RESEARCH ARTICLE / *Araştırma Makalesi*

The Effect of Aromatherapy on Physical Problems Experienced in the Postpartum Period: Systematic Review

Postpartum Dönemde Yaşanan Fiziksel Rahatsızlıklarda Aromaterapinin Etkisi: Sistematik Derleme

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Abstract

Objective	The aim of of this study was to determine systematically examine the studies examining the effect of aromatherapy on physical problems experienced in the postpartum period.
Material-Method	In this systematic review, 7 international databases (Cinahl, PubMed, Web of Science, Google Scholar, Embase, Cochrane Central Register of Controlled Trial, Chinese Electronic Periodicals Service) comprising the period between January 2011 and April 2021 were screened. Articles that are not in English and Turkish were excluded. Twenty studies that met the study criteria were examined in terms of purpose, method, findings and results. Randomized controlled trials and quasi-experimental studies examining the effect of aromatherapy on physical problems experienced in the postpartum period were included in the study. A data extraction form was filled in for each appropriate study. The quality of the studies included in the study was assessed using the JBI, Jadad scale and PRISMA guidelines.
Results	Finally, twenty studies including seventeen randomized controlled trials (RCTs) and three quasi-experimental studies were examined in this study. It has been determined in studies that, while nipple cracks, episiotomy pain and perineal redness-edema-ulcer, post-cesarean section nausea and pain reduced, postpartum relaxation level, sleep quality, prolactin levels increased and the development of feelings towards the baby was a positive effect.
Conclusion	It is seen that aromatherapy applied against the physical problems experienced by women in the postpartum period is effective in the management of many physical problems and symptoms.
Keywords	Aromatherapy, Postpartum Period, Physical Problems Experienced

Öz

Amaç	Bu çalışmanın amacı, aromaterapinin doğum sonrası dönemde yaşanan fiziksel sorunlar üzerindeki etkisini inceleyen çalışmaları sistematik olarak incelemektir.
Gereç ve Yöntem	Bu sistematik derlemede, Ocak 2011 ile Nisan 2021 dönemini kapsayan 7 uluslararası veri tabanı (Cinahl, PubMed, Web of Science, Google Scholar, Embase, Cochrane Central Register of Controlled Trial, Chinese Electronic Periodicals Service) tarandı. İngilizce ve Türkçe olmayan makaleler hariç tutulmuştur. Araştırma kriterlerini karşılayan yirmi çalışma amaç, yöntem, bulgular ve sonuçlar açısından incelenmiştir. Aromaterapinin doğum sonu dönemde yaşanan fiziksel sorunlar üzerindeki etkisini inceleyen randomize kontrollü çalışmalar ve yarı deneysel çalışmalar çalışmaya dahil edildi. Her uygun çalışma için bir veri çıkarma formu doldurulmuştur. Çalışmaya dahil edilen çalışmaların kalitesi JBI, Jadad ölçeği ve PRISMA kılavuzları kullanılarak değerlendirildi.
Bulgular	Son olarak bu çalışmada, on yedi randomize kontrollü çalışma (RKÇ) ve üç yarı deneysel çalışma dahil olmak üzere toplam yirmi çalışma incelenmiştir. Meme ucu çatlakları, epizyotomi ağrısı ve perineal kızarıklık-ödem-ülser, sezaryen sonrası bulantı ve ağrıyı azaltırken, doğum sonrası gevşeme düzeyi, uyku kalitesi, prolaktin seviyesinin arttığı ve bebeğe karşı duyguların gelişiminin pozitif etki gösterdiği yapılan çalışmalarda saptanmıştır.
Sonuç	Kadınların doğum sonrası dönemde yaşadıkları fiziksel sorunlara karşı uygulanan aromaterapi, birçok fiziksel rahatsızlıkların ve semptomun yönetiminde etkili olduğu görülmektedir.
Anahtar Kelimeler	Aromaterapi, Doğum Sonrası Dönem, Yaşanan Fiziksel Rahatsızlıklar

INTRODUCTION

The postpartum or postnatal period is considered the fourth trimester of labor, and the early postpartum period covers one week postpartum. This period is defined as the time between a woman's reproductive organs recovering to their prenatal and prenatal state.[1,2] This is the most important but also the most sensitive stage of labor.[3] In the postpartum period, women experience various changes in their physiopsychological conditions and have difficulty adapting to these changes.[4] Difficulties in this adaptation process can affect mothers' parenting roles and health-related quality of life. Therefore, women in the postpartum period need the help of health professionals to adapt to life in this period.[5,6]

Traditional and complementary therapies include aromatherapy; It can be used in various ways such as skin application, inhalation, oral intake and massage and can be applied safely without serious complications. For this reason, the use of aromatherapy in all life stages of women can be used to increase individual satisfaction and to reduce the problems experienced by postpartum women, which is a natural process. The clinical pharmacological effects of essential oils used in aromatherapy include antibacterial, antiviral, antifungal, anti-inflammatory, anti-cancer and antioxidant effects.[6-8] In particular, lavender oil has excellent analgesic, sedative, antidepressant and vitality effects, and is non-toxic and non-irritating. Therefore, it is widely used for postpartum women.[6,8,9]

Considering the systematic review of the literature before confirming the effect of aromatherapy on postpartum women, not all studies included in the analysis are randomized controlled trials and some studies are meta-analyzedb.[10-12] Until now, there have been many studies that address and confirm the effect of aromatherapy on the problems experienced by women in the postpartum period separately for each problem, but systematic literature containing a detailed analysis of the effect on the problems experienced in the postpartum period according to the patient's health status, aromatherapy intervention method and the essential oil used. investigation was insufficient. In addition, although many studies have shown that aromatherapy has a positive effect on problems experienced in the postpartum period, there are limitations in its application to real clinical practice due to differences in aromatherapy intervention methods and study participants. For this reason, in this systematic review of the literature based on the results of research on the problems experienced in the postpartum period that has been tried so far, good clinical practices, which are the essence of evidence-based nursing practices, have been integrated with systematic and scientific methods by combining aromatherapy interventions and effects on physical disorders experienced in the postpartum period. This study provides a rationale for the development and implementation of an intervention guideline that can be applied in clinical practice.

The aim of this study is to systematically compile the effects of aromatherapy on the physical ailments experienced by postpartum women. It is to determine the effect of aromatherapy in postpartum women on the physical problems experienced by women in this period, depending on the method or essential oil.

MATERIALS and METHODS

Eligibility criteria

Aromatherapy studies meeting the following criteria were included in this systematic review: (a) presence of aromatherapy intervention interventions and presence in the atmosphere of the aromatherapy setting (such as menthol, peppermint, lavender, orange peel, and Citrus aurantium); (b) while discussing the physiological and psychological health of the participants in the postpartum period (nipple cracks as physiological health factors, perineal discomfort after episiotomy, pain and healing, physical pain, fatigue, post-cesarean (SS) incision pain, SS nausea and sleep quality; consideration of mood, anxiety, stress, depression, and distress) as psychological health factors; (c) randomized controlled trial (RCTs) and quasi-experimental; (d)

Reporting all the results of articles published and accessible in Turkish and English; and (e) the study participants are human. Case reports, case series, descriptive studies, letters to the editors, or editorial reviews were excluded. The target audiences were all postpartum women, and all studies were conducted over a period of 8 weeks or less.

Information resources and search

Online databases were searched for Turkish and English language studies evaluating the effects of aromatherapy on postpartum women published between January 2011 and April 2022. Used online databases PubMed (n=315), Web of Science (n=242), Google Scholar (n=460), EMBASE (n=65), CINAHL (n=140), Cochrane Central Register of Controlled Trial (n=87) and Chinese Electronic Periodicals Service (CEPS) (n=31) investigated (Figure 1). Foreign database MeSH terminology was checked and its keywords; "women", "postpartum", "postnatal", "aromatherapy", "aroma", "aromatic", "aromatic substances", "essential oils", and "volatile oil" in English and Turkish. "Postpartum" was used as the main variable. According to the characteristics of each database, MeSH terms and text words were used as the search formula. A method has been applied to increase the sensitivity and specificity of the search by applying AND/OR and truncated search to Boolean operators. The domestic database search is based on the search strategy used for international search, but given that there is no MeSH search function, the search was performed according to the characteristics of each database. As specified in the eligibility criteria, only human RCTs of aromatherapy were included in this systematic review. In addition, the literature has been carefully searched for citations and citations to articles included and reviewed in this study to avoid duplication and include as many original original studies as possible.

Study Selection

PRISMA guidelines (2009) were used to evaluate intervention and evaluation.[13] Titles and structured abstracts were independently reviewed by the researcher to identify potentially relevant articles. Then, the full texts of these articles should be used to verify that the eligibility criteria are valid and to determine the characteristics of the study (author, year, country, design, participants, and risk of bias), intervention characteristics (aromatherapy administered, aromatherapy dose, frequency of treatment, method of administration, time per session, total number of sessions, total intervention time) and main results. Two independent researchers performed data selection and necessary data extraction.

Data Items

The modified Jadad scale is often used to evaluate the quality of reports of studies to be included in the systematic review and has a reliability of 0.9.[14] The methodological quality of the included studies was evaluated using the modified Jadad scale. It is highly reliable and easy to use.[14] Therefore, it is possible to evaluate the quality of original studies.[2,15,16] The quality of the studies was determined by an eight-item scale (randomization, blinding, withdrawal and withdrawal, inclusion and exclusion criteria, side effects, and statistical analysis) and a score of four or higher from the "high" quality scale. The quality of quasi-experimental studies was evaluated using the Joanna Briggs Institute (JBI) quasi-experimental evaluation tool.[17] Each article was independently graded by two researchers; Disputes were discussed with third parties until consensus was reached. If the average score of 3-5 on the JBI instrument and the answer is yes on 3 out of 6 items on the Jadad scale, the studies were assumed to be of sufficient quality.[14]

Risk of bias

The validity of appropriate RCTs was determined by evaluating the frequency and duration of aromatherapy interventions, identifying methods used to measure intervention effectiveness, and selecting intervention approaches used. Two researchers provided the degrees of validity for independence, and the rating scores given by each were fully matched.

RESULTS

Study selection

A total of 607 articles were identified from the search of databases. After removing similar studies, 522 studies remained, and 224 studies were screened. Of the remaining studies, 197 studies were excluded because they were not randomized controlled trials, did not use essential oils in interventions, and did not include postpartum women. After scanning the titles and abstracts of the remaining articles, 20 randomized controlled and quasi-experimental studies were deemed suitable for full-text search (Figure 1).

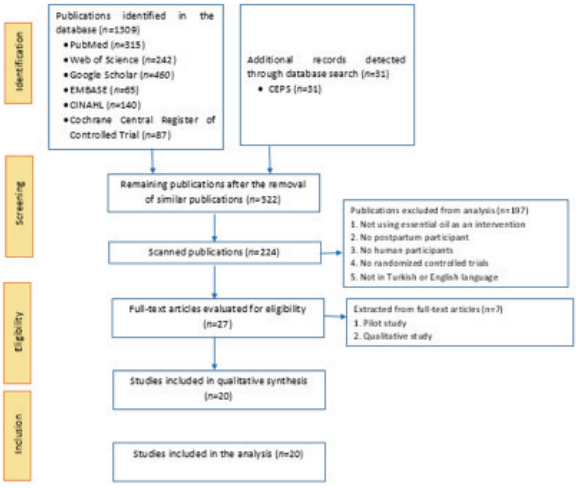

Figure 1. Flow chart with steps involved in selection and evaluation of publications for analysis.
**CINAHL: Cumulative Index to Nursing and Allied Health Literature; CEPS = Chinese Electronic Periodicals Service.*

Trial Quality

Information on investigators, design, intervention, follow-up, main outcome, and modified Jadad scale scores for studies are shown in Table 1 and the main results of each study are compared numerically. All 17 RCTs and 3 quasi-experimental studies met quality standards. While seven of the studies[6,20,25,28,30,35,40] used the randomization method appropriately, the other ten RCT studies did not use the blinding method. When we look at the studies using the blinding method; single blinding was used in three studies[6,25,28], double blinding was used in two studies[20,40], and triple blinding was used in two studies[30,35]. All studies reviewed had clear and understandable definitions of dropout, inclusion and exclusion criteria. In addition, all studies applied statistical analysis methods appropriate to the research plan. One article described the negative impact of an applied aromatherapy intervention.[25] All studies scored between 3 and 5 indicating high quality.

Study characteristics

In the included studies, 20 studies on 1,994 postpartum women entered the final stage. The studies were conducted in Iranian, Egypt, Japan, Indonesia, the United States, and Taiwan, with sample sizes ranging from 29 to 228. A low risk of bias was determined in all included studies. The authors, design, sample size, measurement tools, aromatherapy type and dose, Aromatherapy application method, follow-up process, primary results and quality assessment score of the included studies are shown in Table 1.

Measurement Tools

Measurement of primary outcomes; Nipple fissure pain, measured using the Visual Analogue Scale (VAS), Pain Rating Scale, Nurmen Ical Rating Scales (NRS), or Modified Johanson Pain-O-Meter, was associated with pain relief, including physical pain, postepisiotomy pain, and post-cesarean delivery pain. . In addition, the severity of nipple fissure discharge and the severity of nipple cracks were evaluated using the Amir Scale (Nipple soreness rating scale (NSRs), Nipple Trauma Score (NTS), Champion Scale). Fatigue, VAS fatigue (Fatique Scales); perineal discomfort, daily discomfort VAS; sleep quality Pittsburgh Sleep Quality Index; Nausea after cesarean section was evaluated with the Ondinal Nausea Scale and the episiotomy wound REEDA score. VAS is the most commonly used measurement tool for postpartum pain.

Key Findings

Effects of Aromatherapy on Physiological Health

The effect of aromatherapy on nipple cracks: While most of the breastfeeding mothers face many neonatal and maternal-related problems during the breastfeeding process, it reinforces the mothers' negative experiences, and when the root of the problems is reached, breastfeeding malpractices are observed.[18] In a study conducted in Egypt (Evidence level I), the effect of aromatherapy on nipple cracks and pain encountered by breastfeeding mothers during this process was examined. 120 postpartum and lactating mothers were divided into three groups as breast milk, peppermint essential oil and breast shell, and it was administered for 14 days. In the group in which peppermint essential oil was used, peppermint essential oil was added drop by drop to 1 L of distilled water, and it was more effective than breast milk and breast shell treatment in healing nipple cracks and discharge and reducing pain.[19] In two studies conducted in Iran (Evidence level I), the effects of aromatherapy used in the processes and coping ways of nipple cracks in nursing mothers were evaluated. In one of the studies (Evidence level I), 126 postpartum mothers were divided into three groups as dexpanthenol cream, 0.2% peppermint essential oil cream and lanolin cream. Nipple pain was evaluated with the "Storre Scale" and nipple cracks with the "Champion Scale". Although each group showed positive improvement on the 3rd, 7th and 14th days, it was similar in the healing of nipple pain and cracks in the comparison of the groups.[20] Another study (Evidence level I) examined the efficacy of massage aromatherapy interventions with peppermint menthol to 110 primiparous and lactating mothers, in which four drops of menthol (peppermint) extract were applied to the nipple and areola after each breastfeeding, lasting 2 weeks. "Visual Analog Scale (VAS; 0–10 cm)" and "Amir Scale (1–10 mm)" were used to evaluate nipple pain, injury, and discharge. Additionally, nipple discharge was observed.[21]

In line with the results of these studies, it is consistent with the study findings that menthol extract and peppermint essential oil water and cream are effective in preventing breast pain, cracks and discharge in postpartum mothers when aromatherapy intervention is performed after each breastfeeding for 2 weeks postpartum. These studies show that menthol and peppermint essential oil aromatherapy can be used in nursing practice to relieve nipple cracks in nursing mothers. In line with these results, it is recommended that nurses provide evidence-based education to mothers about the use of menthol and peppermint essential oil in the nursing process, based on individual care for nipple cracks.

Effect of aromatherapy after episiotomy: Episiotomy is a deliberate perineal incision made to widen the vaginal opening in the second stage of labor and has become the most common surgical procedure worldwide.[22] Three of the included articles (All of them were Evidence level I) examined the effectiveness of aromatherapy in relieving discomfort and pain experienced and in facilitating recovery after episiotomy. These three studies in the literature were conducted to evaluate the effectiveness of aromatherapy in reducing discomfort and pain after episiotomy and facilitating recovery after episiotomy in Indonesia and Iran. In three of these studies, the participants; They were asked to take a sitz bath in lavender oil twice a day to reduce pain, suture separation, number of sutures, infection, and Episiotomy Site Assessment Scale (Redness, Edema, Ecchymosis, Discharge Scale-REEDA) score.[23-25] Lavender oil baths reduced redness[25], pain[23-25] and REEDA scores[23,24]. In addition, the effectiveness of lavender oil inhalation on perineal pain, physical pain, and fatigue was evaluated in one of the included studies (Evidence level I). Treatment with lavender oil was repeated in three doses 6 hours after the first intervention and within the first 24 hours after bedtime. Lavender essential oil inhalation has been found to be effective in reducing perineal and physical pain, perception of stress, fatigue and negative affect, and increasing positive affect.[5] In a study conducted in Indonesia (Evidence level I), postpartum women were asked to apply lavender essential oil for 20 minutes through inhalation aromatherapy, and inhaled lavender essential oil reduces perineal pain.[6] In one of the five studies, it was determined

that there was a participant presenting with a complaint of minor irritation[25], and no side effects were reported in the other four studies[5,6,23,24].

In line with these results, aromatherapy using five to 10 drops of lavender essential oil in 4-5 liters of bath water is added twice a day for 5-10 days[23,25] or inhalation of 5 drops of lavender oil[5]. After perineal episiotomy, 15-20 minutes[5,6] inhalation aromatherapy and bath aromatherapy for wound care in mothers[23-25] application of physical pain, fatigue and has beneficial effects on the problems seen in the episiotomy area. In line with these results, it is recommended that nurses include the use of lavender essential oil in nursing care as a bath aromatherapy for perineal episiotomy care and provide evidence-based education to mothers about the use of lavender essential oil in episiotomy care.

Impact of aromatherapy after cesarean delivery: The rate of cesarean delivery has been increasing dramatically in many parts of the world over the past two decades. It is estimated that the average cesarean delivery rate worldwide increased from 12.1% in 2000 to 21.1% in 2015, with an average annual increase rate of 3.7%.[26] Five studies have been found in the literature on the problems experienced by mothers who had a cesarean section examined the effectiveness of aromatherapy in alleviation, and they reported nausea[27] (Evidence level IV), pain[28-30] and anxiety[31] after cesarean delivery. In two studies conducted in Iran (Evidence level I in both studies) and a study conducted in Egypt, participants were asked to inhale lavender essential oil for 3 or 5 minutes to reduce pain after cesarean delivery.[28,30] In these studies, lavender aromatherapy was found to be effective in reducing postpartum labor pain.[28,30] A study conducted in the United States (Evidence level I) supports the use of peppermint (82% ethyl alcohol, peppermint essential oil, purified water, peppermint leaf extract) inhalation aromatherapy intervention for the resolution of nausea after cesarean delivery.[27] A study conducted in the Egypt (Evidence level II) supports the use of lavender essential oil inhalation aromatherapy intervention for the resolution of incision pain after cesarean delivery.[29] In another study conducted in Iran (Evidence level I), participants were asked to pour 3 drops of Citrus aurantium (citrus) essential oil and inhale for 5 minutes from a distance of 10 cm for 5 minutes in order to alleviate the anxiety experienced after cesarean delivery.[31] In this study, it was reported that Citrus aurantium (citrus) essential oil inhalation aromatherapy had a positive effect on reducing post-cesarean section anxiety.[31] While no side effects were found in one of the five studies[29], side effects were not mentioned in the other studies.[27,28,30,31] Based on these findings; Nausea after cesarean section using lavender[28-30], Citrus aurantium (orange)[31] and peppermint[27] aromatherapy. It can be used as an effective complementary therapy to manage anxiety[31] and pain[28-30]. In line with these results, it is recommended that nurses should include the use of lavender, Citrus aurantium (orange) and peppermint essential oils in nursing care in the management of pain and anxiety in post-cesarean section care, and evidence-based training for mothers on the use of lavender, Citrus aurantium (orange) and peppermint essential oils in the post-cesarean delivery period.
The effect of aromatherapy on sleep: Poor sleep quality of mothers, which is common in the postpartum period due to nighttime breastfeeding and frequent night waking's in infants, may be an important factor affecting women's physical and mental health.[32] Three studies in Iranian and one in Taiwan examined the effectiveness of aromatherapy in improving sleep quality in postpartum women. In one of the studies conducted in Iran (Evidence level I), 141 mother lavender oil and foot baths were divided into three groups as lavender oil only and placebo. Both groups with lavender oil were asked to massage by applying a cream containing 2 g lavender essential oil for 10-20 minutes 1.5 hours before going to bed. It was determined that the group using lavender essential oil cream had better sleep quality compared to the placebo group.[33] In the other Iranian study (Evidence level I), 158 primiparous mothers were given a cylindrical container containing four drops of 10% lavender essential oil and a cotton ball containing

sesame carrier oil. Participants were instructed to take 10 deep breaths and then place the cotton pads next to their pillows at a distance of 20 cm until morning.[34] In another Iranian study (Evidence level I), 96 postpartum female participants were asked to drink a 20 ml glass of water to which 10 drops of orange peel essential oil were added three times a day after each meal for 8 weeks. In the study, it was determined that orange peel essential oil improves sleep quality.[35] In a study conducted in Taiwan (Evidence level I), a packet of lavender tea (2 g of dried lavender flowers) was put into 300 ml of hot water for 10-15 minutes before going to bed for 2 weeks and asked to smell and drink.36 In another study conducted in Taiwan (Evidence level I), bergamot essential oil was diluted in 15 ml of distilled water for 15 minutes to 60 postpartum mothers and the solution was administered by inhalation with aromatherapy every day for a month. Levels were shown to be better than the control group.[37] One of these five studies identified side effects including dizziness and increased urination[36], while the other four studies did not mention side effects[33-35,37].

In line with these results, 6 or 8 weeks after giving birth, lavender[33,34], orange peel[35] and bergamot[37] aromatherapies were found on women's sleep quality. While supporting its positive effects, it was determined that after 2 weeks, lavender emerging aromatherapy had no effect.[36] In line with these results, it is recommended that nurses provide evidence-based training on the use of lavender, orange peel and bergamot essential oils in nursing care 6 or 8 weeks after birth in order to increase the sleep quality of mothers. The effect of aromatherapy on fatigue and relaxation: Mothers feel tired from birth and experience increased fatigue during breastfeeding and baby care in the postpartum period. While fatigue and lack of energy are considered the common effects of childbirth in the postpartum period, fatigue causes mothers to experience negative emotions and become uncomfortable.[38] There are five studies in total, two studies conducted in Japan, two study conducted in Iran, and one study conducted in Taiwan. In one study conducted in Japan (Evidence level I), 228 mothers in the early postpartum period applied lavender, ylang-ylang, citron, rosewood, and sweet orange essential oils to their hands for 20 minutes through massage aromatherapy. While their fatigue decreased through massage aromatherapy in postpartum mothers in the intervention group, their relaxation levels increased.38 In another study conducted in Japan (Evidence level III), lavender, ylang-ylang, citron, rosewood and sweet orange essential oils were diluted with 2% sweet almond oil and applied to their hands for 20 minutes through massage aromatherapy to 29 postpartum mothers. It was determined that while the fatigue of postpartum mothers in the intervention group decreased through massage aromatherapy, their relaxation levels increased.[39] In a study conducted in Iran (Evidence level I), they were asked to breathe normally at a distance of approximately 20 cm from their noses for 10-15 minutes with 1% lavender essential oil via inhalation aromatherapy. It was determined that the fatigue levels of postpartum mothers in the intervention group decreased, while their relaxation levels increased through inhalation aromatherapy.6 In the other Iranian study (Evidence level I), 96 postpartum female participants were asked to drink a 20 ml glass of water to which 10 drops of orange peel essential oil were added three times a day after each meal for 8 weeks. However, in the study, it was determined that orange peel essential oil had no effect on depression and stress.[40] In the study conducted in Taiwan (Evidence level I), a cup of tea by inhalation and drinking aromatherapy was made, a lavender tea bag (origin: France; 2 g dried lavender flower) brewed in 300 mL hot water for 10-15 minutes, and they were asked to first smell it and then drink it. In postpartum mothers in the intervention group, inhalation and drinking through aromatherapy reduced fatigue in the 2nd week, but did not affect the 4th week.[37]

In summary, in these four studies, lavender oil[6,37-39], orange peel[40], ylang-ylang, citron, rosewood, and sweet orange essential oil[38,39] with inhalation6, drinking[37,40], and massage[38,39] aromatherapy reduces fatigue in postpartum women,

drinking[38] no significant long-term effect was found in the aromatherapy intervention. In line with these results, it is recommended that nurses provide evidence-based training on the use of lavender, ylang-ylang, citron, rosewood and sweet orange essential oils in nursing care to reduce the fatigue of mothers in the postpartum period.

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

First Author (Year)	Research Design	Sample Size	Outcome Measurements	Aromatherapy Usage Form / Type	Intervention and Dose	Follow-up	Primary Outcomes		Quality Evaluation Score 1.Scale 2.Conclusion or decision
Chen et al. 2022 Taiwan[37]	RCT	60 postpartum mothers IG=29 CG=31	Sleep quality, PSQI	Inhalation aromatherapy Bergamot	In the intervention group, four drops of 100% bergamot essential oil were diluted in 15 ml of distilled water and the solution was used in an ultrasonic atomizer for aromatherapy. Aromatherapy was applied to the control group with 15 ml of distilled water. Aromatherapy was applied for 15 minutes by a designated researcher in a 26.4*33.3 m2 single room where each postpartum woman regularly resides. The ultrasonic atomizer used in the intervention turns off automatically after 15 minutes. Two identical atomizers were used separately for the two groups to avoid cross-contamination. The intervention lasted 4 weeks for both groups, consistent with the 1-month period recommended by Chinese tradition for postpartum recovery.	2nd and 4th week	PSQI (1) 2nd week (p>0,05) (2) 4th week (p>0,05)		1. Jadad 2. 5
Ismail et al. 2019 Egypt[19]	Quasi-experimental	120 postpartum mothers	Nipple pain, VAS Nipple discharge, NSRs	Massage aromatherapy Mint	Intervention group 1 applied 2-3 drops of breast milk and ventilated the nipple and aerolae after each feeding; intervention group 2, which added peppermint essential oil to 1 L of distilled water and wiped the nipples and aerolae with peppermint oil-containing water after each feed; intervention group 3 placed the breast shells on the nipple and aerolae after each feeding.	1st, 3rd, 7th ve 14th day	VAS (1) 1st day (p=0,210) (2) 3rd day (p=0,534) (3) 7th day (p<0,001) (4) 14th day (p=0,011) NSRs (1) 1st day (p=0,880) (2) 3rd day (p=0,086) (3) 7th day (p=0,006) (4) 14th day (p=0,013)	NTS (1) 1st day (p=0,477) (2) 3rd day (p=0,315) (3) 7th day (p<0,027) (4) 14th day (p=0,001	1. JBI 2. Included
Asazawa et al. 2018 Japan[38]	RCT	228 early postpartum mothers IG=114 CG=114	Fatigue, Self-Diagnosis Check List for Assessment of Worker's Accumulated Fatigue Relaxation, subjective relaxation feeling scale	Massage aromatherapy Lavender, ylang-ylang, citron, rosewood and sweet orange	Hand massage was applied to the intervention group for 20 minutes using the effleurage method, using 5 essential oils: pure lavender, ylang-ylang, citron, rosewood and sweet orange.	24 hours	Self-Diagnosis Check List for Assessment of Worker's Accumulated Fatigue (p=0.055) Relaxation (p<0,001)		1. Jadad 2. 5

Effati-Daryani et al. 2018 Iranian[33]	RCT	141 pregnant IG1= 47 IG2=47 PG= 47 (18-40 yaş arası)	Sleep quality, PSQI Fatique, Fatique Scales	Massage aromatherapy Lavender	Intervention group 1 was asked to use the cream containing 2 g lavender topically on the legs, rubbing it for 10-20 minutes 1.5 hours before going to bed, and immersing them in 40-42C water 5 cm above their ankles 30 minutes after applying the cream. In intervention group 2, it was requested to use 2 g lavender-containing cream topically only on the legs 10-20 minutes before going to bed 1.5 hours before rubbing. The placebo group, on the other hand, was asked to use a placebo cream that does not contain the active ingredient of lavender.	6 week	PSQI (1) 4th week (p<0,001) (2) 6th week postpartum (p<0,001) Fatique Scales (1) 6th week (p=0,228) (2) 6th week postpartum (p<0,001)	1. Jadad 2. 4
Asazawa et al. 2017 Japan[39]	Quasi-experimental-one group	29 postpartum mother	Fatigue, subjective symptom scale Relaxation, subjective relaxation feeling scale	massage aromatherapy Lavender, ylang-ylang, citron, rosewood and sweet orange	It included applying five essential essential oils (pure lavender, ylang-ylang, citron, rosewood and sweet orange) with sweet almond oil diluted 2% for 20 minutes, by massaging the group's hands and forearms..	after 24 hours	Fatigue scale (p<0.001) Relaxation Scale (p<0.001)	1. JBI 2. Included
Mirghafourvand et al. 2017 Iranian [40]	RCT- double blind	96 postpartum mother IG= 48 PG= 48	Depression, EDPQ Stress, STAI	Aromatherapy through drinking Orange	The intervention group drank 10 drops of orange peel essential oil in a glass of water (18 ml) 3 times a day after each meal for eight weeks. In the control group, propylene glycol was added to 20 ml of water as a placebo, and they were allowed to drink it in the same way.	8 week	EDPQ (p>0.05) STAI (p>0.05)	1. Jadad 2. 5
Umaroh et al. (2017) Indonesia[8]	RCT	30 postpartum mother IG= 15 CG= 15	Perineal pain, NRS	Inhalation aromatherapy Lavender	In the intervention group, lavender oil was administered by inhalation for 30 minutes.	After inhalation	NRS (p<0,001)	1. Jadad 2. 4
Vaziri et al. 2017 Iranian[6]	RCT- single blind	56 postpartum mother with episiotomy IG= 29 PG=27 (18-35 yaş)	Pain level, VAS Fatigue, VAS	Inhalation aromatherapy Lavender	After applying 5 drops of 1% lavender essential oil to a cotton ball, the intervention group was asked to hold it approximately 20 cm from their nose for 10-15 minutes and breathe normally. The same procedure was applied to the placebo group with sesame carrier oil. It was repeated 3 times in total at 6-hour intervals from the first application.	after 1 and 24 hours	Perineal Pain VAS (1) 1 hour (p=0.004) (2) 24 hours (p<0.001) physical pain VAS (1) 1 hour (p<0.001) (2) 24 hours (p<0.001) Fatigue VAS (1) 1 hour (p=0.02) (2) 24 hours (p<0.001)	1. Jadad 2. 4

Mirghafourvand et al. 2016 Iranian[35]	RCT-triple blind	96 postpartum mother IG= 48 CG= 48 (18 years and over)	Sleep quality, PSQI	Aromatherapy through drinking Orange	The intervention group drank 10 drops of orange peel essential oil in a glass of water (18 ml) 3 times a day after each meal for eight weeks. In the control group, propylene glycol was added to 20 ml of water as a placebo, and they were allowed to drink it in the same way.	8 week	PSQI (p=0,001)		3. Jadad 4. 5
Chen and Chen 2015 Taiwan[36]	RCT	80 postpartum mother IG= 40 CG= 40 (25-42 years old)	Sleep quality, PSQI Fatigue, PFS	Inhalation/ drinking aromatherapy Lavender	The intervention group drank a cup of lavender tea 6 weeks after birth after smelling and confirming its aroma 1 hour before bed for 2 weeks. Each cup of tea was made from a lavender tea bag (origin: France; 2 g dried lavender flowers) steeped in 300 mL of hot water for 10-15 minutes.	14th day	PSQI (1) 2nd week (p=0.460) (2) 4th week (p=0.901) PFS (1) 2nd week (p=0.014) (2) 4th week (p=0.154)		1. Jadad 2. 5
Afshar et al. 2015 Iranian[34]	RCT	158 postpartum mother IG= 79 CG= 79 (18-35 years old)	Sleep quality, PSQI	Inhalation aromatherapy Lavender	In the intervention group, 4 drops of aromatherapy, sesame carrier oil and 10% lavender essential oil, and in the control/placebo group, sesame carrier oil were poured onto a cotton ball and after 10 deep breaths, placed 20 cm away from the pillow to induce sleep. It was applied 4 times a week for 8 weeks.	4th and 8th week	PSQI (1) 4th week (p=0.216) (2) 8th week (p=0.033)		1. Jadad 2. 4
Metawie et al. 2015 Egypt[29]	Quasi-experimental	100 postpartum mother IG=50 CG=50 (21-35 years old)	Post-cesarean incision pain, MJPOM-VAS	Inhalation aromatherapy Lavender	In the intervention group, 1 cc of lavender oil was used as inhalation for 3 minutes, with an oxygen face mask, three days a week for four months. The control group was given a placebo oxygen face mask.	30 min later	VAS (p<0,001) MJPOM (p<0,001)		1. JBI 2. Included
Shanazi et al. 2015 Iranian[20]	RCT- double blind	126 postpartum mother IG1=42 IG2=42 CG=42	Nipple pain, Storre Scale Nipple injury, Champion Scale	Massage aromatherapy Mint	Intervention group 1 used dexpanthenol cream, intervention group 2 used 0.2% peppermint essential oil cream, and control group lanolin cream.	3rd, 7th and 14th day	Storre scale (1) 3rd day (p=0,861) (2) 7th day (p=0,589)	Champion scale (2) 3rd day (p=0,4) (2) 7th day (p=0,954)	1. Jadad 2. 5
Akbari et al. 2014 Iranian[21]	RCT	110 primiparous lactating mother IG=55 CG=55	Nipple pain, NFP-VAS Nipple discharge, NFDAS Nipple fissures, NFDCAS	Massage aromatherapy Mint	Four drops of menthol (mint) extract given in 15 ml packages were applied to the intervention group after each feeding on the nipple and areola, and to the control group, four drops of their own milk were applied.	3rd, 10th and 14th day	NFP-VAS (1) 3rd day (p=0.34) (2) 10th day (p=0.002) (3) 14th day (p=0.001) NFDAS (1) 3rd day (p=0.44) (2) 10th day (p=0.001) (3) 14th day (p=0.001)	NFDCAS (1) 3rd day (p=0.24) (2) 10th day (p=0.05) (3) 14th day (p=0.001)	1. Jadad 2. 5

Olapour et al. 2013 Iranian[30]	RCT-triple blind	60 postpartum mother born by cesarean section IG=30 CG=30	Post cesarean section incision pain, VA	Inhalation aromatherapy Lavender	In the intervention group, 10% lavender essential oil was applied by pouring 3 drops on a cotton ball and breathing 4 times every 4 hours for 5 minutes at a distance of 10 cm from the person.	4th, 8th and 12th hours later	VAS (1) 4th hour (p=0.008) (2) 8th hour (p=0.024) (3) 12th hour (p=0.011)		1. Jadad 2. 5
Sheikhan et al. 2012 Iranian[24]	RCT	60 postpartum mother with episiotomy IG=30 CG=30	Perineal pain, VAS Perineal Evaluation, REEDA	Bath aromatherapy Lavender	In the intervention group, 0.25 ml of lavender essential oil was poured into each 5 L of water and a sitz perineal bath was applied twice a day for 30 minutes.	4th and 12th hour and 5th day	VAS (1) 4th hour (p=0.001) (2) 12th hour (p=0.066) (3) 5th day (p<0.001)	REEDA (1) 5th day (p<0,001)	1. Jadad 2. 4
Lane et al. 2012 United States[27]	RCT	35 postpartum mother born by cesarean section IG=22 PG=8 CG=5	Post-CS-delivery nausea, an ordinal nausea scale	Inhalation aromatherapy Lavender	Antiemetics were used for 2 to 5 minutes in the intervention group by inhaling mint spirit and the placebo group by dripping water colored with green food dye onto a cotton ball and placing it in a ziplock bag, after taking 3 deep breaths, and intravenously in the control group	2nd and 5th min	Post-CS-delivery nausea, an ordinal nausea scale (1) 2 minutes (p<0.001) (2) 5 minutes (p=0.005)		1. Jadad 2. 5
Behmanesh et al. 2011 Iranian[23]	RCT	89 postpartum mother IG1=30 IG2=30 CG=29 (17-34 yaş)	Pain, VAS Perineal Evaluation, REEDA	Bath aromatherapy Lavender	Intervention group 1 received a 2%-based lavender essential oil sitz bath, intervention group 2 received an olive oil stiz bath, and the control group a distilled water sitz bath. A sitz bath containing 10 drops of lavender oil or olive oil distilled water in 5 liters of warm water has been used twice daily for ten days.	2nd h, 5th and 10th day	VAS (1) 2 saat (p<0,001) (2) 5. gün (p<0,001) (3) 10. gün (p<0,001)	REEDA (1) 2. saat (p<0,001) (2) 5. gün (p<0,001) (3) 10. gün (p<0,001)	1. Jadad 2. 3
Hadi ve Hanid 2011 Iranian[28]	RCT- single blind	200 postpartum mother born by cesarean section IG=100 CG=100	Pain, VAS	Inhalation aromatherapy Lavender	In the intervention group, 2 drops of 2% lavender essential oil are dripped onto a cotton ball and placed in the cavity of the oxygen mask and used for 3 minutes.	30 min, 8th and 16th hour	VAS (1) 8th hour (p<0.001) (2) 16th hour (p<0.001)		1. Jadad 2. 5
Vakilian et al. 2011 Iranian[25]	RCT- single blind	120 postpartum mother IG=60 CG=60	Perineal pain, VAS Perineal redness (1-10)	Bath aromatherapy Lavender	The intervention group was given a sitz bath with 5-7 drops of 1.5% lavender essential oil per 4 L of water, and the control group with povidone-iodine twice a day.	10th day	VAS (p=0.06) Perineal rash (p<0.001)		1. Jadad 2. 5

*RCT: Randomized controlled trials; IG: Intervention group; CG = Control group; PG = placebo group; CS = cesarean section; EO = essential oil; VAS = Visual Pain Scale; NSRs: Nipple soreness rating scale; NTS: Nipple Trauma Score; PUKI: Pittsburgh Sleep Quality Index; NRS: Nurmen ical rating scales; PFS: Postpartum Fatigue Scale; MJPOM: Modified Johanson Pain-O-Meter; NFP- VAS: Nipple fissure pain VAS; NFDAS; Nipple fissure damage Amir Scale; NFDCAS; Nipple fissure discharge Chief Scale; REEDA = Redness, Edema, Ecchymosis, Discharge; EPDQ = Edinburgh Postnatal Depression Questionnaire; STAI = = State-Trait Anxiety Inventory

Summary of Aromatherapy Results

In the included articles, the essential oils described; Contains pure, diluted and multiple essential oil blends. The effects determined on the physiological health of mothers in the postpartum period are shown in Table 2. Lavender essential oil is the essential oil with the greatest impact on physiological health (n = 13).

Table 2. Aromatherapy essential oils used in studies on the psychological and physiological health of postpartum mothers

Disorders Encountered in the Postpartum Period	Number of Studies	Aromatherapy Oil Type	Number of Studies Showing the Effect
Physiological Health			
Nipple Cracks	3	Menthol and mint	3
After Episiotomy	5	Lavender	5
1. Pain	5		5
2. REEDA	3		3
(1) Redness	3		3
(2) Edema	2		2
(3) Ecchymosis	2		2
(4) Discharge	1		1
(5) Proximity	1		1
3. Leafy suture	1		1
4. Skin cracks	1		1
5. Daily ailments	3		3
Post Cesarean Section	2	Lavender	2
1. Pain	1	Mint	1
2. Nausea	5		4
Sleep	1	Lavender, bergamot, orange and orange peel	1
Physical Pain	5	Lavender	4
Fatigue		Lavender, ylang ylang, citron, rose, orange, orange peel	

DISCUSSION

Essential oils can be combined with holistic and individually administered care to improve the health status of individuals and offer a natural and non-invasive option for nursing care.[29] The 17 RCTs and three quasi-experimental studies evaluated reported the efficacy of aromatherapy in improving physiological health outcomes in postpartum women. Most of the included studies found positive effects of interventions on postpartum women on physiological health. Aromatherapy has been found to increase sleep quality and relaxation, while reducing nipple pain, nipple crack severity, nipple discharge, post-cesarean delivery pain, post-cesarean delivery nausea, physical pain, fatigue, post episiotomy pain, and perineum REEDA scores. Although most of the included studies demonstrated positive effects of interventions to improve postpartum physiological health, few of these studies evaluated health effects such as nausea, physical pain, and fatigue. Therefore, further studies with a high level of evidence are needed to evaluate the effects of aromatherapy on physiological health in postpartum women.

The most common aromatherapy methods in the postpartum period were adding lavender oil to bath water, inhaling lavender oil, and applying menthol (mint) oil to the skin. Aromatherapy methods in the studies examined; It has been applied using various methods such as bathing, drinking, inhalation and massage. The aromatherapy methods used were arranged according to the health needs of postpartum women and were preferred for use. In studies, it was determined that a bath aromatherapy intervention for 30 minutes alleviated the discomfort and pain experienced and accelerated the recovery after the episiotomy. However, the duration of interventional aromatherapy by postpartum women varies according to the type of essential oil they use.

Although, as the study investigator, reviewed all RCTs involving aromatherapies on postpartum physical disorders, this systematic review was affected by methodological limitations. Seven electronic databases were searched, and the review was limited to only published and full-text articles. However, the reviewability of the RCTs and the high methodological quality of the included studies were pro-

mising in achieving high-evidence results on the subject. Another limitation is the low number of countries where studies on the subject and included in accordance with the criteria are conducted. It was determined that most of the studies were conducted in Iranian. It is thought that there are two reasons for this result. First reason; aromatherapy practices are an accessible, economical, practical and convenient method to improve health in Iran.[6,20,21,23-25,28,30,33-35,37,40] The second reason is that complementary and alternative therapy practices are an integral part of the culture of the Iranian people and the continuity of their interpersonal transmission from the past to the present. Therefore, aromatherapy is one of the most widely used traditional and complementary therapies in this community.[6,20] In addition, the majority of studies conducted outside Iran did not have RCT characteristics. For example, one study used a pretest-posttest design with a placebo group without a control group to examine the effects of essential oils on post-cesarean incision pain in Egypt.[29] Another study, conducted in Japan, used a single-group quasi-experimental design to investigate the effects of aromatherapy massage on fatigue and relaxation in postpartum mothers.[39]

It is very difficult to plan and carry out blinding studies in order to carry out and follow up the aromatherapy intervention in a healthy way. However, seven of the included studies blinded outcome evaluators to minimize potential methodological bias.[6,20,25,28,30,35,40] Studies involving strict blinding procedures should be planned and conducted to provide further evidence supporting that aromatherapy is a valid therapy among mothers' coping methods for postpartum physical ailments. Meta-analysis studies evaluating more RCTs should be conducted to demonstrate the effect of aromatherapy on postpartum physical disorders with a high level of evidence.

CONCLUSION

When the literature was examined, the number of RCT and quasi-experimental studies evaluating the effects of aromatherapy on postpartum women has increased in recent years. The systematic review show that aromatherapy is an inexpensive, effectiveness, easy-to-use, fast-acting and holistic method to improve postpartum women's conditions such as nipple cracks, episiotomy pain and perineal redness-edema-ulcer, post-cesarean delivery nausea and pain, and sleep. In addition, aromatherapy is effective in improving postpartum relaxation and improving sleep quality in a positive way.

The use of aromatherapy method can be an effective method in terms of being non-invasive and accessible for postpartum women. In most of the studies reviewed, lavender essential oil was found to be widely used. Few of the included studies included an article examining the effects on conditions with more defined and specific health effects (nausea). Therefore, there may not be sufficient clinical evidence to support the practical application of aromatherapies used on specified conditions in postpartum women. Better quality and more advanced studies are needed by arranging the methodology with larger samples in order to add to the existing findings and increase the level of evidence.

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Conflict of interest

There is no potential conflict of interest relevant to this article.

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