Review Article

Aromatherapy for Postpartum Depression: A Systematic Review and Meta-Analysis

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Abstract

Objective: The incidence and prevalence of postpartum depression is increasing due to multiple factors. Aromatherapy is a widely used complementary and alternative (CAM) therapy in the management of depression. This systematic review and meta-analysis was done to find the effect of aromatherapy on postpartum depression.

Materials and methods: Electronic databases like PubMed, Scopus, Cochrane Library and Science Direct since inception till February 2021 were searched using related keywords to obtain eligible studies. Randomised controlled trial studies (RCTs) reporting the effects of aromatherapy therapy in women with postpartum depression were included. Aromatherapy studies conducted on population other than postpartum women were excluded. The primary outcome was depression scores obtained by using valid depression scales. Meta-analysis was performed using the random-effects model of Der Simonian and Laird to produce summary treatment effects in terms of Hedges' g effect sizes with 95% confidence interval (CI).

Results: A total of 4 RCTs (n=303) were included. The results indicate that aromatherapy (Hedges' g =-0.94, 95 CI= -2.55, 0.61, I^2=88%, p<0.01) reduces depression levels among postpartum women without statistical significance.

Conclusion: The available evidences suggest aromatherapy may be effective in reducing post-partum depression. The number of scientific evidences currently available are very limited and more studies with robust study designs are required to strongly recommend aromatherapy in the management of post-partum depressions. However, being a safer intervention with no adverse effects being reported in previous studies, aromatherapy could definitely be added as an effective complementary therapy in the management of post-partum depression along with conventional medicine.

Keywords: Aromatherapy; Postpartum Women; Meta-Analysis; Naturopathy; Depression

Introduction

Post-Partum depression (PPD) is one of the major global health challenge associated with childbirth and triggers negative emotions in the mother post-delivery (1). These negative emotions are even

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considered as a major risk factor for maternal mortality in many countries (2). The estimated prevalence of PPD is 7% to 19 % which differs significantly depending on the country and culture followed by the people (3). Symptoms of PPD include anxiety, sadness, difficulty to sleep, diminished pleasure and thoughts of death (4). Moreover, PPD in women has an impact on their offspring as well, leading to risk of poor health and psychological outcomes later in their adulthood (5). There are many valid and reliable treatments for postpartum depression including pharmacotherapy, psychotherapy, neuro-modulation and hormonal therapy (6). Though PPD is more openly discussed in recent times, there still remains a strong stigma to seek these treatment modalities (7). In addition, breast feeding mothers are scared of taking medication due to any possible adverse effects. Meanwhile, many women use CAM therapies during pregnancy, with not much evidence regarding the safety and efficacy of these therapies (8). Aromatherapy is a widely used CAM therapy which aims at reaping the therapeutic benefits of plants by refining them into essential oils (9). These natural oils can be used in a variety of ways such as in massage, in baths or through inhalation. The unique therapeutic property of essential oils to affect emotional and psychological health is being used in the management of many psychological conditions. Few essential oils such as lavender, jasmine, ylang-ylang, sandalwood, bergamot, and rose are being documented to be effective in the management of depression and anxiety (9). Various studies have shown the effective role of aromatherapy in overcoming depression and anxiety during pregnancy and postpartum (10-14). Recent systematic reviews on aromatherapy for postpartum women have added a positive impact on the beneficial effects of aromatherapy (15, 16). However, the available scientific evidence on the beneficial effects of aromatherapy in women with PPD is limited. The objective of the current systematic review and meta-analysis is to evaluate the impact of aromatherapy on depression levels in women with PPD, through a systematic examination of all the available randomized controlled trials.

Materials and methods

The current systematic review and meta-analysis is reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (17).

Search Strategy: Electronic databases like PubMed, Scopus, Cochrane Library and Science Direct since inception till February 2021 were searched using a combination of search terms such as “Aromatherapy” OR “Aroma”, OR “essential oils” AND “postpartum depression”, OR “post natal depression”. Two authors independently performed the title and abstract screening to find eligible articles as per the inclusion and exclusion criteria and then accessed full-text of the eligible articles. Reference section of the recent systematic reviews was also searched for possible inclusions. Any discrepancies regarding the selection of studies and possible duplications were resolved by mutual discussions which involved the corresponding author as well.

Eligibility criteria

Inclusion criteria

All studies which had met the following (PICO) criteria were included

- Participants (P): Participants were women in postpartum period.
- Intervention (I): Studies including aromatherapy alone as the intervention.
- Control (C): A control group with usual care or wait-list.
- Outcomes (O): Studies measuring depression with any valid scale

Exclusion criteria

- Studies conducted on population other than pregnant women.
- Studies including other therapies along with aromatherapy.

Data extraction and reliability: Two authors performed data extraction using MS Excel and independently evaluated published literature using the selection criteria. Data was extracted primarily based on Study information (Eg. First author, year of publication, study period), Study design (Eg. RCT), Participant characteristics (eg. age, country), Aromatherapy intervention characteristics (Eg. component of essential oil, frequency), Control intervention characteristics (Eg. Wait-list control, active control, duration, frequency) and Outcome measures (Depression Scale) from each study.

Assessment of risk of bias: Qualities of the included studies were independently assessed by two investigators (SY and AA). The bias analysis tool provided by the Cochrane risk of bias tool was used to assess the quality of RCTs included in the meta-analysis (18). Each study is classified into low risk, high risk, and unclear risk based on random

sequence generation, allocation concealment, blinding of participants or outcome assessors, incomplete outcome data, selective outcome reporting and other sources of bias.

Data synthesis: Meta-analysis was conducted in R software version 4.0.2, using the metafor packages (19). Effect size (ES) with 95% confident interval (95% CI) was calculated between the experimental and control group at post treatment. Hedge's g statistics selected for the effect size estimation which is the standardized mean difference. Cohen's d is positively biased in the Meta analysis for studies with smaller sample size (20). This upward bias can be reduced using Hedge's g by weighting each group's standard deviation (SD) by its sample size and therefore using pooled weighted standard deviations (SDs). This makes Hedge's g statistics more appropriate for the clinical studies with smaller sample size (20). ES values equivalent to 0.2, 0.5, and 0.8 are reflected, respectively as, small, medium, and large effects for the respective measurements. We have used random or fixed effect model for each of the outcome parameters to calculate the summary effects based on the heterogeneity (21). To reject null hypothesis ES equal to zero, $p<0.05$ is considered significant.

The I^2 statistic was used in order to analyse the statistical heterogeneity between studies. The magnitude of heterogeneity was categorized as low (I^2 = 0-24%), moderate (I^2=25-49%), substantial (I^2 = 50-74%) and considerable heterogeneity (I^2 = 75-100%). The χ^2 test was further used in order to assess whether differences in results are compatible with chance alone. Given the low power of this test, a p = 0.10 was considered as indicating significant heterogeneity, when only few studies with low sample sizes are included in a meta-analysis.

Results

Literature selection: Literature selection was carried out by two individuals through various electronic databases. After using various relevant key words, 234 potential studies were identified. After removal of duplicates, further screening for studies was performed by reading the title and abstract. Articles were removed owing to their irrelevancy to the intervention (as mentioned above) and 34 studies were included for the screening process. After reading through the abstracts, 8 full-text articles were screened for eligibility, out of which, 4 articles were finally included for the analysis (11-14) (Figure 1).

Literature Characteristics: Out of 4 included studies (Table 1), 3 studies were carried out in Iran (12-14) and one study in the USA (11). All studies were RCTs and were published in English language between the years 2012 and 2016. The largest sample size was 140 and smallest was 28.

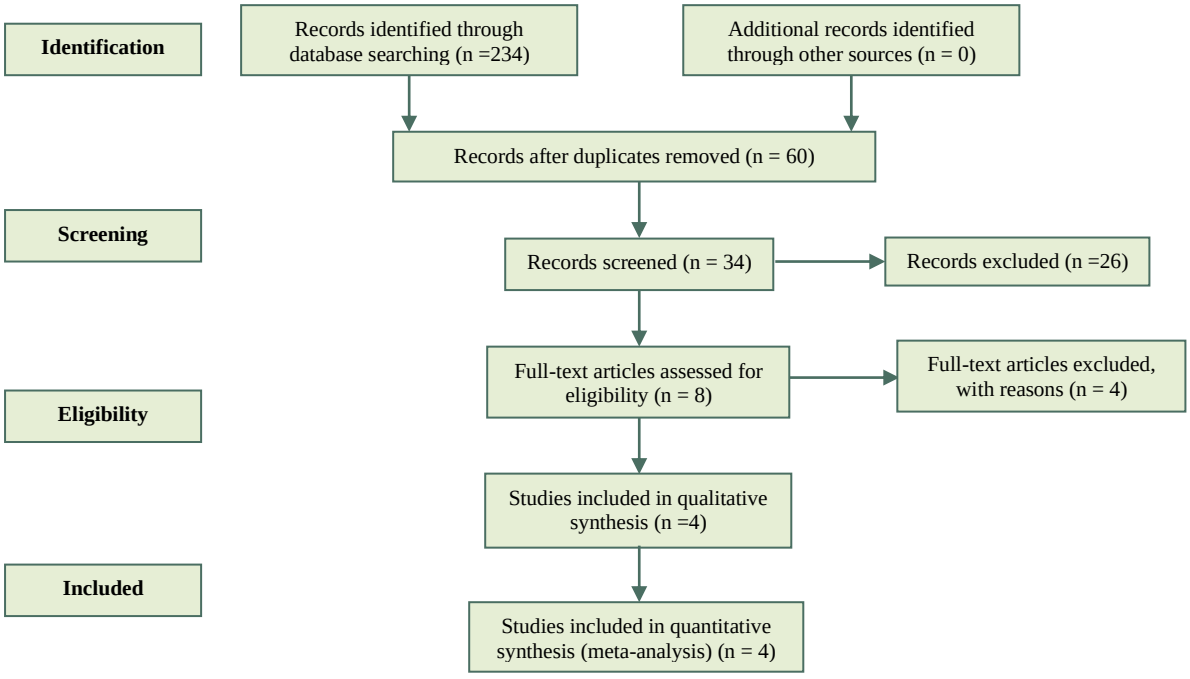

Figure 1: PRISMA Search strategy and flow chart for this meta-analysis

Table 1: Details of the included studies

First author	Year	Country	Study period	Age (Mean ± SD)	Intervention details	Carrier for essential oil	Participants details	Outcome measurements	Design of the study
Pam Conrad,	2012	USA	Twice a week/4 weeks	32 ± 4.4	Inhalation of Lavender essential oil with 2% rose otto blend.	Inhalation- Jojoba oil; Hand m' technique - Unscented white lotion.	28 Women, 0-18 Months of Postpartum.	EPDS, and GAD	RCT
Kianpour M,	2018	Iran	Daily/6 weeks	1.23 ± 1.04	Inhalation of 7 drops of Lavender Essential oil and 1cc Rose water, before sleep.	Rosewater	105 - pregnant women from 37 weeks	EPDS, HADS and NSSQ	RCT
Kianpour M,	2016	Iran	3 times per day/4 weeks	not specified	Inhalation 3 drops of Lavender essential oil	Nil	140 women after child birth.	EPDS, DASS-21	RCT
Mirghafourvand,	2016	Iran	3 times per day/8 weeks	28.8 ± 5.3	Participants drank a glass of water with 10 drops of orange peel essential oil	Drinking water	96 non-depressed women	EPDS, and STAI	RCT

The age of the participants ranged from 18 to 43 years and the study was generalized to both primi-gravid and multi-gravid women. The study periods varied from 4 weeks to 4 months post-delivery. The mode of aromatherapy intervention was either through inhalation or consumption. The end results were measured with the help of EPDS (Edinburgh Postnatal Depression Scale) and DASS-21 (Depression anxiety and stress scale) scale.

Quality and risk of bias assessment: All studies have included randomized sequence of sampling and except one study (14) all others (11-13) have mentioned about drop outs in their study. Among the four studies, two studies (13, 14) reported general allocation concealment. Only one paper (13) detailed on comparing the aromatherapy and placebo group (Table 2).

Meta-analyses of primary outcome: The pooled estimate of effect size for (Hedge's g =-0.94, 95 CI= -2.55, 0.61) all studies indicate improvement on depression levels (Figure 2) with aromatherapy in postpartum women without statistical significant ($P<0.05$). Since the statistical heterogeneity among the included studies were greater than 50% (I^2= 88%, p = 0.01), random effect model was used for pooled analysis. Egger's and Begg's test (P_{Egger}= 0.28, P_{Begg}=0.49), suggesting that there was no significant publication bias among studies. Sensitivity analysis results suggest that there was no essential change in the combined results or estimated heterogeneity after these exclusions, suggesting that the meta-analysis results were reliable.

Discussion

Our study is the first known systematic review and meta-analysis that specifically investigates the effect of aromatherapy on PPD. A total of 4 RCTs were included which reported the effect of different essential oils on women with PPD with variations in the defined postpartum period and duration of the intervention. The mode of aromatherapy intervention was through inhalation, hand massage technique or ingestion either with or without carrier oil. Lavender was the most commonly used essential oil and more often promoted for the betterment of postpartum depression (12, 13). Lavender is known to contain camphor, terpinen-4-ol, linolool, linalyl aetate, beta-ocimene, and 1,8-cineole (22). Previous studies report that these constituents depress the central nervous system, having a sedative effect, and marked narcotic-like actions which can reduce anxiety/ depression and improve sense of well-being (23). On the other hand, one study reported that orange peel essential oil, a type of essential oil used in aromatherapy, has no impact in treating women with postpartum depression (14). All studies confirmed that the essential oils used were obtained from standard manufacturers to ensure its safety and efficacy.

A recently done systematic review stated aromatherapy as the most common intervention used for PPD than any other CAM therapies (6). Use of different aroma oils, mode of application, dosage and duration of the intervention, diversity of tools used in the included studies contribute to the heterogeneity that is observed in our Meta-analysis.

There are few limitations in the selected studies. Only subjective questionnaires were used in all the included studies for the assessment of depression, so it could be either an overestimation or under estimation of the conditions and an objective measurement of depression would have added greater value. Lack of detailing on the randomization and blinding methods of the included studies reduces the quality of these studies. Next is the large heterogeneity of the studies included; only the random effect model can be applied, which will have an impact on the results and finally; small sample size, varied postnatal period all types of delivery (i.e., normal delivery, Caesarean, episiotomy) and different gravidity of women further deviates the findings. To overcome these shortcomings, more robust randomised control trials (RCTs) with adequate sample size and objective measurements of depression are required to substantiate the positive impact of aromatherapy on PPD.

Table 2: Quality assessments of included studies

	Random Sequence	Generation Allocation concealment	Blinding of participants and personnel reporting	Other sources of bias	Blinding of outcome assessment	Incomplete outcome	Data Selective outcome
Pam Conrad, 2012	Low Risk	Low Risk	High risk	Unclear	High risk	Low Risk	Unclear
Kianpour M, 2018	Low Risk	Low Risk	Low Risk	Unclear	Low Risk	Low Risk	Unclear
Mirghafourvand M, 2016	Low Risk	Low Risk	Low Risk	Unclear	Low Risk	Unclear	Unclear
Kianpour M 2016	Low Risk	Unclear	High risk	Yes	High risk	Low Risk	Unclear

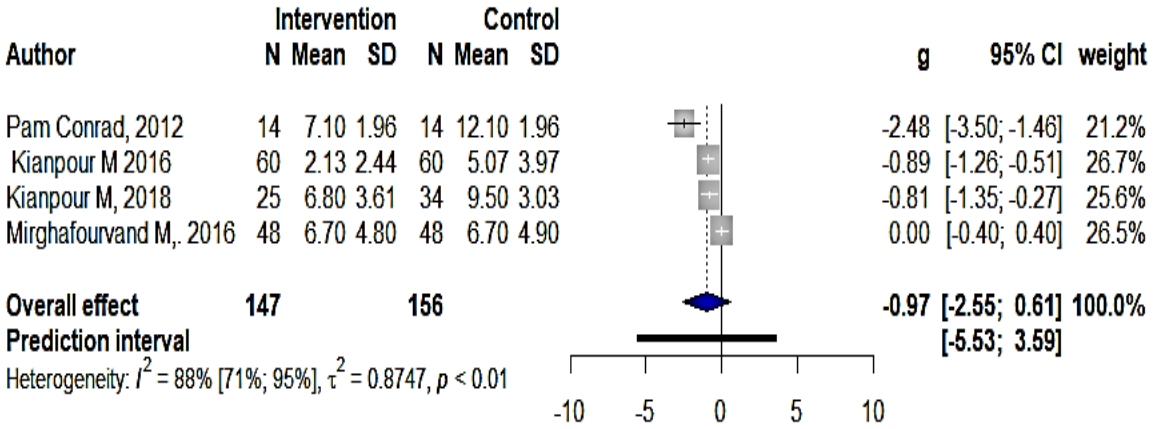

Figure 2: Forest plot showing effect size estimates for comparisons between intervention and control groups on depression scale

Conclusion

In summary, findings from this meta-analysis of randomised controlled studies indicate aromatherapy to may have a positive effect on depression levels among women with PPD. Further RCTs with objective measurements of depression would add more value in understanding and substantiating the benefits of aromatherapy in PPD.

Conflict of Interests

Authors declare no conflict of interests.

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