

Effect of aromatherapy on post-partum complications: A systematic review

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ABSTRACT

Introduction: and purpose: Aromatherapy is a known popular method to reduce the symptoms of various physiologic processes and diseases. The aim of the study was to determine whether aromatherapy improves symptoms commonly experienced by women during the postpartum period.

Methods: In the present systematic review, four international databases (PubMed, Google Scholar, Web of Science, and Scopus) were searched from inception of databases through August 2018. References for each study were manually reviewed to ensure that relevant works were included.

Results: Thirty-four (34) articles were identified with 17 studies meeting eligibility criteria and included a total of 1400 women using a variety of aromatherapies. Results demonstrated that aromatherapy can improve symptoms commonly experienced in post-partum period, including depression, stress, pain, anxiety, and fatigue.

Conclusion: There are therapeutic effects in use of aromatherapy during the post-partum period. Aromatherapy, however, should be used with caution as safety concerns have not been conclusively demonstrated.

1. Background

The postpartum period is considered as a crucial time associated with various physical and emotional symptoms including pain, impaired sleep quality, stress, anxiety, and fatigue [1–4]. In the postpartum period, more attention is paid to the neonates, and mothers are particularly less evaluated for post-partum symptoms. Screening, diagnosis, and treatment of postpartum symptoms are also essential. The results of studies show that along with treatment of physical symptoms during this period, social support is necessary for improvement of psychological symptoms [5,6]. Various studies indicate that the postpartum period is often associated with having “postpartum blues,” which include temporary transient symptoms, the development of depression and anxiety, as well as feelings of forgetfulness, irritability, headache, and dizziness [7,8]. The prevalence of these symptoms range from 25% to 85% varying in different countries [9–11].

Available treatments for common post-partum symptoms include complementary and alternative therapy approaches - though they often lack evidence for safety and efficacy [12], and complication-specific

pharmacologic therapies [13,14]. Both approaches are designed to minimize postpartum morbidity and mortality and improve quality of life. The use of complementary and alternative therapies has become very popular in recent years [15,16]. Complementary and alternative therapies are popular methods among pregnant women as well. Research from varied countries demonstrate rates of aromatherapy use among pregnant women ranging from 13 to 78% [17]. In addition, studies indicate that most women use at least one complementary therapy during pregnancy [18–20].

Aromatherapy is one complementary and alternative therapy that is very popular considering its ease of use and availability [21]. Aromatherapy medicinally applies aromatic substances or essential oils to effect health and mood. Essential oils are volatile oils obtained from raw vegetable material through a process of distillation with water or steam, or by dry distillation and are known to have antiseptic, antimicrobial, antiviral, antifungal, and antioxidant properties [22]. Some of the plants used in the creation of essential oils include rosemary, jasmine, rose, tangerine, patchouli, cinnamon, and lavender. Aromatherapy is typically used through topical application or inhalation

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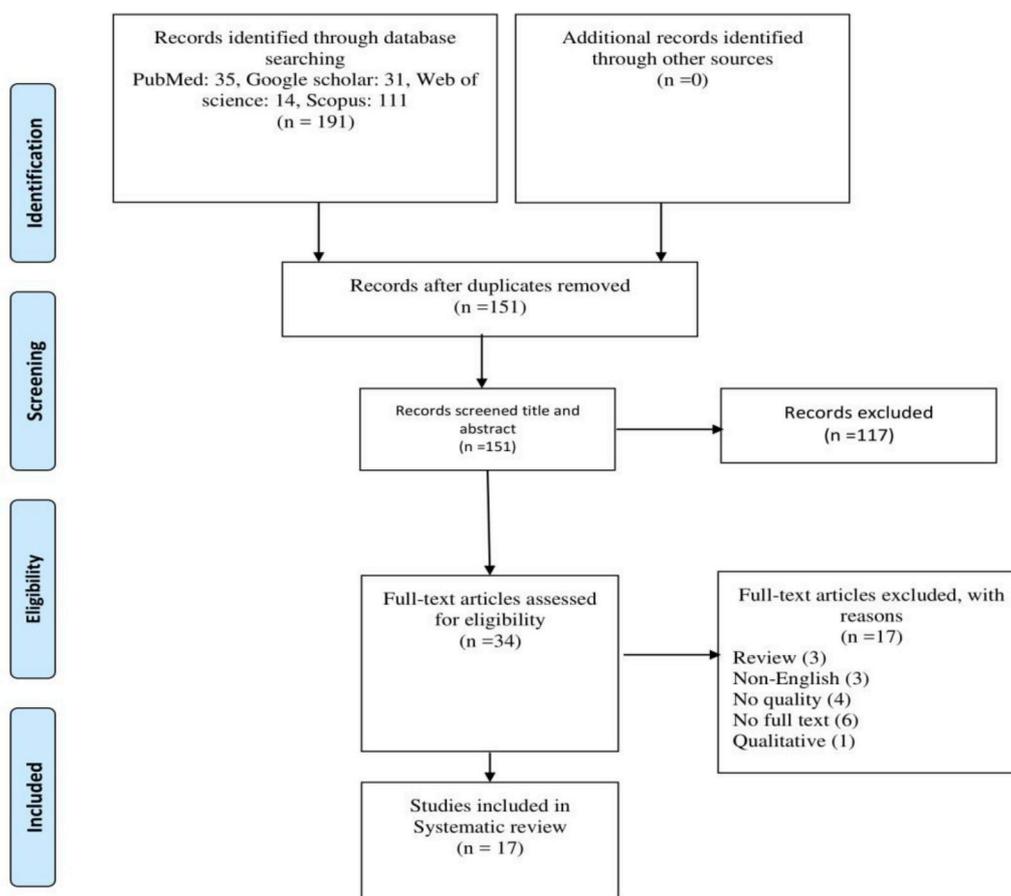


Fig. 1. Study selection process.

[23]. Topical application through use of massage oils, or bath and skin care products, allows for absorption through the skin. Inhalation allows for oil evaporation into the air through use of a diffuser, spray or droplets, then breathing in the product [22].

When inhaled, the essential oil molecules are sensed by olfactory epithelium and a neural impulse is generated. This neural impulse reaches the olfactory bulb, passes through the olfactory nerve, reaches the limbic region, and stimulates the limbic system of the brain. Essential oils penetrate the skin, enter the bloodstream and the immune system, and release endorphins, improve oxygenation, and nourish cells and tissues, leading to physical and emotional relaxation and a good feeling, because they can have beneficial effects on physiological and psychological processes [24]. Inhaled aromatherapy exerts its effects as physical and mental improvement and stabilization of emotions in persons; these effects can lead to therapeutic effects including reduction in anxiety, depression, pain, spasm, muscle cramp, and fatigue, and improvement of sleep quality [25]. There is a large body of anecdotal evidence regarding the safety and efficacy of essential oils and, while many have been shown to be safe when used as directed, the products are not regulated by the Food and Drug Administration in the United States [26]. Caution is warranted regarding use to minimize possible risks and benefits, particularly in lactating women during the postpartum period where newborn impacts are unknown.

Various studies have shown that the aromatherapy is used during pregnancy and postpartum to treat and improve various symptoms such as depression and anxiety, as well as quality of life [12,27,28]. Nevertheless, various studies differ in terms of method, type, amount, and duration of use of varied aromas, and there is a contradiction between results which lead to different results. Therefore, the aim of the present study was to determine the effect of aromatherapy, as an evidence-based, cost-effective and available treatment, on postpartum

symptoms and quality of life. Findings are potentially of use to health professionals and women where efforts are made to reduce symptoms and improve quality of life.

2. Methods

2.1. Search strategy

Four (4) databases were searched from inception of databases August 2018. These databases included PubMed, Google Scholar, Web of Science, and Scopus. Keywords used included “inhalation aromatherapy” AND “postpartum complication” AND “essential oil” AND “massage aromatherapy.” References for each identified study were manually reviewed to ensure that relevant works were not missed. Inclusion criteria were published, full-length, peer-reviewed studies written in English. The sample population had to comprise postpartum women and use valid and reliable measures to assess outcomes. We excluded abstracts, dissertations and theses, qualitative studies, studies of low methodological quality, and studies where aromatherapy was not the primary focus. Ethical approval was not required for this study since no primary data was being collected.

2.2. Study selection and quality assessment

PRISMA guidelines (2009) were used to assess intervention and evaluation studies [29]. Article titles, abstracts and finally full content of the articles were evaluated by two of the researchers (A.B and M.S) to determine the extent to which each article met the inclusion criteria and ensure high inter-rater reliability. Duplicates were removed prior to the analysis. The data extracted included study characteristic (Design, Sample, Quality Assessment), interventions details (time, frequency,

Table 1
Description of the study characteristics, outcome, measurement, interventions and results.

First Author (Year)	Study Design	Sample Size	Outcome Measures	Type of Aromatherapy 2.dose	Intervention and dose	Primary Results	Quality Assessment Score
Asazawa, K. (2017) [47]	Quasi-experimental one-group	34 PPD 1-7	Fatigue, subjective symptoms scale Relaxation, subjective sense of relaxation scale	Massage aromatherapy lavender, ylang-ylang, citron, rosewood, and sweet orange	Massage aromatherapy using one of five types of essential aroma oil (pure lavender, ylang-ylang, citron, rosewood, and sweet orange), Once for 5 min.	Positive effect on fatigue and relaxation where citron and sweet orange used (p < 0.05)	1..JBI 2.Include
Asazawa, K. (2018) [46]	Quasi-experimental one-group	34 PPD 1-7	Fatigue, subjective symptoms scale Relaxation, (subjective sense of relaxation scale)	Massage aromatherapy lavender, ylang-ylang, citron, rosewood, and sweet orange	Massage aromatherapy using one of five types of essential aroma oil (pure lavender, ylang-ylang, citron, rosewood, and sweet orange), Once for 5 min.	No effect on fatigue; positive effect on relaxation	1..JBI 2.Include
Behmanesh, F. (2011) [34]	Randomized clinical trial	89 PPD 2-10	Pain, VAS Postpartum healing, REEDA	Bath aromatherapy lavender and olive oil	Bath aromatherapy using 10 drops lavender and essence oil 10% in five liters of warm water twice a day in ten days.	Positive effect on pain and postpartum healing	1..Jadad 2.3
Chen, S.L. (2015) [35]	Randomized control trial	80 PPD 6-8	Sleep quality, PSQS Fatigue, EPDS Depression, PFS Improving maternal infant attachment, PBQ Anxiety, EPDS Depression, GAD-7	Inhalation/drink aromatherapy lavender	Inhalation aromatherapy and ingest a glass of hot water containing 2 gr steeped lavender one a day before bedtime for two weeks.	Positive effect on sleep quality; fatigue (p = 0.01), depression (p = 0.03 and improving maternal infant bonding (p = 0.04)	1..Jadad 2.5
Conrad, P. (2012) [43]	Pilot study	28 PPD 0-18	Stress, anxiety and depression, DASS-21	Inhalation/Massage aromatherapy lavender and Rose	Inhalation and massage aromatherapy using 8 drops blend 2% essential oil of lavender and rose, twice a week, for four weeks.	Decrease anxiety and depression.	1..JBI 2.included
Effati-Daryani, F. (2017) [27]	Randomized Controlled Trial	141 PPD 0-6	Maternity Blues, STAI-Anxiety, POMS Mood, MBS feeling toward baby, FBS quality of sleep, PTSQI	Massage aromatherapy lavender	Massage aromatherapy using 2 gr Lavender cream every night 1.5 h before bedtime for six weeks.	Positive effect on stress, anxiety, depression,	1..Jadad 2.4
Imura, M. (2006) [48]	Quasi-experimental	36 PPD 2	Stress, anxiety and depression, DASS-21	Massage aromatherapy lavender	Massage aromatherapy using 10 drops Lavender and Neroli per 100 ml once for 30 min.	Positive effect on anxiety, maternity blues, mood, and feeling toward baby	1..JBI 2.included
Keshavarz Afshar, M. (2015) [44]	Randomized clinical trial	158 PPD 0-8	Stress, anxiety and depression, DASS-21	Inhalation aromatherapy lavender	Inhalation aromatherapy using lavender essence oil 10%, 4 drops per session, four times a week before sleeping for 5 min at eight weeks.	Positive effect on quality of sleep	1..Jadad 2.4
Kianpour, M. (2016) [28]	Randomized clinical trial	140 PPD 1-3	Stress, anxiety and depression, DASS-21	Inhalation aromatherapy lavender	Inhalation aromatherapy using 3 drops of Lavender scent every day for 4 weeks.	Positive effect on stress, anxiety and depression	1..Jadad 2.3
Kianpour, M. (2018) [36]	Randomized clinical trial	105 PPD 0-6	Postpartum Depression, HADS Nausea, Nausea Scale	Inhalation aromatherapy lavender and Rose water	Inhalation aromatherapy using 7 drops of Lavender and rose scents every day for 6 weeks.	Positive effect on postpartum depression	1..Jadad 2.5
Lane, B. (2012) [37]	Randomized clinical trial	35 PPD NR	Postpartum Depression, HADS Nausea, Nausea Scale	Inhalation aromatherapy Peppermint	Inhalation aromatherapy using peppermint spirits for between 2 and 5 min.	Positive effect on nausea	1..Jadad 2.5
Metawie, M. (2015) [45]	Quasi-experimental	100 PPD 0-1	Post Caesarean Incision Pain, MJPOM, VAS sleep quality, PSQI	Inhalation aromatherapy lavender	Inhalation aromatherapy using 1 cc of lavender oil via an oxygen facemask, three days per week, for four months.	Positive effect on post-Caesarean incision pain	1..JBI 2.included
Mirghafourvand, M. (2016) [38]	Randomized clinical trial	96 PPD 0-8	Depression and Anxiety, STAI	Drink aroma oil Orange	Drink a glass of water containing 10 drops of orange peel essential oil, 3 times a day for eight weeks.	Positive effect on sleep quality	1..Jadad 2.5
Mirghafourvand, M. (2017) (25)	Randomized clinical trial	96 PPD 0-8	Depression and Anxiety, STAI	Drink aroma oil Orange	Drink a glass of water containing 10 drops of orange peel essential oil, 3 times a day for eight weeks.	No positive effect on depression and anxiety	1..Jadad 2.3
Vakiliyan, K. (2008) [40]	Randomized clinical trial	120 PPD 0-2	Episiotomy ulcers, VAS	Bath aromatherapy lavender	Bath aromatherapy using 5-10 drops of lavender essence oil twice a day for five days.	Positive effect on episiotomy ulcers	1..Jadad 2.4

(continued on next page)

Table 1 (continued)

First Author (Year)	Study Design	Sample Size	Outcome Measures	Type of Aromatherapy 2.dose	Intervention and dose	Primary Results	Quality Assessment Score
							1.Scale 2.Score or judgment
Vaziri, F.(2017) [41]	Randomized clinical trial	56	Intensity of pain, VAS	Inhalation aromatherapy lavender	Inhalation aromatherapy using 5 drops of lavender essence oil three times.	No positive effect on episiotomy pain	1.Jadad 2.4
Widyawati, M.(2016) [42]	Randomized clinical trial	52	Stress, DASS Prolactin level, ELISA	Inhalation/Message aromatherapy Jasmine	Inhalation/massage aromatherapy using 3 drops of Jasmine, once a week for four weeks.	Positive effect on stress, and prolactin level	1.Jadad 2.5

Key = VAS: Visual Analogue Scale, REEDA: Redness, edema, Ecchymosis, Discharge, Approximation; PSQS: Postpartum Sleep Quality Scale; PFS: Postpartum Fatigue Scale; EPDS: Edinburgh Postnatal Depression Scale; PBQ: Postpartum Bonding Questionnaire; GAD-7: Generalized Anxiety Disorder 7-item; DASS-21: The Depression, Anxiety and Stress Scale - 21 Items; STAI: The State-Trait Anxiety Inventory; POMS: Profile of mood states scale; PTSQI: Pittsburgh Sleep Quality Index; HADS: Hospital Anxiety and Depression Scale; MJPOM: Modified Johanson Pain-O-Meter; ELISA: enzyme-linked immunosorbent assay; PPD: postpartum day.

and dose), and results. Quality Assessment of each study was conducted using the Jadad scale whose rating criteria take into account randomization, double blinding, and withdrawals or dropouts [30]. The quality of quasi-experimental studies was assessed using the Joanna Briggs Institute (JBI) quasi-experimental appraisal tool [31]. Each article was independently rated by two of the researchers (K.RK, A, B); disagreements were discussed with third person until consensus was reached. Studies were deemed to be of sufficient quality if they achieved an average score of 3–5 on the JBI instrument [32], and yes answer in 3 of 6 items on the Jadad scale [33].

3. Results

3.1. Study selection

A total of 191 articles were retrieved from the search of databases; 35 from PubMed, 31 from Google Scholar, 14 from Web of Science, and 111 from Scopus. Of the 151 non-duplicated studies in the title and abstract screening process, 117 were excluded because they had unrelated titles and abstracts. Of the remaining 34 studies, 17 met the eligibility criteria. Of the 17 excluded studies, three were review, one was qualitative, six did not have the full text, three were not in English and four did not meet quality requirements for inclusion (see Fig. 1).

3.2. Study characteristics

A total of 17 studies that were carried out on 1400 postpartum women entered the final phase. Of these, most of them were clinical trials (n = 12) [12,27,28,34–42]. The sample size across studies ranged from 28 to 158. All studies had low bias risk. Table 1 demonstrates the included studies, design, sample size, measures, type of intervention, primary outcomes, and quality assessment score.

3.3. Main results

3.3.1. Type of interventions

Aromatherapy interventions used across studies included inhalation aromatherapy (n = 9) [28,35–37,41–45], aromatherapy massage (n = 6) [27,42,43,46–48], bath with aroma (n = 2) [34,40], and consumption of aroma-containing beverages (n = 2) [38,39]. Interventions were carried out separately or in a combined manner. The aromas examined included lavender (n = 13) [27,28,34–36,40–44,46–48], orange (n = 4) [38,39,46,47], and rose (n = 4) [36,43,46,47].

3.3.2. Interventions procedures

Six studies investigated aromatherapy massage interventions with 3–10 drops used for 5 min to 1.5 h ranging from one day to 6 weeks. In the 9 studies that investigated the various inhalation aromatherapy interventions, 3 to 8 drops were used from 2 to 5 min (three times a day, for one week up to four months). Another four studies investigated other aromatherapies with two studies examining bath use of where 10 lavender drops were added to 5 L of warm water; individuals took a bath twice a day for 10 days. In another intervention, 10 orange aroma drops were dissolved in a glass of warm water and ingested three times a day for 8 weeks.

3.4. Effect of aromatherapy on common postpartum symptoms

The 17 studies included in this systematic review investigated the effect of aromatherapy on commonly experienced postpartum symptoms. The most commonly reported symptoms and outcomes included depression (n = 6) [27,28,35,36,39,43], fatigue (n = 3) [35,46,47], and stress (n = 3) [27,28,42]. Reviewing the effect of aromatherapy on postpartum symptoms (outcomes) showed that the aromatherapy had a positive effect on depression (n = 5) [27,28,35,36,43], fatigue (n = 3) [35,46,47], stress (n = 3) [27,28,42], anxiety (n = 2) [27,28],

relaxation (n = 1) [47], pain (n = 2) [34,45], sleep quality (n = 3) [35,38,44], episiotomy pain (n = 1) [41], postpartum healing (n = 1) [34], nausea (n = 1) [37], prolactin level (n = 1) [42], episiotomy ulcers (n = 1) [40], maternity blues, mood, and feeling toward baby (n = 1) [48], and improving maternal-infant attachment (n = 1) [35]. Aromatherapy use had no significant effect on fatigue, depression or anxiety in one study [39], or on relaxation in another [46]. In order to ensure the safety of aromatherapy, psychiatrists were present along with patients during the intervention in some studies.

4. Discussion

This is the first known systematic review or meta-analysis specifically investigating the effect of aromatherapy on postpartum symptoms. Work reported here determined the effect of aromatherapy on postpartum symptoms from inception of databases to August 2018. A total of 17 studies were examined and included 1400 women. The aromatherapy interventions in various studies were based on inhalation aromatherapy, aromatherapy massage, bath with aroma, and aroma ingestion (drinking).

Findings demonstrate that aromatherapy improves or diminishes commonly experienced postpartum symptoms including depression, fatigue, stress, anxiety, relaxation, pain, sleep quality, episiotomy pain, postpartum healing, nausea, altered prolactin levels, episiotomy ulcers, maternity blues, mood lability, and feelings toward baby. It was interesting to note that lavender was the most commonly used essential oil and likely explains the improvement of the identified post-partum symptoms. Lavender is known to contain camphor, terpinen-4-ol, linalool, linalyl acetate, beta-ocimene, and 1,8-cineole [23]. These constituents are known to depress the central nervous system, have sedative effects, and marked narcotic-like actions which can reduce anxiety and sleep difficulties, and improve a sense of well-being [23,49,50]. Constituents have also been shown to promote new cell growth, reduce skin problem, reduce painful muscles, and improve immune functioning.

There were three studies (25, 27, 32) demonstrating that aromatherapy has no effect on fatigue, pain, depression or anxiety. Asazawa and colleagues (33) conducted a pilot study examining the effect of massage aromatherapy on postpartum fatigue and relaxation and found two massage oils provided significant reduction in fatigue and increased relaxation with use of citron and sweet orange oils ($p < 0.05$). Study replication found no significant differences. Since no other included study examined use of these particular aromas, further study is warranted, also considering the other aspects of aromatherapy can be help. While several of the studies utilized differences in dosage and methodology, findings from this systematic review are consistent with systematic review studies on the effects of aromatherapy on depression in populations of chronic patients [51], psychological symptoms in post-menopausal women [52], anxiety in chronic patients [24], pain relief in chronic patients [26], depression [53], sleep quality [54], and nausea and vomiting of women during pregnancy [54]. Safety in the present study was confirmed because essential oils were obtained from standard companies. The efficacy and presumed safety of raw materials was further confirmed through pilot use in previous studies of case series [55].

Finally, there were some limitations to the work presented here. The most important limitation of the present study is that while all studies utilized aromatherapy, different aromas were used and at different doses which it is an important barrier to wide use of study results. A few studies failed to give precise details regarding the interventions mentioned making it difficult to analyze the works with greater rigor. These differences made it impossible to conduct a meta-analysis to more precisely determine the effect of aromas on postpartum symptoms. Additionally, several of the studies had small sample sizes with failure to report power calculations. Both nulligravid and multigravid women were included with potentially different experiences of common

postpartum complications. There were also differences in the defined postpartum period with studies ranging from one day to 8 weeks, and postpartum women who had experienced both surgical (i.e., Caesarean, episiotomy) and normal physiologic birth were included and potentially biasing results. Finally, one study (16) examined use of aromas across pregnancy and postpartum periods creating potential bias where treatment was prolonged. Despite the current limitations, this is the first known systematic review that investigates the effects of aromatherapy on common postpartum complications. The promising results should prompt further larger and methodologically sound research.

5. Conclusion

Results from this systemic review demonstrate that aromatherapy is effective as an inexpensive, easy-to-use, fast-acting, and holistic method to improve common postpartum symptoms such as nausea, postpartum blues, depression, and mood lability, as well as anxiety, stress, fatigue, pain – including episiotomy pain, and episiotomy ulcers. Further, aromatherapy improves postpartum relaxation, sleep quality, healing, prolactin levels, and feelings toward the baby. Despite the great benefits of aromatherapy in the postpartum period, the perfumes should be used with caution and after evaluating their safety due to the mentioned limitations. Given the limited number of articles in this area, further studies are also suggested into the effects of aromatherapy on pregnant women.

Authors' contribution

Khadije Rezaie-Keikhaie and Maryam Shoorvazi: study design and conceptualization; Maryam Shoorvazi, Zeinab Younes Barani and Fahime Shojaei Shad: Search strategy and data collection; Mahdieh Sari and Abbas Balouchi: data analysis and interpretation; Marie Hastings-Tolsma, Khadije Rezaie-Keikhaie, Abbas Balouchi, and Salehoddin Bouya: manuscript writing; Marie Hastings-Tolsma, Khadije Rezaie-Keikhaie, Maryam Shoorvaz: study supervision.

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Appendix A. Supplementary data

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