



Review article

Effectiveness of psychological interventions in the treatment of perinatal depression: A systematic review of systematic reviews and meta-analyses



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ABSTRACT

Background: Perinatal depression is a high prevalent mental health problem with serious consequences. Evidence about effective psychological interventions in treating perinatal depression has been increasing, but it lacks a comprehensive synthesis of findings.

Methods: A systematic review of systematic reviews and meta-analyses concerning the effectiveness of psychological interventions in treating perinatal depression (depression during pregnancy and the first 12 months postpartum) in adult women was conducted. The electronic databases MEDLINE (PubMed), PsycINFO, The Cochrane Library, Web of Science and Prospero were searched, on May 2020, using a combination of keywords. Data were independently extracted by two authors and a synthesis of the results was presented. Methodological quality was independently assessed by two authors, using AMSTAR-2.

Results: Seven systematic reviews were included and reported, overall, the effectiveness of psychological interventions in decreasing depressive symptoms in women in the perinatal period, both short and long-term. CBT was found to be the most effective intervention, regardless of the treatment format.

Limitations: Grey literature was not searched, and some studies may overlap among the included systematic reviews. These (the included reviews) were rated with low methodological quality, which weakens the evidence of the reported results.

Conclusions: CBT is currently the most evidence-based psychological intervention, provided in different delivery formats (individual, group, face-to-face or Internet-based). Further studies, including systematic reviews, with other types of psychological interventions (e.g., third-wave CBT) and with higher quality are needed.

1. Introduction

Perinatal depression is widely recognized as a serious mental health problem in developed countries (Gaynes et al., 2005) and, more recently, in low and middle-income countries (e.g., Dadi et al., 2020; Umuziga et al., 2020). The Diagnostic and Statistical Manual for Mental Disorders (American Psychiatric Association, 2013) classifies a depression with a peripartum onset as a depressive episode beginning during

pregnancy or within the first month after birth. However, researchers and clinical practitioners recommend that the time frame should be extended to the first six months postpartum (Sharma and Mazmanian, 2014), or to 12 months postpartum (O'Hara and McCabe, 2013).

Perinatal depression prevalence rates vary in different studies due to several factors, such as evaluation criteria, time frame, and population/region. Even so, the overall adjusted pooled prevalence of perinatal depression, according to a recent systematic review, is of 11.9% (Woody

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et al., 2017). Moreover, the prevalence is estimated to be higher in Low- and Middle-Income countries (19–25%) when compared to High-Income Countries (10–15%; in Gelaye et al., 2016; Woody et al., 2017). Perinatal depression represents a serious socioeconomic burden, causing significant medical expenditures to the family and society, for example, an estimated cost of £8.1 billion per year, in the United Kingdom (Bauer et al., 2014).

There is substantial evidence suggesting that perinatal maternal disorders have profound and widespread effects on the mother (Reck et al., 2012; Slomian et al., 2019) and the mother-infant relationship (Moehler et al., 2006; Reck et al., 2011; Śliwerski et al., 2020), and entail serious implications for subsequent infant development (Field, 2011; Goodman et al., 2011; Loomans et al., 2013; Stein et al., 2014; Slomian et al., 2019), and family well-being (Letourneau et al., 2012). Women with depression during pregnancy are at increased risk of experiencing postpartum psychiatric disorders (Robertson et al., 2004) and negative physical health and birth outcomes (Alder et al., 2007). Perinatal depression has been associated with maternal difficulties in practical parenting practices, such as breastfeeding, sleep, infant health care, and safety practices (Dennis and Ross, 2005; Field, 2010; McLearn et al., 2006). Importantly, perinatal depression impairs the mother's ability to be sensitive and to adequately respond to her baby's needs, which affects the maternal-infant bonding and, ultimately, may impact the adaptive development of self-regulatory skills in the infant (Murray and Cooper, 1997).

Antenatal depression is associated with infant reduced engagement, increased negativity and poor fear regulation (Feldman et al., 2009), disorganized attachment (Hayes et al., 2013), lower intelligence quotient (Barker et al., 2011; Evans et al., 2012; Koutra et al., 2012), emotional and behavioral problems (Kvalevaag et al., 2013), socio-emotional developmental problems, such as difficult temperament and behavioral dysregulation (Madigan et al., 2018). Postnatal depression has also been associated with child insecure attachment (Murray et al., 2011; Tomlinson et al., 2005) and impaired mental development (Conroy et al., 2012), with these child adverse outcomes persisting into late adolescence (Stein et al., 2014). In addition, maternal perinatal depression may affect the woman's partners, specifically their ability to support the woman, cope with parenting challenges, and care for the newborn or other children (Boath et al., 1998; Webster, 2002). Postnatal depression is linked to paternal depression (Caparros and Rodríguez-Muñoz, 2020; Paulson and Bazemore, 2010), and the father's mental health is also associated with child development disturbances (Stein et al., 2014).

Due to these severe consequences, several pharmacological and psychological interventions have been developed for treating perinatal depression and gathered evidence for their effectiveness (Chow et al., 2021; Cuijpers et al., 2008). However, the use of antidepressants during pregnancy or postpartum period is often feared by women, due to the perception of possible consequences for the baby and concerns about addiction (Battle et al., 2013; Dennis and Chung-Lee, 2006; Molenaar et al., 2018). In addition, the literature shows that women prefer psychological interventions in the treatment of perinatal depression, over pharmacological interventions (Battle et al., 2013; Dennis and Chung-Lee, 2006).

Cognitive behavioral therapy (CBT) and Interpersonal therapy (IPT) are the most widely used and effective psychological intervention modalities for depression during perinatal period (Nillni et al., 2018). More recently, contextual-behavioral interventions/third-wave CBT have targeted pregnant women suffering from depression and anxiety and have yielded promising results. These include Mindfulness Based Interventions (e.g., Shi and MacBeth, 2017), Acceptance and Commitment Therapy (e.g., Bonacquisti et al., 2017), and Compassion Focused Interventions (e.g., Kelman et al., 2016). These psychological interventions have been provided in different delivery formats, including individual and group therapy, but also using telephone and information and communication technologies (Nillni et al., 2018). Among these,

internet-based interventions (internet-based interventions or mobile apps) have been recently applied, increasing the accessibility and cost-effectiveness of such interventions (Lee et al., 2016; Loughman et al., 2019).

Recently, several systematic reviews have been conducted about the effectiveness of psychological interventions for treating perinatal mood disorders (e.g., Huang et al., 2018; Lee et al., 2016), particularly perinatal depression, exploring the role of face-to-face interventions (e.g., CBT; IPT) as well as web-based interventions. Some of the systematic reviews, as the review from Nillni et al. (2018), also concern the treatment of low-income and/or minority women. However, these systematic reviews only partially cover the broader scope of existing interventions by focusing on one specific type (e.g., only e-health interventions; only CBT interventions; only interventions including the partner). In addition to this growing number of systematic reviews on the subject and the need to include a broader scope of interventions, there are methodological variations in the studies included in these systematic reviews, therefore being crucial to synthesize the information concerning the evidence about the available interventions. This will guarantee safety and efficacy and will help identify aspects that require further consideration/study.

To our knowledge, there is no systematic review of systematic reviews and meta-analyses about the effectiveness of psychological interventions in the treatment of perinatal depression. Therefore, a systematic review of systematic reviews and meta-analyses is proposed, as this will: a) allow to comprehensively summarize the evidence regarding the effectiveness of psychological interventions for perinatal depression (depression during pregnancy and the first 12 months postpartum), b) offer a better use of existent evidence, c) provide guidance/guidelines for clinicians and researchers; and d) help to identify knowledge gaps in the current literature to inform future research in the area.

In particular, we aim: 1) to identify the common characteristics of psychological interventions that improve depression outcomes; 2) to examine if psychological interventions are effective both for treating depression in the prenatal period and for treating depression in the postpartum period; and 3) to identify the secondary outcomes that are reported (maternal and child outcomes) in the efficacy studies.

2. Methods

2.1. Search procedures and eligibility criteria

This systematic review was conducted by following the Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA) statement (Cajal et al., 2020; Moher et al., 2009). A protocol was developed to guide the different steps underlying this systematic review and was registered on PROSPERO, the International Prospective Register of Systematic Reviews (ID: CRD42020168065).

A systematic review of systematic reviews and meta-analyses published between 2000 and 2020, written in English (due to resource limitations), assessing psychological interventions for the treatment of perinatal depression was conducted. Database search was conducted independently in May 2020 by two authors (MFR and MB).

A total of 5 electronic databases were searched: MEDLINE (PubMed), PsycINFO, The Cochrane Library, Web of Science and Prospero. The following search terms were combined: [("major depression*") OR (depress*) OR ("mood disorder*") OR ("affective disorder*")] AND ("perinatal") OR ("perinatal period") OR ("pregnancy") OR ("pregnancy outcomes") OR ("primipara") OR (peripartum) OR (postnatal) OR (postpartum) OR ("postpartum depression") OR (puerperal) OR (prenatal) OR (antenatal) OR (antepartum) OR ("antepartum period") AND ("psychotherapy") OR ("counsel*ing") OR ("psycho* treatment*") OR ("psycho*treatment*") OR ("psycho* intervention*") OR ("psycho*intervention*") OR ("psycho* therap*") OR ("psycho*therap*") OR ("supportive therap*") OR ("supportive treatment*") AND ("systematic

review") OR (systematic*review) OR (meta analys*) OR (meta*-analys*)]. The reference lists of retrieved papers were examined to identify other relevant articles.

Analysis of the articles followed previously established inclusion and exclusion criteria. To be included, articles had to meet the following inclusion criteria:

- (1) Population: women aged over 18 years in the perinatal period (during pregnancy and the first 12 months postpartum);
- (2) Intervention: Psychological interventions aiming to treat perinatal depression (depression during pregnancy and the first 12 months postpartum);
- (3) Outcomes: depression symptoms measured with structured clinical interviews or validated screening self-report questionnaires (e.g., Edinburgh Postnatal Depression Scale);
- (4) Study design: systematic reviews or meta-analysis about the effectiveness (e.g., reduction of symptoms) of psychological interventions.

Systematic reviews or meta-analyses were excluded if they did not evaluate the effectiveness of a psychological intervention to treat perinatal depression, did not include a psychological intervention or did not present information about women's age or information about the postpartum period. Search results were exported to an Excel file and duplicates were removed. Two authors (MFR and MB) independently screened titles and abstracts for eligibility. Potentially eligible papers were, then, extracted, and the two authors independently screened the full text of the articles. Any disagreement was resolved by discussion and, if necessary, by consultation of a third author (AF).

2.2. Data extraction

A data collection form was developed to extract relevant information from the included papers. Extracted data included the following:

- a) Authors, year of publication; study aims; search strategy; type and number of included studies;
- b) Participants' characteristics – total number of participants and mean age;
- c) Interventions' characteristics – type (e.g., CBT, IPT); delivery format (face-to-face, individual, group, online); duration of intervention (range); number of sessions (range); time of intervention (pregnancy, postpartum or both); follow-up duration;
- d) Outcome measures;
- e) Funding sources;
- f) Risk of bias;
- g) Main findings; effect estimates.

Two authors (JO and PM) extracted the data from the included papers and a third author (MB) checked the extracted data. Any doubts or disagreements were resolved through discussion between the authors. If necessary, missing information was obtained from the original authors. Summary tables were made to synthesize the extracted information in a structured format.

2.3. Quality assessment

Methodological quality of the included studies was independently assessed by two reviewers (MB and MF) using AMSTAR-2, a tool developed for assessing the quality of systematic reviews that include randomized or non-randomized studies of healthcare interventions, or both (Shea et al., 2017). Any disagreements on quality ratings were discussed and a consensus was reached. When disagreements were not resolved by discussion, two other authors (PM and SC) were consulted, who also checked the quality ratings.

3. Results

3.1. Identification of articles

Search results are summarized in the PRISMA flowchart (Fig. 1). The initial search identified a total of 886 citations and 10 additional records were collected following reference checking. After duplicates were removed, a total of 545 records were screened based on title and abstract (first screening). A total of 485 studies were excluded and the remaining 60 citations were obtained for full-text review (second screening). After the eligibility assessment, 53 records were excluded (reasons for exclusion are presented in Appendix 1) and 7 articles were included in the systematic review of systematic reviews.

3.2. Study characteristics

Characteristics of the included reviews are presented in Table 1. The 7 systematic reviews were published between February 2016 and January 2020 and report the findings from 97 studies (including 79 randomized clinical trials [RCTs]), with a total number of 12,830 participants (i.e., adult women with depressive symptoms in perinatal period).

Two papers included only RCTs (Huang et al., 2018; Mendelson et al., 2017) and the remaining included RCTs and open trials or pilot studies (Lee et al., 2016; Loughnan et al., 2019; Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020).

Three reviews focused on the postpartum period only (Huang et al., 2018; Lee et al., 2016; Mendelson et al., 2017) and one review focused only on pregnancy (Ponting et al., 2020). The other papers included interventions during pregnancy, postpartum or perinatal periods (Loughnan et al., 2019; Nair et al., 2018; Nillni et al., 2018).

3.3. Characteristics of psychological interventions

All 7 reviews evaluated the effectiveness of CBT in the reduction of depressive symptoms. Four reviews included behavioral activation ([BA], Lee et al., 2016; Loughnan et al., 2019; Nair et al., 2018; Ponting et al., 2020) and 2 reviews included IPT (Nillni et al., 2018; Ponting et al., 2020). The reviews also presented the results about the effectiveness of interventions such as mindfulness (Huang et al., 2018; Ponting et al., 2020), psychological or social support (Mendelson et al., 2017; Nillni et al., 2018; Ponting et al., 2020) and psychoeducation or education-based interventions (Mendelson et al., 2017; Nair et al., 2018; Nillni et al., 2018) in the reduction of depressive symptoms in the perinatal period. Concerning the delivery format, the effectiveness of internet-based interventions was analyzed in 5 reviews (Huang et al., 2018; Lee et al., 2016; Loughnan et al., 2019; Nair et al., 2018; Nillni et al., 2018) and 2 reviews included only individual or group interventions (Mendelson et al., 2017; Ponting et al., 2020). Telephone-based modalities were also reported (Huang et al., 2018; Nillni et al., 2018).

The psychological interventions reported in the reviews had in average 8.33 to 9.75 sessions, ranging from 1 to 16 sessions (Huang et al., 2018; Lee et al., 2016; Loughnan et al., 2019; Mendelson et al., 2017; Nillni et al., 2018; Ponting et al., 2020) and the duration of treatment could last between 2 and 15 weeks (Lee et al., 2016; Loughnan et al., 2019; Mendelson et al., 2017; Nillni et al., 2018; Ponting et al., 2020). Interventions were generally provided by therapists, psychology students or researchers or other health professionals, including nurses, psychologists, physicians, community health workers or health visitors (Huang et al., 2018; Lee et al., 2016; Loughnan et al., 2019; Mendelson et al., 2017; Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020).

To assess depressive symptoms, the measures most frequently reported in the reviews were the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) [Huang et al., 2018; Lee et al., 2016; Loughnan

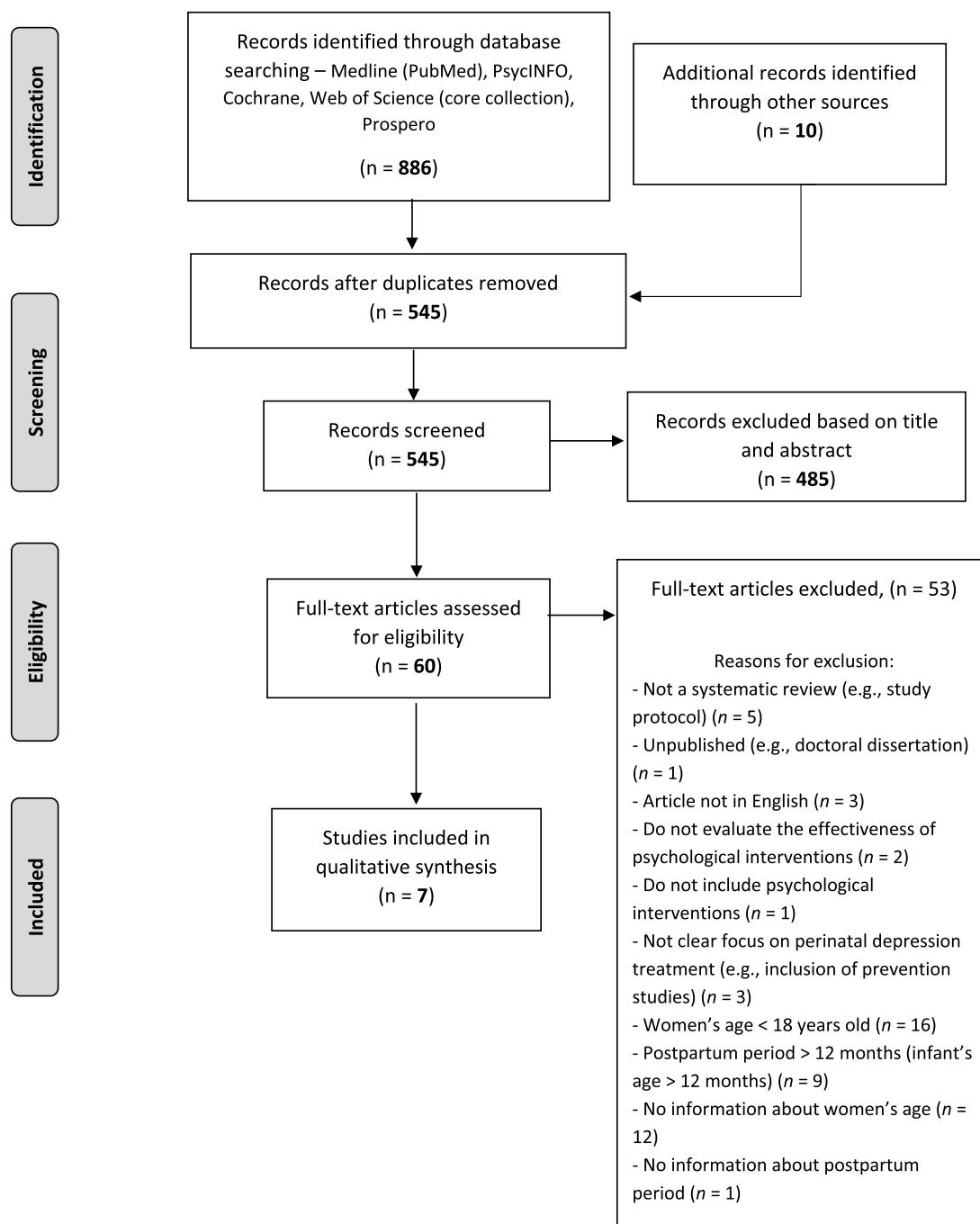


Fig. 1.

et al., 2019; Mendelson et al., 2017; Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020], the Beck Depression Inventory-II (BDI-II; Beck, Steer & Brown, 1996) [Huang et al., 2018; Loughnan et al., 2019; Mendelson et al., 2017; Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020], the Center for Epidemiological Studies–depression (CES-D; Radloff, 1977) [Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020] and the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) [Lee et al., 2016; Nillni et al., 2018; Ponting et al., 2020], and clinical interviews such as the MINI (Sheehan et al., 1998) [Loughnan et al., 2019; Nillni et al., 2018] and SCID (First et al., 1997) [Lee et al., 2016; Loughnan et al., 2019; Nillni et al., 2018].

3.4. Effectiveness of psychological interventions

All reviews presented a narrative synthesis of findings and 4 reviews also performed meta-analysis. Summary of results are presented in Table 2.

In general, the reviews reported effectiveness of psychological interventions in decreasing depressive symptoms for women during the perinatal period. Results also provided evidence that improvements in depressive symptoms are maintained at both short (4 weeks) and long-term periods (12 months) [Huang et al., 2018; Lee et al., 2016; Nair et al., 2018]. Four reviews (Loughnan et al., 2019; Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020) also reported that psychological interventions targeting depression in perinatal period can reduce symptoms of anxiety. No other secondary outcomes of interest to our

Table 1
Characteristics of included systematic reviews.

First author (year of publication)	Aims	Search strategy: Databases searched. Search terms defined. Examples. Hand searching and reference checking.	Type and number of included studies	Participants' characteristics: Total number of participants; mean age of mother (and range); country/ nationality	Interventions characteristics: a) type (e.g., CBT, IPT); b) delivery format (e.g., individual, group, online); c) range of number of sessions (mean); d) range of duration of treatments (mean); e) time of intervention (pregnancy, postpartum or both) f) follow up	Intervention providers	Outcome measures	Funding sources
Ponting et al. (2020)	To examine treatment outcomes of psychological interventions for anxiety and depression during the prenatal period in Latina and Black women, in order to better understand mental healthcare and treatment disparities in this group	Databases searched: Cumulative Index to Nursing and Allied Health Literature (CINAHL®), PubMed®, PsycINFO®, Web of Science®, and ProQuest Dissertation and Theses AI® Search terms defined. Examples: Antenatal, pregnancy, intervention, treatment, postpartum depression, anxiety, African-American, minority. Reference checking.	N = 13 10 RCTs and 3 pilot studies	N = 1971 Mean's age: 25.2 years (range 24.3 - 30) Latina/Hispanic or Black/African-American	a) CBT (n = 6) IPT (n = 4) CBT+ social support (n = 1) BA (n = 1) Mindfulness (n = 1) b) Group (n = 6) Individual (n = 4) Combination of group and/or individual sessions (n = 3) c) 4 to 14 sessions (mean = 8,46 sessions) d) 4 to 8 weeks – not reported from all studies e) pregnancy f) not reported	Health professional or lay person (master's or PhD level therapists, community health workers or community caseworkers)	EPDS CES-D BDI-II STAI PHQ-9	Grant Number: NIH 5T32MH015750–38
Loughnan et al. (2019)	To examine the overall effect of internet-delivered interventions on anxiety and depression symptoms, establish their relative efficacy compared with that of control conditions, and examine acceptability as indicated by adherence rates and reported participant satisfaction	Databases searched: PsycINFO, Medline, Cochrane Central Register of Controlled Trials, Embase, PubMed, CINAHL, and Maternity and Infant Care. Search terms defined. Examples: Perinatal, depression, intervention, treatment, psychotherapy, CBT, online, e-health No hand searching or reference checking.	N = 7 5 RCTs and 2 open uncontrolled pilot studies	N = 595 Mean's age: 31.35 years (range not reported) Australia, USA, Canada and Sweden	a) CBT (n = 5) BA (n = 2) b) Internet-delivered with therapist support (n = 7) c) 6 to 12 sessions (mean = 8.33 sessions) d) 6 to 15 weeks (mean = 10 weeks) e) Pregnancy (n = 2) and postpartum period (n = 5) f) 4-week to 6-months follow-up – not reported from all studies	Graduated research assistant Research psychology Graduated psychology Clinical Psychology Psychology student Mental health worker Specialist health visitor	MINI EPDS DASS GAD-7 W-DEQ SCID-IV BDI-II MADRS	PhD scholarship and NHMRC grant (1,145,382)
Nillni et al. (2018)	To review existent interventions for depression, anxiety and	Databases searched: PubMed and PsychINFO Search terms	N = 35 studies* 25 RCTs and 10 open trials *a total of 78 studies were	N = 3366* Mean age and range not reported.	a) CBT (n = 17) IPT (n = 13) Other talk therapies (i.e., peer support, listening	Therapists, nurses, psychologists, physicians, mental health	IDA EPDS HRSD SCID PHQ-9	NICHD Grant 1K23HD087428–01A1

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Table 1 (continued)

First author (year of publication)	Aims	Search strategy: Databases searched. Search terms defined. Examples. Hand searching and reference checking.	Type and number of included studies	Participants' characteristics: Total number of participants; mean age of mother (and range); country/ nationality	Interventions characteristics: a) type (e.g., CBT, IPT); b) delivery format (e.g., individual, group, online); c) range of number of sessions (mean); d) range of duration of treatments (mean); e) time of intervention (pregnancy, postpartum or both); f) follow up	Intervention providers	Outcome measures	Funding sources
	trauma-related disorders during the perinatal period and, in particular, on perinatal low-income and minority women.	defined. Examples: Postpartum mood disorder, anxiety, therapy, cognitive behavioral therapy, interpersonal psychotherapy, treatment, evidence based treatment, acceptance and commitment therapy Reference checking.	included in the review (total number of participants = 5567), but we only report the data from the studies focused on psychological treatment for perinatal depression		visits, and psychoeducation; n = 5) b) Individual (n = 18) Group (n = 10) Online (n = 5) Telephone-based (n = 2) c) 4 to 16 sessions (mean = 9,14 sessions) d) 3 to 28 weeks – not reported from all studies e) Pregnancy (n = 17), postpartum (n = 17) and perinatal period (n = 1) f) 6-weeks to 6-months follow-up – not reported from all studies	nurses, case workers, home visitor	HRSD-17 BDI CIS-R MINI DASS-21 BAI STAI brief-STAI IDAS-GD CES-D STAI SCL-20	
Nair et al. (2018)	To assess telemedicine effectiveness for delivering evidence-based interventions for treating Maternal Depression	Databases searched: The Cochrane Library, PubMed/ MEDLINE, and PsycINFO. Search terms defined. Examples: Pregnancy, postnatal, psychotherapy, depression, mobile application, mobile health, internet-delivered, telehealth No hand searching or reference checking.	N = 10 8 RCTs and 2 open uncontrolled pilot studies	N = 1138 Mean's age not calculated (range 26.3–32.6 years) USA, Singapore, UK, Sweden, Australia and Canada	a) CBT (n = 6) BA (n = 2) Unspecified psychoeducation (n = 1) Mood tracking (n = 1) b) Website (n = 8) Mobile application (n = 2) c) not reported d) not reported e) Pregnancy (n = 2), postpartum (n = 6) and perinatal period (n = 2) f) 1 to 9 months follow-up	Not reported	BDI-II CES-D EPDS GAD-7 WSAS MADRS	No external funding.
Huang et al. (2018)	To assess the combined effectiveness of CBT for postnatal depression.	Databases searched: PubMed, Embase, and the Cochrane library Search terms defined. Examples: Puerperal depression, postnatal depression,	N = 20 20 RCTs	N = 3623 Mean's age: 29,8 years (range 18 – 37 years) China, Canada, USA, Australia, Iran, UK and France	a) CBT b) Internet-based therapy (n = 3) Telephone-based therapy (n = 2) Group therapy (n = 7) Mindfulness (n = 1) In-home therapy (n = 4) Hospital (n = 3) c) 1 to 12 sessions	Psychologists, trained nurses, or researchers	EPDS PSI DASS BDI HADS BAI PSQI HAM-A HAM-D STAI	No external funding.

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Table 1 (continued)

First author (year of publication)	Aims	Search strategy: Databases searched. Search terms defined. Examples. Hand searching and reference checking.	Type and number of included studies	Participants' characteristics: Total number of participants; mean age of mother (and range); country/ nationality	Interventions characteristics:a) type (e.g., CBT, IPT);b) delivery format (e.g., individual, group, online);c) range of number of sessions (mean);d) range of duration of treatments (mean); e) time of intervention (pregnancy, postpartum or both)f) follow up	Intervention providers	Outcome measures	Funding sources
Mendelson et al. (2017)	To conduct a systematic review and meta-analysis of NICU-based interventions to reduce maternal depressive or anxiety symptoms.	Databases searched: PubMed, Embase, PsychInfo, Cochrane, and CINAHL. Search terms defined. Examples: Neonatal intensive care, intervention, prevention, depression, depressive symptoms, anxiety, well-being, randomized controlled trial. Reference checking.	N = 8* 8 RCTs *a total of 12 studies were included in the review (total number of participants = 1044), but we only report the data from the studies focused on psychological treatment for perinatal depression	N = 863* Mean's age: 27 to 28 (range 18 – 34 years) Iran, Brazil and USA	d) not reported e) Postpartum period f) not reported a) CBT (n = 4) Education-based (n = 3) Psychological support (n = 1) b) Individual c) 3 to 6 sessions – not reported from all studies d) 2 to 4 weeks – not reported from all studies e) Postpartum period f) not reported	Not reported	CESD BDI-II EDPS QIDS STAI	No external funding
Lee et al. (2016)	To determine whether web-interventions for pregnant and post-partum women are efficacious for prevention and treatment of perinatal mood disorders	Databases searched: MEDLINE, PsycINFO, Embase and Cumulative Index to Nursing and Allied Health Literature (CINAHL). Search terms defined. Examples: Depression, pregnancy, psychotherapy, online, mental-health, self-help, cognitive behavioural therapy, E-health. Reference checking.	N = 4 3 RCTs and 1 feasibility trial with quasi-experimental design	N = 1274 Mean's age not calculated (range 31.9–34.2 years) USA, Australia, Germany and UK	a) CBT (n = 1) BA (n = 2) Not specified (n = 1) b) Online, with therapist/external contact c) 6 to 12 sessions (mean = 9,75 sessions) d) 5 to 15 weeks e) Postpartum period f) 15 weeks to 12 months follow-up	Personal coach, Therapist	EPDS HRSD PHQ-9 ICG BSI GAD-7 SCID	No external funding

Note: CBT: Cognitive Behavioral Therapy; BA: Behavioral Activation; IPT: Interpersonal Psychotherapy; RCT: Randomized Control Trial; W-DEQ: Wijma Delivery Expectancy/Experience Questionnaire, version A; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; CES-D: Center for Epidemiological Studies Depression

Scale; CGI-S: Clinical Global Impression Severity Scale; CIS-R: Clinical Interview Schedule-Revised; EPDS: Edinburgh Postnatal Depression Scale; GAD-7: Generalized Anxiety Disorder Scale; HADS: Hospital Anxiety and Depression Scale; HRSD: Hamilton Depression Rating Scale; IDA: Irritability, Depression, Anxiety Scale; IDAS-GD: Inventory of Depression and Anxiety Symptoms Gender Depression Scale; IDS-SR: Inventory of Depressive Symptomatology-Self Report; MADRS: Montgomery Depression Rating Scale; MINI: MINI International Neuropsychiatric Interview; PHQ-9: Patient Health Questionnaire-9; QIDS: Quick Inventory of Depressive Symptomatology; SCID: Structured Clinical Interview for DSM-IV; SCL-20: Hopkins Symptom Checklist-20; STAI: State-Trait Anxiety Inventory; WSAS: Work and Social Adjustment Scale; PSI: Parenting Stress Index; DASS: Depression Anxiety Stress Scales; PSQI: Pittsburgh Sleep Quality Index; HAM-A: 14-item Hamilton Rating Scale for Anxiety; HAM-D: 21-item Hamilton Rating Scale for Depression; ICG: Inventory of Complicated Grief; BSI: Brief Symptom Inventory.

paper (e.g., child outcomes) were reported in the included reviews.

A wide variability of attrition rates was found (5%–78.9%). Reviews focused on individual or group interventions revealed low to medium attrition rates (from 5% to 45%; Mendelson et al., 2017; Ponting et al., 2020), whereas internet based-interventions revealed higher attrition rates (up to 61% or 78.95%; Lee et al., 2016; Nair et al., 2018).

CBT was found to be the most effective intervention in the reduction of depressive symptoms during the perinatal period (Huang et al., 2018; Mendelson et al., 2017; Nillni et al., 2018; Ponting et al., 2020). Mendelson et al. (2017) reported an estimated effect of -0.44 (95% CI: -0.77 to -0.11 ; $p = 0.01$) and Huang et al. (2018) found a mean difference in short-term EPDS of -2.86 (95% CI: -4.41 to -1.31 ; $p < 0.05$). Reviews evaluating IPT interventions also revealed its efficacy in the treatment of depressive symptoms (Nillni et al., 2018; Ponting et al., 2020).

Concerning the formats of psychological interventions, face-to-face CBT, both individually and in group (e.g., Nillni et al., 2018), was found to be effective in reducing depressive symptoms. In addition, internet CBT based interventions were shown to be an effective format of treatment delivery for perinatal women, resulting in a decrease of depressive symptoms (Lee et al., 2016; Loughnan et al., 2019; Nair et al., 2018; Nillni et al., 2018).

3.5. Risk of bias

The methodological quality and risk of bias of included studies are presented in Table 3. All reviews were classified with critically low-quality using AMSTAR-2, mainly due to the inexistence of a list of excluded studies with its reasons and to the fact that authors did not discuss the impact of risk of bias when interpreting the results. Moreover, four of the systematic reviews included also did not demonstrate the existence of a previous protocol prior to the conduction of the review.

4. Discussion

This systematic review synthesized the results from the existent systematic reviews and meta-analyses about the efficacy of the psychological interventions in perinatal depression.

First, we must emphasize the predominant implementation of CBT for the treatment of perinatal depression in all included reviews. In fact, CBT is recommended as a first-line treatment for perinatal depression (NICE, 2009; 2014). The reviews integrating studies focused in using CBT found significant reductions in the depressive symptoms from pre to post-treatment (e.g., Nillni et al., 2018). In the trials included in these reviews, women in the active CBT treatment condition reported significantly fewer depressive symptoms, after treatment, versus the control group (Huang et al., 2018; Lee et al., 2016; Nillni et al., 2018; Ponting et al., 2020). Mendelson et al. (2017) meta-analysis (NICU-based interventions) pointed to strong evidence in favor of a reduction of maternal depressive symptomatology using this type of intervention. Additionally, longer interventions were associated with a marginally significant improvement in depressive symptoms, whereas those of a shorter duration were not (Mendelson et al., 2017). Considering these results, it is possible to conclude that CBT interventions applied face-to-face seem to be an appropriate option for the treatment of women with perinatal depression, both at short and long term. This type of intervention promotes therapeutic support, which might justify the increased adhesion to treatment and, also, the efficacy rates (Wentzel

et al., 2016).

Regarding the effectiveness of IPT in the treatment of perinatal depression, inconsistent results were found, with some studies revealing a significant reduction in depressive symptoms (absence of clinical criteria for major depression, after treatment), persisting until six months of follow up, while others did not confirm these differences (Nillni et al., 2018; Ponting et al., 2020).

The systematic reviews that integrated studies assessing the effectiveness of other verbal therapeutic strategies (Nillni et al., 2018), such as problem solving, listening visits, and supportive therapy, showed, generally, non-significant results. In contrast, Honey et al. (2002) found statistically significant reductions in women's depressive symptoms in the psychoeducation group, compared to the control group. Moreover, in the study from Segre et al. (2015), women in the listening visitor modality reported a greater reduction in the depressive symptoms in the postpartum period, when compared to the women in the control group. Regarding education-based approaches and interventions focused on improving maternal-infant responsiveness, the results did not confirm improvements in these areas.

There is a lack of systematic reviews and meta-analyses on the efficacy of contextual-behavioral interventions/third-wave CBT (e.g., Mindfulness/Compassion-based, ACT) for perinatal depression, and therefore the efficacy of these more recent types of interventions could not be compared to that of more traditional and widely used treatments, such as CBT or IPT.

Some systematic reviews also showed that interventions targeting perinatal depression also indicated reductions in anxiety symptoms (Loughnan et al., 2019; Nair et al., 2018; Nillni et al., 2018; Ponting et al., 2020), suggesting that psychological interventions may contribute to the decrease of both symptoms, and therefore improve women's well-being in the perinatal period.

The present systematic review also synthesized relevant features of the intervention's characteristics (i.e., format, number of sessions, perinatal period under consideration, follow-up period, and who conducted the intervention). Regarding the format of psychological interventions, different formats were found (internet delivered or face-to-face; individual or group). The systematic reviews revealed the effectiveness of psychological interventions in individual and group formats (Huang et al., 2018; Nillni et al., 2018; Ponting et al., 2020). Five systematic reviews included psychological interventions delivered through the internet, revealing an increased interest and number of studies in this area.

The reviews that integrated psychological interventions at distance, using an online platform (Lee et al., 2016; Loughnan et al., 2020; Nillni et al., 2018) demonstrated that women who benefited from antenatal and postnatal interventions, in the CBT group, presented significant improvements in depressive symptoms severity (major and clinical depression) from pre to post-treatment, in comparison to those from the control group (standard maternal care). Similar results were found in the modalities via telephone, forums and email (e.g., Danaher et al., 2013; Milgrom et al., 2016; O'Mahen et al. 2013). All the studies included in these three systematic reviews point out to the efficacy of internet-delivered interventions in the reduction of depression during the perinatal period (Lee et al., 2016; Loughnan et al., 2020; Nillni et al., 2018). The consistency of the efficacy of the internet-delivered interventions might be due to its benefits. Internet-based interventions can save time and costs to women because they can access the intervention from home or work whenever they wish, therefore reducing

Table 2
Summary of results.

First author (year of publication)	Risk of bias	Main findings	Effect estimates (if meta-analysis was performed)
Ponting et al. (2020)	Mixed methodological bias. Low risk of bias (n = 6), medium risk of bias (n = 5) and high risk of bias (n = 2)	2 RCTs (using a CBT group intervention and a BA intervention) outperformed a control group condition and showed statistically significant reductions in depressive symptoms. 1 RCT (using IPT) outperformed treatment as usual. 3 RCTs did not find effects of the intervention on depressive symptoms. IPT intervention also demonstrated to be effective as CBT. There were more CBT and IPT interventions that did not outperform standard care than those that did. 2 studies using non-controlled designs and CBT showed reductions in depressive symptoms from pre-treatment to post-treatment. 1 RCT showed a significant reduction in anxiety symptoms from pretreatment to post-treatment. CBT was the modality with most evidence for reducing depressive symptoms in pregnant Black and Latina women. 5 studies made cultural adaptations to their treatment protocols. Attrition ranged from 8% to 45% but was low overall (mean attrition = 17%).	Not performed
Loughnan et al. (2019)	Included RCTs were low in selection of bias and attrition bias, unclear in detection of bias and reporting bias and high in performance bias	All studies reported large improvements in depression and anxiety symptom severity. Between-group difference compared with control conditions was moderate. Low attrition rates were found (<30% of dropouts) as well	Uncontrolled effect sizes for pre-post-intervention studies: The internet-delivered interventions demonstrated large and significant improvements in depression (Hedges g of 1.63; 95% CI 1.47–1.79;

Table 2 (continued)

First author (year of publication)	Risk of bias	Main findings	Effect estimates (if meta-analysis was performed)
		as moderate to high program adherence. (60–80% completed all sessions). Lower program adherence was found in a study with longer treatment period. Participants satisfaction was overall positive.	Q = 14.90; P < 0.01) from pre to post-treatment. Controlled effect sizes for intervention vs. control group studies: Internet-delivered interventions outperformed control conditions overall, with medium between-group effect sizes for depression (Hedges g of 0.55; 95% CI 0.38–0.71; Q = 7.66; p < 0.01)
Nillni et al. (2018)	Open trials and pilot studies had greater risk of bias than RCTs.	CBT, followed by IPT, were the most studied treatments for perinatal depression and both have achieved a strong evidence base among this population. A significant benefit of CBT or IPT was found over the control condition (i. e., significant reduction in depressive and anxiety symptoms at post-treatment), regardless of delivery format and duration. The web- and telephone-based interventions showed encouraging results as compared to wait list control and treatment as usual conditions. There was some evidence for the effectiveness of group peer support or psychoeducation in decreasing depressive symptoms over treatment. Results provided some evidence that CBT and IPT can be effectively delivered by non-mental health providers (e. g., nurses).	Not performed
Nair et al. (2018)	Low risk of bias	Interventions delivered via telemedicine demonstrated to be effective in the reduction of maternal depression symptoms. 8 trials (80% of studies) reported	A meta-analysis of studies that used the EPDS (n = 5) was conducted. The meta-analysis indicated heterogeneity (I2=74.2%; X2= 14.63; df=4; p = 0.06).

(continued on next page)

Table 2 (continued)

First author (year of publication)	Risk of bias	Main findings	Effect estimates (if meta-analysis was performed)
		significant improvement in depression scores post-intervention; 4 studies that conducted post-intervention follow-up found that these improvements continued. 6 studies found significantly decrease in anxiety outcomes (in 75% of studies that measured the outcome) High attrition rates (ranging from 9.7% to 78.9%) and lack of blinding were common problems. Sources of heterogeneity were likely differences in outcomes and follow-up time.	Effect sizes ranged between -0.69 and -4.03.
Huang et al. (2018)	More than 60% of the studies were considered as low-risk of bias, approximately 30% as unclear risk, and less than 10% as high risk of bias	CBT effectively improved depressive symptoms over treatment. 13 studies reported a reduction of depressive symptoms after interventions (assessed by EPDS or BDI). There was some evidence that Internet-based and telephone-based therapies were effective.	Short term EPDS: mean difference = -2.86, 95% CI: -4.41–-1.31; P<0.05 Long-term EPDS: mean difference = -1.68, 95% CI: -1.81–-1.56; P<0.05 Short term BDI: mean difference = -6.30, 95% CI: -11.32–-1.28; P<0.05 Long term BDI: mean difference = -4.31, 95% CI: -6.92–-1.70; P<0.05 In-home short-term (EPDS): SMD = -0.97, 95% CI: -1.81–-0.13; P<0.01 In-home long-term (EPDS): SMD = -0.31, 95% CI: -0.57–-0.05; P<0.01 Depressive symptoms: effect = -0.16 (95% confidence interval [CI], -0.32 to -0.002; P < 0.05) CBT interventions: effect = -0.44; 95% CI, -0.77 to -0.11; P = 0.01 Long-duration interventions: effect = -0.23; 95% CI, -0.47 to 0.004, P = 0.054
Mendelson et al. (2017)	3 studies with low risk for bias and 2 studies with moderate risk for bias. 2 studies with high risk of bias were excluded from meta-analysis.	All 7 studies assessing depressive symptoms showed a significant reduction. The subgroup of interventions using CBT significantly reduced depressive symptoms. Interventions of longer duration were associated with a significant improvement in depressive symptoms. Attrition rates	

Table 2 (continued)

First author (year of publication)	Risk of bias	Main findings	Effect estimates (if meta-analysis was performed)
Lee et al. (2016)	1 study rated with poor quality, 2 studies with intermediate quality and 1 study with good quality	ranged from 5% to 26%. All studies reported reduction in depressive symptoms following intervention, either at post-treatment or follow-up. The 2 studies using the EPDS as an outcome measure reported clinically significant improvements. This review did not provide evidence whether the severity of symptoms impacted on the effectiveness of CBT. Attrition rates ranged from 13 to 61%.	Not performed

Note: RCT: Randomized Clinical Trial; CBT: Cognitive Behavioral Therapy; BA: Behavioral Activation; IPT: Interpersonal Psychotherapy; EPDS: Edinburg Postnatal Depression Scale; BDI: Beck Depression Inventory.

help-seeking barriers (Barrera et al., 2015). In addition, this format ensures more anonymity, since women did not have to go to a consultation office or hospital, which could also contribute to increase adherence to treatment (e.g., Estes et al., 2010).

This systematic review also highlighted the increasing concern in providing CBT or IPT interventions for perinatal depression directed at minority samples, including low-income African-American and Hispanic women (Nilni et al., 2018; Ponting et al., 2020), perhaps due to the elevated prevalence of perinatal depression in these groups (Woody et al., 2017). Most studies used, in general, CBT and revealed statistically significant reductions in depressive symptoms among women. However, the findings were inconsistent since there were more CBT interventions which results were not found to be superior to those found in the control groups. Similarly, inconsistent results were found regarding the use of IPT in women belonging to minority groups and with low income. In this way, and given the inconsistency of the results, new studies are needed, using comparable methodologies, that can offer more precise answers regarding the efficacy of these interventions in this specific group of women. Moreover, due to the scarcity of studies that entail a follow-up component, it would be important to assess the long-term benefits of these interventions. Given these results, it is possible that cultural adaptations to treatment protocols are required to address these population specific needs, as suggested by the studies included in the systematic review of Ponting et al. (2020).

4.1. Limitations and future directions

Despite the important findings, this systematic review of systematic reviews and meta-analyses has some limitations. First, we did not search any database for information on gray Literature. However, the PROSPERO was consulted to find systematic reviews and meta-analysis registered and unpublished or registered and still being developed.

Second, the systematic reviews and meta-analyses selected, in some cases, have included the same trials, so that those studies have been considered more than once in our synthesis, which could have skewed some results. However, we found that the overall of trials among systematic reviews and meta-analysis was slight (Pieper et al., 2014).

Table 3

Risk of bias of included systematic reviews.

Study	AMSTAR-2 Items																Quality rating
	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	
Pointing et al. (2020)	+	+/-	-	+/-	+	+	-	+/-	+	-	NM	NM	-	+	NM	-	Critically low
Loughnan et al. (2019)	-	+/-	-	+/-	+	-	-	+/-	+/-	-	-	-	-	-	+	+	Critically low
Nillni et al. (2018)	-	-	+	+/-	-	-	-	+/-	+/-	-	NM	NM	-	+	NM	+	Critically low
Nair et al. (2018)	-	+	-	+/-	-	-	-	+/-	+	-	-	-	-	-	-	+	Critically low
Huang et al. (2018)	+	-	-	+/-	+	+	-	+/-	+	-	+	+	+	+	+	+	Critically low
Mendelson et al. (2017)	+	-	-	+/-	-	+	-	+/-	-	-	+	+	-	+	+	+	Critically low
Lee et al. (2016)	+	-	-	+	+	+	-	+	-	-	NM	NM	-	-	NM	+	Critically low

Note. Yes: +; Partial Yes: +/-; No: -; Not meta-analysis: NM.

Third, the inclusion of systematic reviews that were of low methodological quality, based on AMSTAR-2 ratings, weakens the evidence reported in this systematic review of reviews. However, and despite the small number of included reviews (only 7), the sample sizes were of a reasonable size and the systematic reviews included a high number of studies ($n = 97$), of which most were RCTs. Also, it should be noted that, using secondary sources of information, the biases were cumulated from the individual trials and from systematic reviews and meta-analysis. Therefore, further systematic reviews and meta-analysis of higher quality are required, to improve the level of evidence of psychological interventions for perinatal depression treatment.

Future studies should also seek to conduct systematic reviews and meta-analyses that allow for the evaluation of the efficacy of contextual-behavioral interventions in comparison to standard CBT and IPT, since this was an important gap identified in the literature. The systematic reviews included in our review did not report other secondary outcomes (e.g., maternal and child outcomes) usually reported in the efficacy studies, which restricts our comprehension on the effectiveness of such interventions in improving other outcomes other than depression (and anxiety) symptoms.

5. Conclusion

This is the first systematic review of systematic reviews and meta-analyses assessing the effectiveness of psychological interventions in the treatment of perinatal depression. The current study has identified important knowledge gaps in the existing literature. Most of the interventions considered in our systematic review were based on CBT principles and there is a clear lack of systematic reviews and meta-analyses about the effectiveness of contextual-behavioral interventions (e.g., compassion focused interventions). Therefore, further RCTs, as well as systematic reviews, with other types of psychological interventions (e.g., third-wave CBT) are needed.

Overall, this systematic review of systematic reviews and meta-analyses points to the efficacy of CBT in the treatment of perinatal depressive symptoms in women from community samples, albeit the findings regarding the efficacy of CBT or IPT in women from minority groups are inconsistent. Furthermore, we concluded that CBT is currently the most evidence-based treatment, regardless of the delivery format used (individual, group, face-to-face or Internet-based). This systematic review of systematic reviews and meta-analyses may, therefore, provide a better use of current evidence on the efficacy of the psychological interventions in perinatal depression and contribute to

inform research and clinical practice with these women.

Author statement

MFR and MB develop the process and independently screened titles and abstracts for eligibility. Also they wrote the method section and all tables and figures.

JO and PM extracted the data from the included papers and a MB checked the extracted data.

The others author prepared the introduction and discussion.

All authors discussed the results and contributed to the final manuscript.

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Declaration of Competing Interest

The authors have no conflict of interest.

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