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# Effectiveness of Aromatherapy in Perineal Discomfort and Pain after Childbirth: A Systematic Review

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## Abstract

**Objective:** To identify the effectiveness of the use of aromatherapy on perineal discomfort or pain in primiparous adult women who had a vaginal birth without complications.

**Methods:** The search strategy was aimed to find both published and unpublished studies. A three-step search strategy will be utilized in this review. The databases to search included: PubMed, CINAHL, Cochrane Library, EMBASE, and Evidence- Based CAM, Medline, USF University of South Florida Libraries, BMC Complementary and Alternative Medicine, CAM PubMed. The search for unpublished studies was included: ProQuest Dissertations and Thesis, and Open Grey.

**Results:** A comprehensive search of the literature found 39 studies, including 4 duplicates. After screening the titles of the remaining 35 studies, 21 studies were excluded. The full-text articles assessed for eligibility were 14, excluded 7 and included 7. The aromatherapy treatments for early postpartum mothers revealed a reduction of fatigue and increase in relaxation.

**Conclusions:** This systematic review highlights the possibility of applying another form of alternative and complementary therapy such as aromatherapy to reduce perineal discomfort and pain in mothers in the period of postpartum, in inhaled form and in a massage.

**Keywords:** Aromatherapy; Perineal; Pain; Maternal well-being

**Abbreviations:** VNS: Verbal Numeric Scale; VAS: Visual Analog Scales; VRS: Verbal Rating Scores; WHO: World Health Organization.

## Introduction

Childbirth is an event that can affect primarily to primiparous women, health conditions that can disturb the wellbeing of both mother and newborn. One of the problems that can occur is the discomfort or perineal pain [1]. Perineal pain is common after childbirth, especially if there was the trauma of the genital tract or the women have been exposed to an episiotomy and operative vaginal delivery. The pain and discomfort depending on the type of trauma the women have been exposed [2,3]. Specifically, the perineal trauma can occur in different ways for instance: "Anterior perineal trauma is an injury caused to the labia, anterior vagina, urethra, or clitoris,

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and is usually associated with little morbidity. Posterior perineal trauma is any injury to the posterior vaginal wall, perineal muscles, or anal sphincter" [3].

Much research has been carried out mentioning the level of prevalence and the effects that may be the condition of discomfort or perineal pain in the postnatal period. To the respect, Francisco, Kinjo, Bosco, et al. [4] carried out a study to identify the association between perineal trauma and pain in 473 primiparous women. The authors mentioned, "The occurrence and intensity of the pain were associated with perineal trauma and postpartum time" [4]. And on the other hand, the chance of presenting pain is tripled. The prevalence and mean intensity of pain were 33.0% and 4.7 points (pain scale 0 to 10, 0 being no pain and 10 maximal pain), with standard deviation = 2.0 in the numeric scale. Finally, they concluded that primiparous women are more likely to present perineal trauma frequently, where the episiotomy surgical wound is more prominent [4].

In the same way, MacArthur & MacArthur [5], "developed a cohort study for determining the frequency of perineal pain in the six weeks after vaginal delivery and the association between perineal trauma and perineal pain". The incidence of perineal pain among the groups during the first week was intact perineum 75% (day 1) and 38% (day 7); first-/second-degree tears 95% and 60%; episiotomies 97% and 71%; and third-/fourth-degree tears 100% and 91%. By six weeks, the frequency of perineal pain was not statistically different between trauma groups. The authors concluded that acute postpartum perineal pain is common among all women. However, perineal pain was more frequent and severe for women with increase perineal trauma.

Amorin, Junqueira & Barsosa [6], developed another study that identifies the severity and prevalence of perineal pain during the post-partum on patient period and associated obstetric, maternal and newborn baby factors following birth. In this research perineal assessment were conducted to evaluate trauma and pain; participated 303 postnatal women and the result demonstrated that 80.5% had perineal trauma (60.7% had an episiotomy) and 18.5% reported perineal pain. They used a visual analogue scale (1-9) to measure the pain intensity score. In conclusion, the authors referred that perineal pain following vaginal birth is associated with interventions during labour as well as with maternal characteristics.

For this reason, the care provided by health professionals to women during their delivery becomes an important factor to consider and should be based on the best available evidence to reduce problems to normal birth. As well as pain, some women may experience health problems like dyspareunia (difficult or painful sexual intercourse) [7].

Respect to the patient care in the postpartum to reduce the discomfort or perineal pain, the midwives have to make a care plan; between the activities or function to alleviate women symptoms of pain with the intention to reinforced the binomial newborn/mother.

There are several allopathic treatments (i.e., standard medical treatment) and complementary and alternative treatments. In the case of allopathic, the paracetamol will be "the first line of pain management; however, women who have more severe trauma may require stronger analgesia. If a woman is unable to tolerate oral analgesia, for example, if she is experiencing nausea and vomiting, an alternative, stronger analgesia may be required. Rectal suppositories were associated with reduced perineal pain in the first 24 hours post-birth and less need for additional analgesia" [7,8].

In the other hand, Amorin et al. [6], in their investigation about techniques to reduce perineal pain during spontaneous vaginal delivery and perineal suturing, mentioned that the use of pharmacological and non-pharmacological methods of perineal analgesia used by midwives in 210 maternity units, were several methods like hot packs (33%), cold packs (21%) and perineal massage (52%), and 62% used injectable local anesthetics to control perineal pain. In addition, there are considerable variations in what midwives provide to control pain [7]. However, not all applications including local anesthetics such as lidocaine spray, gel or cream will provide an appropriate level of pain relief [8-10].

Respect to non-pharmacological (complementary and alternative treatments) preparations can include cool gel pads, ice packs and bathing and so on. Although, there is not enough evidence to demonstrate the effectiveness of these treatments to relieve pain [1,11].

Ching [12] mentioned that people are using complementary and alternative therapies for general health and wellbeing. In that sense, the aromatherapy has been utilized in diverse clinical settings to facilitate the care and improve the intervention respect to the management of the pain. In America the nurses use complementary therapies "to enhance patient care, in that sense, aromatherapy is a tool for holistic nursing that appears to enhance pain control" [13].

The aromatherapy is a complementary or alternative treatment "documented as an integrative therapy and tool

of holistic nursing and is been defined as the therapeutic use of essential oils from plants for the enhancement of physical, emotional and spiritual wellbeing." [14]. The essential oils are complex mixtures distilled from aromatic plants [14]. They can be useful during pregnancy, labor, delivery, and postpartum. The oils are lipophilic (they do not dissolve in water) [14,15].

So, the aromatherapy can be used in different manners for example: in massage, oral (pill or tea), nasal (inhaler, cotton ball infused with oil) [16] and sitz bath. The essential oils used in aromatherapy have physiological and pharmacological properties and are applied in various fields of medicine –both curative and preventive. Men and women of all ages can benefit from the use of aromatherapy [17] and some authors agree that it has a complementary positive use in health care.

A preliminary search of the JBI Database of Systematic Reviews and Implementation Reports, the Cochrane Database of Systematic Reviews, Prospero, CINAHL, and MEDLINE revealed that there are currently no systematic reviews (neither published nor in progress) on the effectiveness of the use of aromatherapy on perineal discomfort or pain in primiparous adult women who had vaginal birth without complications. Therefore, this systematic review will have a high impact on the practice of midwifery, since the results will be inputs to improve the practice in the delivery and postpartum care of women, offering effective options for the relief of perineal discomfort.

**Review question/objective:**
The objective of the review was to identify the effectiveness of the use of aromatherapy on perineal discomfort or pain in primiparous adult women who had a vaginal birth without complications.

More specifically, the review questions were:

¿What is the effectiveness of the use of aromatherapy on perineal discomfort in primiparous adult women who had a vaginal birth without complications?

¿What is the effectiveness of the use of aromatherapy on pain in primiparous adult women who had a vaginal birth without complications?

## Methods

### Inclusion criteria

**Participants:** This review considered studies that included primiparous adult women with 20 years or more who had a vaginal birth without complications.

### Types of factors/exposure

This current reviewed considered studies that evaluate the use of aromatherapy in various forms (smell herbs essence, essential oils reduced by diluting and mixing, sitz bath and essential oils)

### Outcomes

The primary outcomes of interest were perineal discomfort postpartum and pain postpartum, measured by any pain scale score or discomfort scale score such as Visual Analog Scales (VAS) [18], McGill Pain Questionnaire [18,19], Verbal Numeric Scale (VNS) [19,20], Numeric Pain Intensity Scale, and Verbal Rating Scores (VRS). And the review considered the following secondary outcomes:

1. Urine retention and constipation on maternal, measured as present or absent referred by the mothers,
2. Relation of maternal/newborn wellbeing measure by World Health Organization-5 Well-Being Index (WHO-5) [21],
3. Physical and emotional maternal wellbeing [22,23].

### Types of studies

This review considered both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, and quasi-experimental studies. Descriptive and qualitative studies were excluded from this review. Studies published in Portuguese, Spanish and English were included. Studies published since 2012 and so on were included. This timeframe was selected to capture more robust studies about aromatherapy [24].

### Search strategy

The search strategy was aimed to find both published and unpublished studies. A three-step search strategy will be utilized in this review. An initial limited search of PubMed and CINAHL was undertaken followed by an analysis of the text words contained in the title and abstract, and of the index terms used to describe the article. A second search using all identified keywords and index terms were then is undertaken across all included databases. Third, the reference list of all identified reports and articles was searched for additional studies. This was informed of the development of a search strategy which was being tailored for each information source.

The databases to search included: PubMed, CINAHL, Cochrane Library, EMBASE, and Evidence- Based CAM, Medline, USF University of South Florida Libraries, BMC Complementary and Alternative Medicine, CAM

PubMed. The search for unpublished studies was included: ProQuest Dissertations and Thesis, and Open Grey.

### Assessment of methodological quality

Papers selected for retrieval was assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardized critical appraisal instruments from the Joanna Briggs Institute critical appraisal tools and Joanna Briggs Institution extraction tools for quasi-experimental studies (non-randomized experimental studies) and for randomized controlled trials (JBI SUMARI) [25]. Any disagreements that arise between the reviewers were resolved through discussion, or with a third reviewer. All studies, regardless of their methodological quality, was underwent data extraction and synthesis.

### Data extraction

After assessment of methodological quality was complete, data were extracted by two reviewers independently and entered into JBI SUMARI data extraction tool [25]. All results were subject to double data entry. Effect sizes expressed as mean/ SD and their 95% confidence intervals (CIs).

### Data synthesis

The statistical pooling was not possible; the findings were presented in a narrative form including tables and figures to aid in data presentation where appropriate.

Subgroup analysis was conducted where there was sufficient data to investigate. We used the following outcomes in subgroup analysis:

**Primary outcomes**: perineal discomfort or pain.

**Secondary outcomes**: maternal: Physical and emotional maternal wellbeing (fatigue or relaxation), urine retention, and constipation. Newborn: relationship of maternal/newborn wellbeing. This involved the aggregation or synthesis of research findings to generate a set of statements based on assembling the quality-rated research findings and categorizing them by similarity. These categories were then subjected to a meta-synthesis to produce a single comprehensive set of synthesized findings.

Research findings reported in individual studies were extracted, as were supporting illustrations. Each research finding was assigned a level of credibility according to the JIB SUMARI module. The levels of credibility are as follows:

- Unequivocal (U) – findings that are accompanied by an illustration that is beyond a reasonable doubt and therefore not open to challenge.
- Credible (C) – an interpretation that is plausible in light of the data and the theoretical framework but can be challenged.
- Unsupported (US) – findings not supported by the data.

A sensitivity analysis was conducted to test decisions made regarding the presence of substantial heterogeneity, which may lead to the exclusion of the primary study and to confirm the results seen. We conducted sensitivity analysis for the primary review outcomes to determine whether the results are robust according to the decisions made during the review process.

This review was register in PROSPERO with the code CRD42017073698. Besides, was approved by the Vice-rectory of Research of the University of Costa Rica with the code 421-B7-A45.

## Results and Discussion

### Study inclusion

A comprehensive search of the literature found 39 studies, including 4 duplicates. After screening the titles of the remaining 35 studies, 21 studies were excluded. The full-text articles assessed for eligibility were 14, excluded 7 and included 7 (Figure 1).

For the methodological quality, two independent reviewers assessed the seven studies, four studies included are RCTs [27-30], and three studies corresponded a quasi-experimental design [31-33]. The disagreements between the reviewers were resolved through discussion, or with a third reviewer. The results of the quality assessment using the JBI SUMARI appraisal tools for randomized controlled trials and for quasi-experimental studies.

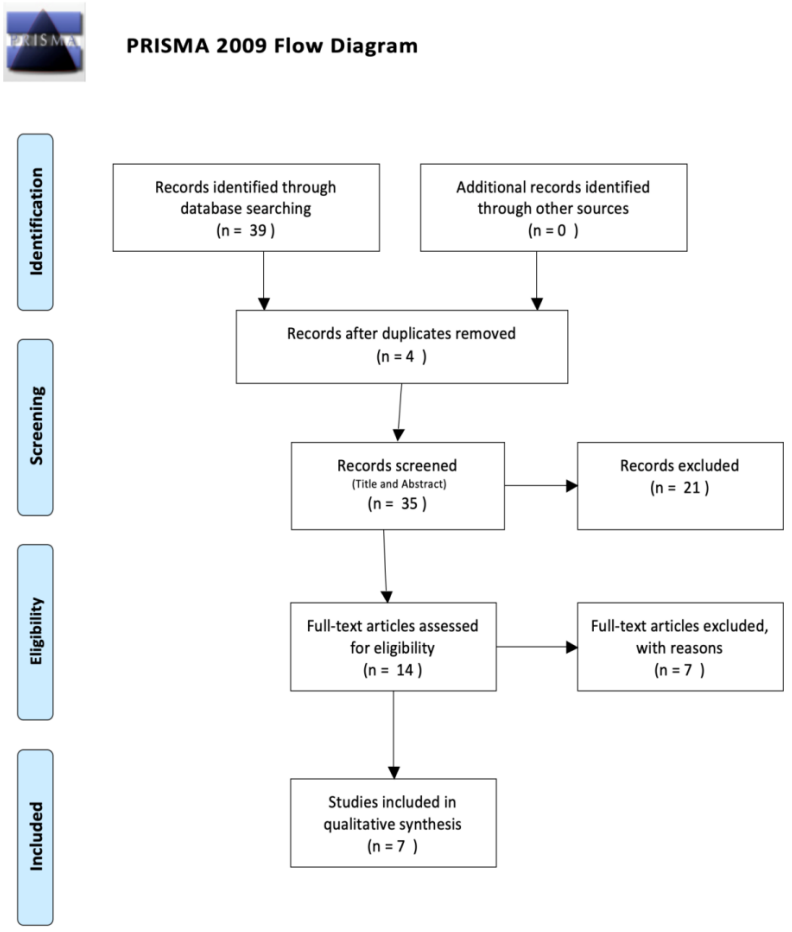


Figure 1: Flow diagram.
Source: Moher D, et al. (2009) [26].

In table 1, observe that of 13 questions in the standardized critical appraisal instrument for RCTs, any of the studies reached the total score. However, they manage to determine adequately the reliability of outcome measurement. All the studies used true randomization for the assignment of participants. In the study of Vaziri et al. [28] it was unclear the allocation to treatment groups, and Sheikhan et al. [29] it was unclear the blind to treatment assignment, the delivering treatment blind to treatment assignment and the outcome assessors blind to treatment assignment. In the other hand, Peralta-Amores et al. [30] it was unclear the outcome assessors blind to treatment assignment too.

| Citation | Q1[1] | Q2[2] | Q3[3] | Q4[4] | Q5[5] | Q6[6] | Q7[7] | Q8[8] | Q9[9] | Q10[10] | Q11[11] | Q12[12] | Q13[13] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dale et al. [27] | Y | Y | Y | Y | U | U | Y | Y | Y | Y | Y | Y | Y |
| Vaziri et al. [28] | Y | U | Y | Y | Y | U | Y | N | U | Y | Y | Y | Y |
| Sheikhan et al. [29] | Y | Y | Y | U | U | U | Y | Y | Y | Y | Y | Y | Y |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| eralta-Amores et al. [30,31] | Y | Y | Y | Y | U | N | Y | Y | Y | Y | Y | Y | Y |
| % | 100 | 75 | 100 | 75 | 25 | 0 | 100 | 75 | 75 | 100 | 100 | 100 | 100 |

Table 1: Assessment of methodological quality of included randomized controlled trials
Y, yes; N, no; U, unclear
[1]Q1- Random allocation.
[2]Q2 – Allocation to treatment groups
[3]Q3 – Treatment groups similar baseline
[4]Q4 – Blind to treatment assignment
[5]Q5 – Delivering treatment blind to treatment assignment
[6]Q6 – Outcome assessors blind to treatment assignment
[7]Q7 – Treatment groups treated identically other the intervention
[8]Q8 – Follow up complete
[9]Q9 – Participants analyzed in the groups
[10]Q10 – Outcomes measure in the same way for treatments groups
[11]Q11 – Outcome measured in a reliable way
[12]Q12 – Appropriate analysis used
[13]Q13 – Trial design appropriate

Respect to the quasi-experimental studies included shown in table 2, observe the three studies answered "yes" to the nine questions, except Asasawa et al. [32], and Widayani[32] it was unclear about the presence of a control group.

| Citation | Q1[1] | Q2[2] | Q3[3] | Q4[4] | Q5[5] | Q6[6] | Q7[7] | Q8[8] | Q9[9] |
|---|---|---|---|---|---|---|---|---|---|
| Imura [31] | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Asazawa et al. [32] | Y | Y | Y | N | Y | Y | Y | Y | Y |
| Widayani [33] | Y | Y | Y | N | Y | N | Y | Y | Y |
| % | 100 | 100 | 100 | 33 | 100 | 33 | 100 | 100 | 100 |

Table 2: Assessment of methodological quality of included Quasi-experimental studies
Y, yes; N, no; U, unclear
[1]Q1-Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first).
[2]Q2-Were the participants included in any comparisons similar?
[3]Q3-Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?
[4]Q4-Was there a control group?
[5]Q5-Were there multiple measurements of the outcome both pre and post the intervention/exposure?
[6]Q6-Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?
[7]Q7-Were the outcomes of participants included in any comparisons measured in the same way?
[8]Q8-Were outcomes measured in a reliable way?
[9]Q9-Was appropriate statistical analysis used?

## Review Findings

| Study | Setting | Country | Characteristic of participants | Child birth | Sample size | Measure scale |
|---|---|---|---|---|---|---|
| Dale et al.[27] | Midwifery Sister, Hinchingbrooke Hospital | England | 635 women mothers (primiparous or | Instrumental or normal delivery | The sample data yielded a mean of 38.5 and an SD of 23.7. To achieve a 90% power for a difference of 10 points in mean | VAS |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | multiparous) | | scores between groups using a 5% test, a sample size of 119 in each group would be required. (3 groups) | |
| Vaziri et al.[28] | Educational hospital affiliated to Shiraz University of Medical Sciences | Iran | 56 primiparous women | Normal vaginal delivery and episiotomy | Convenience sampling. Randomly divided into a control and an intervention group. Based on a previous study, considering α= 0.05 and power of 80%, and using the statistical formula, a 60-subject sample size was determined for the study. (29 in the intervention group and 27 in the control group) | Pain VAS Fatigue VAS PANAS |
| Sheikhan et al.[29] | Clinic of Kamali Hospital in Karaj | Iran | 60 primiparous mothers | Cephalic vaginal delivery. All mothers had received an episiotomy. | Randomly allocated to either the experimental or control group (n=30 each group) | Pain and discomfort VAS, and REEDA scale |
| Peralta-Amores et al.[30] | San Juan De Dios Hospital | Phillipine | 64 women (primiparous and multiparous) | Vaginal delivery | Group to aromatherapy (n=32) or control (n=32). A simple concealed random allocation shall be performed. | NRS score (All numerical rating scale) |
| Imura[31] | Middle-sized hospital in urban Tokyo | Japan | 36 mothers primiparous | Full-term normal vaginal delivery | Two groups (Aromatherapy massage n=16 and control group n=20) | -Maternity Blues Scale -Profile of Mood States -STAI scores -Revised Feelings toward Baby Scale |
| Asasawa et al.[32] | General Hospital Maternity unit in Tokyo. | Japan | 34 postpartum mothers | Normal delivery | Applying the results of Cohen's formula and the anticipated dropout rate yielded, n ≥24.5÷(1-0.26)=33.1. Therefore, the target sample size was set at 34 participants. Baseline (n=33) 97.1% Aroma treatments intervention. Post-test (n=29) 85.3% | -Fatigue Scale -Relaxation Scale |
| Widayani[33] | Independent Practical Midwife in the Bandung City | Indonesia | 28 postpartum mothers | Normal, vaginal delivery, and experienced grade 2 rupture | Non-probability sampling in the form of consecutive sampling technique. One group pre and post-test design. | Pain VAS |

Table 3: Characteristics of the participants and measure scale included studies

Table 3 provided descriptions of the characteristics of participants, sample size and the measure scales applied in the seven studies included in the current review. The first four studies [27-30] are randomized control tries and the following three [31-33] are quasi-experimental studies.

In five studies [27-31] the participants were primiparous women, in two would include multiparous also [28-30], two studies mentioned that the participants were postpartum mothers and no specifically the parity. Respect to the childbirth condition all the studies mentioned normal vaginal delivery, the study of Vaziri et al. [28]and Sheikhan et al. [29] added episiotomy

intervention, only Widayani [33] made reference to experienced grade 2 rupture.

On the other hand, all the studies are conformed by a little population between 28 and 56 women; only Dale et al. study [27] had 635 women. The sample size was divided into two groups, intervention and control for the RCT´s and the Imura´s quasi-experimental study [31]; for the others quasi-experimental studies [31,33] the participants were in a single group with pretest and posttest. The study of Asasawa et al. [32] the target sample size was set at 34 participants with a baseline of (n=33) 97.1% and the posttest (n=29)85.3%; so Widayani´s study [33] only mentioned 28 participants in one group pre and posttest design.

Respect to the measurement scale, four studies applied the Visual Analogue Scale (VAS) especially for measuring pain and discomfort; some criticism can be leveled at the use of VAS as a measure for recording perineal discomfort because it is not an objective measure. However, authors reported success in measuring feeling both in experimental situations and in clinical practice compared with verbal rating methods [27]; other scales were "all numerical rating scale" (NRS score) for measuring pain; Imura [31] apply four instruments: 1. Maternity Blue Scale, it consists of 13 items with a 0-1 to 0-5 Likert scale; possible scores range from 0 to 26 points, 2. Profile of Mood States, it rates 6 subcategories: Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor, Fatigue, and Confusion. The scale has adequate concurrent validity and good internal consistency ($r$ =.95). The subcategories of the Japanese version have adequate reliability (Cronbach's α=.779) and concurrent validity ($r$ = .368 to $r$ = .551), rates six subcategories: Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigor, Fatigue, and Confusion.

The scale has adequate concurrent validity and good internal consistency ($r$ = .95). The subcategories of the Japanese version have adequate reliability (Cronbach's α= .779) and concurrent validity ($r$ =.368 to $r$ =.551). 3. State-Trait Anxiety Inventory (STAI scores) measure state and trait anxiety. It comprises 20 items and assessed how the subject feels at that moment in terms of severity, The STAI scores increase in response to stress and decrease under relaxing conditions. the STAI has adequate concurrent validity and internal consistency ($r$ =.83). Reliability (Cronbach's α=.92) and validity of the subcategories in the Japanese version have been demonstrated; and 4. Revised Feelings toward Baby Scale. This scale consists of 28 adjective items rating "Approach" or "Avoidance" toward one's own baby; ratings are on a 4-point scale from "not at all" to "extremely." Reliability and concurrent validity for this scale were demonstrated ($r$= .85). Besides, Asasawa et al.[31] applied the Fatigue scale using the subjective symptoms 13-item subscale of the Self- Diagnosis Checklist for Assessment of Worker's Accumulated Fatigue, and the Relaxation Scale using a revised version of the rating scale of emotion using the items referring to relaxation. Sheikhan et al. [29] utilized the REEDA scale (Redness, Edema, Ecchymosis, Discharge, Approximation) too. All the scales applied are very similar in the structure of the score according to the number of items. All the results were based in the confidence of 95%.

## Characteristics of intervention and assessment period in the included studies

In table 4, it observes the interventions of the studies included in the current review. The study of Dale et al. [27] consisted of daily bathing added 6 drops of the pure lavender oil. Half an hour after having the bath, the mother was asked to complete the VAS record indicating the degree of discomfort being experienced. This study demonstrated that no statistically significant difference between groups for 10 days' period. Nevertheless, it observed some consistently lower mean scores in the lavender oil group, particularly between days three and five, but it appears that it has little clinical relevance and equally items of clinical significance may not be demonstrably statistically significant. Another point important in this study is that the effect size increases over time within each group consistently, but is not unexpected as perineal discomfort decreases over time. The practice of adding six drops of pure lavender oil to bath water daily for 10 days after childbirth to reduce perineal discomfort, it is a practice that no support the evidence.

In the study of Vasiri et al. [28] they applied 1% Lavender essential oil. The researcher instilled five drops of lavender essential oil on a cotton ball and asked the participants to hold it about 20 cm from their nose for 10–15 min and breathe normally. One hour later, the participants' physical pain, fatigue, and mood were evaluated. In the following morning before discharge, the participants' physical pain, fatigue, distress, and mood were measured again. The authors affirming that the lavender oil aromatherapy starting in the first hours of postpartum period resulted in better physical and mood status compared to the non-aromatic group. Statistically, the authors mentioned that "The baseline severity of perineal pain was 70.55 ± 17.92 in all the participants with a minimum and maximum of 40 and 100, respectively. Before the intervention, the mean perineal pain was not statistically different between the two groups ($P$ = 0.82). However, a significant difference was

observed between the two groups after the first intervention and at the tomorrow morning assessment. The intragroup comparisons showed that the intensity of perineal pain differed only in the intervention group over time ($P < 0.001$).

The baseline severity of other physical pain, such as back pain and uterine cramps, was 62.64 ± 20.12 and 69.54 ± 23.29 in the intervention and control groups, respectively, and the difference was not statistically significant. Nevertheless, a statistically significant difference was found between the two groups after the interventions ($P < 0.001$).

Respect to the other variables measured in the study: fatigue, and distress, could improve maternal mood. Besides, the authors said that although the mother´s physical pain and fatigue may decrease by resting after delivery, the effectiveness of the intervention was determined after comparison with the control group.

In conclusion, the study point that the findings showed that inhalation aromatherapy practice in the early hours of postpartum could reduce the mother´s pain and fatigue and improve their mood.

The study of Sheikhan et al. [29], the experimental group received 30 min sitz baths (+0.25 ml Lavender oil essence per 5 L of water. It reflected there were no similarities between pain intensity; the mean level for the intensity of the pain was (5.03 ± 1.49) for the Lavender oil group and (4.47 ± 1.30) for the control group; there was no significant difference between two groups (p =0.12) at this point. Moreover, 70% of subjects in the experimental group (Lavender oil group) had not taken analgesia in contrast to 33.3% of participants in the control group who had not consumed analgesics in the four days following their episiotomy. This differential in analgesic use between the two groups was significant at (p =0.007). For this review, the result of this study it is important because perineal trauma, like episiotomy, causes pain and discomfort, besides other morbidity and complications on the women´s health in the postpartum period and consequently in the wellbeing maternal and neonate, so in general, influence the experience of the mother after childbirth.

Sheikhan et al. [29] mention that in several studies the lavender oil essence on the perineum can be effective in the prevention of infection and early repair of wounds, and a form of pain relief. All subjects in this study received routine hospital analgesia (Mefenamic Acid 250 mg every 8 h); the analysis of analgesic consumption showed that the experimental group reduced pain relief significantly more than the control group. This reduction may be due to the analgesic effects of lavender oil essence.

In the same way, Peralta-Amores [30] treated firstly with lavender oil patch to rule out sensitivity to lavender. Two drops of lavender oil were applied to the inside of a patient's wrist. Six hours post vaginal delivery has completed, the patients in the aromatherapy group will receive oxygen with a facemask coated with lavender oil. Two drops of 2% lavender oil were applied with a cotton swab to the inside of an oxygen facemask. They were found out that postpartum pain scores were significantly decreasing within each group (p=0.001) from five, 10 and 15 minutes of observation. There was a significant difference between the pain scores of the treatment group (aromatherapy) and control group at the 10 and 15 minutes of observation. So, the study noted aromatherapy is an effective method in the management of postpartum pain and it has a significant impact on the decrease of pain especially at a longer period of exposure. They recommend for the medical service division and its health care personnel; aromatherapy can be included in caring mothers after giving birth.

On the other hand, the purpose of the Imura [31] study was to investigate the effects of full-body aromatherapy massage on various mood states of normal postpartum mothers. Participants were treated in the supine position. Oils used in the massage contained three drops of Neroli (Citrus aurantium) and seven drops of Lavender (Lavendula officinalis) per 100 mL of Squalane. The concentration of essential oils was thus 0.5% (1 drop in converted into .05 mL). The results noted the effects of the aromatherapy-massage group whose baseline scores indicated maternity blues and high anxiety showed a shift to normal limit scores after the intervention, whereas those in the control group remained in the same or higher scores over the same period of time. This results said the authors, could have been influenced by the emotional support the mothers received through the aromatherapy-massage, by being touched gently and warmly by other people. When new mothers have sufficient physical and emotional support from others, negative feelings may be alleviated, allowing more energy and awareness of the baby, which might assist in the transition to motherhood. In general, the positive effects of aromatherapy-massage as an olfactory-somatosensory-tactile integrated therapy were seen in this study.

Asasawa et al. [32] focus the study in comparing the scores before and after aroma treatment intervention. The treatment included applying one of five types of essential aroma oil (pure lavender, ylang-ylang, citron, rosewood, and sweet orange) through massage to the

mother´s hands and forearms. Aroma treatments used a blend of sweet almond oil as the carrier oil and the essential oil, diluted the concentration of the essential oil to within 2% (mild dilution) for women in the early postpartum period. The technique used was the oil on the palm was spread thoroughly across the entire palm, and then the participants 'hand and forearm (first in the left side and then in right side) were slowly and gently stroked in order to promote the flow of blood and lymph. The massage was conducted for approximately 20 minutes in a private room with control of temperature (25 degrees Celsius). Data collection of the outcome evaluation was carried out for the pre-test and post-test. The outcome measures included fatigue and relaxation.

The aromatherapy treatments for early postpartum mothers revealed a reduction of fatigue and increase in relaxation, coinciding with the results of Vasiri et al. [28] Thus; it was considered that receiving aromatherapy was a benefit for mothers with fatigue and nervousness during the postpartum hospitalization. An interesting finding was that the aromatherapy treatment was more effective against fatigue on the mothers' third day postpartum and for those who were in their 30s. The feeling of relaxation was effective on the fourth day postpartum. Maternity blues occur more often on the day three of the postpartum; generally, emotional changes associated with the childbirth occur on day five of the postpartum until the end of the postpartum period, this outcome coinciding with Vasiri et al. [28], and Peralta-Amores [30].

Respect to Widayani´s [33] quasi-experimental study with one group pre and post-test design, where participated postpartum mothers who had perineal suture injuries. The intervention was done after two hours of perineal suturing. After completing the pretest questionnaire, respondents were given intervention in lavatory inhalation aromatherapy within minutes to 10, 30 and 60 for 10 minutes. The instrument used was Visual Analogue Scale (VAS), and the material used was lavender oil vapor with a concentration of 100%, given 4-5 drops dissolved in 200 ml of water, given inhalation through a vaporizer or electrical appliance. After smelled of aromatherapy, the patient was asked to relax and inhale aromatherapy for 10 minutes. Respondents are conditioned in a room between 10-16 $m^2$ and not many air vents. In conclusion, the author said there was a decrease in the intensity of perineal suture pain before and after lavender aromatherapy was given to a postpartum mother with a p-value of 0.01. Inhalation of lavender aromatherapy can be used as an alternative to complementary therapy in postpartum mothers with perineal suture wounds.

| Study | Intervention A | Intervention B | Control | Assessment period |
|---|---|---|---|---|
| Dale et al. [27] | Pure lavender oil. Daily bathing added 6 drops of the oil. Half an hour after having the bath, the mother was asked to complete the VAS record indicating the degree of discomfort being experienced. Prior to transfer home the mother was prepared by the midwifery staff to continue the bathing procedure, and was given a reference sheet to take home with her. Daily visits by the community midwife to reinforce the procedure with the mother and for assessment of the perineum to be continued until the 10th day. | Synthetic lavender oil. Idem intervention A | Inert substance. Idem intervention A | 10 days following normal childbirth |
| Vaziri et al. [28] | 1% Lavender essential oil was utilized. The researcher instilled five drops of lavender essential oil on a cotton ball and asked the participants to hold it about 20 cm from their nose for 10–15 min and breathe normally. One hour later, the participants' physical pain, fatigue, and mood were evaluated. In the following morning before discharge, the participants' physical pain, fatigue, distress, and mood were measured again. The mother was separated from her baby during the aromatherapy period. The study was a single-blinded study. Received routine postpartum care including sedative drugs. | Non-intervention | Sesame oil was used as placebo similar to lavender oil in intervention group. Received routine postpartum care including sedative drugs. | Before the intervention, after the first intervention (6h), and the tomorrow morning assessment. |

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|---|---|---|---|---|
| Sheikhan et al. [29] | The experimental group received 30 min sitz baths (+0.25 ml Lavender oil essence per 5 L of water). | Non-intervention | Subjects in the control group were asked to follow a usual hospital routine programmed of taking 30 min warm sitz baths (+10 ml Betadine 10% per 4 L water) | Twice a day for 5 days |
| Peralta-Amores et al. [30] | They were treated with lavender oil patch to rule out sensitivity to laven-der. Two drops of lavender oil were applied to the inside of a patient's wrist. Six hours post vaginal delivery has completed, the patients in the aromatherapy group will receive oxygen with a facemask coated with lavender oil. Two drops of 2% lavender oil were applied with a cotton swab to the inside of an oxygen facemask. | Non-intervention | Patients in the control group will receive oxygen coated with non-scented baby oil six hours post vaginal delivery. | 5, 10, 15 min, 6 h postpartum |
| Imura [31] | Aromatherapy massage procedure. Participants were treated in the supine position. Oils used in the massage contained 3 drops of Neroli (Citrus aurantium) and 7 drops of Lavender (Lavendula officinalis) per 100 mL of Squalane. The concentration of essential oils was thus 0.5% (1 drop in converted into .05 mL). | Non-intervention | Stayed with their babies in single hospital rooms and received standard care in the maternity ward. The room environment was the same as the aromatherapy-massage group. | Unclear |
| Asasawa et al. [32] | The treatment included applying one of five types of essential aroma oil (pure lavender, ylang-ylang, citron, rosewood, and sweet orange) through massage to the mother's hands and forearms. Participants were then able to smell each one, and then they selected the oil for their treatment. To ensure safety, prior to beginning the treatments, the participants received a patch test to determine if they might have an allergic reaction to the ingredients of the aromatherapy. Treatment consisted of using the optimal effleurage as a basic technique so that the oil on the palm was spread thoroughly across the entire palm, and then the participants' hand and forearm were slowly and gently stroked in order to promote the flow of blood and lymph. Treatment was provided beginning on the left side and then the right side; it was conducted for approximately 20 minutes. Each participant received 1 aromatherapy treatment, which took place in a private room and either sitting or lying down. | Non-intervention | No control group. It is a single group pretest-posttest. | The pre-test was requested the day before the intervention, and the post-test request was for the current day, after about 24 hours of the pre-test |

| | | | | |
|---|---|---|---|---|
| Widayani [33] | After completing the pretest questionnaire, respondents were given intervention in lavatory inhalation aromatherapy within minutes to 10, 30 and 60, aromatherapy is given for 10 minutes. Then posttest was carried out along with observation of the 2-hour postpartum period, by examining perineal suture wounds using anatomic tweezers. When the suture wound was examined, the researcher looked at the reaction of the respondent's face. The material used is lavender oil vapor with a concentration of 100%, given 4-5 drops dissolved in 200 ml of water, given inhalation through a vaporizer or electrical appliance. Before inhalation, aromatherapy furnace dishes that have been given freshly awaited water are dripped with aromatherapy essences. The distance between the stove and the respondent is less than 30 cm. After smelled of aromatherapy, the patient was asked to relax and inhale aromatherapy for 10 minutes. Respondents are conditioned in a room between 10-16 m2 and not many air vents. | Non-intervention | No control group. It is a single group pretest-posttest. | Intervention is done after 2 hours of perineal suturing |

Table 4: Characteristics of intervention and assessment period in the included studies.

## Primary Outcomes

Respect to the primary outcomes in the current review (Table 5), four of the seven studies included refers to perineal pain and discomfort. Vasiri et al. [28] explain there are significant differences were found concerning the mean scores of positive, and the physical pain had (P < 0.001), administering lavender oil in the first hours of the postpartum period compared to the non-aromatic group. In the same way, Peralta-Amores et al. [30] mentioned that postpartum pain scores were significantly decreasing within each experimental group (p-value =0.001) from 5, 10, and 15 min of observation. Contrary to these authors, Dale et al. [27] mentioned the study provides no evidence to support the practice as it stands. No statistically significant difference between groups in means discomfort scores and 95% confidence intervals by the group, for 10 days; although the effect size increases over time, it is not significant to the clinical practice.

On the other hand, Widayani[32] refers to it can be seen that the median value and range of the intensity score of the perineal wound pain after treatment is lower than before the treatment. Based on the results of statistical tests p-value <0.05 so, there are differences in scores in the respondent group before treatment and after treatment. Therefore, it can be assumed that the administration of lavender aromatherapy affects the reduction in the intensity of perineal wound pain. Finally, the author point there were significant differences in pain intensity between the treatment group and the control group with a p-value of 0.01, inhalation of lavender essential oil has a significant effect on pain reduction with a p-value <0.05.

## Secondary Outcomes

These current review establishment secondary outcomes: Urine retention and constipation on maternal, measured as present or absent referred by the mothers; Relation of maternal/newborn wellbeing; Physical and emotional maternal wellbeing.

In the studies included no mentioned urine retention and constipation on maternal problems, thus this current review does not have any response respect the theme. Respect to the relation of maternal/newborn well-being, Imura [31] said the results on the Feelings Toward Baby Scale in the aromatherapy-massage group showed that the scores on the "Approach" Feeling Toward Baby subscale were significantly higher (*P*=.005), so there is a benefit to the baby. The relaxation and anxiety aspect was mentioned by three studies [28, 31,32], everyone agrees that results are very positive compared with the non-aromatic group. For example, Vaziri et al. [28] mentioned that in distress scores the p-value was p<0.001. In addition, significant differences were found concerning the mean scores of positive (*P* < 0.001) and negative (*P* = 0.007, *P* < 0.001) moods between the two groups after the

interventions. Equally, Imura [31] notes that mothers in the aromatherapy-massage group had significantly lower scores on scales measuring Maternity Blues, State-Anxiety, and five of the six subscales of Profile of Mood States: Tension-Anxiety, Anger-Hostility, Depression-Dejection, Fatigue, and Confusion. They also had higher scores on the Profile of Mood States subscale "Vigor" after the massage session tan those in the control group.

On the other hand, Asasawa et al. [32], said that participants showed a significant decrease in fatigue, and increased in relaxation. Significant findings indicated the effectiveness of the essential oil of citron or oranges on puerperal day three and without pregnancy complications in mothers over 30 years. In addition, a majority of the participants were satisfied with the intervention and felt it augmented their comfort level. There were significant differences between the pretest-posttest in Fatigue and Relaxation for participants who selected citron essential oi ($P<0.05$), and those who selected sweet orange essential oil ($P<0.05$). In the evaluation process, 77.8% of the participants were satisfied with the treatment methods; 89.6% felt the implementation time was appropriate, and 89.6% felt increased comfort. The majority (72.4%) of the participants indicated a high agreement between their expectations and the implementation, and 93.1% evaluated the treatment methods as a considerate and thoughtful act.

| Study | Outcomes | Effect size | Notes |
|---|---|---|---|
| Dale et al. [27] | -Perineal discomfort | No statistically significant difference between groups. Mean discomfort scores and 95% confidence intervals, by group, for 10 days. An effect size of 0.2 is considered small, 0.5 moderate, and 0.8 large. The effect size increases over time. No side effects were identified by the women or midwives during the trial. | The study provides no evidence to support the practice as it stands. |
| Vaziri et al. [28] | -Intensity of perineal pain<br>-Fatigue<br>-Distress level<br>-Mood | Regarding perineal pain ($P$ = 0.004, $P$ < 0.001), physical pain ($P$ < 0.001), fatigue ($P$ = 0.02, $P$ < 0.001), and distress scores ($P$ < 0.001). In addition, significant differences were found concerning the mean scores of positive ($P$ < 0.001) and negative ($P$ = 0.007, $P$ < 0.001) moods between the two groups after the interventions. | Lavender oil aromatherapy starting in the first hours of postpartum period resulted in better physical and mood status compared to nonaromatic group. |
| Sheikhan et al. [29] | -Perineal discomfort<br>-Pain<br>-Episiotomy discomfort | There was a statistical difference in pain intensity scores between the 2 groups after 4 h (p =0.002, and 5 days (p =0.000) after episiotomy.<br>The REEDA score was significantly lower in the experimental group (Lavender oil group) 5 days after episiotomy (p= 0.000). | Use of Lavender oil essence can be effective in reducing perineal discomfort following episiotomy. |
| Peralta-Amores et al. [30] | -Pain | Postpartum pain scores were significantly decreasing within each group (p-value =0.001) from 5, 10, and 15 min of observation. With the influence of aromatherapy, a significant decrease of pain scores was observed (p-value=0.001)at the significant level of 0.05. | Aromatherapy has significant impact in the decrease of pain scores of patients especially at a longer period of exposure. Even there are various intervening factors associated to pain, aromatherapy can be a conclusive non-pharmacologic approach in helping mothers after birth. |
| Imura [31] | -Maternity blues<br>-Anxiety | There were no significant differences between groups on the mean pretest scores of each questionnaire. In the aromatherapy massage group experienced significantly lower maternity blues scores after receiving the massage tan those of the control group. After completing the session, no mothers had posttest scores indicating maternity blues in the aromatherapy-massage group; 2 mothers (10%) in the control group had scores indicating | The results of this study indicate that mothers in the aromatherapy-massage group had significantly lower scores on scales measuring Maternity Blues, State-Anxiety, and 5 of the 6 subscales of Profile of Mood States: Tension-Anxiety, Anger-Hostility, Depression-Dejection, |

| | | | |
|---|---|---|---|
| | | maternity blues (*P*=.035).On the State-Anxiety instrument were also significantly lower in mothers in the aromatherapy massage group. After the session, all of these mothers in the aromatherapy-massage group came down into the normal (31–41) or low anxiety range (22–30). On the other hand, all 5 mothers in the control group, whose scores indicated high anxiety, still remained at the high anxiety level (*P*=.002). All mothers (100%) in the aroma- therapy-massage group showed decreased the scores on Tension-Anxiety and Fatigue subscales after the session. In the control group, 12 mothers (60%) decreased these scores, and 8 mothers (40%) increased or did not change their scores (*P* .016). The results on the Feelings Toward Baby Scale in the aromatherapy-massage group showed that the scores on the "Approach" Feeling Toward Baby subscale were significantly higher (*P*=.005). | Fatigue, and Confusion. They also had higher scores on the Profile of Mood States subscale "Vigor" after the massage session than those in the control group. In addition, they had higher scores on "Approach" Feeling and lower scores on "Avoidance" Feeling, which resulted in lower scores on the composite score. |
| Asasawa et al. [32] | -Fatigue<br>-Relaxation | There were significant differences between the pretest - posttest in the two scales: Fatigue (P<0.001) and Relaxation (P<0.001) based on the Wilcoxon signed-rank test. There were significant differences between the pretest- posttest for each attribute in the Fatigue scale items: age 31-35 (P<0.01), age 36-40 (P<0.05), puerperal day three (P<0.05), no pregnancy complication (P<0.01). There were significant differences between the pretest-posttest for each attribute in the Relaxation scale items: puerperal day three and four (P<0.05). There were significant differences between the pretest - posttest in Fatigue and Relaxation for participants who selected citron essential oil (P<0.05), and those who selected sweet orange essential oil (P<0.05). In the evaluation process, 77.8% of the participants were satisfied with the treatment methods; 89.6% felt the implementation time was appropriate, and 89.6% felt increased comfort. The majority (72.4%) of the participants indicated a high agreement between their expectations and the implementation, and 93.1% evaluated the treatment methods as a considerate and thoughtful act (Figure 2). The results of the content analysis of the open-ended responses revealed five categories: (1) increased relaxation, (2) gained a comfortable feeling, (3) treatment matched expectations, (4) need for improvement of techniques, and (5) need for improvement of thoughtfulness. Comments included both affirmative opinions and suggestions for future improvements. | Participants showed a significant decrease in fatigue, and increase in relaxation. Significant findings indicated effectiveness of the essential oil of citron or oranges on puerperal day three, and without pregnancy complications in mothers over 30 years. In addition, a majority of the participants were satisfied with the intervention and felt it augmented their comfort level. |
| Widayani [33] | -Perineal pain | It can be seen that the median value and range of the intensity score of the perineal wound pain after treatment is lower than before the treatment. Based on the results of statistical tests p value <0.05 so that there are differences in scores in the respondent group before treatment and after treatment. | Lavender aromatherapy can be an alternative treatment for pain of perineal wounds, which can lead to better physical and psychological conditions of the mother. There was a decrease in |

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| | | Therefore, it can be assumed that the administration of lavender aromatherapy affects the reduction in the intensity of perineal wound pain. Perineal tears can cause discomfort and dyspareunia. The results showed that respondents experienced moderate pain (35.7%).33% of women experienced perineal pain due to episiotomy and 52% were spontaneous lacerations. there were significant differences in pain intensity between the treatment group and the control group with a p-value of 0.01. inhalation of lavender essential oil has a significant effect on pain reduction with a p-value <0.05 | the intensity of perineal suture pain before and after lavender aromatherapy was given. Aromatherapy lavender significantly affects the reduction of perineal suture pain in post-partum mothers with a p-value of 0.01.<br>Inhalation of lavender aromatherapy can be used as an alternative to complementary therapy in post-partum mothers with perineal suture wounds. |

Table 5: Outcomes, effect size and notes of the included studies.

## Qualitatives Analysis

| Category | Subcategory | Evidence Synthesis |
|---|---|---|
| Perineal discomfort | Effectivity in postpartum | The use of lavender oil resulte in statistically significant difference detected by the REEDA score 5 days after episiotomy, compared with betadine use by the control group. There were no differences detected in discharge and approximation between the two groups. (U) |
| | Perineal discomfort | The mean and standard deviation for the REEDA scores before intervention in each group were: (4.07+/-1.14). Lavender oil group; (4.47+/-1.54), betadine group. There was no significant difference between two groups (p=0.22). (U)<br><br>It cannot be concluded that the dilution used (6 drops of lavender oil in bath water) for 10 days will reduce perineal discomfort. (C) |
| Perineal pain | Reduce the pain in primiparous women | The group of aromatherapy and the control group, were no significantly different in age, gravidity and parity (U) |
| | Pain | There were no similarities noted between pain intensity noted. (U)<br><br>No significant different between two groups (p=0.06). Group of lavender oil user's vs control group 12 h following episiotomy. (U)<br><br>The differential in analgesic use between the experimental group and the control group was significant at (p=0.007) (U) |
| | Pleasant | The most mothers using the oil found it a pleasant experience yet further research is required (C) |
| Emotional responses | Maternity mood | Mothers in the aromatherapy-massage group experienced significantly lower maternity blues scores after receiving aromatherapy-massage than those of the control group. (C)<br><br>By using a clinical cutoff point (a score of 8 or higher) to indicate maternity blues, there were 5 mothers (31.3%) in the aromatherapy-massage group whose baseline scores before the session indicated this diagnosis and 3 mothers (15%) in the control group. (C) |
| | Fatigue and relaxation | There were significance differences between the pretest and post-test in the two scales: fatigue and relaxation. Fatigue (p=0.001) Relaxation (p=0.001), based in Wilconxon singed rank test © |

| | | |
|---|---|---|
| | | There were significance differences between the pretest and post-test for each attribute in the fatigue scale items: age 31-35 (p=0.01) 36-40 (p=0.05) Puerperal day 3 (p=0.05) no pregnancy complication (p=0.01) (C)<br><br>There were significance differences between the pretest and post-test in Fatigue and Relaxation for participants who selected citron essential oil (p=0.05), and those who selected sweet orange essential oil (p=0.05). (C)<br><br>Aromatherapy with lavender oil, was effective in reducing pain, fatigue, and distress and could improve maternal mood. (U) |
| Maternal wellbeing | Anxiety | The scores of the State-Anxiety instrument were also significantly lower in mothers in the aromatherapy massage-group. By using a clinical cutoff point (a score of 42 or higher) to indicate high anxiety, there were 5 mothers in each group whose baseline scores indicated high anxiety. (C)<br><br>Mothers in the aromatherapy-massage group showed significantly lower scores on Tension-Anxiety, Depression-Dejection, Anger-Hostility, Fatigue, and Confusion subscales. After the massage session, they had higher scores on the Vigor subscale than the control group. All mothers (100%) in the aromatherapy-massage group showed decreased the scores on Tension-Anxiety and Fatigue subscales after the session. (C)<br><br>After the session, all of these mothers in the aromatherapy-massage group came down into the normal (31-41) or low anxiety range (22-30). On the other hand, all 5 mothers in the control group, whose scores indicated high anxiety, still remained at the high anxiety level (p=0.002) (C) |

## Narrative Synthesis

This review focused on two primary outcomes that were perineal discomfort and perineal pain (Figures 1, 2). In relation to the perineal discomfort, there was no clarity in the use of lavender oil in relation to the effectiveness in the postpartum, because the study found included women with episiotomy, an intervention that was not contemplated by this review to assess the effectiveness of aromatherapy in postpartum perineal discomfort, so it is a variable that can be confused in relation to conclusions. Regarding perineal pain, two important aspects were determined, such as the intensity of pain that can be very variable among women and its reduction, especially in primiparous women, which was the target population in this review. The investigations do not show clarity with respect to the decrease in pain intensity with the use of aromatherapy, similarities are pointed out between the pain intensity between the groups; On the other hand, no significant differences were found between compared groups (use of lavender oil with no use); however, another study showed a significant difference with the use of aromatherapy by adding analgesic with a p-value of 0.007, so it is not clear whether the reduction in pain is especially due to the use of analgesic. There was also no difference between the experimental and control groups according to age range, pregnancy or parity.

The secondary results were concentrated in two variables: the emotional response with two sub variables, the pleasurable experience, the maternal mood; the second variable referring to maternal well-being with two sub-variables, fatigue and relaxation, and anxiety. (Figures 3,4)

With regard to the emotional response, the research included in this review states that the majority of mothers who use aromatherapy had a pleasant experience. On the other hand, the group of mothers who experienced aromatherapy in the form of massage reported very low scores of melancholy compared with the mothers of the control group.

On the other hand, in the results of the studies analyzed with respect to maternal well-being, significant differences were found between pretest and posttest groups with respect to fatigue and relaxation with a p-value of 0.001. In the same way, there were significant differences between the groups in terms of age, postpartum period (3 days p = 0.05), uncomplicated pregnancy (p = 0.01), this last aspect is very important for

the results of this review where the target population I should have that condition. All these results were in favor of the use of aromatherapy either by the use of lavender oil as another type of oils such as sweet orange and citron.

Another study determined that the use of lavender oil was effective in reducing fatigue and stress and can improve maternal mood. The anxiety scale applied to mothers yielded low scores in mothers who received aromatherapy in the form of massage. Also low scores on tension/anxiety, depression/dejection, anger/hostility, fatigue, and confusion, evidencing an increase in vigor score compared with mothers in the control group.

The childbirth is an event that can affect all women in general, and especially the primiparous, producing perineal discomfort, and pain in the postpartum, conditions that may alter the well-being of mothers and their newborn; especially if there has been trauma in the genital tract or episiotomy has been performed [2,3].

Due to the importance of this topic in the health of women mothers, explain the research that has been carried out to determine different forms of intervention that help to reduce the effects during postpartum period [4-6]. One of the alternatives and complementary therapies that have been studied to be applied by midwives is aromatherapy in its different forms of application and also have been compared with standard medical treatment [7,8]. The use of complementary and alternative therapies for the general care of health and well-being has been mentioned since past decades [12].

The aromatherapy is considered an integral complementary and alternative treatment, used by holistic nursing through the use of essential oils for physical, emotional and spiritual care [14]. However, there have been doubts regarding the significant results in terms of the effectiveness of the use of aromatherapy, especially in the topic of this review.

This systematic review demonstrates the scope and limitations of the effectiveness in the use of aromatherapy in its different forms of application to treat discomfort and perineal pain, as well as other secondary outcomes such as maternal well-being and emotional responses. Six studies were included that correspond to randomized clinical trials and quasi-experimental studies that used scales of measurement; for examples, four studies applied to the (VAS) especially for measuring pain and discomfort, others used numerical scales like (NRS score) for measuring pain. In the same manner, a study applied four instrument [31] where included scales of Likert, the STAI scores and the Revised Feelings towards Baby Scale. As well as research applied the fatigue scale [27], and the REEDA scale [27]. It is important to note that in five of the [27-31] the participants were primiparous women, a characteristic included in the inclusion criteria.

Regarding the childbirth condition, all of the studies mentioned normal vaginal delivery, in addition, two of these studies [28,29] contemplated the variable of episiotomy intervention and only one study included experienced grade 2 rupture [33].

The investigations showed statistically positive effects, especially with the use of lavender oil applied in drops to breathe normally for reducing perineal discomfort and pain [28,30,33], which contributes to improving fatigue and the mood; besides, it is recommended for the care of the health of women after birth as an alternative or complementary therapy in the postpartum period even with perineal suture wounds.

Another form of aromatherapy application is postpartum massage, using a combination of oils like three drops of Neroli added to seven drops of Lavender in 100 ml of Squalane. The concentration of essential oils was thus 0.5% (one drop in converted into .05 ml). The result showed the effects of the aromatherapy-massage group whose baseline scores indicated maternity blues and high anxiety showed a shift to normal limit scores after the intervention, whereas those in the control group remained in the same or higher scores over the same period of time.

Other researchers [32] applied the massage in other concentrations and combinations of essential oils, one of five types of essential oil (pure lavender, ylang-ylang, citron, rosewood, and sweet orange) through massage to the mother's hands and forearms. Aromatherapy treatments used a blend of sweet almond oil as the carrier oil and the essential oil diluted the concentration of the essential oil to within 2% (mild dilution) for women in the early postpartum period. This application also showed a reduction of fatigue and increase in relaxation, especially on the third postpartum day, coinciding with other investigations [28,32]. Especially for the emotional response to birth, maternity blues occurs most often on the third postpartum day to the fifth day. So the application of aromatherapy in those days has a very positive effect on mothers [28,30]. The recommendations mean that the use of aromatherapy is beneficial for the mother with fatigue and anxiety during the postpartum period.

In other forms of application such as sitz baths [29] did not reflect an improvement in pain intensity, nor did the

included studies mention urine retention and constipation on maternal problems. It is important to note that the results of five of the studies included in this review are based on small samples [28-32]; only one study mentions a sample of 635 women.

## Conclusion

This systematic review highlights the possibility of applying another form of alternative and complementary therapy such as aromatherapy to reduce perineal discomfort and pain in mothers in the period of postpartum, in inhaled form and in a massage. It also points out the importance of making more efforts to carry out more robust research on this subject in such a way that it seeks to establish different intervention strategies adapted to the contexts of work in health for the promotion of quality and effectiveness of obstetric care.

## Recommendation for practice

The evidence recommends the application of inhaled aromatherapy and massage as an alternative and complementary treatment in the postpartum period, in women with normal vaginal births either primiparous or multiparous. However, the midwives must be trained in the use of this type of therapies and adapt or build strategies according to their context and system of work to provide quality and effectiveness in care for postpartum mothers.

## Recommendation for research

Further research with robust samples is needed within this setting to determine with greater scientific support that the practice of aromatherapy as a complementary and alternative treatment is effective to reduce discomfort and perineal pain as well as the consequent reduction of fatigue, maternity blues in the postpartum.

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