Lots of folks use lavender oil to chill out, sleep better, and worry less [1].

3.2. Oil Mixes for Aromatherapy

Many aromatherapy products mix different oils for relaxation and even more. These often combine lavender, chamomile, ylang-ylang, and bergamot. Each of these oils is known for their help in calming down. Lavender is good for relaxing and sleeping, while chamomile can ease tension. Ylang-ylang can balance mood and might lower blood pressure, and bergamot's nice smell can lift spirits and calm anxiety. By mixing these oils, companies hope to make something that works even better for stress. These mixes are called stress-relief or relaxation oils, and they're used in hospitals, spas, homes, and yoga places [8].

3.3. Aromatherapy gadgets

Aromatherapy gadgets are getting more popular because they make using aromatherapy easier. These include electric diffusers, inhalers, patches, and even jewelry that holds scents. Electric diffusers spread essential oils in the air to make a calm space at home or work. Inhalers are like little sticks that can be carried to smell the oils on the go. Aroma patches let enjoyment long lasting as they scent all day long by slowly releasing the oils. The wearable items ease to keep favorite scents close to body for looking good and feeling relaxed. These new options make aromatherapy easier to use and more helpful for everyday life [6].

3.4. Patented products

Lavender oil extracts like Silexan are protected by patents. These patents cover how the oil is made, what are its constituents, and how they help with anxiety. The patents make sure that the product is the same high quality every time. By keeping the amounts of important ingredients like linalool and linalyl acetate the same, the extracts can be graded to ease anxiety. This not only helps it work in studies but also backs up the science and meets rules [9].

Aromatherapy has some new inventions that are also patented, such as:

- Aroma patches that release scents slowly
- Inhalers for essential oils
- Tiny capsules that release essential oils over time

These inventions try to make aromatherapy more stable, easier to use, and more reliable [10].

Main methods of preparation of essential oils used in aromatherapy:

3.4.1. Steam distillation

The essential oils are extracted from plant parts using steam. The first step is proper collection of plant parts like leaves and flowers and chuck them into a special container connected to a steam maker. The steam goes into the container, gets into the plant stuff, and pops open in these tiny pockets full of oil. When those pockets burst, the good-smelling fragrance that makes up the essential oils turns into a gaseous state and floats away with the steam. Then, this mix of steam and oil gas goes through a heat exchanger. It turns the gas back into a liquid, which is now water mixed with essential oil. Oil and water don't mix, so they split into layers and the essential oil separated by Florentine receivers [11].

3.4.2. Water extract

In this method, plant bits are dumped into water and heated until it boils. The steam and good-smelling gas go to a condenser which turns them back into liquid. The lighter essential oils tend to float on the top of the water, then the oil is separated. The leftover water, called hydrosol, is also good and can be used as aromatic water [2].

3.4.3. Squeezing Cold

To get essential oils from oranges and lemons, a cold press is used. The outer skin of the fruit has tiny oil pockets. Machines rough up the skin to break those pockets and release the oils. When the sacs are broken, yield a mix of oil and water with bits of peel. Then, the mixture is spinned fast or let it be allowed to get the oil separated from the water and solid stuff. Since there's no heat, the oil keeps its smell and stays the same. That makes it raw material for aromatherapy and perfumes [2].

3.5. Clinical evaluation

Most studies reported were randomized controlled trials (RCTs). These are the best ways to prove cause and effect because they use random assignments to reduce skewed results. Besides RCTs, some quasi-experimental studies without full random assignments have also been reported; they provide useful information by testing in everyday situations. Few observational studies (cohort and case-control studies) have also been experimenting to understand what happens naturally, without anyone stepping in to change things. In addition, systematic reviews and meta-analyses have also been done. These approaches draw data from lots of studies, making the evidence stronger by giving summaries and number-based analysis of what's already out there. To measure worry, studies used standard tests like the State-Trait Anxiety Inventory (STAI), Visual Analogue Scale (VAS), and Hospital Anxiety and Depression Scale (HADS) [8].

3.6. Common essential oils used for anxiety

Aromatherapy, a popular treatment for anxiety, involves using fragrant oils. These oils are often paired with massage to induce relaxation and ease anxiety. Some oils that can be used in aromatherapy are lavender, bergamot, chamomile, frankincense, ylang ylang, lemon, clary sage, rose, neroli, jasmine, cedarwood, marjoram, *citrus aurantium* and peppermint. Lavender aromatherapy stands out, though, because it's easy to use, has no bad side effects, isn't invasive, and doesn't cost a lot [8].

Lavender aromatherapy can wake up the brain to release hormones that make feeling good, calming down, and hurt less. Lavender also affects the heart, gets blood moving, and helps feel peaceful. Hence, it fights depression and anxiety, eases spasms, kills germs, and helps with sleep and reduces pain.

Aromatherapy that involves sweet orange noticeably lowered pain over time, also helped lessen anxiety, with a link between them. Breathing in sweet orange also brought down blood pressure, heart rate, breathing rate, and fetal heart rate [9].

Damask rose oils help with anxiety and pain after C-sections. Aromatherapy with damask roses can make patient less anxious and sleep better. Lemon oil, from lemons, is also great with antioxidant, germ-fighting, and mood-boosting powers [1,12].

3.7. Mode of administration

Breathing in, massage and putting on skin were three frequently used modes of administration. Breathing in the scent was the most popular way to use the oils, and it seemed to work better for easing anxiety than putting it on the skin or using massage. A few times when people were exposed to the scents, how strong the scents were, and how often they used them made the results vary between studies [8].

3.8. Aroma therapy in different settings

3.8.1. Aromatherapy for Hospital Patients

Research on patients in different hospital areas (medical, surgical, ICU, etc.) shows aromatherapy is good for easing anxiety. Being in a hospital can be tough as it is a strange place, dealing with being sick and medical aids. Aromatherapy, mostly with lavender, can help to relax, feel less worried, sleep better, and just be more comfortable. Lots of research has found that anxiety goes way down when using it and it does not interfere with regular medical care [8].

3.8.2. Worries Before Surgery

People get nervous before surgery, and that can make things harder during and after the procedure. But, using lavender aromatherapy beforehand seems to help calm those nerves when compared to those who didn't get it. Besides feeling less anxious, people also had lower heart rates and blood pressure. So, aromatherapy can really help with both mind and body before surgery, making it a helpful part of overall care [8].

3.8.3. Stressed-Out Students

School and tests can cause a lot of anxiety for students. Research shows that essential oils, like lavender and citrus, can help college students feel less anxious. Aromatherapy is simple, cheap, and doesn't involve any medicines, seems to be a good way to help students deal with stress and feel better overall [13].

3.8.4. Anxious Elderly Folks

Older adults often feel anxious because of health issues, memory problems, or just being lonely. Research in this area has found that aromatherapy can lower anxiety and boost mood. Lavender is a great choice for older people because it's safe, easy to use, and doesn't take a lot of energy. So, aromatherapy is useful in nursing homes and other programs that help older adults [8].

Overall, aromatherapy, especially with lavender, seems to consistently reduce anxiety for all ages and in different situations, both in and out of the hospital. Most research shows anxiety scores go down a lot, and physical stress gets better too. And the best part is that no one has reported any big problems. This means aromatherapy is a ‘safe and effective’ way to add to current treatments in place. The Summary of Previous Studies on Aromatherapy and Anxiety was listed in table 1.

Table 1 The summary of studies and outcomes

Study Setting	Population	Essential Oil Used	Measurement Tools	Major Findings
Hospitalized patients	Medical and surgical patients	Lavender	STAI, HADS	Reduced anxiety, improved relaxation and sleep
Preoperative care	Surgical patients	Lavender	STAI, VAS-A	Lower preoperative anxiety, stable vital signs
Students	College/University students	Lavender, Citrus oils	STAI	Reduced academic and exam-related anxiety
Elderly	Older adults	Lavender, Rose	HADS, STAI	Improved mood and reduced anxiety
Systematic reviews	Mixed populations	Lavender	Multiple scales	Majority showed significant anxiety reduction

3.9. Limitations

Even though more people are using aromatherapy as a helpful treatment, there are still some important things to consider when looking at how effective and scientifically valid it really is.

3.9.1. Lack of Standard Dosage

One big issue with aromatherapy is that there are no clear rules about how much of an essential oil to use. Different studies use different kinds of oils, different strengths, different numbers of drops, and different ways of applying them, like inhaling, massaging, or using a diffuser. Without a set standard, it's hard to compare results between studies and come up with clear advice for real-world use [10].

3.9.2. Small Sample Sizes

A lot of research on aromatherapy is based on small groups of people. This makes it hard to draw strong conclusions because the results may not apply to a bigger or more varied group. The findings from these studies might not be accurate for most people, which weakens the support for the treatment [13].

3.9.3. Subjective Outcome Measures

When checking if aromatherapy works, researchers often rely on what people say, like how they feel about their anxiety, pain, or sleep. These are useful, but they depend on personal feelings and can be influenced by things like expecting it to work or even a placebo effect. This makes the results less objective [6].

3.9.4. Risk of Allergic Reactions

Even though essential oils are usually safe, they're very strong and can cause problems for some people. They might cause allergies, skin irritation, headaches, nausea, or breathing issues. If the oil isn't properly diluted or used for too long, these problems can get worse.

3.10. Future trends

The vast amounts of scientific research and empirical data can be analyzed by AI algorithms to identify the most effective essential oil combinations for specific health conditions or wellness goals. AI systems can also be used to tailor the individual needs with specific essential oils or blends. The overall user experience and therapeutic benefits of aromatherapy enhanced by iterative process and maximizes personalized treatment. The user's daily activities and sleep patterns, by AI algorithms can optimize aromatherapy schedules. In addition, alerting to refill essential oil cartridges or replacing diffuser components by AI-powered devices ensures uninterrupted aromatherapy sessions through virtual assistants or smart phone apps.

4. Conclusions

Aromatherapy might be a good add-on treatment for anxiety. We need more well-done studies to figure out exactly how it works and what it does to the body. Of all the essential oils we checked out, lavender and *Citrus aurantium*/*Citrus sinensis* seemed to calm nerves the most consistently. Lavender oil seemed to lower both general and immediate worry. From what we've seen, essential oils can ease both immediate and general anxiety. *Citrus aurantium L.* oil looks like the best bet for anxiety because it really helps lower anxiety scores. *C. sinensis* oil seems to cut down on pain and anxiety during childbirth. This means it could be really useful during labor. The AI based systems can further enhance the beneficial effects and combat the limitations.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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