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Using Essential Oils to Enhance Nursing Practice and for Self-Care

A simple, sensory way to provide comfort and decrease certain symptoms.

ABSTRACT: With the growing popularity of integrative medicine, essential oils have found their way back into health care. Essential oils provide a simple way to alleviate certain physical symptoms, promote emotional well-being, and provide comfort. This article, the last in a five-part series on holistic nursing, discusses the administration and common uses of essential oils; their reported benefits, potential risks, and contraindications; and the current state of associated research. The authors focus specifically on the inhalation, both direct and by diffusion, as well as the topical application of essential oils, providing guidance for their use in acute care, self-care, community nursing, and long-term care that will enable readers to incorporate this modality into nursing practice.

Keywords: aromatherapy, essential oils, holistic nursing, integrative nursing, self-care

James O'Dell, a middle-aged man, was prescribed five weeks of daily palliative radiation therapy for head and neck cancer. (This case is a composite based on our experience.) Both the simulation process and subsequent treatments required him to wear a tightly fitting mask over his entire face and neck. As the mask was applied, his nurse noticed his discomfort and increased restlessness. With a great deal of coaxing and support from the nursing staff, he was able to make it through the simulation process and the first few radiation treatments, but said he found each session increasingly difficult.

Mr. O'Dell was given a prescription for lorazepam and was instructed to take it 30 to 60 minutes before each treatment and to arrange for a friend or family member to drive him to and from his appointments while using this anxiolytic drug. When he arrived for his next appointment, Mr. O'Dell said he was unable to tolerate the discomfort of the mask any longer but acknowledged that he had not filled the prescription for lorazepam because he didn't want to impose on a family member or friend for daily transportation.

To help him with his anxiety and distress about the treatment process, Mr. O'Dell's nurse decided to explore another intervention available at the facility: essential oils. The nurse gave Mr. O'Dell an inhaler with a blend of lavender and frankincense oils and instructed him to breathe in the aromas deeply and

Clinical nurse Fawn Burgess uses essential oils with a patient in the Psychiatric Medicine Center at Salem Health, Salem, Oregon. Photo courtesy of Margo Halm.

slowly for 10 minutes prior to every radiation treatment. Not only was he able to complete the next several treatments with greater ease, but he asked if he could take the inhaler with him to use before clinic appointments and throughout the day as needed. After several sessions, he began enthusiastically telling other patients in the waiting room, "You've got to get one of these—they're amazing!" Subsequently, Mr. O'Dell completed his prescribed radiation treatments using only an essential oil inhaler and no medication to manage his anxiety.

An important aspect of nursing care is the effort to ease a patient's experience of illness or injury by providing care and comfort during this time. If we truly aim to treat the whole person, we must maintain an awareness of body, mind, and spirit working together. In addition to our effective use of conventional Western interventions, nurses can provide comfort to patients and alleviate certain physical and psychological symptoms through simple, sensory holistic modalities such as essential oil therapy. Here we describe how these oils may be used in acute care, self-care, community nursing, and long-term care. We discuss the administration and common uses of essential oils; their reported benefits, potential risks, and contraindications; and the current state of associated research.

USE OF ESSENTIAL OILS IN HEALTH CARE

The use of essential oils is believed to date back 5,000 years, based on evidence of plant distillation in the Middle East and Egypt.[1] Today, essential oils have found their way back into health care with the growing popularity of integrative nursing. Extracted by steam or hydrodistillation from aromatic plants, essential oils contain volatile, complex chemical compounds known for their antibacterial, antiviral, antifungal, antiinflammatory, and other medicinal properties.[2] The chemical substances contained in an essential oil determine its effects, and their recognition determines the oil's particular therapeutic use. Today, through tests such as gas chromatography and mass spectrometry, we can better ascertain the specific chemical constituents of a plant's essential oil.[3]

Essential oil therapy refers to the use of "therapeutic grade essential oils to promote physical, emotional, and spiritual health and well-being."[4] It is often called "aromatherapy," but the odor of the oils is not always pleasant and inhalation is only one of the ways they are absorbed. The therapeutic value of an essential oil relies on its chemical constituents, the route of administration, and often less measurable elements, such as the pleasantness or astringency of its scent, or its associations for a particular patient. The most common routes of administration are inhalation (direct or by diffusion) and topical application, sometimes through massage. Once absorbed into the circulatory and nervous systems, the chemicals may eventually affect all body systems.[1]

The experience that follows inhalation of an essential oil is more than simply the perception of an aroma. When oils enter the body through inhalation, the molecules stimulate olfactory pathways that are closely connected to portions of the brain's limbic system, which influences heart rate, blood pressure, respiratory rate, memory, and hormone levels. The limbic system includes the brain's amygdala, which plays a major role in such reactions as fear and anger, and becomes highly active during emotional trauma.

When applied topically, certain essential oils have been found to make skin more penetrable, which could, theoretically, cause them to potentiate the effectiveness of other topical pharmaceuticals, or of other essential oils when used in a blended concoction.[5] A study of the absorbency of lavender oil found that its two main constituents, linalool and linalyl acetate, were detectable in the blood of a single male subject for up to 90 minutes following a lavender massage.[6] Absorption through inhalation of the fragrant molecules during the massage may have also been a factor, but the absorption patterns of essential oils in humans have not been widely studied. Further clinical research in this area may be beneficial.

Making an Inhaler Stick

To create an inhaler stick, assemble the following:

- a blank inhaler with a wick
- a medicine cup
- the essential oil(s)
- gloves
- a label

After putting on the gloves, place 20 to 25 drops of the essential oil in the medicine cup. (Swirl to combine the oils if using more than one.) Place the wick into the cup until all the oil is absorbed. Place the wick into the inhaler tube, secure the cap, and tightly screw the inhaler cover onto the inhaler tube. Label the inhaler with the essential oil(s) used.

ADMINISTRATION TECHNIQUES

The means by which essential oils are administered should be determined based on the oils being used, the condition for which they're being used, the desired effect, the nurse's skill and knowledge level, and the preference of the patient. In the health care setting, essential oils are generally administered in one of three ways:

- direct inhalation–breathing in the scent of the oil from a drop or two on a cotton ball, tissue, or inhaler wick (see *Making an Inhaler Stick*) for five to 10 minutes as needed to relieve symptoms
- indirect inhalation–breathing the scent dispersed in ambient air, either by an electric or battery-powered diffuser filled with three to 10 drops of oil or by a spray bottle filled with 250 mL of water and 10 to 12 drops of oil
- topical application–by massage, light touch, or spray

When considering the use of essential oils as a nursing intervention tool, take an inventory of symptoms or conduct a general well-being assessment. To determine the appropriate intervention and application, consider the underlying indication and common uses of the available oils (see Table 1).

With few exceptions, 100% essential oils should be applied *not* directly to the skin, but in diluted forms (constituting 1.5% to 2% of a carrier oil, lotion, or gel).[7] Half the concentration is advised for use in patients who are very young, elderly, or medically or cognitively compromised. In 5 mL of a carrier substance, each drop (0.05 mL) of an essential oil is equivalent to a 1% dilution, so two drops are equivalent to a 2% dilution, three drops to a 3% dilution, and so on. Topical absorption can be enhanced by heat—for example, by putting a warm towel over the area to which the essential oil solution is applied.

Essential oils can also be delivered through mouthwashes and gargles containing three drops of the oil in 15 mL of warm water.

SUPPORTIVE RESEARCH AND METHODOLOGICAL CRITICISM

Essential oils have been commonly used to alleviate nausea and vomiting,[8] decrease pain,[9-12] reduce anxiety,[13, 14] diminish mental fatigue,[15] and, with mixed results, improve behavioral and psychological symptoms in dementia.[16] In recent years, an increasing amount of research has been conducted on the efficacy of essential oils for these and other purposes.

Supportive research. One study suggests that inhalation of the essential oils lavender and rosemary may affect mood, anxiety levels, and alertness.[17] In this study, 40 adults were randomly assigned to receive aromatherapy with one of these two essential oils by direct inhalation. Following the sessions, both groups demonstrated a significant reduction in anxiety, as measured by the State-Trait Anxiety Inventory (STAI). The lavender group showed improved mood,

Table 1. Popular Essential Oils and Their Common Uses

Oil (Botanical Name)	Common Uses
Bergamot (*Citrus bergamia*)	• For skin conditions such as acne and insect bites • To produce a calming effect
Eucalyptus (*Eucalyptus globulus*)	• As a topical disinfectant, expectorant, or mucolytic • To open sinus passages • To alleviate the pain of arthritis, muscle aches, and sprains • As an air purifier
Frankincense (*Boswellia carterii*)	• To relieve symptoms of the common cold • To reduce symptoms of depression • To induce relaxation
Lavender (*Lavandula angustifolia*)	• For burns and insect bites • To alleviate anxiety and insomnia
Peppermint (*Mentha piperita*)	• For headaches, fever, fatigue, and muscle soreness
Tea Tree (*Melaleuca alternifolia*)	• For skin conditions, including viral, bacterial, and fungal infections

as measured by the Profile of Mood States, and the rosemary group reported feeling more alert. Electroencephalography data, recorded for three-minute periods before, during, and after the aromatherapy sessions, showed that frontal beta 2 power, associated with drowsiness, increased after sessions in both groups, while frontal alpha power, associated with relaxation and drowsiness, increased significantly after the lavender sessions, but decreased after the rosemary sessions, which provided some physiologic support for the subjective reports of reduced anxiety in both groups and the reported increased alertness in the rosemary group.

In an Austrian study of 200 patients waiting to undergo dental procedures, the effects of diffusing orange or lavender oils in the waiting room were compared with playing music and with providing no ambient intervention (control). Both the orange and the lavender oils, diffused separately, were found to significantly reduce anxiety (as assessed by a German version of the STAI) compared with music or no intervention, and to improve mood (as assessed by the Mehrdimensionale Befindlichkeitsfragebogen, which uses a Likert scale to ascertain mood, alertness, and calmness).[18]

A pilot study investigated the effects of topically applied lavender and clary sage in a carrier solution of sweet almond oil on work-related stress among 14 medical–surgical ICU nurses over three 12-hour shifts within a two-week period. Compared with a control group that applied only the sweet almond oil, the intervention group reported decreased perceptions of stress.[19]

In a study of test-taking graduate nursing students, inhaling a sachet of lavender or rosemary before and during each of two exams was found to reduce pre- to posttest anxiety, as assessed by a 10-question test-anxiety scale. In a control test in which no intervention was offered, pre- to posttest anxiety did not change.[20]

In a review of six studies—including two randomized controlled trials, which together included a total of 387 participants—aromatherapy, administered by way of a 30-to-60-minute massage, was found to have positive effects on mood in people with depression, people with cancer-related depression, and mothers with postpartum depression.[21] Oils used in these studies included lavender; chamomile; and a blend of sweet orange, geranium, and basil.

In a systematic review of 16 randomized controlled trials that examined the anxiolytic effects of aromatherapy administered by massage, inhalation, tablet intake, or footbath, all of the studies found the practice to be effective in reducing anxiety, with no adverse events reported.[22] Improvement among participants with low anxiety levels, however, tended to be insignificant.

Methodological criticism. The methodology used in much of the research on essential oils has been criticized for failing to incorporate randomization or control groups, and for combining aromatherapy with other complementary modalities, such as massage. For example, when Cooke and Ernst analyzed 12 randomized controlled trials that found that aromatherapy reduced anxiety and improved well-being, they found methodological flaws in all of the studies.[23] Specifically, they found it problematic that six had no independent replication and six combined the effects of aromatherapy with massage, making it impossible to ascertain the effects of each. The reviewers concluded that aromatherapy may be "pleasant, slightly anxiolytic, and often enjoyable for patients in stressful situations[, but] the data do not support [any] legitimate clinical indications."

Another frequent criticism is that most studies supporting the efficacy of essential oils rely exclusively on subjective evidence to determine the intervention's therapeutic effects and, thus, vary widely in reliability. One systematic review of 18 studies that explored the effects of aromatherapy on mood, physiology, and behavior found that such differences as culture, experience, gender, and personality affect a person's response to aromatic chemicals. The investigators concluded that psychological factors (the perceived quality of a scent), rather than pharmacologic factors (the specific chemicals that emanate from the oils), are most influential in determining both emotional and physiologic response.[24]

A systematic review of five clinical trials that evaluated the effects on hypertension of aromatherapy (delivered by direct inhalation in four trials and by massage in one) found that all of the trials showed favorable effects but had a high risk of bias.[25] Since only one of the trials was randomized, the rest were open to selection bias, which can produce false-positive findings. The investigators concluded that better designed trials would be required to establish a role for aromatherapy in hypertension management.

Lee and colleagues conducted an overview of 10 systematic reviews that evaluated the efficacy of aromatherapy (with and without massage) in reducing hypertension, depression, anxiety, pain relief, and symptoms of dementia.[26] The authors determined that, though three of the reviews were of good methodological quality, many of the primary studies they evaluated were not. They found the evidence for using aromatherapy to promote psychological health and alleviate pain encouraging but not sufficiently convincing. They concluded that aromatherapy, generally delivered with massage therapy, "may induce relaxation which, in turn, might improve pain and psychological health," but that its value in improving other conditions was unclear.

The problems researchers face. In response to criticism, aromatherapy practitioners have countered that the gold standard randomized controlled trial may be an impractical means of studying essential oils, as it is impossible to blind study participants to aromas. Furthermore, practitioners and patients who use essential oils argue that the randomized controlled trial doesn't capture the "essence" of aromatherapy, often described "in esoteric terms as 'energies,' 'vibrations,' [and] 'subtle effects.'"[27] In addition, professional, certified aromatherapy practitioners generally have little training in research methodology.[27]

Further research using high-quality designs that build the evidence base for the efficacy of essential oils will certainly benefit both patients and health care professionals. In the interim, while current studies and systematic reviews may not provide definitive evidence supporting the use of essential oils, the risk of harm has consistently been found to be minimal when essential oils are used with appropriate caution and common sense.

SAFETY

Since essential oil manufacturers are not regulated by the U.S. Food and Drug Administration (FDA) or any other regulatory body, it is the responsibility of the practitioner to investigate any supplier from which an essential oil is obtained to ensure that the oil has a known botanical origin, is of high quality, and has been tested for chemical makeup between batches.[3,28] Without standardization, it's impossible to guarantee the therapeutic value and safety of any product.

Practitioners need to be vigilant to avoid acquiring adulterated essential oils. Adulteration, the practice of adding extraneous and possibly harmful substances—such as ethanol, mineral oil, glycol, and others—to a solution to increase the profit margin, is common among disreputable manufacturers.[28] Adulteration of an oil with such substances increases the risk of adverse reactions, typically skin reactions. Because lavender and tea tree are popular oils with a tremendous presence in the marketplace, they are frequent targets of adulteration.

Essential oils are our facility's most widely used integrative modality, representing 64% of all modalities used.

Before purchasing oils, solicit supplier recommendations from trusted sources and contact the supplier directly to investigate manufacturing practices. A good manufacturer will provide information about the location and climate in which the source plant was grown, harvest time and technique, and tests used to verify the chemical constituents in specific oils (the best practice being to conduct gas chromatography and mass spectrometry on each batch).[29]

Keep in mind that even pure essential oils must be used with caution and diligence. Essential oils, like pharmaceuticals, have specific chemical constituents that catalyze a particular set of reactions. Varying chemotypes (chemical constituents within the same plant species) and hybrids, which vary from crop to crop, make it difficult to consistently ascertain the

bioactivity of oils.[30] For example, the *Lavandula* genus (lavender) has 39 known species, each with a unique chemical composition and therefore different therapeutic properties. To use an essential oil correctly, the practitioner must be familiar with its botanical name (genus and species). Furthermore, when an oil is to be used in a hospital or clinic setting, material safety data (MSD) sheets, which contain the oil's toxicologic properties, potentially hazardous ingredients, and first-aid information, must be requested directly from the manufacturer and kept readily available.

The National Association for Holistic Aromatherapy (NAHA) emphasizes six factors that influence the safety of an essential oil: quality, chemical composition, method of application, dosage (or dilution), integrity of skin, and age of the client.[31] It provides these 12 safety guidelines[31]:

- Keep oils away from children and pets.
- Avoid sunlight and tanning booths for 24 hours after using a photosensitizing essential oil.
- Avoid prolonged use of the same essential oil (such as exposures of an hour or more to high levels of its vapor, repeated topical application to the same site, and repeated use over several weeks).
- Research any oil before using it on yourself or a patient.
- Do not use undiluted oils (those not mixed with a carrier substance) on the skin unless specifically indicated.
- If you suspect an allergy or sensitivity, perform a skin patch test.
- Know the safety data on any essential oil you use.
- Use caution when administering essential oil therapy to women who are pregnant or trying to become pregnant.
- Avoid contact between essential oils and the eyes.
- Keep all essential oils away from open flames.
- Ensure adequate ventilation when using essential oils.
- Do not use essential oils internally unless properly trained in such use.

Variations of these guidelines are found throughout aromatherapy literature and serve as a safety framework for essential oil use.

GETTING STARTED WITH ESSENTIAL OILS

For self-care. In a study of 700 critical care nurses across the United States, Lindquist and colleagues found that personal use of complementary and alternative therapies correlated with greater knowledge and use of these modalities in practice.[32] To use essential oils for self-care, you need some basic knowledge, access to quality products, and a willingness to explore your responses to different oils. To get started,

- educate yourself on the use of oils by taking an introductory aromatherapy class, if available, through your local community college.
- seek out knowledgeable sales personnel in a store that sells essential oils, and ask questions.
- purchase one or two essential oils, such as true lavender (*L. angustifolia*) and tea tree (*Melaleuca alternifolia*), for your own needs. True lavender is used to enhance relaxation, minimize skin inflammation, and lessen discomfort. Tea tree oil is helpful in reducing bug bite inflammation and pruritus and can be applied to scrapes and bites in people over two years of age. Nurses working the night shift may wish to experiment with camphoraceous oils such as eucalyptus and rosemary for their stimulating and revitalizing effects.[33]
- explore the University of Minnesota Center for Spirituality and Healing Web site on clinical aromatherapy (www.csh.umn.edu/free-online-learning-modules/index.htm).

In acute care. To support safe and sustainable use of essential oils in hospitals and other health care settings, a well-developed protocol is required. It's necessary to have clear guidelines for training staff on the safe use of essential oils, identifying a reputable supplier of therapeutic-grade oils, filing MSD sheets, disseminating plans for rollout of the use of essential oils, determining routes of administration of the oils, and establishing documentation practices. Administrative areas requiring formal infrastructure include the following:

- policy and procedures
- required approvals from institutional committees, such as the nurse practice committee
- budget
- proper storage and handling of supplies

Some hospitals have established integrative health departments to guide the use of complementary modalities such as essential oils, while others introduce them through a professional group, such as nurses, or on a specific unit, such as a hospice or postsurgical unit. Key actions for safe and effective implementation of an essential oil program in our facility, the Minneapolis Veterans Affairs (VA) Health Care System, have included the identification of

- a program leader who has completed all the requirements and obtained certification through an aromatherapy program for health care providers endorsed by either the NAHA or the American Holistic Nurses Association.
- staff to develop an initial concept of essential oil use specific to the clinical setting (for example, for inducing a calming effect in a traumatic brain injury unit, alleviating grief and discomfort in a palliative care unit, or reducing nausea and vomiting in an oncology infusion center).
- at least one administrator to assist with key decisions.

Nurse Practice Act Implications

State boards of nursing vary in addressing integrative therapies. While some provide a position statement, guidelines, or advisory opinions, others include these items within their nurse practice act, and still others make no mention of integrative therapies. Some statements list aromatherapy under the umbrella of integrative therapies but do not specifically outline guidelines for the use of essential oils.

The Minnesota Board of Nursing issued a *Statement of Accountability for Utilization of Integrative Therapies in Nursing Practice*, which was adopted in 2003 and reaffirmed in 2010.[34] For nurses using integrative therapies, this statement outlines associated responsibilities, such as ensuring patient safety, using evidence-based modalities, educating patients, and ensuring personal competence.

The American Holistic Nurses Association Web site discusses "Nurse Practice Acts by State" with links to each state's nurse practice act, as well as any statements about the use of integrative therapies (www.ahna.org/Resources/Publications/State-Practice-Acts).[35] It is the responsibility of nurses to be knowledgeable about their specific state's guidelines.

At the Minneapolis VA Health Care System, essential oils were introduced on the inpatient hospice–palliative care unit by an NP who was certified in the practice of essential oil therapy. She educated the nursing staff and worked with a local essential oil company to obtain supplies, which were purchased with donations to the unit. Soon other areas within the hospital were interested in using integrative therapies, including essential oils, requiring our facility to develop a more sustainable infrastructure. The administrator charged an interested group of NPs with developing policies and procedures for all of the integrative modalities to be used—essential oils, acupressure, imagery, and energy healing. After consulting contacts at other area institutions that used integrative modalities, the NPs developed a set of policies and procedures that were shaped to fit our organization and which were then reviewed by multiple committees whose suggestions were incorporated.

Initially, the facility obtained grant funding for supplies, development of an integrative therapy documentation template, and staff education, which was provided by faculty at the University of Minnesota Center for Spirituality and Healing. When grant funding was no longer sustainable, in-house practitioners skilled in integrative therapies provided education and support to interested staff.

State boards of nursing are increasingly acknowledging the use of integrative therapies within the scope of nursing practice (see *Nurse Practice Act Implications*[34,35]). It is the practice of our facility to allow nurses and other licensed staff—such as psychologists, social workers, occupational and physical therapists, and dietitians—to deliver essential oil therapy without an order from a prescribing clinician.

A frequent and considerable concern regarding the use of essential oils in a clinical setting is that they are not FDA regulated and cannot claim to treat disease. In a medical facility, they may be used only for very specific indications, and the language surrounding their use must be monitored. For example, essential oils can be said to "minimize discomfort" but not to "treat pain"; they can be used to "promote a sense of calm and well-being," but not to "treat anxiety." At the Minneapolis VA Health Care System, the need to maintain a clear distinction between the uses of conventional medications and the uses of essential oils required that the purchase and disbursement of essential oils be administered by our medical supply distribution department rather than our pharmacy.

A committee of three certified aromatherapy practitioners worked closely with a local essential oil supplier to develop blends of oils to assist patients with symptoms and general well-being. Use was limited to inhalation and topical application; staff education emphasized that ingestion of essential oils was prohibited in a clinical setting. After initial staff training, nurse champions provided guidance and support on each of the various hospital units. The documentation template was incorporated into the inpatient nursing note, and data within the template related to use, effectiveness, and safety were periodically evaluated. Our latest data review showed essential oils to be the most widely used integrative modality, representing 64% of all modalities used. Collectively, all integrative modalities demonstrated an 84% effectiveness rate in terms of nurse- or patient-perceived improvement of some aspect of patient comfort, such as mood, ability to rest or sleep, anxiety level, or level of discomfort.

Community nursing. Hospice nurses delivering care in the home have long promoted the use of essential oils.[36] A home care nurse knowledgeable in the use of essential oils can provide guidance to interested patients and their families in where to obtain quality oils and how to use them safely. Steam delivery (floating one to three drops of an essential oil in a bowl of hot water and inhaling the aroma for up to 10 minutes) is not well suited to a hospital setting, but can be easily used in the home.[7]

Long-term care. For elderly patients, the use of essential oils may help reduce polypharmacy. We have found that lavender, tea tree, eucalyptus, and rose are four essential oils considered safe for such at-risk populations as frail elders. Some level of administrative

support, however, is required in order to provide staff with the resources to use essential oils safely in nursing homes. ▼

For 16 additional continuing nursing education activities on complementary therapy topics, go to www.nursingcenter.com/ce.

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REFERENCES

1. Halcón L. Aromatherapy. In: Lindquist R, et al., eds. *Complementary and alternative therapies in nursing*. 7th ed. New York, NY: Springer Publishing Compay; 2014. p. 323-43.
2. Bakkali F, et al. Biological effects of essential oils—a review. *Food Chem Toxicol* 2008;46(2):446-75.
3. Dunning T. Applying a quality use of medicines framework to using essential oils in nursing practice. *Complement Ther Clin Pract* 2005;11(3):172-81.
4. Smith LL. *Essential oils for physical, emotional, and spiritual health: a program of certification in aromatherapy*. Arvada, CO: Healing Touch Spiritual Ministry Program; 2006.
5. Edris AE. Pharmaceutical and therapeutic potentials of essential oils and their individual volatile constituents: a review. *Phytother Res* 2007;21(4):308-23.
6. Jäger W, et al. Percutaneous absorption of lavender oil from a massage oil. *J Soc Cosmet Chem* 1992;3(1):49-54.
7. Price S, Price L, eds. *Aromatherapy for health professionals*. 3rd ed. Philadelphia: Churchill Livingstone/Elsevier; 2007.
8. Lua PL, Zakaria NS. A brief review of current scientific evidence involving aromatherapy use for nausea and vomiting. *J Altern Complement Med* 2012;18(6):534-40.
9. Ayan M, et al. Investigating the effect of aromatherapy in patients with renal colic. *J Altern Complement Med* 2013;19(4):329-33.
10. Kaviani M, et al. The effect of lavender aromatherapy on pain perception in intrapartum outcome in primiparous women. *Br J Midwifery* 2014;22(2):125-8.
11. Kim S, et al. The effect of lavender oil on stress, bispectral index values, and needle insertion pain in volunteers. *J Altern Complement Med* 2011;17(9):823-6.
12. Olapour A, et al. The effect of inhalation of aromatherapy blend containing lavender essential oil on cesarean postoperative pain. *Anesth Pain Med* 2013;3(1):203-7.
13. Braden R, et al. The use of the essential oil lavandin to reduce preoperative anxiety in surgical patients. *J Perianesth Nurs* 2009;24(6):348-55.
14. Burns E, et al. The use of aromatherapy in intrapartum midwifery practice an observational study. *Complement Ther Nurs Midwifery* 2000;6(1):33-4.
15. Varney E, Buckle J. Effect of inhaled essential oils on mental exhaustion and moderate burnout: a small pilot study. *J Altern Complement Med* 2013;19(1):69-71.
16. Nguyen QA, Paton C. The use of aromatherapy to treat behavioural problems in dementia. *Int J Geriatr Psychiatry* 2008;23(4):337-46.
17. Diego MA, et al. Aromatherapy positively affects mood, EEG patterns of alertness and math computations. *Int J Neurosci* 1998;96(3-4):217-24.
18. Lehrner J, et al. Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office. *Physiol Behav* 2005;86(1-2):92-5.
19. Pemberton E, Turpin PG. The effect of essential oils on work-related stress in intensive care unit nurses. *Holist Nurs Pract* 2008;22(2):97-102.
20. McCaffrey R, et al. The effects of lavender and rosemary essential oils on test-taking anxiety among graduate nursing students. *Holist Nurs Pract* 2009;23(2):88-93.
21. Yim VW, et al. A review on the effects of aromatherapy for patients with depressive symptoms. *J Altern Complement Med* 2009;15(2):187-95.
22. Lee YL, et al. A systematic review on the anxiolytic effects of aromatherapy in people with anxiety symptoms. *J Altern Complement Med* 2011;17(2):101-8.
23. Cooke B, Ernst E. Aromatherapy: a systematic review. *Br J Gen Pract* 2000;50(455):493-6.
24. Herz RS. Aromatherapy facts and fictions: a scientific analysis of olfactory effects on mood, physiology and behavior. *Int J Neurosci* 2009;119(2):263-90.
25. Hur MH, et al. Aromatherapy for treatment of hypertension: a systematic review. *J Eval Clin Pract* 2012;18(1):37-41.
26. Lee MS, et al. Aromatherapy for health care: an overview of systematic reviews. *Maturitas* 2012;71(3):257-60.
27. Basso L. Aromatherapy and scientific research: the current status of aromatherapy in relation to scientific research methadology. *International Journal of Aromatherapy* 2004;14(4):175-8.
28. Tisserand R, Young R. *Essential oil safety: a guide for health care professionals*. 2nd ed. Edinburgh; New York: Churchill Livingstone/Elsevier; 2014.
29. Peterson D. *Top 5 ways to check quality of essential oils: gas chromatography (GC), mass spectometry (MS), Latin, organoleptic testing, and knowing your supplier*. Portland, OR: American College of Healthcare Sciences; 2014 Jan 7. http://info.achs.edu/blog/bid/316901/Top-5-Ways-to-Check-Quality-of-Essential-Oils-Gas-Chromatography-GC-Mass-Spectometry-MS-Latin-Organoleptic-Testing-Knowing-Your-Supplier.
30. Lis-Balchin M. Possible health and safety problems in the use of novel plant essential oils and extracts in aromatherapy. *J R Soc Promot Health* 1999;119(4):240-3.
31. National Association for Holistic Aromatherapy. *Exploring aromatherapy: safety information* n.d. https://www.naha.org/explore-aromatherapy/safety.
32. Lindquist R, et al. Personal use of complementary and alternative therapies by critical care nurses. *Crit Care Nurs Clin North Am* 2003;15(3):393-9, x.
33. Smith LL. *Healing oils, healing hands: discovering the power of prayer, hands on healing and anointing*. Arvada, CO: HTSM Press; 2008.
34. Minnesota Board of Nursing. *Statement of accountability for utilization of integrative therapies in nursing practice*. Minneapolis; 2010 Feb 4. https://mn.gov/boards/nursing/practice/topics/integrative-therapies.jsp.
35. American Holistic Nurses Association. *Nurse practice acts by state*. Topeka, KS; 2014 Jun. http://www.ahna.org/Resources/Publications/State-Practice-Acts.
36. Katseres J, Nelson K. Integrative nursing; palliative care and end-of-life. In: Kreitzer MJ, Koithan M, eds. *Integrative nursing*. Oxford; New York: Oxford University Press; 2014.