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REVIEW ARTICLE

Safe use of essential oils in labor: a scoping review

Uso seguro de aceites esenciales en el parto: una revisión del alcance

Uso seguro dos óleos essenciais no trabalho de parto: uma revisão de escopo

Renata Reis Loureiro e Sá[1*]
ORCID: 0000-0002-2404-0950
Edymara Tatagiba Medina[1]
ORCID: 0000-0001-7180-6704
Ricardo José Oliveira Mouta[1]
ORCID: 0000-0002-1284-971X
Sandra Cristina de Souza Borges Silva[1]
ORCID: 0000-0001-9147-5949

[1]Universidade do Estado do Rio de Janeiro. Rio de Janeiro, Brazil.

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***Corresponding author:**
renatareissa@gmail.com

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Abstract

This study aimed to identify guidelines for the use of aromatherapy in childbirth in the international literature and develop recommendations for safe management. This was a scoping review. The databases used were BDTD, BVS, Cochrane Library, PubMed, SciELO, and SCOPUS. Inclusion criteria were studies published in the last 5 years. Study selection was performed by two independent reviewers, guided by the research question, constructed using the PCC (Population, Concept, Context) strategy. Eight records met the research objective, comprising 38% Brazilian, 38% Asian, and 25% English speakers. Categories of eligibility and ineligibility for aromatherapy use, contraindicated essential oils, safe management, physical characteristics and storage, precautions, and recommended essential oils were identified. It is concluded that obstetric nursing has legal provisions for aromatherapy training, which can achieve expected birth outcomes and minimize adverse effects such as allergies, dermatitis, changes in vital signs, negative psycho-emotional changes, nausea, and headaches. To this end, recommendations for the use of essential oils during childbirth were developed.

Descriptors: Aromatherapy; Essential Oil; Childbirth; Labor; Clinical Practice Guide.

Resumén

El objetivo de este estudio fue identificar directrices para el uso de aromaterapia en el parto en la literatura internacional y desarrollar recomendaciones para un manejo seguro. Esta fue una revisión exploratoria. Las bases de datos utilizadas fueron BDTD, BVS, Cochrane Library, PubMed, SciELO y SCOPUS. Los criterios de inclusión fueron estudios publicados en los últimos 5 años. La selección de los estudios fue realizada por dos revisores independientes, guiados por la pregunta de investigación, construida utilizando la estrategia PCC (Población, Concepto, Contexto). Ocho registros cumplieron con el objetivo de la investigación: 38% brasileños, 38% asiáticos y 25% ingleses. Se identificaron categorías de elegibilidad e inelegibilidad para el uso de aromaterapia, aceites esenciales contraindicados, manejo seguro, características físicas y almacenamiento, precauciones y aceites esenciales recomendados. Se concluye que la enfermería obstétrica cuenta con disposiciones legales para la capacitación en aromaterapia, que puede lograr los resultados esperados en el parto y minimizar los efectos adversos como alergias, dermatitis, cambios en los signos vitales, cambios psicoemocionales negativos, náuseas y dolores de cabeza. Con este fin, se elaboraron recomendaciones para el uso de aceites esenciales durante el parto.

Descriptores: Aromaterapia; Aceites Esenciales; Parto; Trabajo de Parto; Guía de Práctica Clínica.

Resumo

Objetivou-se identificar, na literatura mundial, diretrizes para o uso da aromaterapia no parto e elaborar uma recomendação para o manejo seguro. Trata-se de uma revisão de escopo. As bases utilizadas foram BDTD, BVS, Biblioteca Cochrane, PubMed, SciELO e SCOPUS. Critérios de inclusão: estudos publicados nos últimos 5 anos. A seleção dos estudos foi realizada por dois avaliadores independentes, norteados pela questão da pesquisa, construída através da estratégia PCC (População, Conceito, Contexto). Oito registros atenderam ao objeto da pesquisa, 38% brasileiros, 38% orientais e 25% ingleses. Foram identificadas categorias de elegibilidade e inelegibilidade ao uso da aromaterapia, óleos essenciais contraindicados, manejo seguro, características físicas e estocagem, precauções e óleos essenciais indicados. Conclui-se que a enfermagem obstétrica tem previsão legal para a capacitação em aromaterapia, sendo capaz de atingir resultados esperados no parto, e minimizar a ocorrência de efeitos adversos como alergias, dermatites, alterações de sinais vitais, alterações psicoemocionais negativas, náuseas e dores-de-cabeça. Para tanto, elaborou-se uma recomendação de uso dos OES no parto.

Descritores: Aromaterapia; Óleo Essencial; Parto; Trabalho de Parto; Guia de Prática Clínica.

Introduction

During labor (LAB), psychosocial aspects, quality of care, duration of pre-labor, and the sociocultural conception of childbirth are factors that can lead the parturient to experience a lot of stress, anxiety, and fear, as well as increase the sensation of pain[1]. From a humanized perspective of care, nursing understands these factors and promotes comprehensive care for the woman in labor, using essential oils (EOs) to achieve important results such as reduced anxiety, reduced pain, reduced labor time, and a better childbirth experience[2].

In line with this reality, COFEN published Technical Opinion No. 034/2020, enabling nurses to prescribe OES, in all their uses as an integrative and complementary practice[3]. Then, through Resolution No. 739/2024, it standardized the role of nurses in all Integrative and Complementary Practices (ICPs), requiring training through free courses, and making it their responsibility to implement ICPs in the systematization of care, and the institution of care protocols in PICs in health services[4].

However, a survey of nurses in two Brazilian maternity hospitals showed that although 100% of the total respondents were aware of EOs therapy, less than 70% had the technical knowledge to apply it safely[5]. The other study on non-pharmacological methods for pain relief showed that massage with EOs was already a common practice in labor because it brought comfort and physical and psychological well-being to women; however, there was no training for professionals, nor standardization in its use[6].

Given the above, this study aims to identify guidelines, recommendations, and protocols in the global literature for the safe use of essential oils during childbirth and develop recommendations for their use in maternity wards.

Furthermore, the relevance of this study lies in systematically providing study results on the safe use of essential oils during labor, culminating in a scientifically based document that can contribute to the systematization of obstetric nursing care and the autonomy of this category of healthcare professionals.

Methodology

Data collection was carried out using a scoping review protocol, structured according to the methodological guidelines of the JBI Manual for Evidence Synthesis, which allows for the systematic mapping of scientific studies, expanding the view of all available information related to the research object[8].

The guiding question was developed under the PCC strategy, so that the restricted selection of scientific studies would allow the objective of the present study to be achieved[9]. Guiding question: "What existing records on the safe use of EOs in parturients?". In which, P (population): Parturients; C (concept): safe use of EOs; C (context): childbirth care. Records were in the BDTD, BVS, Cochrane Library, PubMed, SciELO, and Scopus databases. Searches were conducted on August 28, 2024, and included the following descriptors and alternative terms: “Aromatherapia”, “Gromatherapy”, “Óleo Essencial”, “Essential Oil”, “Parto”, “Labor”, “Childbirth”. The Boolean operator "AND" was used to generate conceptual blocks aimed at retrieving studies on the safe use of EOs. The inclusion criteria were publications from 2019 to 2024, in any language, and with different study designs. Exclusion criteria were duplicate publications, publications not available for free, research projects, and opinion letters.

The search, identification, and screening process of articles was conducted by two independent reviewers, guided by the JBI guidelines and aided by Zotero software. The evidence classification system chosen was GRADE (Grading of Recommendations Assessment, Development, and Evaluation)[10].

This research is registered with the Open Science Framework (OSF), so that sharing of the results is available to other actors in the scientific community[11]. DOI: 10.17605/OSF.IO/H6XKG.

Results

The database search identified 337 studies. After removing duplicates, 260 (77%) were identified. After analyzing the titles and abstracts, 49 (16%) remained. After attempting to access the full texts, 25 records were removed because they were projects, not open access, or contained expert opinions. Of the 24 (7%) publications evaluated for eligibility, six (2%) remained. Searches in the gray literature identified 14 records through websites, organizations, and citations from other studies. After removing records without open access or that did not meet the research objective, two (14%) publications remained. In total, eight records were eligible for this study, as shown in the flowchart in Figure 1.

Fifty percent of the records are in Portuguese and were found in the BVS and BDTD databases. There are two integrative reviews and a randomized clinical trial. The latter is a master's thesis, as is one of the integrative reviews. The remaining 50% of the records, each from Japan, Turkey, and Iran, are published in English and come from the Cochrane and Scopus databases. In the gray literature, the selected records are two maternity guidelines from the English National Health Service (NHS), both in English.

Chart 1 shows the eligible records with a description of the authors, year of publication, country of origin, information source, study design, objective, and level of evidence according to the GRADE system.

The eight selected records address the use of OES in pregnant women in labor. The three clinical trials and three literature reviews, while providing information related to the research objective, are not primarily intended to compile such information.

The two guidelines, considered high evidence level according to the GRADE system of evidence quality assessment, essentially report on the safety of the therapy in pregnant women in labor and provide some suggestions for EOs and application methods.

Figure 1. PRISMA 2020 flowchart of study selection and inclusion processes. Rio de Janeiro, RJ, Brazil, 2024

Identification of studies through databases and records

Identification

Records identified through:

Scopus (n = 103)
Cochrane (n = 58)
SciELO (n = 9)
BVS (n = 54)
PubMed (n = 77)
BDTD (n = 36)

Records removed before duplicate screening (n = 77)

Selection

Records in screening (n = 260)

Studies excluded because they are not related to the object (n = 211)

Publications sorted to keep (n = 49)

Excluded by projects, not free, expert opinion (n = 25)

Eligibility

Publications evaluated for eligibility (n = 24)

Excluded for not returning information related to the concept (n = 18)

Inclusion

Total number of studies included (n = 6)
Total number of publications included (n = 2)

Identification of studies through other methods

Records identified in:

Websites (n = 4)
Organizations (n = 2)
Quote citations (n = 8)

Records searched to keep (n = 14)

Records excluded for not being freely accessible or not meeting the objective (n = 12)

Records evaluated for eligibility (n = 2)

Chart 1. Records with their structural components and level of evidence according to the GRADE system. Rio de Janeiro, RJ, Brazil, 2024

Authors / Year	Country	Journal	Study design	Objective	Level of evidence
Rigon, M. (2022)	Brazil	Repositório Universitário Ânima	Randomized clinical trial	Investigate the effect of inhalation with Lavandula angustifolia essential oil on active labor and the immediate postpartum period.	Moderate
Tadokoro, Y. et al. (2023)	Japan	International Journal of Environmental Researchand Public Health	Non-randomized clinical trial	Clarify whether a foot bath with clary sage and lavender oils and a foot bath with jasmine oil will increase salivary oxytocin levels in full-term pregnant women, compared to foot baths without the use of essential oils.	Low
Karatopuk, S.; Yarici, F. (2023)	Turkey	Explore (New York, NY)	Randomized clinical trial	Reveal the effects of lavender aroma inhalation and massage with lavender essential oil on severe labor pain in primiparous women.	Moderate
Ghiasi, A. et al. (2022)	Iran	Journal of Obstetrics and Gynecology	Systematic review	Determine the effect of aromatherapy on the duration of labor.	High

Karasek, G. et al. (2022)	Brazil	Revista Cuidarte	Integrative review	Identify scientific literature on the use of aromatherapy and essential oils in labor management, and develop a hospital protocol, based on findings in publications, on aromatherapy and the use of essential oils during labor.	Low
Cruz, K. (2021)	Brazil	Repositório Cogna	Integrative review	Conduct a survey among nurses working in the obstetric centers of Campo Grande-MS (Cândido Mariano Maternity Hospital and Maternity Hospital of the Maria Aparecida Pedrossian University Hospital) on the use of aromatherapy and EOs, carry out an integrative review on the aromatic medicinal plants and EOs used in labor, and produce a technical bulletin specifying and characterizing the species of aromatic plants used during labor.	Low
NHS. Aneurin Bevan University Health Board (2022)	UK	Aneurin Bevan University Health Board	Guideline	Promote the safe and appropriate use of aromatherapy in maternity settings. Facilitate options for maternity clients who choose to use aromatherapy.	High
NHS. University Hospital Wishaw (2022)	UK	University Hospital Wishaw	Guideline	Enable registered midwives who have completed the appropriate training detailed in this guideline to safely administer indicated aromatherapy oils to women in labor.	High

Discussion

During the analysis of the records, significant content fields were repeatedly identified concerning the research objective, which complemented or diverged in their information. The observation of these information groups evolved into research categories: Indications and contraindications for the use of EOs in labor; EOs contraindicated in labor; safe handling of EOs (dilution; blends; application methods); physical characteristics, packaging and storage; precautions (abdominal massage, pregnant professionals, phototoxicity; birthing tub and ingestion); and EOs indicated for use in labor.

Indications for the use of essential oils

The studies mention criteria for pregnant women to receive EOs therapy. For example, the clinical trial site for one of the studies was a low-risk maternity ward, where aromatherapy has been used since 2016[12]. Other researchers have stipulated inclusion criteria as low-risk pregnant women with full-term pregnancies, cephalic babies, and ages between 20 and 40 years[13].

Following the same parameters, in one of the records, qualified parturients are those who can be assisted in places led by nurses, such as pregnant women with BP within normal parameters, with single pregnancies, without a history of hemorrhage in the 3rd trimester, with a normally inserted placenta, without evidence of Intrauterine Growth Restriction (IUGR), with babies in cephalic presentation and reassuring fetal heartbeats[14].

In contrast, one of the guidelines extends the use of EOs to pregnant women who are in the week before the scheduled induction date, based on maternal age, gestational diabetes mellitus, or in vitro fertilization, and to pregnant women with pregnancies considered late in pregnancy by the institution's protocol. However, pregnant women must first give consent for the intervention[15].

Contraindications for the use of EOs

We also found contraindications for the use of EOs in pregnant women in labor. In one study, women who had obstetric complications in previous deliveries, such as pre-labor blood loss, miscarriages, cesarean sections, and post-term pregnancies, were excluded from the trial. Furthermore, pregnant women with a medical history of dermatitis, mental distress, endocrine or olfactory disorders, smokers, alcohol dependence, allergies to any food, medication, plant, and/or essential oils, or who were breastfeeding were excluded from the study[13]. In addition, the Wishaw guideline contraindicates the use of EOs in women with a medical history of epilepsy, heart, kidney, liver disease, Diabetes Mellitus (DM) with insulin use, decompensated DM, severe asthma or other respiratory condition, Deep Vein Thrombosis (DVT) or women using anticoagulants, any identified infection or unexplained pyrexia, complex mental conditions (bipolarity, schizophrenia, use of psychotropic drugs, previous psychosis), dermatitis, non-intact skin, sunburned skin[14].

Studies show that some obstetric clinical complications make the use of EOs in labor unsafe, such as multiple gestation, transverse or oblique fetal position, placenta previa, hypertension or pre-eclampsia, pre-term labor, parturients using oxytocin, the first 30/60 seconds following the use of prostaglandins, pregnant women with polyhydramnios, reduced fetal movements, and uncertainty about the woman's clinical condition[7]. The comorbidities mentioned may alter the expected results with the use of EOs, because the body's physiology is altered, but in addition, allopathic medications are capable of interacting with EOs, intensifying or decreasing their effects[16].

EOs contraindicated for use in labor

The specialized literature contraindicates some EOs for use in pregnant and parturient women. Rosemary EO (Rosmarinus officinalis verbenoniferum) and Dalmatian sage

EO (Salvia officinalis) contain ketone molecules, which have abortifacient and neurotoxic effects[17,18]. However, the use of Dalmatian sage EO in parturients has been reported[18].

Still within the exceptions to the use of aromatherapy during childbirth, according to ANVISA, camphor EO (Cinnamomum camphora) should not be used due to its abortive and convulsive effect with rapid absorption by the body[20]. In turn, Brazilian pennyroyal EO (Mentha pulegium L.) has convulsive, epileptogenic, and neurotoxic effects, contraindicating its use[16]. Nutmeg EO (Myristicona fragrans) can produce hallucinogenic effects[21].

We found in the specialized literature, EOs contraindicated in pregnancy, due to characteristics such as neurotoxicity, hepatotoxicity, anticoagulation, carcinogenicity, with effects similar to estrogen, hallucinogenic or abortifacient: Angelica, Angelica archagelica (neurotoxic); Anise or fennel Pimpinella anisum (carcinogenic and hepatotoxic); Star anise, Illicum verum (carcinogenic); Rue, Ruta graveolens (anticoagulant); Fennel, Foeniculum vulgare (carcinogenic); Hyssop, Hyssopus officinalis (neurotoxic); Lavandin, Lavandula hybrida (neurotoxic); Lavender spicata, Lavandula latifolia (neurotoxic), Melissa, Melissa officinalis (estrogen-like), Parsley, Petroselinum sativum, Petroselinum crispum (abortifacient and hallucinogenic); Sage, Salvia officinalis (neurotoxic); Spanish sage, Salvia lavandulifolia, Salvia lavandulaefolia (abortive and neurotoxic)[22].

Safe methods of managing EOs

Dilution

For the safety of pregnant women, EOs used on the skin must always be diluted to avoid allergic reactions[17]. In this regard, one of the studies using lavender essential oil dilution followed the parameter of 1:10, in distilled water, with the justification that higher concentrations are likely to cause irritation[23]. These parameters agree with the literature, where a dilution scheme for labor of 1-2% of EO (1 to 2 drops) in 5 ml of lotion or carrier vegetable oil is described[7]. With similar reasoning, Tisserand and Young recommend that for people with compromised immunity, such as pregnant women and those at the extremes of the age range, the dosage of EO concerning the carrier vegetable oil or carrier lotion should be 1-1.5% (0.05 ml-0.1 ml), for every 5 ml[22].

The same authors indicate that, as a rule, safe preparation contains 15 ml of carrier vegetable oil and 3% of EO, that is, for every 5 ml of carrier vegetable oil, we have 1% of essential oil, and thus the total quantity of active ingredients will be 2,000 times less than the lethal dose[22].

Blends

Dilutions with more than one essential oil are called blends. One study found that in labor, blend dilutions only achieved synergistic effects when the mixtures contained two or even three EOs[24]. A similar fact is described in the literature, where a blend must have a minimum quantity of 15 ml of carrier oil, and a maximum of 3 types of EOs, with 0.1 ml each, that is, 2 drops of each EO[22]. To avoid errors in the composition of a blend, first mix the synergy EOs, and then drop this mixture into the carrier oil/lotion, or, conversely, place the desired amount of carrier vegetable oil over the EO blend. Considering 1 drop/5ml = 1%[7]. After preparing blends, it is important that the packaging of the blends is always labeled, identifying the EOs and quantities[14]. Additionally, the NHS advises that gloves should be worn when preparing blends[14]. And the literature adds that hands should be washed immediately[7].

Application methods

Inhalation

The essential oil inhalation method can relieve pain, reduce anxiety, and reduce nausea and vomiting during labor[24]. Another important result is that this method is also capable of stimulating labor when associated with EOs that promote the release of the hormone oxytocin in women with full-term pregnancies[13]. After analyzing 7 studies, it was identified that the EOs of Salvia officinalis, Jasminum officinale, Citrus aurantium, and Lavandula stand out in labor through the inhalation method[12]. It is important to highlight that even through another method of administration, such as massage, a significant proportion of the chemical components of the EO will evaporate and be inhaled[22]. Therefore, even though inhalation is not the primary method of choice, it will also have physical and emotional impacts[17]. That said, a Turkish study recommends placing a maximum of two drops of EO in the palms of the laboring woman's hands, instructing her to inhale for up to three minutes, always keeping her hands 2.5 to 5 cm away from her nostrils. After administration, wash her hands immediately and ventilate the room[23].

In this reasoning, one of the English guidelines advises dripping just 1 drop of EO into the palms of your hands, rubbing them together, and gently inhaling the aroma[15]. And the literature recommends dripping 1-3 drops of EO onto a tissue or gauze, but unlike the study, it suggests a greater distance from the nostrils, attaching the tissue to clothing, at a distance of 10-15 cm from the nostrils[7]. This is likely because the exposure time to the aroma will be continuous. In Rigon's study, inhalation was stipulated to be offered every 2 hours, lasting 5 minutes, and lasting until the end of labor. The results led to a lower need for analgesia than in the control group, and the Apgar scores in both groups were not different, which provides important information about the non-toxicity of the EO.

Unlike the inhalations, which are continuous and for a short period, the literature also suggests that inhalation can be punctual 3 times, slowly and deeply, and with the EO diluted in fatty oil, applied to the inner surface of the wrists, as a precaution against causticity and irritation of the dermis[18].

Massage

The English Wishaw guideline recommends that the chosen methods for using EOs be described in the patient's medical record, such as the type of massage, the areas of the body involved, the duration and frequency of the intervention, as well as the number of drops of EO and the amount of carrier vegetable oil implemented[14]. Accordingly,

one of the studies described that the sample received a back massage with 2 drops of lavender EO diluted in 50 cc (1cc+1ml) almond carrier vegetable oil[12]. Comparing inhalation and massage, a study recommends circular and compressive massage on the sacrum with 2 drops of diluted essential oil for a period of up to 15 minutes[23]. In both studies, the results showed a decrease in pain sensation and anxiety. The literature recommends that if the skin on the hands is not intact, the massage should be performed with gloves[7]. In this sense, it also claims that occupational exposure to EOs can cause dermatitis on the hands, as allergic reactions can occur after repeated contact with EOs[22].

Foot bath

Karasek's review showed that foot baths lasting at least 10 minutes can have an anxiolytic effect, although it is a less frequent method[24]. However, it is good to be cautious, and authors of a clinical trial took the following precautions: checking the batch specification and the manufacturer's brand of the essential oil, prior testing of the therapy on non-pregnant women for 20 minutes, and the concentration adjusted to the following measurement: 0.1 ml of lavender, 0.2 ml of sage, 0.25 ml of jasmine[13]. In another study, another concentration was identified: 1% rose EO[25]. The Aneurin Bevan University Health Board guideline advises diluting 1-3 drops in liquid soap before adding the EO to warm water[15]. Accordingly, the literature indicates the prior dilution of EOs in carrier vegetable oil before adding them to water, for dispersion because they are not water-soluble[7]. They also suggest that dilution can be done in whole milk and warn that undiluted EO drops can adhere to the skin[22].

Spray

Sprays can be made by adding 12 drops of EO (pure or blended) to 30 ml of distilled water, shaking, and dispersing the EO drops in the area where the woman is laboring to create a more welcoming environment. However, the preparation time is 24 hours[7,17]. Specifically, a blend of Lavandula angustifolia with Lavandula vera and Lavandula officinalis, to be used as a spray, on a tissue for inhalation, or directly in the environment, being safe for the eyes[15].

Diffusion

In diluted form, ultrasonic diffusion with water provides a lower concentration of aromatic molecules in the aspirated air, making it a safe method for pregnant women. Dry diffusion, on the other hand, would be safer in hospital settings because there is no humidity carrying pathogenic microorganisms present in the environment[16,18]. The NHS advises that the diffuser should be used in single rooms[15]. This is justified because in collective use environments, other people such as companions, family members, and staff will also be affected by the aroma[17]. Studies show that inhaling concentrated EO vapors for more than 30 minutes can trigger headache, nausea, dizziness, and lethargy[22]. And the literature claims that for more than 15 minutes, these symptoms are already likely to be triggered[17].

Regarding concentration, a study used 4 drops of EO in 300 ml of distilled water to relieve the sensation of pain in parturients, and the results were significantly lower pain scores in the group that used EOs[12]. The NHS recommends adding up to 6 drops to a diffuser with the amount of water indicated in the product manual. It also states that the treatment can last up to 60 minutes, needing to be interrupted for the same period and then resumed, arguing that better effects are achieved with intermittent use[15].

Physical characteristics and storage

EOs are colorless, brownish, reddish, or yellowish. The only strong color is German chamomile or blue chamomile, Matricaria chamomilla. EO drops should float on top of water or sink because they are not water-soluble[16]. The packaging should contain the Latin binomial that makes up the botanical name, with only the first letter of the first name capitalized to correctly identify the aromatic plant from which the essential oil was extracted, for example, Pimpinella anisum, which is the scientific name for fennel. This demonstrates the EO's provenance. Furthermore, the packaging should be amber glass for photoprotection, with a batok lid for safety[16,22].

The guidelines recommend that EOs available in the maternity ward be stored in locked cabinets or containers to prevent them from being handled by untrained professionals[14,15]. Furthermore, studies indicate that it is best to keep EOs stored in refrigerators, at 4 to 20°C[22]. And stay away from homeopathic remedies, as they run the risk of becoming inactive[17].

Emergencies

For the patient's safety, the use of aromatherapy should be discontinued in the event of a rapid change in the birth scenario, or the event of an emergency[17]. Specifically, the NHS recommends that EOs should be immediately washed off a woman's skin with soap and water. And if EOs accidentally get into the eyes, they should be flushed with cold water for 5 minutes[15].

Precautions

Abdominal massage

EOs are easily absorbed by the skin when diluted in carrier vegetable oils because they are fat-soluble molecules[16]. In most of the studies surveyed, massage is indicated in the back region, in the lumbar region, and in some cases specifying massage from the waist down[23,24]. Furthermore, the NHS advises against abdominal massage on pregnant women with an anterior placenta or a history of an anterior placenta[14]. In any case, if this area has been exposed to EOs, as is the case in the birthing tub or pool, it is recommended to wash the woman's chest and abdomen before placing the baby to breastfeed[17].

Safety of pregnant professionals

For pregnant professionals, the guidance is that they should not apply uterotonic EOs to clients, such as sage[19], those of damask rose[25], and jasmine[24].

Phototoxicity

Precautions should be taken regarding citrus EOs, such as oranges, bergamot, and lemons, because they may contain phototoxic compounds, that is, capable of interacting with the DNA of cells, under UV light, causing skin blemishes[17]. These molecules are large and non-volatile, so they will be present when the oil is produced by pressing rather than distillation. The problem is that the industry prefers EOs made by the former method[22]. However, the literature reports that if the product label says "[...] without bergapten", or "LFC" free of furanocoumarins, then the EO is not phototoxic.

Birthing tub

The Wishaw, NHS, and literature guideline contraindicate the use of EOs in birthing baths or pools[7,14]. The Aneurin Bevan University Health Board, NHS, does not recommend it, and recommends using up to 6 drops of EO, even if more than one type, before adding it to the water, emulsifying them in liquid soap or shampoo. If using Peppermint EO (Mentha piperita), only 1 drop should be added. Similarly, there are two conditions for using EO in birth tubs: the bag of water must be intact, and the EO must be diluted beforehand[17].

Ingestion

According to NHS guidelines, EOs should always be administered externally during labor, and pregnant women should never be allowed to ingest them in any form, whether through food, drink or pure[14,15]. Like many drugs, the constituents of EOs are molecules that are easily absorbed by the nuclear membranes of cells, and possible adverse effects include mucosal irritation, epigastric pain, vomiting, diarrhea, respiratory depression, convulsions, and liver and kidney failure[17].

Essential oils recommended for use during labor

Below are some of the essential oils that appear in the records collected: Bergamot (Citrus bergamia), Chamomile (Matricaria recutita L.), Frangipani (Plumeria rubra L.), Geranium (Pelargonium graveolis), Peppermint (Mentha piperita), Jasmine (Jasminum grandiflorum or Jasminum sambac), Bitter orange (Citrus aurantium L.), Sweet orange (Citrus sinensis), Lavender (Lavandula angustifolia), Lemon (Citrus limonum), Mandarin orange (Citrus reticulata), Frankincense, Frankincense (Boswellia carterii), Damask rose (Rosa x damascena Mill.) and Sage (Salvia officinalis L.).

Bergamot (Citrus bergamia)

Using the diffuser, studies have identified an effective reduction in the sensation of pain in the latency phase and the beginning of the active phase, which led women to request significantly less analgesia than women in the control group[24]. The literature adds that through massage you can even achieve the objective[17]. Additionally, relief from stress, anxiety and fear is described with the use of this citrus fruit[7]. As a preventative measure, it is important that women using Citrus bergamia avoid sun exposure for at least 12 hours after use, to prevent skin blemishes due to the interaction of furanocoumarins with cell DNA[17].

German chamomile (Matricaria recutita L.)

EO alleviates the intensity of contractions, mainly through inhalation[19]. Furthermore, it has the quality of being anxiolytic in the active phase of labor, also through inhalation, and reduces the sensation of pain in any phase of labor, through massage in the lumbar region[24]. Chamomile EO should be avoided in women with a history of seasonal allergies or asthma[7,17], which may be related to the origin of this oil, which is from chamomile flowers[19].

Geranium (Pelargonium graveolis)

Palargonium graveolis EO has flavonoids as important chemical components, which act as antihypertensives and muscle relaxants[19]. This information is consistent with the results of a review that found a decrease in DBP in women undergoing labor during the first stage, using inhalation. They also reported less anxiety after the intervention[24]. Geranium EO also appears to be a powerful reducer of pain sensation in the latent phase and early active phase, when using the diffusion method[24]. Furthermore, a reduction in the time of parturition in the first phase was identified through massage in the dorsal region of the parturients[25].

Peppermint (Mentha piperita)

Peppermint essential oil, according to studies, is an important tool for reducing nausea and vomiting, through inhalation, during the transition phase[24]. In addition to these properties, Mentha piperita EO provides relief from headaches and lower back pain, the latter through massage[7]. It is worth noting that peppermint EO has some precautions for use, such as in the case of women who have glucose-6-phosphate dehydrogenase (G6PD) deficiency, which can trigger the disease if they use this EO[15]. It is also recommended to use a maximum of 1 drop because it is an important stimulant, and its use is not recommended for people with heart problems[15,17].

Jasmine (Jasminum grandiflorum or Jasminum sambac)

Jasmine EO is said to optimize the pattern of contractions and restore the strength and disposition of the woman in labor[7]. These qualities are supported by another study in which jasmine EO increased oxytocin levels, promoting labor progression. However, caution should be exercised with tachysystole. Furthermore, methods used may include foot baths in the latent and early stages of labor, only once, and abdominal massage[24]. This last orientation, as already mentioned in this work, is contraindicated by other literature[14,17]. This EO can reduce the duration of the active phase through diffusion or inhalation. However, they emphasize that it can significantly increase Respiratory Rate (RR), blood O2 saturation, SBP, and DBP, demonstrating its effect on the Sympathetic Nervous System (SNS)[25]. In this sense, the literature adds the precaution of not using this oil in pregnant women with BP fluctuations[7]. It is important to be cautious with the possibility of tachysystole, making it

impossible to use it together with oxytocin infusion[19]. Furthermore, the NHS emphasizes that the use of uterus-stimulating OES should be avoided in cases of uterine bleeding, rupture of membranes or induction with prostaglandins[14].

Lavender (Lavandula angustifolia)

Lavandula angustifolia activates the parasympathetic system[7]. This is because lavender contains linalool and linalin acetate, which help suppress the neocortex, which favors the release of hormones that promote labor[19]. These bioactives function as serotonin transporters, acting as inhibitors of anxiety and depression, and as relaxants, promoting a shorter duration of labor[25]. Inhalation and massage with lavender EO may shorten the duration of the first and second stages of labor, but inhalation is the most used method[25]. At the same time, this EO can promote periods of rest during labor by activating the parasympathetic system[7]. Lavender can reduce the pain of contractions and labor, as it is sedative and anti-inflammatory[7]. Pain modulation occurs from the fourth hour after the onset of labor. Furthermore, women report greater satisfaction with childbirth when using lavender. Apgar scores at minutes 1 and 5 in Rigon's study were unchanged, thus claiming that lavender is non-toxic, since the women used it throughout labor[12]. It is worth noting that there have been reports of dermatitis or eczema after topical use of lavender EO, probably without dilution[13]. Women using analgesia should wait 30 to 60 minutes before using this EO, as studies indicate depressant effects on the sympathetic system[17]. Use should be avoided in women with a history of asthma or seasonal allergies, as lavender EO is also obtained from the flowers[7,19]. Regarding the methods of use, inhaling just 1 drop during the latency phase calms and relaxes the woman[7]. It is also suggested to drip 2 drops into the palms of your hands and inhale for 3 minutes during the latency phase, and for the active and transition phase, massage the lumbar region for 15 minutes with 2 drops of EO[23].

Bitter orange (Citrus aurantium L.)

Inhalation of Citrus aurantium L. EO provides pain reduction in all phases of labor and can also reduce anxiety in the latency and active phases[24]. This anxiolytic action is justified by the flavonoids that make up most of the chemistry of this aromatic plant and suggest a CNS depressant action[19]. The inhalation method is recommended and consists of attaching a gauze pad with up to 3 drops of EO diluted in a carrier base to the collar of the woman's clothing, and the procedure can be repeated up to 3 times in each phase of labor[24].

Sweet orange (Citrus sinensis)

Sweet orange EO is used as an antidepressant and anxiolytic when applied by inhalation, using cotton, or through the diffusion method[7]. The calming properties of sweet orange are mentioned, and it is even added that it may reduce SBP and HR. In this study, inhalation occurred through a piece of tissue tied to the patient's neck, and it could be used up to three times in each phase of labor[24].

Lemon (Citrus limonum)

Lemon EO, like other citrus fruits, contains chemical substances called monoterpenes, which, in addition to other functions, have a stimulating effect[7]. In addition to this characteristic, through inhalation of lemon EO, nausea and vomiting experienced during labor can be reduced[17].

Mandarin Orange (Citrus reticulata)

Anxiety during labor allows the release of catecholamines, which leads to vasoconstriction, decreasing the supply of O2 to the myometrium, thus decreasing contractions and generating more pain[19]. To this end, mandarin EO works on fear, stress, and anxiety, and consequently, reduces pain[17]. Studies have concluded that massages with mandarin EO can reduce the duration of labor[25].

Frangipani (Plumeria rubra L.)

Parturients who underwent massage with frangipani EO reported a significant decrease in pain sensation. Studies show that this effect may be related to the analgesic action of cyclooxygenases and lipoxygenases present in this EO[19]. The method used was massage applied with the palms of the hands on the back at the height of the thoracic vertebrae 10, 11, 12 and lumbar vertebrae 1, as the nerves that reach the uterus and cervix come from these[19].

Olíbano, Frankincense (*Boswellia carterii*)

This EO promotes pain reduction by stimulating blood circulation, reducing blood stasis and promoting better tissue oxidation[19]. Furthermore, it can reduce anxiety and stress during labor[7]. Inhalation methods or massage of the lower back were used during the active phase of labor[24]. There is a restriction on the use of this EO in women with a history of mental suffering[7].

Damask rose (Rosa x damascena Mill.)

It was identified that Damask rose EO reduced anxiety and pain in the first stage, after 30 minutes of inhalation, relating this fact to the relaxing effects of the oil, due to the presence of phenolic compounds in its chemical structure, which are anti-inflammatory and antidepressant[19]. Corroborating this result, it was demonstrated that inhalation and foot baths with Damask rose EO induce the secretion of enkephalin and endorphins, which leads to a decrease in anxiety and pain sensation. Consequently, this allows for a more rapid progression of the active phase of labor[25]. The effects of Damask rose essential oil are best observed at the beginning of the active phase of labor, and to a lesser extent during the transition phase. Massage or foot baths were used to achieve these effects[24]. There is a warning that this EO, as it is a uterotonic, should not be used in cases of increased bleeding or hemorrhage[19].

Sage (Salvia officinalis L.)

A reduction in pain sensation was observed 30 minutes after inhalation of Salvia officinalis L. EO, but 60 minutes after the intervention, the analgesic effects of the EO were no longer noticeable. The same study identified a

reduction in the time of parturition in the first and second stages[24]. These results are due to the major compounds in this oil, which are flavonoids and terpenoids, which include camphor, limonene and alpha pinene, for example[19]. The methods of using this EO to stimulate contractions are foot baths or massage in the abdominal region during the latency phase[24]. The latter is contraindicated by other literature already mentioned in this work[14,17].

Clary sage

Clary sage EO can reduce the time of parturition in the active phase, through massage in the back region, with dilution of 1.5% of the EO in carrier oil[25]. And, through foot baths or massage, clary sage essential oil can increase oxytocin release and intensify uterine contractions. It can also relieve pain through inhalation[24]. In addition, another study showed that inhaling clary sage EO can increase oxytocin levels in women with full-term pregnancies[13]. Given this uterotonic potential, it is recommended that Clary sage be avoided when oxytocin is being infused or when bleeding is increased. Furthermore, if the water has ruptured or labor has been induced with prostaglandins, wait at least 1 hour before administering this EO[14]. It is also suggested that sage not be used by women with a scar from a cesarean section or other surgery on the uterus[17]. On the other hand, the NHS guideline claims that this is a hypotensive EO and should be avoided in women with analgesia[14]. Therefore, it should be used for 30 to 60 minutes after analgesia and should be avoided in hypotensive women[7]. Regarding the possibility of adverse skin reactions, studies report that the use of clary sage EO in foot baths, alone or mixed with lavender EO, did not show dermatological events, possibly due to the low concentration in contact with the skin[13].

Final Considerations

Obstetric nurses are legally required to receive aromatherapy training and are competent to systematize essential oil care during labor, recording the phases of therapy application, the essential oils and methods chosen, and the dilutions and preparations employed. This way, the expected results are more likely to be achieved: decreased pain, anxiety, stress, nausea and vomiting, and a shorter labor duration, while minimizing adverse effects such as allergies, dermatitis, changes in vital signs, negative psycho-emotional changes, nausea, and headaches. To this end, recommendations for the use of essential oils during labor were developed based on this research.

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