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Interventions to Prevent Perinatal Depression: An Evidence Update for the U.S. Preventive Services Task Force

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Structured Abstract

Objective: To systematically review the benefits and harms of primary care-relevant interventions to prevent perinatal depression (PND) (i.e., depression during pregnancy and postpartum depression) to inform the United States Preventive Services Task Force.

Data Sources: We searched MEDLINE, PsycINFO, CINAHL, and the Cochrane Central Register of Controlled Clinical Trials for relevant English-language literature published between January 1, 2018, and January 2, 2024. Additionally, we re-evaluated all studies included in the 2019 review. We supplemented our searches with suggestions from experts and reference lists of previously published systematic reviews. Ongoing surveillance through November 22, 2024.

Study Selection: English-language controlled trials of interventions to prevent PND in general populations of pregnant and postpartum women (up to 1 year) or in those at increased risk of PND. We included trials of behavior-based counseling, supportive, educational, physical activity, infant-sleep focused, debriefing interventions, and prophylactic pharmacologic therapies.

Data Analysis: Two investigators independently reviewed abstracts and full-text articles and studies were rated as fair- and good-quality, based on predetermined criteria. One investigator abstracted data into an evidence table and a second investigator checked these data. Random-effects meta-analysis with a Knapp-Hartung adjustment was used to estimate the benefits of the interventions on depression status and depression symptoms. Other outcomes were qualitatively synthesized including anxiety, psychosocial outcomes, quality of life, maternal and child health outcomes, and healthcare utilization. Strength-of-evidence ratings were made based on consistency, precision, study quality, and evidence of reporting bias, taking into account the size of the evidence base and other noted limitations.

Results: We identified 75 trials (N=30,842) that met our inclusion criteria. In general, most trials recruited women at increased risk of PND regardless of inclusion criteria as reflected in control group event rates that are higher than the current United States estimates for PND. Counseling was the most widely studied intervention with the most consistent benefit seen in both depression incidence and changes in depression symptoms. We identified 27 trials (n=6,583) of behavioral counseling interventions, most commonly based on cognitive behavioral therapy (CBT) or interpersonal therapy (IPT), to prevent PND demonstrating a 17% lower risk of depression at the longest followup (at 6 to 78 weeks postpartum) (21 RCTs, n=4,974; RR, 0.83 [95% CI, 0.72 to 0.95]; I^2=0% and a small beneficial effect in depression symptoms at the longest followup (measured at 26 weeks gestation to 52 weeks postpartum) (20 RCTs, n= 2,880; SMD, -0.35 [95% CI, -0.57 to -0.12]; I^2=84%). We identified 15 trials (n=6,237) of supportive interventions demonstrating no statistically significant association with depression incidence at the longest followup (8 to 61 weeks postpartum) (8 RCTs, n=3,085; RR, 0.81 [95% CI, 0.57 to 1.16]; I^2=36%) or change in depression symptoms at the longest followup (measured at 38 weeks gestation to 61 weeks postpartum) (6 RCTs, n=1,058; SMD, -0.63 [95% CI -1.61 to 0.35]; I^2=96%). We identified twelve trials (n=11,415) of educational interventions demonstrating a 21% reduction in depression incidence (7 RCTs, n=8,319; RR, 0.79 [95% CI, 0.70 to 0.88]; I^2=0%) but no difference in the SMD in change in depression symptoms (6 RCTs, n=6,292;

SMD -0.04, [95% CI -0.16 to 0.09]; I^2=32%). We identified seven trials (n=1,826) of physical activity interventions to prevent PND demonstrating a 52 percent lower risk of depression incidence at the longest followup (ranging from 39 weeks gestation to 43 weeks postpartum) (6 RCTs, n=1,574; RR, 0.48 [95% CI, 0.35 to 0.66]; I^2=0%) and a statistically significant difference in change in depression symptoms between the physical activity and control groups at the longest followup (39 weeks gestation to 38 weeks postpartum) (3 RCTs, n=364; SMD -0.46 [95% CI, -0.80 to -0.12]; ; I^2=0%). Infant sleep (3 RCTs, n=980), debriefing (2 RCTs, n=2786), complementary (7 RCTs, n=1060), and pharmacologic interventions (antidepressants: 2 RCTs, n=80, ketamine: 1 RCT, n=25) had limited bodies of evidence precluding conclusions about their effectiveness.

Limitations: The precision and generalizability of the body of literature for any single intervention type is limited by the marked heterogeneity in intervention protocols. The most consistent evidence exists for behavioral counseling interventions which are largely based on CBT/IPT approaches. The evidence base for both educational and physical activity interventions show improvements in depression incidence but only the physical activity interventions are associated with statistically significant differences in depression symptoms. No specific educational or physical activity protocol has been widely replicated in larger population trials.

Conclusions: Counseling interventions can be effective in preventing PND, although most evidence was limited to women at increased risk for PND. A variety of other intervention approaches demonstrated some evidence of effectiveness but lacked a robust evidence base thereby requiring further research. Of these other interventions, educational and physical activity interventions show the most promising results.

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Chapter 1. Introduction

Condition Background

Condition Definition

Perinatal depression (PND), or major depressive disorder of peripartum onset, is defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 as the occurrence of a major depressive episode during pregnancy or within 4 weeks after delivery,[1] however the timeframe is commonly expanded by experts to postpartum onset up to 1 year.[2, 3] In the DSM-5, PND is not considered a separate diagnosis and patients are required to meet the criteria for a major depressive disorder, with the additional qualifier of the time period for onset. The criteria include experiencing five or more of the following nine symptoms in the same 2 week period of time: depressed mood (subjective or observed); loss of interest or pleasure in all, or almost all, activities most of the day; change in weight (5% change in a month) or appetite; insomnia or hypersomnia; psychomotor retardation or agitation; loss of energy or fatigue; feelings of worthlessness or excessive/inappropriate guilt; diminished concentration or indecisiveness; or recurrent thoughts of death, recurrent suicidal ideation with or without a specific plan, or a suicide attempt.[1] The symptoms experienced should include at least one of a depressed mood or loss of interest or pleasure. Other symptoms associated with PND include a persistent doubt of the ability to take care of the infant, trouble bonding with or forming an emotional attachment with the infant, and thoughts of death, suicide, self-harm or harm of the infant.[4] Several symptom severity scales have been used in clinical practice and research studies (**Appendix A Table 1**).

PND should not be confused with the less severe "postpartum blues" or "baby blues," which is a commonly experienced, transient mood disturbance consisting of crying, irritability, fatigue, and anxiety usually resolving within the first 10-14 days following delivery.[3, 5] Additionally, PND should be distinguished from postpartum psychosis, which is a severe form of mental illness characterized by extreme confusion, paranoia, loss of touch with reality, delusions, disorganized thought process, and hallucinations.[6] Postpartum psychosis is rare, affecting around 1-2 per 1000 women of childbearing age, and typically occurs shortly after childbirth to the first 6 weeks after birth. Although the condition is rare, it is considered a psychiatric emergency that requires urgent medical and psychiatric attention and hospitalization if the risk of suicide or filicide exists.[6]

Prevalence of Perinatal Depression

Depression is a common and serious illness in the United States and women have been found to have approximately double the risk of developing depression compared with men.[7] The Centers for Disease Control and Prevention (CDC) published survey data collected across 31 sites using the Pregnancy Risk Assessment Monitoring System (PRAMS) and found that among women with a live births, the prevalence of self-reported depression during pregnancy (based on the patient health questionnaire-2 (PHQ-2) has increased from 11.6 percent in 2016 to 16.8 percent in 2022.[8] Additionally, in 2022, 12.7 percent of women self-reported postpartum depressive symptoms, with geographical variations showing the highest prevalence among women in U.S.

territories Northern Mariana Islands and Puerto Rico (23.3% and 17.7%, respectively) and the prevalence among U.S. states ranged from 8 percent in Rhode Island and 17.6 percent in Kansas.[8]. A publication from 2020 found that the subgroups with the highest rates across a number of categories included: women who were aged 19 years or younger (22.2%, vs. 10.8% to 17.8% among age 20 and older), American Indian/Alaska Natives (22.0%, vs. 11.4% to 19.2% for other race/ethnic groups), those with less than 12 years of education (17.8%, vs. 11.2% with more than 12 years of education), unmarried women (16.9%, vs. 11.0% in married women), and those participating in WIC during pregnancy (17.0%, vs. 11.2% for women not participating in WIC).[9]

There is limited US-based epidemiologic data on rates of perinatal depression spanning the prenatal, pregnant, and postpartum periods. A recent observational study set in a large, integrated health system in Texas (n=3240) screened individuals attending OBGYN appointments for PND, finding a positive screening rate of 18.5 percent in the overall cohort.[10] Of the individuals who screened positive for PND (EPDS ≥10), 53.4 percent were detected during the prenatal period and 46.6 percent during the postpartum period. This equates to a 9.9 percent prenatal positivity rate and an 8.6 percent positivity rate during the postpartum period. In this study, two thirds of participants were not screened for PND until their third trimester, which led to a delayed detection for approximately 28 percent of women who eventually tested positive. These data show the importance of screening women throughout the prenatal period and suggests that onset of PND during pregnancy is common among those with postpartum symptoms.[10]

Burden of Perinatal Depression

It is well established that depression during the postpartum period can have negative effects on maternal health and the maternal-child relationship. Acts of harming oneself or others among women experiencing PND remain rare, however depression has been shown to increase the risk of suicide and suicidal ideation among postpartum women.[11, 12] A 2021 meta-analysis of 14 studies found that the worldwide prevalence of suicide attempts during pregnancy was 680 per 100,000 women and 210 per 100,000 during the postpartum period.[13] Mothers experiencing depression have reported more thoughts of harming their infants than nondepressed mothers.[12, 14] A recent systematic review of 122 studies found that there was a negative association between PND and mother-infant bonding (reported in 11 studies).[12] For example, one study reported that those who scored ≥13 on the EPDS 4 weeks postpartum were five times more likely to be experiencing poor bonding at the same time compared to women who scored <13 on the EPDS.[15] Further, women experiencing depression were found to show a reduced level of maternal-infant closeness, warmth, and mutual attunement, as well as reporting greater difficulties in their relationship with their child in the first year than women who were not depressed.[12 16]

In addition to PND's negative association with the health and wellbeing of the mother, PND can have negative associations with the health and development of the infant/child. The relationship between PND and child psychological development is complex.[17] Studies have shown that depression during pregnancy can increase the risk of preterm birth and small-for-gestational-age and may increase the risk of low birthweight.[16] A systematic review by Slomain and colleagues found a significant association between mothers' PND and health concerns among their infants, including a greater proportion of childhood illnesses.[12] Depressed mothers have been found to

engage in less healthy practices with their infants, such as using a car seat, placing infants on their back to sleep, and having a working smoke alarm in the home, compared to women not experiencing depression. Reduced nurturance (behaviors that promote psychological growth in the child) and high discipline scores have been found to be significantly associated with women experiencing PND.[12] Further, it was reported that children of mothers experiencing depression at 2 to 4 months postpartum were less likely to receive age-appropriate vaccinations or attend well-child visits between 6 and 24 months,[18] a trend reported in other studies included in the review. This study also found an increased likelihood of these children visiting the emergency department between 1.5 and 2.5 years of age. Of the 11 studies reporting the outcome, seven studies found a significant and negative association between cognitive development in the child and peripartum depression in the mother.[12] A cohort study in Brazil that interviewed 4231 women during pregnancy and at 3 months postpartum found that, at age 6, their children were at increased risk of psychiatric disorders, both among mothers who reported symptoms of anxiety and depression during pregnancy (19.8% versus 11.1% for women without symptoms) and postpartum (21.7% versus 10.8%).[19] Results remained statistically significant even when controlling for mood symptoms during the other phase (pregnancy or postpartum), suggesting depression during pregnancy and the postpartum phase each may be independently detrimental to the child's future mental health. These findings have been replicated in Finnish cohorts as well.[20, 21]Impaired motor development, delayed language development, reduced emotional development, and impaired social development, as well as an increase in negative behavior in the infant have all been shown to be associated with PND in the mother, although some of these findings were mixed.[12] Further, there is evidence of co-occurring parental depression in both mothers and fathers in approximately three percent of couples.[22]

Risk Factors and Etiology for Perinatal Depression

The development of PND has been associated with a multitude of risk factors that include history of depression,[23-26] history of physical or sexual abuse,[24] lack of social and financial support[25, 27], intimate partner violence,[28] pregestational or gestational diabetes,[29-31] and complications during pregnancy (e.g., hyperemesis, premature contractions).[32, 33] Additional risk factors include low socioeconomic status,[25, 34, 35] past history of pregnancy/delivery complications (e.g., miscarriage),[25, 36] pregnancy during adolescence,[25] and obesity.[37] Genetic and biological (e.g., hormonal changes) factors are also suspected to contribute to the development of PND. Even though more studies are needed to uncover the biological mechanisms and reliable predictors, recent epidemiological studies that were conducted within families have offered associational insights to heritability of PND.[38, 39]

The etiology of PND is unknown and likely multifactorial including social, psychological, biological, and genetic factors. The condition is complex, heterogeneous, and multifactorial and some debate whether there may be a distinction between PND and depression outside of the perinatal period.[40]The largest family study of PND to date was conducted in a Swedish population-based cohort of 580,006 sister pairs and groups. From this cohort, 3,427 twin sisters were identified to estimate 54 percent heritability of PND, indicating that potentially half the variation in PND may be due to genetic factors.[39] Additionally, a study of a subset of 328 women of childbearing age who were part of the Genetics of Recurrent Early-Onset Depression dataset with at least one sibling who was also part of the dataset showed similar results. They found that

diagnosis of PND in one sibling was associated with a significantly increased risk of a diagnosis of PND in the other sibling (odds ratio [OR], 3.96 [95% confidence interval [CI], 1.51 to 10.42; p=0.005]).[38] These studies, however, have limitations in their design, including relying on retrospective oral reports or chart reviews, failing to control for comorbid psychiatric illnesses, and failure to evaluate possible confounding of environmental factors.[41] Examining the role of well-defined genetic markers in the development of PND remains critical to a better understanding of the heritable component to the condition.

Because hormones have long been suspected of contributing to the onset of PND, research into the genes involved in the regulation or uptake of hormones has substantially increased. Two types of genes—estrogen receptor genes and genes involved in the synthesis or metabolism of the brain monoamines dopamine and serotonin—have been of particular interest to researchers.[42, 43] In addition, dysregulation in hormones during the peripartum period has long been suspected of contributing to the onset of PND. Oxytocin and the hormones involved in the regulation of the hypothalamic-pituitary-adrenal (HPA) axis, namely estrogen, progesterone, and corticotropin-releasing hormone, have garnered interest,[44-46] but more research needs to be done to confirm this relationship.

Interventions to Prevent Perinatal Depression

There are a variety of effective interventions available to treat PND once it is diagnosed. Many of these same interventions have been proposed and evaluated as a method to prevent PND when applied during pregnancy or in the immediate postpartum period. Effective psychological and psychosocial interventions to prevent PND include professionally based home visits (such as intensive nurse home visits and flexible postpartum care provided by midwives), postpartum lay or peer-based telephone support, cognitive behavioral therapy (CBT) and interpersonal psychotherapy (IPT).[47-49] Self-help psychological interventions have also been evaluated for their effectiveness, both in treating and preventing PND, and findings have suggested that these interventions effectively reduce levels of depressive symptoms and the risk of postpartum depression.[50] Pharmacologic interventions available include first- and second-generation antidepressants administered during pregnancy or immediately after delivery; however, due to the potential harms of fetal, neonatal, or infant exposure to medications, studies on their use as preventative agents have been limited among pregnant and postpartum women.[51, 52] Healthy lifestyle interventions such as exercise/physical activity-based interventions have also been evaluated and could be an alternative or adjunctive approach for preventing depression in postpartum women.[53]

Interventions to prevent PND may target specific populations, such as those who are at an increased risk for PND (e.g., adolescents, women with a history of depression or PND) and may vary by setting, interventionist (e.g., midwife, psychologist), intensity, format (e.g., group-based vs individual), and delivery (e.g., telephone-based, virtual). Interventions may be customized for women with different risk profiles, and clear guidance on the ideal method for determining which populations need specific interventions is not available in the evidence.[54] In the 9th Annual Report to Congress on High-Priority Evidence Gaps for Clinical Preventive Services, the USPSTF noted that identifying women at increased risk for PND and determining ways to improve the delivery of interventions represent evidence gaps that warrant high-priority efforts.[55]

Several publications have addressed disparities in access to and implementation of screening, diagnosis, and treatment of PND in populations disproportionately affected by PND. This literature has paid special attention to racially and ethnically diverse populations. Limited access, cultural stigma, and lack of awareness are some of the many barriers to equitable high quality mental health care.[56] Proposed solutions to narrow the gap include: implementing collaborative care models[57] and patient navigation services;[58] empowering community-based organizations to mobilize local resources to identify and support women at risk for PND;[59] training clinicians in administering EPDS and identifying clinic staff to support women in accessing and following through with referrals;[60] improving awareness of and addressing the impacts of social and structural determinants of health among racial and ethnically diverse women;[61] and promoting parental education addressing healthy and culturally appropriate ways to support infant development.[62]

Current Clinical Practice

In 2019, the USPSTF recommended that clinicians provide or refer pregnant and postpartum persons who are at increased risk of PND to counseling interventions (B recommendation).[63] The USPSTF concluded with moderate certainty that providing or referring pregnant or postpartum women at increased risk to counseling interventions has a moderate net benefit in preventing PND.[63] There are no other current guidelines on how to prevent PND; however, there are related guidelines on screening for and/or treatment of depression in pregnant and postpartum women, including national guidelines from the USPSTF,[64] the National Institute for Health and Clinical Excellence (NICE),[65, 66] the Australian Centre of Perinatal Excellence (COPE),[67] and the American College of Obstetricians and Gynecologists (ACOG).[68] Additionally, recommendations from several professional organizations similarly focus on the treatment and management of PND, including guidelines from ACOG,[69, 70] the American Psychiatric Association,[71] the Academy of Breastfeeding Medicine,[72] and the Registered Nurses' Association of Ontario.[73]

We found no studies that describe how current U.S.-based clinical practices approach PND prevention, but individual clinics and clinicians likely vary in their strategies and current practice. Strategies likely include some combination of close monitoring, referral to a counselor or social worker, collaborative care or case management models, or prophylactic use of antidepressants (particularly in women who stopped taking antidepressants during pregnancy despite experiencing symptoms). With regards to referrals to counseling, a recent systematic review found that almost three-fifths of women with positive depression screening results do not follow through with referral offers following PND screening.[74] Authors concluded that while the quality of the evidence on interventions to increase referral uptake was weak, referrals to an on-site assessment and treatment may improve uptake of referrals.[74] Given the low adherence in follow through of referral treatment services after screening and diagnosis, accessing preventive services in those at high risk would be expected to be even more limited.

From a policy perspective, several bills have been introduced by Congress to increase federal support for PND prevention over the past two decades. The Melanie Blocker-Stokes PPD and Research Act, later renamed the MOTHERS Act—was first introduced in 2003 and enacted in 2010 as part of the Affordable Care Act allocating federal funds for public and nonprofit health

care providers to enhance inpatient, outpatient, and home-based health and support services. The legislation also encouraged the U.S. Department of Health and Human Services to facilitate research into perinatal mood disorders and to launch a national awareness campaign. Furthermore, language from the MOTHERS Act was incorporated into the *Patient Protection and Affordable Care Act* Section 2952 (*Support, Education, and Research for PPD*),[75] which authorizes grants to support the establishment, operation, and delivery of effective and cost-efficient systems for providing clinical services to women with, or at risk for, PPD or psychosis.[3]

Additional resources and guidance on prevention of PND are available from the Substance Abuse and Mental Health Administration (SAMHSA), Health Resources and Services Administration Center for Integrated Health Solutions, which promotes the development of, and provides resources for, integrating primary and behavioral health services.[76] Additionally, the SAMHSA provides resources for locating mental health services.[77] A commonly cited CBT-based perinatal support program, the Mothers and Babies program, housed in the Center for Community Health at Northwestern University's Institute for Public Health and Medicine, provides web-based resources for families and clinicians.[78]

Previous USPSTF Recommendations

As mentioned previously, in 2019, the USPSTF recommended that clinicians provide or refer pregnant and postpartum persons who are at increased risk of PND to counseling interventions to prevent PND (B recommendation).[63] The USPSTF acknowledged, however, that there are no accurate screening tools available for identifying who is at risk of PND and who might benefit from preventive interventions. They advised that a pragmatic approach, based on the populations included in the commissioned systematic evidence review, would be to provide counseling interventions to women with one or more of the following risk factors: a history of depression, current depressive symptoms (that do not reach a diagnostic threshold), certain socioeconomic risk factors such as low income or adolescent or single parenthood, recent intimate partner violence, or mental health–related factors such as elevated anxiety symptoms or a history of significant negative life events.[63]

The USPSTF has a related recommendation on screening for depression in adults, including pregnant and postpartum persons (B recommendation).[64] The USPSTF also recommends screening for depression in adolescents aged 12 to 18 years (B recommendation) and found insufficient evidence to recommend for or against screening in children 11 years or younger (I statement).[79]

Chapter 2. Methods

Scope and Purpose

The United States Preventive Services Task Force (USPSTF) will use this report to update the previous B recommendation to provide or refer women at increased risk of PND to counseling interventions.[63] This systematic review is an update of the 2019 review and addresses the effectiveness of interventions to prevent PND in improving health outcomes in pregnant/postpartum women or their children. The review addressed how effectiveness trials identified participants who were described as being at increased risk for PND. The harms associated with these interventions were additionally examined.

Key Questions and Analytic Framework

With input from the USPSTF, we developed an Analytic Framework (**Figure 1**) and two key questions (KQs) to guide our literature search, data abstraction, and data synthesis.

Key Questions

1. Do interventions to prevent PND improve health outcomes in pregnant or postpartum women or their children?
   a. In trials that limit enrollment to women at increased risk, how are participants identified as being at increased risk of developing PND?
2. What harms are associated with interventions to prevent PND in pregnant or postpartum women?

Data Sources and Searches

We re-evaluated all studies from the 2019 review for inclusion in the current review and performed a comprehensive search for new literature. We searched the following databases for relevant English-language literature published between January 1, 2018, and January 2, 2024: MEDLINE, PsycINFO, CINAHL, and the Cochrane Central Register of Controlled Clinical Trials. A research librarian developed and executed the search, which was peer-reviewed by a second research librarian (**Appendix A**). We supplemented our searches with suggestions from experts and reference lists of previously published systematic reviews. We also searched ClinicalTrials.gov for ongoing trials and have conducted ongoing surveillance for relevant literature for all bodies of evidence through November 22, 2024. We imported the literature from these sources directly into EndNote® 20.5 (Thomson Reuters, New York, NY).

Study Selection

We developed specific criteria to guide study selection (**Appendix A Table 2**). Two reviewers independently screened all records based on the titles and abstracts, using prespecified inclusion and exclusion criteria as a guide. Subsequently, at least two reviewers assessed the full text of potentially relevant studies, including all the previously included studies. Disagreements were resolved through discussion and consensus. We kept detailed records of all included and excluded studies, including the reason for exclusion. A list of included studies is available in **Appendix C** and excluded studies can be found in **Appendix D.**

Eligible studies were required to have a primary aim of preventing PND. We excluded studies limited to screening for and treatment of depression during pregnancy or the postpartum period. Included studies were required to be conducted among pregnant or postpartum (≤1 year) women and could have specifically recruited those with mental health symptoms or disorders, except those limited to women with psychotic or development disorders (e.g., schizophrenia, pervasive development disorder). Studies limited to perinatal women currently experiencing or being treated for a depressive episode were excluded, as were those limited to women experiencing perinatal loss or preterm birth, women with infants in the neonatal intensive care unit, and those using assisted reproductive technology (e.g., IVF). Further, studies limited to spouses or domestic partners were excluded, however studies of couples where outcomes were measured in the nonbirthing partner were included as long as outcomes for the birthing partner were reported. We included studies that contained mixed populations that may have included a subset of these types of participants; however, we required that the number not exceed 50 percent of the total population to be considered for inclusion. Because we sought to include trials with participants without baseline depression diagnoses, we carefully examined participant baseline data. If the percentage of participants with major depressive disorder at baseline was not reported, we applied the following cut-points for the mean baseline scores of the entire study population and excluded trials where baseline scores were: EPDS ≥ 13 (high likelihood of diagnosis), BDI ≥ 17 (borderline clinical), BDI-II ≥ 20, HAM-D ≥15 (fully symptomatic), PHQ-9 ≥ 10 (moderate symptoms), CES-D ≥ 16 (possible depression).

We included the following interventions initiated during pregnancy for the first year postpartum: behavioral counseling, educational, or supportive interventions; physical activity; prophylactic psychotropic pharmacotherapy; infant/parent sleep promotion; complementary therapies (e.g., yoga, light therapy). Broad perinatal education interventions were included, as long as they had a component focused on preventing depression. For the key question addressing benefits of interventions (KQ1), we included English-language randomized controlled trials (RCTs, including cluster randomized trials) that included a usual care, no intervention, minimal control, attention control comparison group, or placebo for medication trials, and followed participants for at least 6 weeks. For the key question on harms of interventions (KQ2), we included RCTs and systematic reviews; there was no minimum followup requirement for studies of harms. For the harms of antidepressants, we only included harms of agents with evidence on efficacy (i.e., agents addressed in KQ1 trials). For KQ1 and KQ2, we excluded prospective and retrospective cohort studies, case control studies**,** time series studies, before-after studies with no comparison group, cross-sectional studies, case studies, case series, and editorials/commentaries.

We included interventions that were conducted in or recruited from primary care or a health care system or that could be implemented in or referred from primary care. This included interventions taking place in primary care clinics; prenatal clinics; obstetrics/gynecology clinics; pediatrics; family planning clinics; military health clinics; mental health clinics; and research clinics/offices, homes, or other community settings, including in-person, virtual, electronic, or computer-based interventions. We excluded studies conducted in correctional facilities, school classrooms, worksites, emergency departments, and the NICU. For the greatest applicability to U.S.-based practice, we included studies conducted in developed countries, as defined by "very high" development according to the 2021 United Nations Human Development Index.

To be included, studies must report depression diagnosis or depressive symptoms. Additionally, we abstracted other maternal health outcomes (e.g., suicide-related variables, anxiety incidence or symptoms, heath-related quality of life [including stress], functioning), infant/child outcomes (e.g., neglect or abuse; physical, social, emotional, and behavioral development; attachment), and harms (e.g., serious maternal or fetal/infant harms related to antidepressant use, NICU admissions). See **Appendix A Table 2** for a detailed list of outcomes that were abstracted. We included relevant outcomes reported at least 6 weeks after the baseline assessment or intervention initiation, although for harms we considered outcomes reported any time after the intervention was initiated.

In contrast to the previous review, this review did not include health systems interventions (e.g., health system implementation of quality improvement interventions to reduce PND) or supplements (since the previous review found scant data on the effectiveness of supplements).

Quality Assessment

Two reviewers applied USPSTF design-specific criteria[80] to assess the methodological quality of all eligible studies (**Appendix A Figures 1-3, Appendix A Table 3**). We assigned each study a quality rating of "good," "fair," or "poor." Discordant quality ratings were resolved by discussion or adjudicated by a third reviewer as needed. Studies rated as poor quality were not eligible for the review. Studies included in previous reviews were re-evaluated for inclusion and quality and previously included studies were not necessarily given the same quality ratings.

Good-quality RCTs were those that met all or nearly all of the specified quality criteria. Specifically, comparable groups were assembled initially and maintained throughout the study, followup was 90 percent or higher, assessment procedures were described and blinded if they involved direct interviews, randomization methods were described, and allocation was concealed. Fair-quality studies did not meet all criteria but did not have serious threats to their internal validity related to design, execution, or reporting. To be rated as poor quality, intervention studies generally have several important limitations, including at least one of the following risks of bias: very high attrition (generally >40%); differential attrition between intervention arms (generally >20%); lack of baseline comparability between groups without adjustment; or problematic issues in trial conduct, analysis, or reporting of results (e.g., possible selective reporting; inappropriate exclusion of participants from analyses; questionable validity

of allocation or assessment procedures).

Data Abstraction

For all included studies, one reviewer extracted key elements into standardized abstraction forms in DistillerSR (Evidence Partners, Ottawa, Canada). A second reviewer checked the data for accuracy. For each study, we abstracted general characteristics of the study (e.g., author, year, study design), clinical and demographic characteristics of the sample and setting (e.g., age, race/ethnicity, baseline clinical characteristics, setting, country), analytic methods, and results. For intervention characteristics, we abstracted detailed information about specific components: duration, number, and length of sessions; group or individual delivery of counseling; mode of delivery (i.e., in-person, telephone, electronic, or print); providers and provider training; setting; and adherence to the intervention. We abstracted the number of sessions and length of sessions according to what was planned (and not necessarily what was implemented).

Data Synthesis and Analysis

We synthesized the evidence using text, tables, and figures describing study, population, intervention characteristics, and outcomes for qualitative evidence synthesis. Along with forest plots of results, we examined the data for consistency, precision, and the relationship of effect size with key potential modifiers such as intervention type, population selection, intervention duration, and publication date.

Analyses were stratified by each study's population selection (history or symptoms of depression, other risk factors, or unselected) and grouped according to intervention type: behavioral counseling, educational, supportive; physical activity; prophylactic psychotropic pharmacotherapy; infant sleep; complementary therapies; and debriefing intervention (e.g., exploring the events and emotions of the birth experience).

We selected depression status as our primary outcome. When studies reported more than one related dichotomous depression outcome, we selected cumulative incidence for analysis if it was available, then prevalence if cumulative incidence was not available, or the proportion scoring above a cutoff on a symptom severity scale if neither cumulative incidence nor prevalence were available (**Appendix A Table 1**). When studies reported more than one continuous outcome, we preferentially selected the EPDS if it was available. For multiple timepoints, we selected the study's reported longest followup timepoint.

For both continuous and dichotomous outcomes, adjusted effect estimates reported by primary studies were used over unadjusted values. Crude effect estimates were calculated if between-group results were not reported. For pooling, we used the Restricted Maximum Likelihood model with the Knapp-Hartung confidence interval adjustment.[81, 82] We chose this method because there was a small number of trials to be pooled (fewer than 10 trials).[83] When studies included multiple intervention groups, we used the single most intensive or comprehensive intervention group per study in the meta-analysis. For dichotomous outcomes, we used study-reported adjusted risk ratios (RRs) if available and calculated unadjusted RRs if adjusted results

were not reported. For continuous outcomes, we used change from baseline in each group as the measure of analysis. We pooled between-group standardized mean differences (Hedges' g) because studies used a variety of specific measures.

The statistical heterogeneity of included studies was estimated with I^2 statistics and τ^2.[83] We generated funnel plots to evaluate small-study effects (a possible indication of publication bias) and performed the Egger's test (for continuous data) to assess the statistical significance of imbalance in study size as well as findings that suggest a pattern by study size.[84-86] We also performed sensitivity analyses to examine whether the overall findings were robust to meta-analysis method (fixed vs. random), removal of outliers, followup timepoints, and weighted mean differences. None of the results were sensitive to these modifications and are not discussed further.

We conducted meta-regression and subgroup analyses to examine factors associated with effect size for the dichotomous depression status outcome. Specifically, these factors were population selection, intervention duration, number of intervention sessions, publication year, age group, delivery format (any group sessions vs. none), conducted in the United States, period of intervention delivery (during pregnancy and postpartum, postpartum only, or pregnancy only). Meta-regressions were run for the behavioral counseling intervention which had more than ten trials.

We used Stata 18.0 (StataCorp LLC, College Station, TX). All significance testing was 2-sided, and results were considered statistically significant if the p-value was 0.05 or less.

Grading the Strength of the Body of Evidence

We graded the strength of the overall body of evidence for each key question. We adapted the Evidence-based Practice Center approach,[87] which is based on a system developed by the Grading of Recommendations Assessment,[88] Development and Evaluation (GRADE) Working Group. Our method explicitly addresses four of the five Evidence-based Practice Center-required domains: consistency (similarity of effect direction and size), precision (degree of certainty around an estimate), reporting bias (potential for bias related to publication, selective outcome reporting, or selective analysis reporting), and study quality (i.e., study limitations). We did not address the fifth domain—directness—as it is implied in the structure of the key questions (i.e., pertains to whether the evidence links the interventions directly to a health outcome).

Consistency was rated as consistent, inconsistent, or not applicable (e.g., single study). Precision was rated as precise, imprecise, or not applicable (e.g., no evidence). The body of evidence limitations field highlights important restrictions in answering the overall KQ (e.g., suspected reporting bias, lack of replication of interventions, nonreporting of outcomes).

We graded the overall strength of evidence as high, moderate, low, or insufficient.[87] These grades reflect our level of confidence in the estimate of effect (direction and magnitude) for benefit or harm – equating to our judgement as to how much the evidence reflects a true effect, our assessment of the level of deficiencies in the body of evidence, and our belief in the stability

of the findings. The strength of evidence grade does not reflect the actual magnitude of the effect (e.g., a "small" effect, "low" sensitivity).

"High" indicates high confidence that the evidence reflects the true effect, and that further research is very unlikely to change our confidence in the estimate of effect. "Moderate" suggests moderate confidence that the evidence reflects the true effect, and that further research may change our confidence in the estimate of effect and may change the estimate. "Low" indicates low confidence that the evidence reflects the true effect, and that further research is likely to change our confidence in the estimate of effect and is likely to change the estimate. A grade of "insufficient" indicates that evidence is either unavailable or does not permit estimate of an effect. We developed our overall strength of evidence grade based on consensus discussion involving at least two reviewers.

Contextual Questions

In addition to the systematically reviewed questions (KQ1-2), we also addressed contextual questions (CQs) to aid with the broader interpretation of the evidence. Contextual questions are important considerations that may not be readily answerable from the KQ evidence or RCT literature. Two CQs were prespecified in our Research Plan:

1. Are there reliable and valid prognostic tools for identifying women who are at increased risk of developing PND?
2. When is the most effective time to provide interventions to prevent PND?

Evidence for CQs was identified based on literature retrieved for the systematic search for KQs as well as targeted searches and scanning bibliographies of relevant articles. A best evidence approach was used to identify the most recent, applicable, and robust evidence. We primarily used existing systematic reviews and large well conducted studies applicable to the United States. For CQ1 on prognostic tools for identifying women at increased risk for PND, we focused on systematic reviews with meta-analyses that examined individual risk factors' associations with future PND, screening instruments' prognostic value when used during pregnancy to predict postpartum depression, and externally validated machine-learning models using EHR-derived pregnancy and delivery risk factors to predict postpartum depression. Likewise, for CQ2 on the timing of interventions provided, we focused on any individual studies or systematic reviews addressing the ideal timing of interventions to prevent PND. The results for CQ1 and CQ2 can be found in the discussion section of this report.

Expert Review and Public Comment

The draft Research Plan was posted for public comment on the USPSTF website from February 23, 2023, to March 23, 2023. In response to public comment, clarifications were made to the KQ1 (Benefits) list of included and excluded maternal health outcomes and the KQ2 (Harms) included study designs and minimum followup time requirement. Other minor clarifying revisions were made, however, the USPSTF made no other substantive changes that altered the scope of the review. This draft was reviewed by invited experts and USPSTF federal partners.

USPSTF and AHRQ Involvement

The authors worked with USPSTF liaisons at key points throughout the review process to develop and refine the analytic framework and key questions and to resolve issues around scope for the final evidence synthesis. AHRQ staff provided oversight for the project, coordinated systematic review, reviewed the draft report, and assisted in an external review of the draft evidence synthesis.

Chapter 3. Results

Included Studies

We screened 3,108 abstracts and 223 full text articles for inclusion (**Appendix B Figure 1**). We included 75 trials (reported in 100 publications);[51, 52, 89-186] 34 trials were newly identified[90-93, 96, 97, 106, 109, 113, 115, 117, 125, 128, 129, 135-137, 141, 142, 146-148, 150, 153, 155, 159, 163-165, 170, 173, 174, 176, 183] and 41 trials were carried forward from the previous review.[51, 52, 95, 99-102, 105, 108, 110, 111, 114, 118-122, 126, 130, 133, 134, 138, 143, 145, 152, 154, 156, 158, 160, 162, 166, 167, 169, 171, 172, 178, 180, 182, 184-186] Lists of included and excluded studies (with the reasons for exclusion) are available in **Appendix C** and **Appendix D**, respectively.

Nine trials that were previously included in the prior review were excluded in this update.[187-195] Four studies were excluded for intervention type due to the revised scope of the review (two of these trials were solely focused on provider education; two of these trials examined nutritional supplements).[187, 191, 192, 194] Four additional studies were excluded for quality upon further review, with two having high risk of bias in their randomization process[188, 195] and the other two excluded for high risk of bias in missing outcome data.[189, 193] Also upon further review, one trial was excluded for population as it was primarily comprised of perinatal women currently experiencing depression.[190]

Most of the included trials investigated the effectiveness of behavioral interventions, including counseling (k=27), followed by supportive interventions (k=15), education interventions (k=12), and physical activity interventions (k=7). The remaining behavioral interventions included trials looking at interventions of infant sleep (k=3), debriefing (k=2), and complementary interventions (k=7). Three trials investigated prophylactic psychotropic pharmacotherapy interventions (k=3). An overview of the included studies by intervention category is shown in **Tables 1-2**, **Figure 2**. Results are organized by intervention category.

KQ1. Do Interventions to Prevent Perinatal Depression Improve Health Outcomes in Pregnant or Postpartum Women or Their Children?

KQ1a. In Trials That Limit Enrollment to Women at Increased Risk, How Are Participants Identified as Being at Increased Risk of Developing Perinatal Depression?

Counseling interventions were associated with a reduction in risk across depression related outcomes. Educational and physical activity interventions both demonstrated statistically significant reductions in depression status. Physical activity interventions also showed statistically significant differences in the change in SMD for depressive symptoms; educational interventions, however, did not. Infant sleep, debriefing, complementary, and pharmacologic interventions had limited bodies of evidence, precluding conclusions about their effectiveness.

Evidence for pharmacotherapy was scant and included only two antidepressant trials and one ketamine trial. The one small tricyclic antidepressant trial and one small SSRI trial were both in women with a history of PND and demonstrated no difference in depression outcomes. The one pilot ketamine trial in unselected postpartum women undergoing cesarean section likewise showed no difference in depression.

Behavioral Interventions

Counseling Interventions

Summary of Results

We identified 27 trials (n=6,583) of behavioral counseling interventions to prevent PND, most commonly based on cognitive behavioral therapy and interpersonal therapy. Pooled results from 21 trials (n=4,974) demonstrated that behavioral interventions were associated with a 17 percent lower risk of depression at the longest followup, which ranged from 6 to 78 weeks postpartum (RR, 0.83 [95% CI, 0.72 to 0.95]; I^2=0.0%, **Figure 3 & 6**). Similarly, pooled results from 20 trials (n=2,880) demonstrated a small beneficial effect in depression symptoms at the longest followup, measured at 26 weeks gestation to 52 weeks postpartum (SMD, -0.35 [95% CI, -0.57 to –0.12]; I^2=84%, **Figure 4 & 7**). Qualitative analyses demonstrated that there is scant evidence on other outcomes; only one trial found statistically significant differences in mean difference in change scores for anxiety (MD in change, -24.72 [95% CI: -35.59 to -13.85)],[113] and no statistically significant differences in individual trials for stress or quality of life outcomes. There are no trials reporting other health outcomes or acute health care utilization.

Characteristics of Included Studies

We included 27 trials (in 35 articles) of counseling interventions (n=6,583, **Appendix E Table 1**).[92, 93, 95, 99, 104, 105, 108, 110, 113, 114, 123, 124, 130-135, 137, 139, 145-147, 154, 158, 159, 170-172, 177, 179, 182, 184-186] Of the 27 trials, 18 were included in the previous review[95, 99, 105, 108, 110, 114, 130, 133, 134, 145, 154, 158, 171, 172, 182, 184-186] and nine were newly identified.[92, 93, 113, 135, 137, 146, 147, 159, 170]

Study Characteristics

We identified five good-quality studies[146, 147, 158, 159, 186] and twenty-two fair-quality trials[92, 93, 95, 99, 105, 108, 110, 113, 114, 130, 133-135, 137, 145, 154, 170-172, 182, 184, 185] with a primary or secondary aim of examining the effectiveness of behavioral counseling interventions on depression outcomes during the perinatal period (**Appendix E Table 1**). All trials were RCTs; one was a cluster randomized trial. Most of the trials were conducted in the United States,[105, 110, 114, 133, 135, 145, 158, 159, 170-172, 184-186], two in France,[108, 154] two in Great Britain,[95, 99] three in Hong Kong,[134, 146, 147] one was conducted in Australia,[182] one in Hungary,[130] one in Sweden,[137] one in Thailand[92] one in Spain,[113, 154] and one in Türkiye.[93] The size of the trials (intervention plus control groups randomized for our analyses) ranged from 32[182] to 1438[130] participants. All but three trials[135, 171, 172] recruited from clinical settings like OB-GYN practices, primary care offices, or hospitals after delivery.

Population Characteristics

Most trials recruited participants who were pregnant;[92, 93, 95, 99, 105, 108, 110, 113, 114, 130, 133, 134, 137, 145-147, 154, 158, 159, 170, 171, 182, 184-186] one trial recruited participants during the postpartum period[135] and one trial recruited both pregnant and postpartum women[172] (**Appendix E Tables 1-2**). The gestational age at recruitment for those trials of pregnant women varied across the trimesters but most commonly included participants in the second or third trimester. Most trials recruited adults[92, 93, 99, 105, 108, 110, 113, 114, 130, 133-135, 137, 145-147, 154, 158, 159, 171, 182] three trials limited recruitment to adolescents only,[137, 147, 182] and three trials recruited both adults and adolescents, aged 15 or 16 years and older[95, 99, 170]. The mean age of the participants in the trials ranged from 16 years[158] to 33 years[146]. One third of the trials specifically recruited those with low SES.[108, 133, 145, 154, 170-172, 184-186] Twenty trials reported on participants educational attainment: two trials reported more than half of participants had less than a high school degree,[92, 108] the percent of participants with at least high school or high-school equivalent education, ranged from four percent[158] to 67 percent;[185] and the percent of participants who obtained a college degree ranged from 3[186] to 86[137] Thirteen trials reported current employment status, which ranged from 24 percent[172] to 100 percent.[137]

Six trials[95, 99, 108, 135, 137, 146] solely recruited primiparous women. Twelve of the 26 trials reported race/ethnicity.[95, 105, 110, 135, 158, 159, 170-172, 184-186 95, 105, 110, 135 170] In trials reporting race or ethnicity, percent of White participants ranged from 0[133] to 91[110]; 0 percent to 86 percent[172] identified as Black; 0 percent to 100 percent[133] were Hispanic or Latina. One US trial did not specify, but reported 70 percent of participants were racial or ethnic minority, and 12 percent were born outside the US.[170] Three trials reported that two percent of participants identified as Asian.[95, 105, 110, 133, 135, 145, 158, 159, 171, 172, 184-186]

Overall, the counseling trials mostly recruited those at increased risk of depression with control group depression rates much higher than the United States national average.[9] Twenty-one trials recruited those at increased risk for PND (**Figure 5; Appendix E Table 1**)[92, 93, 95, 99, 105, 108, 113, 114, 133, 135, 137, 145, 154, 158, 159, 170-172, 184-186]; while the remaining trials recruited a population unselected for depression risk[92, 110, 130, 134, 147, 182]. The most common depression risk factors used for recruitment were subclinical depression symptoms in nine trials,[108, 113, 133, 145, 154, 171, 172, 184-186] low SES in ten trials,[105, 113, 114, 135, 137, 145, 170-172] personal history of depression in seven trials,[99, 105, 114, 130, 134, 135, 145, 158, 159, 185] and two trials selected the population based on a factor like adolescent age or other.[158, 184] In the trials reporting a history of depression,[99, 105, 114, 130, 135, 145, 158, 159, 185] eight percent[130] to 100 percent[105, 135] reported prior depression (**Appendix E Table 2**).

Intervention Characteristics

The 27 counseling trials examined a heterogeneous group of counseling interventions. (**Appendix E Tables 3-4**) The vast majority of counseling interventions targeted the recruited perinatal participant; however, five interventions either targeted couples[110, 146, 147, 154] or encouraged partners to attend intervention sessions[130]. Thirteen of the intervention groups (in 11 trials) delivered sessions in the OB-GYN office or other medical setting;[95, 105, 110, 137, 146, 147, 154, 158, 159, 170, 185] six interventions were delivered at home,[93, 99, 108, 135, 171, 172] two were delivered virtually,[93, 113] and two interventions had at least one session delivered in the hospital after delivery.[158, 159] Nine studies did not report the setting where the intervention took place.[92, 114, 130,

[133, 134, 145, 182, 184, 186] Most commonly, psychologists, licensed social workers, psychiatrists, or other mental health providers administered the counseling intervention.[105, 108, 113, 130, 145, 170-172, 182] Other professionals responsible for the counseling included midwives,[99, 146, 147, 154] nurses,[93, 95, 99, 185, 186] health educators,[135, 137] and research staff with various training.[92, 133, 159, 184]

Intervention Components

The most common therapeutic approaches were Cognitive Behavioral Therapy (CBT)[92, 93, 95, 99, 105, 130, 133, 145, 147, 170-172] and IPT[114, 130, 134, 146, 158, 159, 184-186] (**Appendix E Tables 3-4**). Three trials used mindfulness,[105, 137, 182] and one used nondirective counseling[108]. Three interventions included couples counseling in combination with another therapeutic approach,[146, 147, 154] while one trial focused solely on this approach to promote healthy coparenting[110].

Additionally, twelve of the 27 counseling trials described an inclusion of a general prenatal and/or postpartum education component,[92, 93, 99, 110, 130, 137, 145, 158, 172, 185, 186] and thirteen trials included general education specific to postpartum depression.[92, 99, 108, 114, 130, 133, 145, 147, 158, 159, 172, 185, 186] Other educational subjects sometimes included parent training/attachment[99, 108, 137, 145, 172] or stress management.[105, 130, 172]

Intervention Format

Counseling interventions were primarily delivered in person but varied in format (**Appendix E Tables 3-4**). Six intervention groups delivered the counseling intervention to the individual in a 1:1 format only, five of which were delivered in person,[99, 108, 114, 159, 184] and one was delivered solely via phone[135]. Nine interventions delivered the counseling intervention to participants via group format only, seven of which were delivered solely in-person[95, 105, 110, 130, 134, 137, 182] and two delivered virtually through online group sessions[93, 113]. Twelve trials delivered the counseling intervention using a combination of group and individual formats which primarily included at least one in-person group session, followed by individual followup phone calls.[92, 133, 145-147, 154, 158, 170-172, 185, 186]

Intervention Intensity and Duration

The most common trial intervention periods lasted 3 to 6 months and ranged from 4 to 70 weeks (**Appendix E Tables 3-4**). The number of individual sessions varied but primarily fell within the range of 5 sessions in 5 weeks[114] to 14 sessions over 25 weeks[108]. The most common number of group sessions were 4 to 10 sessions and ranged from one in-person session[147] to 12 sessions[145]. Each session, group or individual, typically lasted 1 to 2 hours and ranged from 1 hour[158, 159, 184, 185] to 3 hours.[130, 147]

Intervention Adherence

Adherence was reported in most trials (24 of 27) but was variably defined as either the number of participants who completed a minimum number or all sessions, or as mean number of sessions attended (**Appendix E Table 4**). Generally, the average number of sessions attended were at least half of what was planned by the interventions; the range of mean sessions attended in the 15 trials[105, 108, 110, 113, 114, 133, 137, 145, 146, 170-172, 184-186] reporting this ranged from 50 percent[105, 108, 133, 145]

to 80 percent.[114, 146] Additionally, eight trials reported that at least 75 percent of participants received the allocated intervention, and one trial reported less than half of participants (45.6%) were categorized as intervention attenders.[95] Satisfaction was generally good in the seven trials reporting it.[93, 95, 99, 105, 145, 159, 182]

Control Groups

Most control groups received usual prenatal/postnatal care including access to general antenatal education classes (**Appendix E Tables 3-4**).[92, 93, 95, 99, 105, 108, 113, 133-135, 145-147, 154, 170, 182, 184-186] Four had attention controls,[130, 137, 158, 159] typically including routine prenatal and child-care information. Two received minimal intervention such as information packets on PND[171, 172] and two received no treatment.[110, 114]

Risk of Bias

Of the 27 counseling trials, five were rated good quality with low risk of bias in all domains (**Appendix A Figure 1**).[146, 147, 158, 159, 186] Twenty-two fair-quality trials[92, 93, 95, 99, 105, 108, 110, 113, 114, 130, 133-135, 137, 145, 154, 170-172, 182, 184, 185] had moderate risk of bias in one or two domains. Eleven trials had moderate risk of bias[92, 95, 99, 110, 114, 130, 133, 170, 171, 182, 185] and three had high risk of bias[105, 113, 172] for insufficient reporting of randomization or baseline confounding, three trials had moderate risk of bias for intervention deviations,[99, 171, 182] and two trials had moderate risk of bias for outcome measurement issues.[133, 137] Thirteen trials had moderate risk of bias[93, 108, 110, 114, 130, 133-135, 137, 145, 182, 184, 185] and three had high risk of bias for high and/or differential attrition and missing data.[154, 171, 172]

Detailed Results

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

The trials reported prevalence, incidence and/or diagnosis based on clinical interviews or symptom thresholds using a validated measurement (**Appendix E Table 5**). Six trials reported prevalence based on SCID-CV, SCAN, MMS, or structured clinical interview.[95, 99, 114, 133, 145, 170] Eleven trials reported incidence based on LIFE, MMS, SCID-KID, SCID-CV, or an unspecified screening instrument.[105, 133, 135, 145, 158, 159, 171, 172, 184-186] Six trials reported depression incidence/prevalence based on EPDS scores of ≥10 to 12.[95, 108, 134, 146, 147, 154] Four trials reported statistically significant results at the longest followup with RR point estimates ranging from 0.22 to 0.65.[105, 172, 185, 186] Most of the remaining trials generally reported nonsignificant relative risks favoring the intervention group, however six trials showed null results with point estimates near 1.0[130, 134, 146, 147, 158, 184] and one showed a nonsignificant relative risk favoring the control group.[135] Pooled results from 21 trials (n=4,974) demonstrated a 17 percent reduction in depression incidence/prevalence (RR, 0.83 [95% CI, 0.72 to 0.95]; I^2= 0.0%, **Figure 6**).

Depression Symptom Score Changes

Twenty trials reported symptoms based on a variety of scales including the EPDS, BDI, BDI-II, CES-D, and the Quick Inventory of Depressive Symptomatology-Self Report (QIDS-SR16) (**Appendix E Table 6**); these instruments have 27-point to 63-point ranges. Five trials reported small, statistically significant beneficial effects on depression symptoms.[92, 137, 154, 171, 172] The trial with the greatest effect reported a -8.50 point (95% CI, -10.52 to -6.48) mean difference in change in the 30-point EPDS scale between the intervention and control groups.[113] The remaining trials reported no statistically significant results with MD in change ranging from -0.01 (95% CI, -3.37 to 3.35)[185] in the 63-point BDI to -2.63 (95% CI, -5.35 to 0.09) in the 30-point EPDS.[105] Pooled results from 20 trials (n=2,880) demonstrated a small beneficial effect in depression symptoms at the longest followup, ranging from 26 weeks gestation to 52 weeks postpartum (SMD, -0.35 [95% CI, -0.57 to –0.12]; I^2=84%, **Figure 7**).

Subgroup Results for Depression Incidence Outcome

We performed meta-regression comparisons of subgroups and covariates to determine if treatment effectiveness varied by intervention or study characteristics, including participant recruitment based on PND risk (whether the study recruited a participant at increased risk of depression), setting (conducted in the United States versus other countries), year of publication, timing of the intervention (pregnancy vs. postpartum), format (group versus individual sessions), duration of the intervention, and number of sessions (**Table 3**). The most compelling of these subgroup analyses suggested that the trials selecting those participants at increased risk for PND demonstrated a greater reduction (31%) in depression incidence (p=0.002) than those that had unselected populations (5%) (**Table 3, Figure 8**). Similarly, trials conducted in the United States showed a greater reduction in depression incidence compared to those conducted outside the United States (p=0.003). However, only six counseling studies recruited unselected populations, and only one of these was conducted in the United States; thus, we could not clearly disentangle the effect of country and population risk. Counseling interventions that included group sessions were associated with reducing depression incidence (25%, p=0.008) compared to not having any group sessions (6%, p=0.564) (**Table 3, Figure 8**). The bivariate relationship (interaction) was not significant (p=0.125) likely due to power and small number of studies for detecting large effects. No associations or interactions were found in duration of intervention, number of sessions, year of publication, and timing of the intervention.

Small Study Effects

Test for small study effects was statistically significant for depression incidence (Egger's test of bias, p=0.015), suggesting the effectiveness of counseling was influenced by publication bias or differences in the way smaller studies were conducted. Visual inspection of funnel plots also revealed an imbalance of the distribution of study findings and standard errors consistent with the statistically significant test for small-study effects (**Appendix E Figure 1**). Because random effects meta-analysis modeling weighs smaller studies more heavily, they can exacerbate bias due to small-study effects.[196] We conducted sensitivity analyses using fixed effects meta-analysis (data not shown) that estimated the similar results as the random effects model. Thus, we did not find evidence that the random effects modeling approach resulted in overestimation of the effect

for depression incidence, possibly due to the lack of statistical heterogeneity seen for the outcome.

Other Outcomes

Anxiety Outcomes

Five trials reported outcomes related to anxiety.[93, 110, 113, 114, 182] Only one trial found a significant decrease in anxiety symptoms (using the State Trait Anxiety Inventory (STAI) questionnaire) at 26 weeks postpartum.[113] The remaining four studies found no statistically significant difference in the mean difference in change of anxiety scores (**Appendix E Table 7**).

Quality of Life Outcomes

Only one trial reported quality of life outcomes and there were no statistically significant differences in change of quality of life at the longest followup (**Appendix E Table 7**).[134]

Other Psychosocial Outcomes

Five trials reported other psychosocial outcomes, which include stress. [134, 135, 137, 154, 182] These trials found no difference in the change in mean differences in stress at the longest followup (**Appendix E Table 7**). Similarly, one trial reported no difference in general distress.[114]

Maternal and Infant Health Outcomes

Eight trials reported maternal and infant health outcomes. One trial[99] reported no statistically significant difference in child development outcomes based on the BSQ at 78 weeks postpartum (**Appendix E Tables 7 and 8**). Four trials[114, 134, 154, 184] reported no difference in various family function scales and three trials[93, 114, 185] reported no difference in maternal functioning. Two trials[154, 171] reported no difference in social support measures.

Acute Healthcare Utilization Outcomes

Acute healthcare utilization outcomes were rarely reported. One trial[186] reported that counseling was associated with reduced mental health treatment at 26 weeks postpartum, but this trend was not observed at the longest followup time point of 52 weeks (**Appendix E Tables 7 and 8**).

Supportive Interventions

Summary of Results

We identified 15 trials (n=6,237) of supportive interventions to prevent PND. Pooled results from eight trials (n=3,085) demonstrated no statistically significant association between supportive interventions and depression incidence at the longest followup, which ranged from 8 to 61 weeks postpartum (RR, 0.81 [95% CI, 0.57 to 1.16]; I^2=36%, **Figure 10**). Similarly, pooled results from six trials (n=1,058) demonstrated no statistically significant difference in the change in depression symptoms at the longest followup, measured at 38 weeks gestation to 61 weeks

postpartum (SMD, -0.63 [95% CI -1.61 to 0.35]; I^2=96%, **Figure 11**). Qualitative analyses demonstrated that there is scant evidence on other outcomes: there may be an improvement in anxiety outcomes, but evidence is limited and mixed; quality of life, functioning, child development, maternal-infant bonding, and healthcare utilization are reported in a few trials, showing no statistically significant benefit.

Characteristics of Included Studies

We included 15 trials (in 22 articles) of supportive interventions (n=6,237) (**Appendix F Table 1**).[91, 101-103, 106, 107, 116, 125, 126, 128, 129, 143, 144, 148, 161, 162, 164, 165, 168, 169, 180, 181] Of the 15 trials, seven were included in the previous review[101, 102, 126, 143, 162, 169, 180] and eight were newly identified.[91, 106, 125, 128, 129, 148, 164, 165]

Study Characteristics

We identified five good-quality studies[91, 125, 126, 164, 180] and ten fair-quality trials[101, 102, 106, 128, 129, 143, 148, 162, 165, 169] with a primary or secondary aim of examining the effectiveness of supportive interventions on reducing depression outcomes during the perinatal period (**Appendix F Table 1**). All trials were RCTs. Four were conducted in Great Britain,[126, 143, 162, 180] three were conducted in Australia,[125, 148, 169] three in Canada,[101, 102, 106] two in Türkiye,[128, 129] one each in Japan,[91] Singapore,[165] and Thailand.[164] No trials were conducted in the United States. The size of the trials (intervention plus control groups randomized for our analyses) ranged from 42[101, 164] to 1324[126] participants. Most of the trials recruited from clinical settings like OB-GYN offices[91, 126, 128, 143, 162, 164, 169] or the hospital/clinic post-partum; [101, 129, 148, 165] two trials recruited from the community,[106, 180] and one recruited from multiple settings.[125]

Population Characteristics

Just over half of the trials (8/15) recruited participants who were postpartum;[101, 102, 129, 143, 162, 164, 165, 180] the remaining seven recruited women who were pregnant[91, 106, 125, 126, 128, 148, 169] (**Appendix F Tables 1-2**). Gestational age at recruitment for those trials of pregnant women varied across the trimesters but largely were second or third trimester. Most trials limited recruitment to adults only, while two trials recruited participants aged 16 or 17 years and older[126, 143], and one trial limited recruitment to adolescents only (aged 10 to 19 years)[164]. The mean age ranged from 17 years[164] to 33 years.[91] Two specifically recruited populations with lower SES.[126, 180] Six of the trials had a majority of participants with college degrees.[91, 101, 106, 125, 148, 165] Less than half of the trials reported employment status, which ranged from 10 percent[129] to 77 percent.[125, 128] Marriage among participants was quite high, ranging from 78 percent[169] to 100 percent[91, 101] in the six trials reporting this demographic.[91, 101, 102, 106, 125, 148, 165, 169] Five trials[126, 128, 148, 162, 164] solely recruited primiparous women. Race and ethnicity were rarely reported. In those trials reporting race, 0 percent[148, 165] to 12 percent of participants were Black women and 12 percent[148] to 88 percent[165] were Asian women.

Eight trials recruited those at increased risk for depression based on risk factors such as subclinical depression symptoms, personal history of depression, adolescent age, or low SES (**Figure 9**).[101, 102, 126, 148, 164, 165, 169, 180] The most common risk factor for recruitment was based on subclinical depression symptoms (EPDS ≥ 9 or the antenatal screening questionnaire scale) in

five trials.[101, 102, 148, 165, 169] Only three trials reported a history of depression at baseline,[101, 102, 106] which ranged from 0 percent[129] to 69 percent (**Appendix F Table 2**).[102] Three trials reported a history of PND at baseline, ranging from 0[164] to 19 percent.[101] Four trials excluded those with depression diagnoses or elevated symptoms.[101, 102, 128, 129]

Intervention Characteristics

The fifteen supportive trial publications described a heterogeneous group of supportive interventions (**Appendix F Tables 3-4**). The vast majority of these interventions were focused on the postpartum period (10 trials[101, 102, 106, 129, 143, 148, 162, 164, 165, 180]), three trial spanned both the prenatal and postpartum periods,[91, 125] and only one trial was implemented only during pregnancy.[128] One trial included couples[164] or family.[164]

Eight trials were delivered virtually, either through phone calls or messaging[91, 101, 102, 106, 128, 165] or via web-based platform[125, 129]. Four interventions were delivered solely in the physical home of participants[126, 143, 148, 180] two occurred in the community,[162, 180] one was in a room at the hospital,[169] and one was delivered both in the hospital during the participants' stay and in their home[164]. In four of the trials, peers provided the supportive intervention.[148, 162, 164, 169] In six trials, midwives,[128, 148, 162, 164, 169] a support worker,[143] or nurse[180] administered the intervention. One trial provided consultations with experienced physicians or midwives if needed.[91] Three trials provided interventions that were self-administered via the web, email or text.[106, 125, 129]

Intervention Components

The group of supportive interventions provided depression-specific, as well as general parenting, well-being support (**Appendix F Tables 3-4**). Three of the trials' interventions involved paraprofessional support with or without home visits, general postpartum education, case management, and referrals.[126, 143, 180] Additionally, one trial focused on parenting and mother infant attachment during home visits.[148] Three trials provided depression-specific peer support[101, 102, 165] and two provided support groups with general postpartum education with or without additional electronic educational materials.[162, 169] One provided individual counseling focused on psychological wellbeing and parenting with depression specific elements.[164] Three provided parenting and well-being support through a module or an app and included general postpartum education.[106, 125, 129] The therapeutic approach was described in one trial as social support therapy.[164] Two interventions were access to telehealth counseling services for a specified period of time.[91, 128]

Intervention Format

The trials' interventions used several formats, including in-person group sessions, home visitations, telephone calls, or standardized web-based/text-based content (**Appendix F Tables 3-4**). Approximately half of the interventions provided were either phone-[91, 101, 102, 106, 128, 165] or web-delivered interventions[125, 129]. Of the phone-delivered interventions, three were communication with peers via calls or text,[101, 102, 165] two were communication with midwives or a physician,[91, 128] and one was delivered educational content via text[106]. Both web-delivered interventions were self-driven.[125, 129] Eight interventions (in 7 trials) were delivered in-person, either in groups[162, 169, 180] or to the individual participant[126, 143, 148, 164, 180]. Two of the in-person

home visit interventions also provided support via phone call,[126, 164] and another involved referral to community groups that provided a combination of services including drop-in sessions, home visiting, and/or telephone support[180].

Intervention Intensity and Duration

The intensity and duration of these interventions varied widely amongst the trials (**Appendix F Table 3**). The text messaging trials sent four reminder texts[125] to 53 standardized evidence-based text messages.[106] Many trials had two to three in-person support sessions.[148, 164, 169] The most intensive intervention was in a trial of up to 22 in-person supportive listening home visits.[180] Three virtual phone- or web-based interventions were available as needed by participants.[91, 128, 129]

Intervention Adherence

Adherence was reported by 10 trials but was variably defined and some of the interventions did not have standardized number of contacts (**Appendix F Table 4**). Three trials reported low adherence to group-delivered interventions: one trial reported 18 percent of those invited to groups attended any sessions[162], another reported only 19 percent used the community support groups[180], and the third trial reported 31 percent of participants attended all three group sessions[169]. Two supportive home-visiting interventions reported on adherence one trial reported only 15 percent received all ten of the planned home support visits[143], and the other reported 94 percent received at least one visit (of the planned 12) in this intervention group[180]. One virtually delivered intervention reported that just over half of participants used the web-program at least twice, but on average only three of the nine modules were viewed.[125] One trial reported that 94 percent of attendees attended the three intended sessions.[148] The remaining trials reported different measures of adherence.

Control Groups

Most control groups received usual prenatal/postnatal care, including access to general antenatal and postpartum education and two received a minimal control with general parenting education in print or text form.[125, 162]

Risk of Bias

Of the 15 trials, five were rated good quality with low risk of bias in all domains (**Appendix A Figure 2**).[101, 102, 106, 126, 129, 143, 148, 162, 165, 169] Eleven fair-quality trials had moderate risk of bias in one or two domains.[91, 101, 128, 143, 165] Three trials had moderate risk of bias for insufficient reporting of randomization or baseline confounding,[102, 162, 169] four trials had moderate risk of bias for intervention deviations,[106, 128, 129, 143, 148, 162, 169] and six trials had moderate[106, 129, 143, 148, 162, 169] or high risk[128] of bias for high and/or differential attrition and missing data. One had moderate risk of bias for selective reporting.[162]

Detailed Results

Depression Outcomes

Depression status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

Seven trials reported depression diagnosis based on symptom thresholds using EPDS >9 to 13 ,[91, 101, 126, 162, 164, 169, 180] and one trial reported diagnosis based on a clinical interview, SCID-CV[148] (**Appendix F Table 5**). Only two of the eight trials reported statistically significant findings (RR, 0.30 [95% CI, 0.10 to 0.92][101] and RR, 0.67 [95% CI, 0.48 to 0.93][91]) . Of the remaining trials, three reported nonsignificant results favoring the intervention group[126, 164, 180] and three reported nonsignificant results favoring the control group.[148, 162, 169] Pooled results from eight trials (n=3,085) demonstrated no statistically significant association between supportive interventions and depression at the longest followup, which spanned from 8 to 61 weeks postpartum (RR, 0.81 [95% CI, 0.57 to 1.16]; I^2=36%, **Figure 10**).

Depression Symptom Score Changes

Of the 13 trials that reported a change in depression score,[91, 102, 125, 126, 128, 129, 143, 148, 162, 164, 165, 180] only four reported a statistically significant difference between groups in depression symptom scores at one or more followup timepoints (**Appendix F Table 6**).[102, 128, 164, 165] For example, one supportive intervention trial in adolescents, reported a statistically significant mean difference in change in depression symptoms as measured by the EPDS scores associated with the supportive intervention at the longest followup (MD in change in EPDS of -9.30 (95% CI, -11.50 to -7.10), which translated to SMD -2.57, 95% CI -3.40 to -1.74)[164]. However, the pooled results from six trials (n=1,058) demonstrated no statistically significant difference in the change in depression symptoms at the longest followup, which ranged from 38 weeks gestation to 61 weeks postpartum (SMD, -0.63 [95% CI -1.61 to 0.35]; I^2=96%, **Figure 11**).

Subgroup Results for Depression Incidence Outcome

We performed an exploratory analysis to determine if the treatment effectiveness on depression incidence varied by participant risk status. Six of the trials were conducted in selected populations, while only two trials did not select for risk status, thus limiting data available for comparison. Confidence intervals are overlapping, and overall conclusions about subgroup effects are limited.

Other Outcomes

Anxiety Outcomes

Few trials reported anxiety outcomes and results were mixed. Only one trial reported on anxiety status and it found no significant difference in incidence of anxiety (PASS score of ≥ 26) between intervention and control groups at 17 weeks postpartum (RR 0.57 (95% CI, 0.29 to 1.09)[148] (**Appendix F Table 7**). Of the six trials that reported changes in anxiety symptom scores,[102, 106, 128, 129, 148, 165] three reported statistically significant differences in the mean

difference in change (MD in change –7.74, 95% CI, -14.51 to –0.97 in the 63 point PASS;[148] MD in change -3.90 [95% CI, -5.02 to -2.78] in the 21 point HADS),[128] and –7.74, 95% CI –14.51 to –0.91 in the 93 point PASS[165]) (**Appendix F Table 8**).

Quality of Life Outcomes

Few trials reported quality of life outcomes (**Appendix F Table 8**). Three trials[125, 143, 162] reported these outcomes based on various components of the SF-36 and the Psychosocial Super-dimension Scale, and none reported statistically significant differences between the intervention and control groups.

Other Psychosocial Outcomes

Only two trials reported other psychosocial outcomes, both reporting no difference in social support between treatment groups (**Appendix F Table 8**).[102, 143]

Maternal and Infant Health Outcomes

Two RCTs reported maternal and/or infant outcomes, all finding no effect between treatment groups.[126, 148] One trial reported no difference in child development outcomes (**Appendix F Table 8**).[148] Similarly, one trial reported no statistically significant difference in mother-infant bonding at 8 weeks.[126]

Acute Healthcare Utilization Outcomes

Three trials reported on acute healthcare use (**Appendix F Table 7**). All three trials reported no difference in infant emergency or inpatient services at followup, which ranged from birth to 20 months postpartum.[126, 143, 180] One of the same trials also reported no differences between groups on maternal use of emergency and inpatient services at up to 26 weeks postpartum.[143]

Educational Interventions

Summary of Results

We identified twelve trials (n=11,415) of educational interventions to prevent PND. Pooled analysis from seven trials (n=8,319) demonstrated that educational interventions were associated with a 21 percent reduction in depression status (RR, 0.79 [95% CI, 0.70 to 0.88]; I^2=0%, **Figure 12).** Pooled analysis from six trials (n=6,292) showed no difference in the SMD in change between the educational and control groups (SMD -0.04, 95% CI -0.16 to 0.09; I^2=32%, **Figure 13**). Qualitative analysis shows scant reporting of other outcomes: anxiety, stress, and child development outcomes were not statistically significant in the few trials reporting these outcomes. No trials reported acute health care utilization.

Characteristics of Included Studies

We included twelve trials (in 20 articles) of education-only interventions (n=11,415) (**Appendix G Table 1**).[96, 111, 112, 115, 118, 121, 122, 138, 141, 149, 150, 153, 157, 163, 174] Of the eleven trials, five trials were included in the previous review[111, 118, 121, 122, 138] and seven were newly identified.[96, 115, 141, 150, 153, 163, 174]

Study Characteristics

We identified four good-quality[96, 111, 138, 141] and eight fair-quality trials of interventions[115, 118, 121, 122, 150, 153, 163, 174] (n=11,415) with a primary or secondary aim of examining the effectiveness of educational interventions on reducing depression outcomes during the perinatal period (**Appendix G Table 1**). Three trials were conducted in the United States,[121, 122, 153] three in Denmark,[138, 163, 174] two in Australia,[111, 118] and one each in Norway,[115] Netherlands,[141] Chile,[96] and Japan[150]. Trial sizes ranged from 78[163] to 5017.[150] All but four RCTs recruited from primary care or obstetric offices: two from hospital delivery lists,[111, 190] one from an app subscriber list,[150] and one from online media and midwifery offices.[141]

Population Characteristics

Most trials recruited participants who were pregnant,[118, 138, 141, 150, 153, 163, 174] while four trials recruited participants during the postpartum period,[96, 111, 121, 122] and one trial recruited both pregnant and postpartum women[115] (**Appendix G Tables 1-2**). The gestational age at recruitment for those trials of pregnant women varied across the trimesters, but most commonly included participants in the second or third trimester. Postpartum trials began at delivery,[121, 122] less than 6 weeks postpartum,[111] or between 4 to 10 weeks postpartum[96]. All but one trial[111] limited recruitment to adults only; this trial did not report an age requirement for study entry but the mean age of 32 suggests majority of participants were adults. The mean age ranged from 23 years[153] to 33 years.[122] One trial specifically recruited those with low SES.[153] Most trials[115, 121, 150, 153, 163, 174] reported educational attainment: the percentage graduating from high school ranged from 10 percent[106] to 55 percent.[121] Six trials reported current employment status, which ranged from 51 percent[96] to 97 percent.[153] One trial was set in a residency clinic serving low-income women[163] and one specifically recruited those having complex psychological/psychiatric problems and or difficult social problems in need of a multidisciplinary team.[153, 174] The proportion of participants who were married or cohabitating ranged from 17 percent[150] to 99 percent.[150]

Six trials[96, 111, 118, 138, 153, 174] solely recruited primiparous women. Five of the 12 trials reported race/ethnicity.[118, 121, 122, 153] One trial recruited Black and Latina/Hispanic women;[121] one included those who self-identified as White, Asian or other non-Black and non-Latina.[122] In those trials reporting race, 38 percent[121] to 63 percent[153] identified as Black women; 62 percent in one trial were Hispanic/Latina.[121] One trial reported that all participants were Latin American and the great majority were Chilean,[96] and one trial took place in Japan.[150]

Overall, most participants in the education trials were at low risk for PND based on the depression status in the control groups. Three trials recruited those at increased risk for PND

(**Figure 9**),[121, 153, 163] and the remaining trials recruited a population unselected for depression risk. Two trials limited recruitment to participants with low SES,[121, 153] and one trial recruited those with other psychiatric history, not specific to depression[163]. Four trials reported a history of depression among participants at baseline,[111, 121, 122, 150] which ranged from 14 percent[150] to 22 percent (**Appendix G Table 2**).[122]

Intervention Characteristics

The twelve included RCTs represent a heterogeneous group of education interventions (**Appendix G Tables 3-4**). Most commonly, the education interventions were delivered in person: four trials were delivered at home or in a clinic,[111, 118, 141, 163] two delivered in hospital, post-delivery,[121, 122] one in a community setting,[174] and one setting was not reported[138]. The remaining four interventions were delivered either through virtual content[96, 115, 150] or mailed books,[153] and were self-directed. Providers of the in-person interventions varied widely and included nurses,[111, 163] midwives,[118, 138] research staff,[141] or other mental health professionals.[121, 122, 174]

Intervention Components

The education trials provided a variety of content as part of the intervention (**Appendix G Tables 3-4**). Majority of the trials (10 of 12)[96, 111, 115, 121, 122, 138, 141, 153, 163, 174] provided general prenatal or postpartum education as part of the intervention, and seven trials provided educational content specific to perinatal depression[96, 115, 118, 121, 122, 138, 150]. Three trials provided additional content on parenting and mother-infant attachment,[111, 163, 174] two also provided sleep advice,[141, 174] and one trial also provided information on stress management techniques.[150] Two trials delivered the structured psychoeducational intervention "What were we thinking? (WWWT)" to participants, though one was delivered in-person and one was delivered virtually.[96, 111]

Two interventions provided at least one home visit to participants[141, 163] and three trials provided a phone consult following the post-delivery education session[121, 122, 141]. Three trials provided virtual education materials,[96, 115, 150] one of which also provided an option for virtual individual or group support[96]. Two trials provided physical print materials. Two interventions provided at least one home visit to participants,[141, 163] two trials provided a followup phone call after in-person session,[121, 122] and two other trials delivered contents solely in a virtual setting.[115, 150]

Intervention Format

Intervention formats varied substantially amongst the trials (**Appendix G Table 3**). Five trials delivered an education intervention to the individual in-person,[118, 121, 122, 141, 163] three of which also provided a followup phone call,[121, 122, 141] and two of which included either the participants partner[163] and/or family[118] in the intervention. Three other trials were also delivered in-person, but in group format[111, 138, 174], with one trial delivering to groups of couples[111]. Three trials were self-driven, two of which were web/app-based,[115, 150] and one delivered by mailed booklets[153]. An additional trial was also web-based online modules, which could be self-driven, but virtual support, both individual and group formats were available for participants.[96]

Intervention Intensity and Duration

The intensity and duration of interventions varied widely amongst the trials and ranged from single informational session[118] to 44 internet-based sessions (10 minutes each) over nearly one year[115] (**Appendix G Table 3**). More intense in-person interventions included one trial with nine 90-minute home visits with a nurse[163] and another trial with twelve 120-minute group parent education sessions with a health visitor.[174] The total intervention duration across RCTs lasted from less than 1 day[118] to 75 weeks.[174]

Intervention Adherence

Adherence was reported by eight education intervention trials and was variably defined as the number of participants who completed all or a specified number of sessions, or as mean number of sessions attended (**Appendix G Table 4**). For most studies reporting adherence, it ranged between 70 to 98 percent adherence (either defined as percent of sessions attended or percent of participants attending the session);[96, 121, 122, 138, 141, 174] however, two of the internet and app-based intervention trials reported relatively low adherence (ranging from 33% to 37% completion of all modules or online sessions).[115, 150]

Control Groups

Control groups received usual care, attention, or minimal control (**Appendix G Tables 3-4**). Control groups typically received usual prenatal/postnatal care including access to general antenatal education classes.[111, 115, 138, 150, 163, 174] Four had attention controls[153] typically including noneducational books or minimal control,[121, 122] or waitlist.[141]

Risk of Bias

Four trials were rated as good quality and had low risk of bias in all domains (**Appendix A Figure 2**).[96, 111, 138, 141] Eight trials were rated as fair quality based on moderate or high risk of bias in two or more domains.[115, 118, 121, 122, 150, 153, 163, 174] Three trials were rated as moderate risk of bias risk for bias in the randomization domain.[121, 122, 163] One was rated high[150] for deviations from intended intervention. Seven were rated moderate risk for bias for missing data due to high attrition or lack of reporting on reasons for attrition.[115, 118, 121, 122, 150, 153, 174] Three trials were moderate risk of bias for outcome measurement,[118, 163, 174] and one moderate risk for selective reporting.[150]

Detailed Results

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

Seven trials reported depression incidence/prevalence based on EPDS scores of ≥10-12, 30-day prevalence of MDD, or incidence of a major depressive episode since baseline (**Appendix G Table 5**).[111, 115, 121, 122, 138, 141, 150] The trials reported nonsignificant relative risks in the 0.6 to 1.0 range. Pooled analysis from seven trials (n=8,319) demonstrated that educational interventions

were associated with a 21 percent reduction in depression status (RR, 0.79 [95% CI, 0.70 to 0.88]; I^2=0%, **Figure 12**).

Depression Symptom Score Changes

Only one of the individual education trials reported statistically significant differences in change in depression symptom scores between groups,[115] whereas three of the trials reported nonsignificant results favoring the control group[96, 141, 153] (**Appendix G Table 6**). Pooled analysis from six trials (n=6,292) showed no difference in the standard mean difference in change between the educational and control groups (SMD -0.04, 95% CI -0.16 to 0.09; I^2=32%, **Figure 13**).

Subgroup Results for Depression Incidence Outcome

We performed a subgroup analysis to determine if treatment effectiveness on depression incidence varied by participant risk status (**Figure 12**). Only one of the trials was performed in selected populations, while six trials did not select for risk status, thus limiting data available for comparison. Confidence intervals are overlapping, and overall conclusions about subgroup effects are limited.

Other Outcomes

Anxiety Outcomes

Anxiety outcomes were rarely reported in the education trials, which limited conclusions (**Appendix G Tables 7-8**). Two trials reported no significant differences in incidence of anxiety between intervention and control groups, with RRs ranging from 0.55 (95% CI, 0.23 to 1.29) using a cutoff of >8 on the HADS[141] and 1.18 (95% CI 0.42 to 3.31) using a cutoff of ≥ 10 on the GAD7[111] at the longest followup. Additionally, one trial reported a composite outcome of a diagnosis of depression, anxiety, or adjustment disorders at 26 weeks postpartum and found no significant differences between groups.[111]

Three trials[96, 111, 141] reported mean anxiety scores at baseline and followup; two of these trials reported the mean difference in change between the intervention and control groups, showing no statistically significant difference (ranging from MD in change, 0.39 [95% CI, -0.43 to 1.21] in the HADS[141] to 3.85 [95% CI, -4.61 to 12.31] in the PASS[96].

Quality of Life Outcomes

No trials reported quality of life outcomes.

Other Psychosocial Outcomes

Four trials[141, 153, 163, 174] reported stress outcomes based on the PSI or PSS (**Appendix G Table 8**). Only two[141, 174] of these trials reported a mean difference in change and both reported nonsignificant results (MD in change 1.87 (95% CI, -0.60 to 4.34) in the 66 point PSI and -0.15

(95% CI, -0.83 to 0.53) in the 90 point PSS). One trial reported no difference in general psychological distress.[150]

Maternal and Infant Health Outcomes

Only two trials reported maternal and/or infant health outcomes, both finding no difference between treatment groups. One trial[111] reported no differences in infant behavior or maternal-infant attachment. Another trial[163] reported no difference in child development based on the ASQ-SE at 39 weeks postpartum.

Acute Healthcare Utilization Outcomes

No education intervention trials reported acute healthcare utilization.

Physical Activity Interventions

Summary of Results

We identified seven trials (n=1,826) of physical activity interventions to prevent PND. Pooled results from six trials (n=1,574) demonstrated that exercise interventions were associated with a 52 percent lower risk of depression at the longest followup, which ranged from 39 weeks gestation to 43 weeks postpartum (RR, 0.48 [95% CI, 0.35 to 0.66]; I^2=0%, **Figure 14**). Pooled results from three trials (n=364) found a statistically significant difference in the SMD in change between the physical activity and control groups at the longest followup, spanning 39 weeks gestation to 38 weeks postpartum (SMD -0.46 [95% CI, -0.80 to -0.12]; I^2=0%, **Figure 15**). Qualitative analyses demonstrated that there is scant evidence from a single trial reporting no statistically significant difference in anxiety outcomes and few trials reporting stress outcomes, suggesting there may be an improvement in stress. One trial reports improvement in a quality-of-life scale. No trials reported health outcomes or acute healthcare utilization.

Characteristics of Included Studies

We included seven trials (reported in 7 publications) of physical activity interventions (n=1,826) (**Appendix H Table 1**).[90, 135, 152, 156, 167, 173, 176] Of the six trials, three were included in the previous review[152, 156, 167] and four were newly identified.[90, 135, 173, 176]

Study Characteristics

We identified one good-quality trial[156] and six fair-quality trials[90, 135, 152, 167, 173, 176] with the aim of examining the effectiveness of exercise interventions on improving depression outcomes during the perinatal period (**Appendix H Table 1**). All trials were randomized controlled trials. Three were conducted in Spain,[90, 156, 176] one was conducted in the United States,[135] and one each in Australia,[152] Norway,[167] and New Zealand[173]. The size of the trials (intervention plus control groups randomized for our analyses) ranged from 62[173] to 855[167] participants. Most of trials recruited from clinical settings like OB-GYN offices[90, 152, 156, 176] or the hospital/clinic,[167] and two trials recruited from the community.[135, 173]

Population Characteristics

Half of the trials recruited women who were pregnant[90, 156, 167, 176] and the remaining half recruited those who were postpartum[135, 152, 173] (**Appendix H Tables 1-2**). The gestational age at recruitment for those trials of pregnant women varied across the trimesters but largely were first and second trimester. All trials recruited adults only. The mean age ranged from 30 years[152] to 34 years[90]. Education and relationship status were rarely reported. Three of the trials[152, 173, 176] reported employment status which ranged from 9 percent[152] to 77 percent[176] employed. Five out of the six trials reported the percentage of the participants that were primiparious[90, 135, 152, 156, 167, 176], which ranged from 32 percent[135] to 72 percent.[176] Race was rarely reported, with only one U.S.-based trial reporting this demographic information.[135] In this trial, the majority of participants were White (73%), with 12 percent being Black, and 16 percent identifying as a different race, not captured in the demographic questionnaire.[135] Ethnicity was not reported in any of the included studies.

Overall, most participants in the physical activity trials were at low risk for PND based on the control group depression status. The majority of studies (5 of 7 trials) recruited unselected women and did not limit inclusion to those at increased risk for PND.[90, 152, 156, 167, 176] Two trials, however, recruited women at an increased risk of PND based on participants having a history of depression at baseline (but were not currently depressed)[135] or having subclinical depression symptoms at baseline (EPDS scores ≥ 10)[173] (**Figure 9; Appendix H Table 2**).

Intervention Characteristics

Although all six exercise intervention trials had physical activity as a component to the intervention, they differed in their approach and timing (**Appendix H Tables 3-4**). Four of the interventions focused on pregnant women[90, 156, 167, 176] and three trials focused on exercise in the postpartum period[135, 152, 173]. The majority of trials (4/7) delivered the intervention in other medical settings besides in hospitals, OBGYN or primary care clinics, or university health clinics.[152, 156, 167, 176] Two trials included home-based instructions either alone or to supplement in-person group sessions[135, 167], one delivered the intervention at the water sporting facilities at a university,[90] and one trial was done virtually and was self-driven[173]. Physical therapists[152, 167] or fitness instructors[156, 176] with or without assistance from a medical professional administered the interventions. Research staff[173] or health educators[135] administered the other two interventions. One trial did not report intervention provider(s).[90]

Intervention Format

Format and delivery of physical activity interventions varied across trials (**Appendix H Tables 3-4**). Four interventions provided group-based exercise sessions[90, 152, 156, 176] and one intervention provided group exercise sessions with additional instructions for individual home exercises[167]. All group sessions were held in-person. Two interventions were aimed at the individual, with one trial delivering telephone-based exercise support sessions[135], and the other trial providing home exercise equipment and access to virtual resources and online forum[173]. Both individually delivered exercise interventions and provided additional behavior change support[135, 173].

Intervention Components

The types of exercises varied across interventions but generally included a focus on aerobic, endurance, and/or strength and balance exercises (**Appendix H Table 3**).

Due to the nature of these interventions and the focus on physical activity, therapeutic approaches were rarely a component. In two studies, however, behavioral counseling was an aspect of the program (**Appendix H Table 3**). One trial solely provided telephone-based coaching to increase physical activity using strategies based on Social Cognitive Therapy and the Transtheoretical Model.[135] In the other trial, in addition to other components, the intervention included behavior change support such as goal setting, increasing knowledge, and social support.[173] Two of the group-based interventions delivered additional components to the exercise intervention: one provided education sessions following each of the exercise sessions[152], and the other provided dietary advice to participants in addition to the instructions for independent home exercises.[167]

Intervention Intensity and Duration

The intervention duration across the seven trials varied widely, with three trials lasting more than 20 weeks (23 weeks,[176] 26 weeks,[135] and 30 weeks[156]), one lasting 17 weeks,[90] two lasting 12 weeks,[167, 173] and one intervention for 8 weeks[152] (**Appendix H Table 3**). The number of sessions was also variable, ranging from eight[152] to 90[156] sessions. In all group exercise interventions, group sessions lasted 1 hour[90, 152, 156, 167, 176], with one providing an additional 30 minute educational session[152]. Length of individual sessions were not reported in two trials.[135, 173]

Intervention Adherence

Adherence was only reported in three (of the seven) studies,[167, 173, 176] and was generally moderate, ranging from 57 percent of participants adhering to the recommended amount of exercise[167] to 69 percent attending at least 50 sessions (**Appendix H Table 4**).[176] One trial captured intervention acceptability and reported that almost all participants found the program convenient, accessible, and flexible in implementing.[173]

Control Groups

Most control groups received usual prenatal/postnatal care including general advice around physical activity (**Appendix H Tables 3-4**).[90, 135, 156, 176] Two trials had an attention control, which included written materials focusing on general prenatal education topics.[152, 167] The remaining trial had a waitlist control.[173]

Risk of Bias

Of the seven trials, one was rated good quality with low risk of bias in all domains[156] (**Appendix A Figure 3**). The remaining six trials were rated fair quality and had moderate risk of bias in one or two domains.[90, 135, 152, 167, 173, 176] Three trials had moderate risk of bias for insufficient reporting of randomization or baseline confounding;[90, 152, 173] one trial had moderate risk of bias

for intervention deviations;[167] and two trials had moderate risk[135, 176] and one had high risk[152] of bias for high and/or differential attrition and missing data.

Detailed Results

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

Trials reported depression incidence based on CESD ≥16 or SCID or EPDS threshold of ≥ 10 to 16 (**Appendix H Table 5**).[90, 135, 152, 156, 167, 176] Two trials reported statistically significant results, one at 39 weeks gestation (RR 0.49 [95% CI, 0.25 to 0.97]),[156] and one at four weeks postpartum (RR 0.36 [95% CI, 0.22 to 0.60)[90]. Three trials reported nonsignificant results favoring the intervention group[152, 167, 176]and one trial reported an RR of 1.0 at its longest followup.[135] Pooled results from six trials (n= 1,574) demonstrated a 52 percent reduction in depression incidence (RR 0.48, 95% CI, 0.35 to 0.66) I^2=0%, **Figure 14**).

Depression Symptom Score Changes

Two trials reported statistically significant differences in SMD in change of depression symptoms (**Appendix H Table 6**).[152, 156] Pooled results from three trials (n= 364) showed a statistically significant difference in the SMD in change between the physical activity and control groups at the longest followup, ranging from 39 weeks gestation to 38 weeks postpartum (SMD -0.46 [95% CI, -0.80 to -0.12]; I^2=0%, **Figure 15**).

Subgroup Results for Depression Status Outcome

Only one trial selected for PND risk[135] while five trials recruited participants unselected for PND risk. Such limited data precluded conclusions about the effect of participant risk on depression status outcomes.

Other Outcomes

Anxiety Outcomes

Only one physical activity trial[173] reported anxiety outcomes, showing no difference between the exercise and control groups GAD7 scores at followup (MD, -0.10, 95% CI -1.90 to 1.70) (**Appendix H Table 7**).

Quality of Life Outcomes

Only one trial[152] reported a quality of life outcome, reporting a statistically significant mean difference in change in the 10-point Positive Affect Balance Scale (PABS) at postpartum week 20 (MD in change 1.39 [95% CI, 0.66 to 2.12]) (**Appendix H Table 7**).

Other Psychosocial Outcomes

One trial reported stress outcomes (**Appendix H Table 7**).[135] This trial found a statistically significant 1-point greater reduction in stress score on a 56-point PSS at 30 weeks postpartum (p=0.04), but no group differences at 43 weeks postpartum.[135]

Maternal and Infant Health Outcomes

No trials reported maternal and/or infant health outcomes**.**

Acute Healthcare Utilization Outcomes

No trials reported acute healthcare utilization outcomes.

Infant Sleep Interventions

Summary of Results

We identified three trials (n=980) addressing the effectiveness of infant sleep interventions to prevent PND (**Appendix I Table 1**). Overall, the body of evidence is limited by too few trials to make conclusions about sleep interventions' effects on depression outcomes. Only one trial examined sleep interventions on depression incidence, showing a statistically significant reduction, and three trials reported nonstatistically significant associations with changes in depression symptom scales. Qualitative analysis demonstrated that only one trial reported statistically significant improvements in anxiety outcomes. There were no trials reporting stress, health outcomes, quality of life, or acute healthcare utilization.

Characteristics of Included Studies

We included three trials (reported in 4 publications) of infant sleep interventions (n=980).[98, 119, 120, 178] All three trials were previously included in the prior review.

Study Characteristics

We identified three fair-quality trials that involved interventions focused on infant sleep (**Appendix I Table 1**). All trials were RCTs; two were conducted in Australia,[119, 120] while the remaining trial took place in the United States.[178] The size of the studies ranged from 54[178] to 770 participants, and all trials recruited participants from clinical settings such as primary care or at the routine antenatal visit.

Population Characteristics

One trial recruited pregnant adults, ranging from 28 to 38 weeks gestation,[178] while the remaining two trials recruited postpartum adults (recruitment ranged from 4[119] to 37[120] weeks postpartum (**Appendix I Tables 1-2**). The mean age of participants ranged from 30 to 34 years. In two of the trials, nearly all of participants were married or cohabitating (97-98%), vs. 34

percent in the remaining trial.[178] The majority of participants in two of the trials[119, 120] had at minimum a college degree (67% and 71%), while the remining trial reported the mean number of years of education was 15.[178] Two of the trials reported employment, which ranged from 30[120] to 54 percent[178]. The U.S.-based trial was the only trial to report on race and ethnicity, and reported over half of participants were Hispanic/Latina (59%), followed by Black or African American (19%), White (11%), and Asian (8%).[178]

Only one trial recruited women at increased risk for depression based on subclinical depression symptoms (score of >24 on the Cooper Predictive Index) (**Figure 9**).[178] None of the trials reported history of depression among the participants (**Appendix I Table 2**).

Intervention Characteristics

Intervention Components and Format

All trials included infant sleep education and advice components (**Appendix I Tables 3-4**). Additionally, each of the three included trials included at least one 1:1 session, and one trial additionally included a group session.[119] One trial delivered the intervention via a mailed 27-page booklet and DVD, with an optional individual telephone consultation and parent group session facilitated by a nurse or psychologist.[119] The other two trials delivered in-person, individual sessions to participants,[120, 178] one of which provided additional psychological support and mindfulness techniques delivered by a psychologist.[178]

Intervention Intensity and Duration

Two of the trials delivered 3 to 4 individual sessions (length NR),[120, 178] and the remaining trial provided one telephone call (length NR), as well as one 1.5 hour group session in addition to the mailed materials (**Appendix I Table 3**).[119] The duration of the interventions ranged from 12[119, 120] to 20[178] weeks, the latter of which could have spanned both the pregnancy and postpartum periods.

Intervention Adherence

Two of the trials reported adherence to the intervention (**Appendix I Table 4**).[119, 178] One trial reported that all families received mailed materials, 92.5 percent received telephone consultation, and half of participants attended the available group session.[119] Another trial reported that all participants received the entire treatment.[178]

Control Groups

The control groups for two of the trials received usual care,[119, 120] while the remaining trial's control group received a minimal intervention of two psychologist visits at 34 to 38 weeks gestation and 6 weeks postpartum (**Appendix I Tables 3-4**).[178] During these visits the psychologist discussed PND symptoms with participants and offered print materials of community support services and education on PND, and mental health referrals and clinical followup for all participants who reported symptoms of depression or anxiety.

Risk of Bias

The three included sleep intervention trials were rated fair-quality and were determined to have moderate risk of bias in at least one domain (**Appendix A Figure 3**). Two trials had moderate risk of bias for deviations from the intended intervention protocol,[120, 178] two had moderate risk of bias for missing outcome data,[119, 178] and one trial had additional risk of bias due to insufficient reporting of randomization or baseline confounding and for outcome measurement issues.[178]

Detailed Results

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

Only one of the three included trials reported data on depression cut-offs. This trial reported that participants in the intervention group were less likely to score above 9 on the EPDS when compared to the control group at 26 weeks postpartum (7.9% vs 12.9%, respectively [study reported OR 0.57 [95% CI, 0.34 to 0.94]) (**Appendix I Table 5**).[119]

Depression Symptom Score Changes

Three trials reported symptoms based on the EPDS, PHQ-9, or the HDRS. At the longest followup (ranging from 16 to 42 weeks postpartum), trials reported nonstatistically significant results, with MD in change ranging from -1.88 (95% CI, -3.96 to 0.20) on the PHQ-9[178] to -0.60 (95% CI, -2.02 to 0.82) on the EPDS[120] (**Appendix I Table 6**).

Other Outcomes

Anxiety Outcomes

One trial reported an anxiety outcome. This trial reported statistically significant beneficial effects on anxiety symptoms, with a -7.88 (95% CI, -13.81 to -1.95) MD in change in the 30-point Hamilton Anxiety Rating Scale at 16 weeks postpartum (**Appendix I Table 7**).[178]

Quality of Life Outcomes

No infant sleep trials reported quality of life outcomes.

Other Psychosocial Outcomes

No infant sleep trials reported this outcome.

Maternal and Infant Health Outcomes

No infant sleep trials reported health outcomes.

Acute Healthcare Utilization Outcomes

No infant sleep trials reported acute healthcare utilization outcomes.

Debriefing Interventions

Summary of Results

We identified two trials (n=2,786) of debriefing interventions, both showing no associations between debriefing interventions and PND incidence. In addition, one small trial reported no statistically significant difference in quality of life. No trials reported anxiety, stress, health outcomes, or acute healthcare utilization.

Characteristics of Included Studies

We included two trials (reported in 2 publications) of debriefing interventions (n=2,786) (**Appendix J Table 1**).[160, 166] Both of these trials were included in the previous report.[197]

Study Characteristics

We identified two fair-quality trials (n=2,786) of debriefing interventions, both conducted in Australia (**Appendix J Table 1**). [160, 166] The trials included 1,041 and 1,745 participants, respectively, who were recruited in the hospital following delivery.

Population Characteristics

One of the trials recruited postpartum adults 1 to 3 days after delivery,[160] while the other recruited postpartum adolescents and adults at least 1 day after operative delivery (**Appendix J Tables 1-2**).[166] Participant demographics were scarcely reported. Participants in both trials were unselected with regards to risk for depression, and neither reported history of depression.[160, 166]

Intervention Characteristics

Intervention Components and Format

The debriefing sessions provided participants with a single 1:1 in-person session to discuss their labor, birth, and postdelivery experiences (**Appendix J Tables 3-4**).[160, 166] One trial specifically indicated that the debriefing used the seven key stages from a critical incident stress debriefing model by Mitchell et al.[160, 198]

Intervention Intensity and Duration

In both trials, the intervention groups received a single, up to 60-minute standardized debriefing session in the hospital. The session was administered by a research midwife.[160, 166]

Intervention Adherence

Adherence was not reported in either included trial. In one trial, two-thirds of women rated the debriefing session as moderately or greatly helpful, 23 percent as minimally helpful, and 10 percent as not at all helpful.[160] In the other trial, 26 out of 463 (6%) rating the debriefing session as "unhelpful"; 200 (43%) rated it as "very helpful" and 237 (51%) as "helpful".[166]

Control Groups

The control group received standard postnatal care[160] or a pamphlet proving sources of assistance.[166]

Risk of Bias

The two debriefing trials were fair quality based on moderate risk for bias in one or more domains.[160, 166] Both trials had moderate risk of bias for intervention deviations, and one had moderate risk of bias for missing data.[160]

Detailed Results

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

Two trials reported the incidence of depression using SADs or a cut-off of EPDS ≥13, with both trials reporting nonsignificant results at 26 weeks and 56 weeks postpartum (**Appendix J Table 5**).[160, 166] One trial reported the incidence of depression in the groups at 17.3 percent in the intervention group versus 14.4 percent in the control group (RR 1.20 [0.89 to 1.62]).[166] The other trial reported incidence of 17.8 percent versus 18.2 percent depression in the intervention and control groups, respectively (RR 0.99 [0.88 to 1.11]).[160]

Depression Symptom Score Changes

Only one trial reported differences in depression scores,[166] finding that there was no difference between groups in mean EPDS at followup (7.2 in the intervention group vs. 6.7 in the control group, p=0.24, **Appendix J Table 6**).

Other Outcomes

Anxiety Outcomes

No debriefing intervention trials reported anxiety outcomes**.**

Quality of Life Outcomes

Only one debriefing intervention trial[166] reported SF-36 scores, with several components showing that women allocated to debriefing had poorer health status on seven of the eights

subscales, although the difference was significant only for role functioning (emotional) (**Appendix J Table 7).**

Other Psychosocial Outcomes

Only one trial reported other psychosocial outcomes.[160] This debriefing trial reported no statistically significant difference in PTSD diagnosis as per SADS instrument at one year postpartum (RR 0.71 (95% CI, 0.23 to 2.23) (**Appendix J Table 8**).

Maternal and Infant Health Outcomes

No debriefing trials reported health outcomes.

Acute Healthcare Utilization Outcomes

No debriefing trials reported acute healthcare utilization outcomes.

Complementary Therapy Interventions

Summary of Results

We identified seven trials (n=1,060) of complementary therapy interventions to prevent PND, which included mother-infant contact, yoga, stress management/breathing/muscle relaxation, and mindfulness interventions (**Appendix K Table 1**). Qualitative analysis showed that evidence is too limited to make conclusions about these complementary therapies' effects on depression outcomes. None of the trials reported quality of life, maternal/infant health outcomes, or acute healthcare utilization.

Characteristics of Included Studies

We included seven trials (reported in 8 publications) of complementary therapy interventions (n=1,060) (**Appendix K Table 1**).[97, 100, 109, 155] Of the seven trials, one was included in the previous review[100] and six were newly identified.[97, 109, 117, 136, 155, 183]

Study Characteristics

We identified one good-quality trial[155] and six fair-quality trials[97, 100, 109, 117, 136, 183]} that involved complementary therapies focused on preventing PND (**Appendix K Table 1**). All trials were randomized controlled trials. Two trials were conducted in the United States,[100, 136] and the remaining five were each set in different countries including Germany,[117] the Netherlands,[97] Türkiye,[109] Hong Kong,[183] and Taiwan.[155] The size of the trials (intervention plus control groups randomized for our analyses) ranged from 46[100] to 280[117] participants. All but one of the trials recruited from clinical settings such as OB-GYN offices and family health centers;[100, 109, 117, 136, 155, 183] two of which also recruited from the community through advertisements.[100, 183] The remaining trial recruited participants from a database of women who had expressed interest in

participating in scientific research studies, as well as throughout the community at events or shops focused on infants.[97]

Population Characteristics

All trials recruited participants who were pregnant (**Appendix K Tables 1-2**).[97, 100, 109, 117, 136, 155, 183] Gestational age at recruitment for those trials of pregnant women varied across the trimesters but largely was second trimester. All trials recruited adults only. The mean age ranged from 27 years[109] to 33 years.[117, 136, 155] One study specifically recruited populations with elevated depression symptoms[117] and another recruited those with elevated symptoms of both anxiety and depression symptoms[100] Race or ethnicity was reported in the two US-based trials, one with majority White participants (78%)[100] and the other majority Hispanic or Latina participants (95%).[136]All trials reported demographics related to education and the proportion of participants with college degrees ranged from 21[109] percent to 80 percent[100]. Employment was reported by six trials, and ranged from 13 percent[136] to 96 percent[100]. Majority of participants were either married or cohabitating (percent ranged from 66% to 100%) across the six trials which reported marital/cohabitating status.[100, 109, 117, 136, 155, 183] The percentage of primiparous women included in the trials varied and ranged from 29 percent[109] to 91 percent.[155]

Three complementary intervention trials recruited women at increased risk for depression (**Figure 9**).[100, 117, 136] One yoga intervention trial[100] and one mindfulness intervention trial[117] both recruited women at increased risk for depression based on subclinical depression symptoms (EPDS score ≥ or >9). The yoga trial also reported a history of depression at baseline, with 46 percent reporting having this history (**Appendix K Table 2**).[100] One parenting and mother-infant attachment intervention recruited participants of low SES, but baseline depression status or history was not reported.[136]

Intervention Characteristics

The interventions of the seven trials of complementary therapies were different in approach and focus (**Appendix K Tables 3-4**). Three trials involved training on mindfulness techniques,[117, 155, 183] and two of the four studies involved either yoga[100] or breathing and muscle relaxation techniques.[109] Of the remaining two parenting and mother-infant attachment intervention trials, one was an intervention that encouraged bonding through mother-infant contact,[97] and the other provided a home visit to train participants on the use of an ergonomic infant carrier given by the study[136]. All these trials were focused on pregnant women, with both mother-infant attachment intervention trials spanning both the prenatal and postpartum periods.[97, 136] Both the mother-infant attachment intervention trials[97, 136] and the breathing and relaxation intervention trial[109] were conducted within the participants home. The yoga intervention[100] and two of the mindfulness interventions[155, 183] took place outside the home for at least one training session, but also encouraged home practice. One mindfulness intervention was only available electronically[117].

Intervention Components, Format, Intensity, and Delivery

Mindfulness interventions. Three of the complementary intervention trials focused on mindfulness-based techniques (**Appendix K Tables 3-4**).[117, 155, 183] Two of the three mindfulness

trials delivered intense group training sessions with additional materials for independent practice at home.[155, 183] One of these trials comprised of eight, 180-minute weekly in-person sessions and one 7-hour day of silent meditation, along with audio recordings for practice at home. The intervention was based on the concepts of Mindfulness-Based Stress Reduction and combined this approach with traditional prenatal education topics.[155] The other group-based intervention delivered the Mindfulness-Based Childbirth and Parenting program, which was similar in intensity as it provided nine, 165-minute weekly in-person sessions and one half-day retreat, and also provided audio mindfulness practice for home study.[183] The remaining trial provided an electronic mindfulness-based intervention, in which the intervention delivered eight, 45-minute self-guided audio sessions to participants.[117]

Yoga and breathing/relaxation interventions. Two of the complementary trials focused on breathing/relaxation exercises and/or yoga (**Appendix K Tables 3-4**).[100, 109] One of these studies utilized stress management training, including breathing and relaxation exercises, in order to help participants cope with their stress during the prenatal period.[109] This intervention included three 30 to 40 minutes home visits. During these visits, participants were educated about stress and factors that can cause stress during pregnancy and were given methods of coping with stress using breathing and muscle relaxation exercises. These techniques were taught using demonstration and role-play techniques.[109] In the trial focusing on prenatal yoga sessions to reduce depression and anxiety symptoms, participants attended eight weekly, 75-minute, in-person sessions.[100] The yoga techniques were based on the traditional Ashtanga Vinyasa system of yoga, modified for pregnancy. Additionally, participants received an instructional video to use for home practice and were asked to record the frequency and duration of yoga practiced outside of classes provided in the study.[100]

Mother-child attachment interventions. Two of the complementary intervention trials focused on mother-infant contact (**Appendix K Tables 3-4**).[97, 136] One of the trials was focused on encouraging parental-child bonding through skin-to-skin contact.[97] Women in the intervention group were instructed to engage in at least one uninterrupted daily hour of skin-to-skin contact for the first 5 weeks after birth and used a logbook to document these interactions. The intervention included two home visits, one during the prenatal period, and one 5 weeks after birth. The purpose of these visits was to educate the participants on the importance of skin-to-skin contact, explain the study protocols, observe the mother-child interaction (during the 5-week visit), collect study samples, and answer any questions.[97] Another trial provided participants with an ergonomic carrier and instructions for use during a prenatal home visit with a community health worker to help increase mother to infant contact post-birth.[136]

Intervention Adherence

Adherence was only reported in three studies (**Appendix K Table 4**).[100, 136, 183] In the yoga trial, participants reported attending an average of six out of eight yoga classes and practicing yoga for an average of 93 minutes a week. Reported satisfaction in this study was rated as high.[100] One of the mother-infant contact trials reported 80 percent of participants used the carrier in the first six weeks postpartum.[136] One mindfulness trial reported the mean number of lessons attended was six (of the planned 9).[183]

Control Groups

The control groups in the complementary intervention trials were primarily usual prenatal/postnatal care including access to general antenatal education classes[97, 100, 109, 117, 155] or waitlist control [136] (**Appendix K Tables 3-4**) One of the mindfulness trials used an attention control and provided control group participants with nine weeks of Antenatal Childbirth Education and Support (ACES) classes.[183]

Risk of Bias

Of the four trials, one was rated good quality with low risk of bias in all domains (**Appendix A Figure 3**).[155] The remaining six trials were rated fair-quality and five were determined to have moderate risk of bias in one or two domains.[97, 109, 117, 136, 155] Two trials had moderate risk of bias for insufficient reporting of randomization or baseline confounding,[100, 109] one trial had moderate risk of bias for intervention deviations,[109] two had high risk of bias due to missing data[117, 183], and two trials had moderate risk of bias for outcome measurement issues.[97, 109]

Detailed Results

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

Two trials reported depression incidence, prevalence, or a depression cut-off outcome (**Appendix K Table 5**). One mindfulness trial[155] reported no statistically significant association between the intervention and depression incidence/prevalence as defined by EPDS ≥13 at 36 weeks of pregnancy (RR 1.20 [95% CI, 0.62 to 2.34)]. One parent-infant attachment trial reported also reported no statistically significant effect on depression status defined as EPDS >9 (RR 0.54 [95% CI, 0.14 to 2.11]).[136]

Depression Symptom Score Changes

Four complementary therapy trials reported mean difference in change in depression scores (**Appendix K Table 6**). The mindfulness trial reported a statistically significant difference in the mean difference in change in depression symptoms based on EPDS scores at 36 weeks of pregnancy (MD in change -2.53, 95% CI, -4.37 to -0.70).[155] Three trials, however, reported no significant difference in the mean change in depression symptoms based on the EPDS or BDI[97, 100, 109] with mean differences ranging from -0.62 (95% CI, -2.35 to 1.11) on the 63-point BDI[109] to -1.05 (95% CI, -2.46 to 0.36) on the 30-point EPDS at the longest followup.[97] Two trials reported significant results with different measurements of depression symptoms: Parenting/mother-infant attachment trial presented a likelihood effect with beta coefficient of -0.54 (95% CI: -1.05 to -0.02);[136] and mindfulness trial presented a mean difference of CESD scores between the intervention and control, -3.10 (95% CI, -5.70 to -0.50)[183].

Other Outcomes

Anxiety Outcomes

Two trials[97, 100] (the skin-to-skin and yoga trials) reported no statistically significant difference in mean difference in change between the intervention and control groups using the STAI-T and STAI anxiety scales (**Appendix K Table 7**). Two mindfulness trials[117, 183] reported significant differences using STAI scale: one trial stated a significance difference ($p<0.001$) at 22 weeks of postpartum, but did not present the data,[117] and the other presented a significant mean difference between the intervention and control group, -4.50 (95% CI: -7.40 to -1.70) at 26 weeks of postpartum[183].

Quality of Life Outcomes

One mindfulness trial reported a significant mean difference in mental health-related quality of life as measured by the Mental Health Component of the Short-Form-12 at 26 weeks postpartum (**Appendix K Table 7**).[183]

Other Psychosocial Outcomes

Of the four complementary trials[97, 109, 155, 183] reporting stress, only one mindfulness trial[155] reported a statistically significant difference between treatment groups in stress at the longest followup time point using the PSS (MD in change -2.79 (-4.94 to -0.69) (**Appendix K Table 7**).

Maternal and Infant Health Outcomes

No trials reported health outcomes.

Acute Healthcare Utilization Outcomes

No trials reported acute healthcare utilization outcomes.

Prophylactic Psychotropic Pharmacotherapy Interventions

Antidepressant Interventions

Summary of Results

We identified two trials (n=80) of antidepressant pharmacologic interventions to prevent PND. There were too few trials of these interventions to conduct meta-analyses. Qualitative results showed no difference in depression recurrence at up to 20 weeks postpartum for nortriptyline or sertraline. Neither trial reported outcomes of anxiety, quality of life, psychosocial outcomes, maternal/infant health outcomes, or acute healthcare utilization.

Characteristics of Included Studies

We included two trials (reported in 2 articles) of antidepressant interventions (n=80).[51, 52] Both trials were included in the prior review.

Study Characteristics

We identified two small fair-quality trials of chemoprevention of PND (n=80) with a primary aim of examining the effectiveness of pharmacologic interventions on depression outcomes during the perinatal period (**Appendix L Table 1**).[51, 52] The trials were randomized controlled trials that assessed the effects of nortriptyline (n=58)[51] and sertraline (n=22)[52]. Both trials were conducted in the United States.[51, 52]

Population Characteristics

In the two antidepressant trials, women with a history of PND in the previous 5 years were recruited; one study recruited from obstetrics clinics[51] and the other from psychiatric outpatient program[52] (**Appendix L Tables 1-2**). Both trials recruited participants with history of depression (**Figure 9**) but excluded women with current depression. Participants in one trial had a mean age of 32 and were all White and of middle to high SES.[52] Demographics were not reported in the other trial.[51]

Intervention Characteristics

Intervention Groups

The two antidepressant trial intervention groups received either an oral antidepressant (20-75 milligrams [mg]/day of nortriptyline[51] or 25 to 75 mg/day of sertraline[52]) for 17 weeks, starting in the hospital as soon as possible after birth, followed by a 3-week tapering phase (**Appendix L Tables 3-4**). In the nortriptyline trial, the initial dose was 20 mg/day and was increased daily as follows: 30, 40, 50, 50, 60, and 70 mg/day, and continued at 75 mg/day through day 21.[51] The serum drug levels on day 14 were used to determine the dose from day 22 forward. A nonblinded medical monitor used the serum drug levels and side effects data to adjust the dosage so that nortriptyline level was 50-150 ng/mL, with the optimal dose defined as 80-120 ng/mL. At week 17, the dose was tapered at a rate of 33 percent per week across 3 weeks and treatment was discontinued at week 20.[51] In the sertraline trial, the initial dose was 50 mg/day, however that was reduced to 25 mg/day for 4 days due to reported side effects.[52] Thereafter, the dose was increased to 50 mg/day through week 4, then to 75 mg/day during weeks 5-17. At week 17, the dose was tapered over 3 weeks and discontinued at week 20.[52]

Control Groups

In both trials, the control groups received placebo.[51, 52]

Intervention Adherence

In the nortriptyline trial, five participants were nonadherent based on serum levels <50 ng/mL (**Appendix L Table 4**).[51] In the sertraline trial, all participants were identified as adherent based on serum levels at 8 weeks.[52]

Risk of Bias

The two trials were rated as fair quality based on moderate or high risk of bias in two or more domains. (**Appendix A Figure 3**) The two antidepressant trials had high risk of bias in the randomization process domain. One trial had moderate risk of bias[51] and one had high risk of bias[52] in the missing outcome data domain. These trials were all small in size, thereby limiting power to detect differences in depression outcomes.

Depression Outcomes

Depression Status: Incidence, Prevalence, And Self-Administered Questionnaire Cut-Off

Both antidepressant trials reported depression recurrence but did not report which instrument was used to diagnose this outcome (**Appendix L Table 5**). The nortriptyline trial reported no difference in depression recurrence at 17 weeks postpartum (23.1% v 24.0%; RR 0.96 [0.36 to 2.59]).[51] The sertraline trial reported no difference in depression recurrence at 20 weeks postpartum (21.4% v 50.0% RR 0.43 [95% CI, 0.13 to 1.45]).[52]

Depression Symptom Score Changes

Neither antidepressant intervention trial reported depression symptom score changes.

Other Outcomes

Anxiety Outcomes

Neither antidepressant intervention trial reported anxiety outcomes.

Quality of Life

Neither antidepressant intervention trial reported quality of life outcomes.

Other Psychosocial Outcomes

Neither trial reported psychosocial outcomes.

Maternal and Infant Health Outcomes

Neither antidepressant intervention trial reported maternal or infant health outcomes.

Acute Healthcare Utilization Outcomes

Neither antidepressant intervention trial reported acute healthcare utilization outcomes.

Other Pharmacologic Interventions

Summary of Results

We identified one small pilot ketamine trial reporting no difference in mean changes in depression symptom scores between the intervention and control group at 6 weeks postpartum (MD in change for subcutaneous ketamine [IG1], -1.13 [95% CI, -6.98 to 4.72]; intravenous ketamine [IG2], -0.51 [95% CI, -5.22 to 4.20]). The trial also reported no significant mean difference in change in anxiety scores at the same followup timepoint. The trial did not report outcomes of quality of life, psychosocial outcomes, maternal/infant health outcomes, or outcomes of acute healthcare utilization.

Characteristics of Included Studies

We included one pilot trial (reported in 1 article) of other pharmacologic interventions examining the effect of ketamine on preventing PND (n= 25). This trial was newly identified since the previous review.[142]

Study Characteristics

We identified one small fair-quality trial investigating the efficacy of both subcutaneous and IV delivery of ketamine (n=25) for the chemoprevention of PND (**Appendix L Table 1**). This trial was conducted in the United States.[142]

Population Characteristics

The one ketamine intervention trial recruited women 18 to 45 years of age unselected for risk of depression who were scheduled for cesarean delivery under neuroaxial anesthesia at a tertiary hospital.[142] The mean age of participants was 32 years, and participants were majority White (70%). Seventeen percent had a history of depression (**Appendix L Tables 1-2**).[142]

Intervention Characteristics

Intervention Groups

The ketamine trial compared two ketamine interventions varying in delivery mode, with placebo (**Appendix L Tables 3-4**).[142] All participants received spinal anesthesia with 1.6 – 1.8 ml of 0.75 percent hyperbaric bupivacaine, 15 mcg of fentanyl and 100 mcg of preservative-free morphine; however, one intervention group received an additional subcutaneous injection of ketamine (0.5mg/kg) and normal saline (40mL) IV over 40 minutes. The second intervention group, in addition to the spinal anesthesia, received intravenous ketamine (0.5mg/kg in 40mL) and a subcutaneous injection of normal saline (0.5-1.0mL).

Control Groups

The control group in this trial received the same neuraxial anesthesia as the intervention group (spinal anesthesia with 1.6 – 1.8 ml of 0.75% hyperbaric bupivacaine, 15 mcg of fentanyl and 100 mcg of preservative free morphine) plus saline via subcutaneous injection and intravenous drip.[142]

Intervention Adherence

The included trial did not report adherence, but it presumed to be 100 percent, given the mode of administration.[142] The trial also found no evidence of intolerability of ketamine.

Risk of Bias

The ketamine intervention trial was rated as fair quality based on moderate or high risk of bias in two or more domains (**Appendix A Figure 3**). The trial had moderate risk of bias in the randomization process domain and in the missing outcome data domain. The trial was small in size, thereby limiting power to detect differences in depression outcomes.

Depression Outcomes

Depression Status: Incidence, Prevalence, and Self-Administered Questionnaire Cut-Off

The trial did not report differences in depression incidence, prevalence, or cut-off outcomes.

Depression Symptom Score Changes

The ketamine trial[142] reported no difference in the mean difference in change in EPDS scores between the intervention and control groups at 6 weeks postpartum (IG1: MD -1.13 [-6.98 to 4.72]; IG2: -0.51 [-5.22 to 4.20]) (**Appendix L Table 6**).

Other Outcomes

Anxiety Outcomes

The included trial[142] reported an anxiety outcome, reporting no statistically significant difference in mean difference in change in the GAD-7 in either intervention group at six weeks postpartum (IG1 MD in change 0.41 [95% CI, -5.86 to 6.68]; n=15; IG2 MD in change –0.98 [95% CI, -5.13 to 3.17]; n=15) (**Appendix L Table 7**).

Quality of Life

The ketamine trial did not report quality of life outcomes.

Other Psychosocial Outcomes

The ketamine trial did not report any relevant psychosocial outcomes.

Maternal and Infant Health Outcomes

The ketamine trial did not report any maternal or infant health outcomes.

Acute Healthcare Utilization Outcomes

The ketamine trial did not report acute healthcare utilization outcomes.

KQ2. What Harms Are Associated With Interventions to Prevent Perinatal Depression in Pregnant or Postpartum Women?

Summary of Findings

Harms were sparsely reported across the included intervention trials. Of the behavioral interventions, three counseling trials[93, 137, 159] and one supportive intervention trial[148] reported harms, finding no statistically significant differences between treatment groups. All three included prophylactic psychotropic pharmacologic intervention trials reported harms outcomes,[51, 52, 142] finding no serious harms. No other intervention trials reported on harms.

Description of Included Studies

The intervention characteristics of the counseling, supportive, and prophylactic pharmacologic trials that reported harms are described previously under KQ1 results.

Risk of Bias

The risk of bias of the counseling, supportive, and prophylactic pharmacologic trials that reported harms are described previously under KQ1 results.

Detailed Results

Counseling Interventions

Three counseling intervention trials (n= 484) reported harms outcomes (**Appendix E Table 9**).[93, 137, 159] Two trials reported no serious adverse events in either the intervention or control groups[93, 159] and the remaining trial reported withdrawals due to adverse events, which were not statistically significantly different between the intervention and control groups (1/75 withdrew due to increased anxiety in the intervention group and 0/89 withdrew in the control group; RR 3.55, 95% CI, 0.15 to 85.94]).[137]

Supportive Interventions

One supportive intervention trial (n=111 [n=74 with adverse event data])[148] reported no adverse events in either intervention or control groups (**Appendix F Table 9**).

Complementary Interventions

Two mindfulness intervention trials reported no adverse events in either intervention or control groups (**Appendix K Table 8**).[117, 183]

Prophylactic Psychotropic Pharmacotherapy Interventions

The two antidepressant trials[51, 52] and one ketamine trial reported harms[142] at 6 to 20 weeks postpartum followup (**Appendix L Table 8**). The nortriptyline trial reported similarly low withdrawals due to adverse events in both groups (1/28 vs 1/28; RR 1.00, 95% CI, 0.07 to 15.21).[51] In this trial, constipation was more common in the intervention group (20/26 vs 5/25; RR 3.85, 95% CI 1.71 to 8.66). Additionally, it was reported in the nortriptyline trial that conversion to mania occurred in one participant in the intervention group (1/28 vs 0/28; RR 3.00, 95% CI 0.13 to 70.64).[51]

The sertraline trial reported three withdrawals in the intervention group and none in the control group (3/14 vs. 0/8; RR 4.20, 95% CI, 0.24 to 72.29).[52] Conversion to mania occurred in one participant in the intervention group verse none in the control group (1/14 vs. 0/8; RR 1.80, 95% CI 0.08 to 39.64). Further, all participants in the intervention group reported drowsiness (14/14 vs 4/8; RR 1.93, 95% CI, 1.00 to 3.74), and higher dizziness was reported as well, although there were no statistically significant differences between the intervention and control groups (dizziness: 8/14 vs 1/8; RR 4.57, 95% CI, 0.69 to 30.22).[52]

The ketamine trial reported that no severe adverse events occurred in either intervention group or control group at 6 weeks postpartum.[142] At the same followup, 75 percent of participants in either intervention group reported experiencing at least one adverse effect, which could include nausea, vomiting, shivering, sedation, blurred vision, diplopia, dizziness, anxiety, pruritus, and euphoria, amnesia, hallucinations, or nystagmus; however, all participants in the control group reported at least one adverse event as well. There were no statistically significant differences in hemodynamic adverse events, however the intervention groups had a nonstatistically significant higher prevalence of bradycardia.

Chapter 4. Discussion

Summary of Evidence

We conducted a systematic review to support the USPSTF in updating its recommendation on PND prevention. A summary of evidence for each intervention type appears in **Table 4**.

The most robust evidence base supporting PND prevention exists for behavioral counseling interventions, most of which were based on depression-focused CBT or IPT approaches in women at increased risk for PND. We observed consistent benefits in both changes in depression status at 6 to 78 weeks postpartum (21 RCTs, n=4,974; RR 0.83 [95% CI, 0.72 to 0.95]; I^2=0.0%) and in depression symptoms at 26 weeks gestation to 52 weeks postpartum (20 RCTs, n=2,880; SMD -0.35 [95% CI, -0.57 to –0.12]; I^2=84%). This corresponds to a number needed to treat (NNT) of 27 (95% CI, 17 to 84), assuming a 17 percent baseline risk of developing PND (the rate of PND in WIC participants in 2018 PRAMS data) (**Table 5**).[9]

Education and physical activity interventions also demonstrated statistically significant reductions in depression status; however, only physical activity interventions were associated with significant differences in depressive symptoms following the intervention. Other intervention categories, including infant sleep, debriefing, complementary, and prophylactic psychotropic pharmacologic interventions had limited bodies of evidence, precluding conclusions about their effectiveness. While pharmacologic interventions are important for treatment of PND,[199] the study of their use as preventive agents has been surprisingly limited to one TCA trial and one SSRI trial, both showing null effects. The one small ketamine trial likewise showed no depression benefit. Given the potential for harms from pharmacologic agents, many pregnant women may be hesitant to use these agents in the absence of ongoing depression, unless they have had prior episodes of moderate to severe depression.

Comparison With Other Reviews

Our findings are generally consistent with the findings of other recent systematic reviews. A 2023 umbrella review of reviews on the effectiveness of interventions to prevent PND included 19 systematic reviews and meta-analyses evaluating 152 RCTs (n=83,408) and concluded that psychological and physical activity interventions had small-to-medium effects on PND symptom reduction (SMD 0.28 for psychological and SMD 0.43 for physical activity).[200] The authors stated that most of the included systematic reviews were rated as low or critically low quality (based on AMSTAR-2) and overall strength of evidence was low. A 2021 review of systematic reviews[201] evaluating all types of interventions to prevent PND identified six systematic reviews which included 65 studies (N=30,022).[48, 53, 54, 202-204] Most of the included studies examined the effectiveness of psychosocial interventions. The median effect size for preventive interventions for depressive symptoms in women in the prenatal or perinatal period was a SMD of 0.38; the largest effect size was a SMD of 0.53. The majority (83.3%) of all types of included interventions examined had a significant effect.[201] A separate review examined 36 studies of PND prevention and identified the most common elements of the included psychosocial interventions to be baby-care skills and maternal-infant bonding, but others included family

engagement, supportive networking, interpersonal skills, psychoeducation, and cognitive behavioral therapy.[205]

Behavioral Counseling Interventions

Consistent with this current review's findings, two recent systematic reviews[206, 207] examined the effectiveness of behavioral interventions for PND prevention and found a positive effect. A 2020 systematic review included 18 studies (N=7,416) of various antenatal behavioral interventions, including CBT, IPT, mindfulness- and solution-focused approaches, and psychoeducation.[207] The meta-analysis showed a significant effect of antenatal behavioral interventions on both antenatal and postnatal depression (k=8, N=2,342; SMD 0.28, 95% CI, 0.11 to 0.44, SMD 0.37, 95% CI, 0.08 to 0.66).[207] A 2020 qualitative review included 25 RCTs, 10 quasi-experimental studies, eight open trials, and two case studies addressing the effectiveness of IPT for treatment and prevention of depression.[206] These IPT interventions focused on the impact of role transitions, interpersonal disputes, grief and loss, and interpersonal deficits on depression. Among the 13 prevention studies, most were delivered during pregnancy and the studies aimed to reduce depression incidence. Qualitative synthesis showed that five trials reported small to moderate statistically significant reductions of depressive symptoms.

Parenting, Peer Support and Education Interventions

It is difficult to compare our findings to those of other systematic reviews for parenting support, peer support and educational interventions. Our systematic review had stringent inclusion criteria requiring included trials to have a primary aim of PND prevention; we also had limited predefined intervention categories and pooled results only within single intervention categories even though there are likely overlaps in the intervention categories' content. By contrast, two prior systematic reviews included a heterogeneous mix of trials of general parenting and peer support interventions that reported PND outcomes.[208] A 2022 systematic review identified 17 studies (N=1,665) addressing the effectiveness of various parenting interventions on maternal depressive symptoms among women with or at risk for PND symptoms.[208] The interventions targeted mother–infant interactions, attachment, and relationships and used heterogeneous approaches including video interaction feedback, social media, coaching, peer support, play groups, phone apps, training, home visiting and telephone sessions. The pooled analysis demonstrated statistically significant reductions in maternal depressive symptoms postintervention for mothers in the intervention groups (k=15; SMD -0.34, 95% CI, -0.44 to -0.24; $p < 0.001$; $I^2 = 0\%$).[208] A 2020 systematic review of studies among pregnant or postpartum women with or at risk for PND found 10 RCTs (N=3,064) examining the effectiveness of telephone-based or in-person peer support for PND.[209] Pooled analyses demonstrated that peer support groups were associated with a moderate effect on depression diagnoses (k=7, N=1644; OR= 0.69, 95% CI 0.49 to 0.96, p = 0.03, I^2=70%) and depressive symptoms (k=9, N=1617; standardized mean depressive scores −0.37, 95% CI −0.66 to −0.08).[209] Therefore, while these other reviews found improvements in depression outcomes for these categories of interventions, their findings may have differed from our findings because of different inclusion criteria and intervention categorization.

Physical Activity Interventions

Several recent reviews have investigated the effectiveness of physical activity interventions for PND prevention. A recent 2023 systematic review concluded that moderate exercise interventions could decrease the risk of PND in unselected pregnant women.[210] Similarly, a 2022 meta-analysis which included 14 RCTs (N=4,607) and nine prospective cohort studies (N=181,805), demonstrated a significant positive association between physical activity and PND prevention (adjusted OR 0.73; 95% CI, 0.61-0.87; P < 0.001).[211] This review also found a dose-response relationship where statistically significant decreases in PND status were seen with interventions that included more than 90 minutes/week of physical activity. At 112 minutes/week, the OR for postpartum depression was 0.83 (95% CI, 0.75 to 0.91) and at 180 minutes/week, the OR was 0.54 (95% CI 0.38 to 0.77).[212] Another systematic review including 57 articles found beneficial effects of exercise on prenatal depression but mixed effects on postpartum depression.[213] The review included four systematic reviews[214-217] and one study[218] that demonstrated a beneficial effect on prenatal depression and/or symptom severity. One of the included meta-analysis[214] concluded that exercise-only interventions reduced the severity of prenatal depressive symptoms among participants in the intervention groups (13 RCTs, n=1,076; SMD: −0.38, 95% CI −0.51 to –0.25, I^2=10%) and the odds of prenatal depression by 67 percent (5 RCTs, n=683; OR: 0.33, 95% CI 0.21 to 0.53, I^2=0%) compared with participants in the control groups; however, it found no effect of prenatal exercise on the risk postpartum depression.[214] Conversely, another included systematic review showed positive effects of prenatal exercise on postpartum depressive symptoms.[216]

Sleep Interventions

A recent 2021 systematic review examined the effectiveness of sleep interventions administered during pregnancy to prevent PND and identified only two studies (N=836) with mixed results.[219] Both studies examined the effectiveness of a one-time, in-person education session during pregnancy. One study reported that no statistically significant difference in mood symptoms between intervention and control groups; the second study reported significantly higher mood in the intervention group when compared to the control groups, although no comparisons were made between preintervention and postintervention scores, limiting conclusions about differences in change between the groups.[219] Neither of these studies are included in our current review, one did not include prevention of PND as a primary aim[220] and the other was excluded in the previous review for study quality.[221]

Effect of Intervention Timing (CQ2)

Most of the 24 behavioral counseling trials included in our review had interventions that began during pregnancy, typically in the second or third trimesters. Qualitative analysis does not suggest a benefit to initiating these interventions at a specific time during these trimesters. About one-third of interventions (9 trials) occurred solely in the prenatal period,[92, 93, 95, 105, 130, 134, 137, 154, 182] and half (12 trials) spanned both prenatal and postpartum periods.[99, 108, 110, 133, 145, 147, 158, 159, 184-186] Only one trial[135] occurred entirely in the postpartum period, and its results showed few events with nonstatistically significant increased rates of depression in the intervention group RR

2.00, (95% CI, 0.62 to 6.50). The remaining two behavioral counseling trials did not specify when the intervention took place.[171, 172] Our meta-regression did not suggest any treatment effect modification based on whether intervention spanned the prenatal and/or postpartum periods.

Other considerations that could affect the timing of treatment but are outside of the empirical evidence provided in this review, are the epidemiology and natural history of PND. Screening literature shows that approximately 40-50 percent of women with PND have postpartum onset, one third have onset during pregnancy, and one quarter have chronic episodes predating pregnancy.[222-224] These data have been used to suggest that early screening and treatment during pregnancy is warranted and could also be used to support introducing preventive interventions for those at increased risk during the pregnancy period.[222-224]

Applicability and Implementation of Evidence

Given the association between untreated depression and poorer pregnancy and birth outcomes,[225] there is particular interest in primary prevention of PND through screening, early identification, and treatment. Despite the interest, uptake of the 2019 USPSTF recommendation to provide counseling to women at increased risk for PND appears to be low based on a recent study of pregnant women at increased risk (n=303), which found that less than 15 percent of participants reported that a provider recommended counseling or therapy to prevent PND.[226] Uptake of PND prevention interventions in primary care can be impacted by several factors. Challenges include methods of identifying women at increased risk, limits in providing large-scale counseling resources, and effectively evaluating outcomes.[227, 228] Additionally, questions remain about how to identify those who could benefit most from these interventions and which elements of counseling are the most effective.

Within the current review, there were three counseling intervention programs that were examined across more than one trial. These programs are exemplary in terms of their reproducibility given the fact that standardized, publicly available training for the intervention is available (**Appendix M Table 1**). The most frequently studied intervention was the Mothers and Babies Program, which was implemented in four trials.[133, 145, 171, 172] This CBT-based, culturally tailored counseling intervention included 6 to 12 weekly two-hour group sessions with an additional two to five individual booster sessions. Two other counseling programs were studied in two trials each: the IPT-based Relaxation, Encouragement, Appreciation, Communication, and Helpfulness (REACH) program,[158, 159] which included five 1-hour group or individual culturally-based and adolescent-oriented sessions, and the IPT-based Reach Out, Stand strong, Essentials for new mothers (ROSE) program,[184, 186] which was designed for a culturally diverse population and included four 60-90 minute IPT group sessions, with an additional individual 50 minute booster session. These were all examples of US-based trials conducted in participants at increased risk of PND mostly recruiting participants from underrepresented racial and ethnic populations.

Several challenges have been identified in perinatal access to mental health preventive and treatment services.[229, 230] Implementation and support of PND prevention interventions within primary care could be impacted by policy. A 2021 editorial[231] proposed policy options to improve access to maternal mental health services, including Medicaid coverage extension

through 1 year postpartum; co-location of maternal medical and mental health services through reimbursement redesign; expansion of the availability of home visiting and peer support programs; telehealth policies to support continued maternal mental health access; greater research development in the area of maternal mental health; and exploration of social and economic policies that focus on supporting families.[231] Systems-level changes that increase access to mental health services have potential to improve health outcomes and save lives, while also potentially being be cost-effective. One cost-effectiveness analysis,[232] demonstrated that referral of all pregnant adolescents (considered high risk for PND by age status) for counseling was a cost effective strategy: if a theoretical cohort of 180,000 pregnant adolescents were all referred to counseling, this would result in 8,935 fewer cases of PND, 1,606 fewer cases of chronic depression, 166 fewer preterm deliveries, four fewer neonatal deaths, one fewer case of cerebral palsy, and 20 fewer cases of Sudden Infant Death Syndrome.

Identification of Women at Increased Risk of Perinatal Depression (Contextual Question 1)

Many of the studies identified in this review examined counseling interventions for women at increased risk for PND. Most of these trials most recruited women with elevated baseline depressive symptoms and/or a history of depression (**Figure 5**). Identifying these women could be achieved using simple primary-care feasible depression symptom scales like the PHQ-9 or EPDS, together with history-taking about prior depression (**Appendix N Table 1**).

In addition to the risk factors used for recruitment in the included intervention trials, indirect evidence for identifying women at higher risk of PND, who are likely to have a greater absolute benefit from preventive services, comes from several data sources. As described below, several analyses have examined the predictive properties of (1) individual risk factors, (2) screening tools applied in the prenatal or early postpartum period to identify low level depressive symptoms, and (3) validated machine learning risk prediction tools for PND.

Individual Risk Factors

Several systematic reviews of retrospective and prospective cohort studies report odds ratios and relative risks associated with single risk factors to predict PND (**Appendix N Table 2**).[34, 233-236] One 2016 systematic review (k=97) qualitatively examined individual risk factors for predicting antenatal depression or anxiety.[34] Significant risk factors associated with antenatal depression or anxiety were a lack of partner or social support; history of abuse or domestic violence; personal history of mental illness; unplanned or unwanted pregnancy; adverse life events or high perceived stress; present or past pregnancy complications; and pregnancy loss.[34] A 2022 systematic review and meta-analysis (k=31, n=79,043) examined individual risk factors for predicting PND.[234] Depression was defined by a variety of instruments (EPDS, SRQ-20, HADS, GHQ-12, PSSS, or ICD-9/10 diagnosis) with most studies using an EPDS cutoff as the depression outcome. Risk factors that were correlated with subsequent PND were: educational level (OR 1.40, 95% CI, 1.18 to 1.67); family economic status (OR 1.69, 95% CI, 1.29 to 2.22); history of mental illness (OR 0.29, 95% CI, 0.18 to 0.47); domestic violence (OR 0.24, 95% CI, 0.17 to 0.34); perinatal smoking (OR 0.63; 95% CI, 0.45 to 0.87) or drinking (OR 0.43, 95% CI,

0.23 to 0.80), and multiparity (OR 0.74, 95% CI, 0.63 to 0.87). In this analysis, ORs less than 1.0 indicated that lack of the risk factor was associated with a lower risk of PND, and thus that the risk factor was associated with higher risk. These factors remained statistically significant when the analyses were limited to developed countries.[234] Two other 2020 systematic reviews[233, 236] confirm similar risk factor findings. An additional 2013 study screened 10,000 mothers for postpartum depression at 4-6 weeks after delivery and demonstrated that the most predictive single risk factors for future postpartum depression were prior history of mood and anxiety problems and untreated depression and anxiety during pregnancy.[223]

Screening Tools Applied in the Prenatal or Early Postpartum Period Identifying Low Level Depressive Symptoms

The previous USPSTF review on this topic bridged from a 2003 systematic review by Austin & Lumley[237] and summarized the literature on prenatal or early postpartum tools that could be used to predict PND. The Austin & Lumley review[237] summarized 16 studies investigating prenatal tools for predicting postpartum depression, including the BDI, EPDS, Eysenck Personality Inventory, General Health Questionnaire, Schedule for Affective Disorders and Schizophrenia, Spielberger State/Trait Anxiety Scale, Spanier Dyadic Adjustment Scale, Sarason Social Support Scale, and the Social Support Questionnaire. The authors concluded that there was no evidence that any of the screening instruments were appropriate for predicting future depression through routine use during pregnancy because the existing studies had insufficient sample sizes, the tools were not validated in postpartum women with variable cutoff scores, and/or studies poorly reported tool development or psychometric properties.[237] The bridge search since that review identified five new studies;[238-242] most of which utilized self-report instruments, primarily the EPDS, and found that EPDS scores during the prenatal or early postpartum period (2-7 days postpartum) were predictive of depressive symptoms later in the postpartum period. In terms of the EPDS predicting future depression, the studies reported sensitivity ranging from 67 to 85 percent, specificity ranging from 65 to 95 percent, and positive predictive value (PPV) ranging from 43 to 67 percent. The EPDS cutoff scores varied considerably across the five studies — from >8 to >15 (with higher scores indicating more symptomatology) — and the timing of outcomes assessment ranged from 4 to 8 weeks postpartum.[242] Only one of these studies[242] used a clinician-administered diagnostic interview to assess depressive symptoms at followup; it found that EPDS scores at 3-5 days postpartum were predictive of a diagnosis of major or minor depression at 8 weeks postpartum (sensitivity: 82%, specificity: 95%).

Since the previous USPSTF review, we identified six additional studies investigating the ability of tools used during the prenatal or early postpartum period to predict subsequent depression status or symptom levels (**Appendix N Table 1**). Each of these studies examined a different self-administered instrument: Healthy Start Screen,[243] EPDS,[244] PDPR-R prenatal version,[245] BDI-II,[246] and HDRS,[247] administered at various times during pregnancy from the 'first visit' to the third trimester[243-245, 247] or at 24 hours postpartum (Marin). The most common outcomes reported were the EPDS ≥12 or ≥13[243, 244] and the SCID.[245, 247] Outcomes were assessed at various times postpartum ranging from within the first 6 weeks to 9 months after delivery. All studies showed a positive correlation between the initial score or specific questions on the tool and later postpartum depression.

Two of the new studies used a SCID interview to determine whether participants met criteria for depression at followup. One of these was conducted in three United States academic centers (n=243) and examined how well the HDRS administered during the third trimester predicted depression at up to 24 weeks postpartum, among women with a history of depression (based on a lifetime SCID interview) but not meeting criteria for depression during pregnancy.[247] This study found a positive association between HDRS and later depression ($p<0.001$): among those who scored 0-10 on the HDRS during their third trimester: only 2 percent to 5 percent of participants who scored between 0-10 on the HDRS during their third trimester met criteria for depression at followup, compared with 14 to 15 percent among those scoring 11-16, and 38 percent among those scoring 17-29. Three items provided all the predictive value: those assessing for difficulties related to work activities (item 7), early insomnia (item 4) and suicidality (item 3).[247] The other study using a SCID interview as an outcome measure was a Portuguese study (n=140) found that a cutoff score of 4.5 on the PDPR-R prenatal version during the second trimester of pregnancy was highly correlated with a depression diagnosis at 6-9 months postpartum (AUC 0.803; 95 % CI, 0.60 to 1.00; sensitivity: 83.3%, specificity: 85.8%, PPV: 20.8% and NPV: 99.1%).[245]

Three additional new studies used an EPDS cutoff as the measure of depression status at followup.[243, 244] A large population-based screening study of a cohort in Australia (n=40,964) found that women who scored 13 or higher on the EPDS at their first prenatal visit were 13 times more likely to have PND symptoms within the first 6 weeks after delivery compared to those with EPDS score of <13 (aOR 13.0 (10.3 to 16.5).[244] Another study, conducted in Florida which examined the Healthy Start risk screening program (n=1,783), found that affirmative answers at a prenatal visit to the questions on whether they had recently "felt down, depressed, or hopeless" and "ever received mental health services" were most strongly predictive of an EPDS score of 12 or higher at a postpartum visit.[243] In an adjusted analysis, the PPV for "felt down, depressed, or hopeless" was 34 percent and the PPV for "ever received mental health services" was 24 percent. Finally, one study conducted in Spain (n=209),[246] found that a Pearson correlation of 0.54 between the BDI-II at 24 hours postpartum and 4 months postpartum.

Validated Machine Learning Models

Predictive models have the potential to serve as adjuncts to depression screening and could be especially beneficial in identifying candidates for preventive interventions. Two recent systematic reviews[248, 249] identified a total of five machine learning models[250-254] with internal and external validation (**Appendix N Table 3**). In terms of external validation, one study used geographical, temporal, and holdout set validation; two studies used geographical validation only; and two studies used temporal validation only. Focusing only on the studies with external validation, the most common variables associated with PND included: depression during pregnancy (4/5 studies), race (4/5 studies), maternal age (<19 years or >35 years in 3/5 studies), and primiparity (3/5 studies). The model with the highest AUC at one year postpartum included 69 variables plus the EPDS and was derived from a United Kingdom cohort of 266,544 primiparous women with deliveries from 2000-2017,[250] and reported a median AUROC of 0.844 (range: 0.712 to 0.89). All models had high risk of bias overall. These models are unlikely to be used in clinical practice because of the large number of risk factors in the models and limitations of data from electronic health records (inaccuracy, missing data, under-abstraction) and use of proxy outcomes (e.g., many studies use antidepressant prescriptions as proxy for depression

diagnoses however antidepressants can be used for other conditions, including anxiety disorders).

Limitations of Predictive Risk Factors And Models

The risk prediction literature is fraught with limitations, including small study sizes, differences in threshold cut offs for predictive tools, variability in outcome instruments and the time they are applied in the postpartum period, and variability of measures of prediction reported (AUC, PPV, correlation coefficient). Adding to the complexity of risk prediction is the natural history of depressive symptoms during the perinatal period. Some have suggested that the peak prevalence of postpartum depression is between 2 and 6 months after delivery[255] and that the prevalence of depression is lower than normal in the first days after birth, but many studies evaluate postpartum depression outside of this window.

Limitations of the Review

Our goal was to synthesize the evidence base on interventions with a primary aim of PND prevention, and therefore we excluded a wider literature of interventions supporting the general well-being, stress and anxiety reduction, and maternal parenting knowledge and self-efficacy. However, primary study aims were not always clearly stated in the published literature, so it is possible that we inadvertently excluded trials where the aim was not explicitly reported or, conversely, we could have included a trial that had multiple publications in which one cited PND prevention as an aim.

We sorted the interventions into categories for meta-analysis using the same categories and definitions for behavioral interventions described in the 2019 USPSTF report.[197] While some interventions distinctly fit into a single category, other interventions included multiple components (e.g., many interventions had at least some educational component); we categorized these based on the main intervention type. This could have led to some errors in categorization. Another limitation in our pooling was that followup times varied widely. We chose to pool results from the longest followup timepoint for each trial. Given the natural history of PND, it would have been ideal if the outcome was measured at similar timepoints in the pregnancy and postpartum periods across studies.

Our primary outcome was depression status because of its clinical importance and because it was the most commonly reported outcome. In the meta-analyses, we pooled this dichotomous outcome prioritizing trial-reported incidence if it was available, followed by using prevalence of depression if incidence was not available, and used the proportion of participants meeting a trial-reported threshold for depression symptom severity if neither incidence nor prevalence were reported. The most clinically meaningful outcomes are incidence and prevalence; however, we believe the relative between-group effects are likely similar for incidence, prevalence, and exceeding symptoms cutoffs, although the absolute percent meeting a symptom cutoff would typically be higher than the percent meeting diagnostic criteria. Using this inclusive approach to our primary analysis of depression status allowed us to view the bodies of evidence for each intervention type more comprehensively than if we would have limited the analysis only to the

incidence or prevalence of a confirmed depression diagnosis. For the included counseling intervention literature, most trials reported incidence or prevalence using clinical interviews.

For some intervention types, there appeared to be a larger effect size on the dichotomous depression outcome compared to the continuous depression symptom outcome. There are a few plausible explanations for this unexpected difference in the dichotomous and continuous depression results. The evidence-base for other intervention types, such as supportive, education, and physical activity interventions, however, largely reported the dichotomous depression outcome as the proportion of participants exceeding a symptom threshold based on the EPDS rather than a diagnosis based on a clinical interview. One might expect that a diagnosis may be easier to make based on an EPDS>12 compared to a diagnosis based on a full clinical interview thereby overestimating the dichotomous depression result effects for intervention types other than behavioral counseling. Therefore, it is possible that this may have contributed to the discordance between findings for the dichotomous depression status outcomes and continuous outcome of changes in depression symptoms for some of these intervention types. This discordance could have been further explained by participants with baseline elevated symptoms just below the diagnosis threshold, leading interventions to be associated with a statistically significant difference in depression status without showing a similarly statistically significant difference in the change in depressive symptoms.

Our analysis sorted trials by whether participants were selected for increased risk of developing PND or not. We conducted subgroup analyses based on population selection and found that, for counseling interventions, there was greater relative treatment effectiveness in trials recruiting those at increased risk. However, for the counseling and supportive intervention trials, the percent of participants with depression at followup was very high even in the studies of unselected populations. On the other hand, control group outcome rates indicate that participants in the educational and physical activity trials were at low risk for PND compared to United States national reported prevalence.

Limitations of the Evidence and Future Research Needs

There remains an opportunity to improve risk identification for PND. Measures of sub-threshold depression symptoms on commonly used scales like the EPDS, as well as a history of prior depression, are associated with future PND risk; however, it is not clear if other risk factors could be used to identify those who could benefit from interventions. Relatedly, more research is needed on who is most likely to benefit from these preventive interventions and how they are best identified. There are several trials currently in-progress that could provide additional evidence on preventive interventions and are listed in **Appendix O**. One of these trials is the ROSE (Reach Out, Stay Strong, Essentials for mothers of newborns) Scale-Up trial, and it is the first trial to compare recruitment strategies (universal vs selective) for a PND prevention intervention. It is also the largest PND prevention trial (90 US-based prenatal clinics) to date, thus examining scalability, an understudied area of implementation science.[256] There was limited evidence for virtual interventions in our review: the one virtual counseling[93], three text/email/app based supportive[106, 125, 129], and two web/app-based education[115, 150], trials did not demonstrate a statistically significant benefit at the longest followup. In contrast, two physical activity interventions delivered virtually did show statistically significant improvements in depression

symptoms.[173, 257] There are a few ongoing trials examining depression prevention interventions using novel web-based or mobile applications, which may provide helpful findings to be considered in future reviews.

The most common approaches used in the behavioral counseling interventions were CBT or IPT (k=17);[93, 95, 99, 105, 114, 130, 133, 134, 145, 147, 158, 159, 171, 172, 184-186] however, few trials had published protocols that could be used for implementation. Aside from identifying CBT/IPT, we were unable to identify specific features of effective behavioral counseling interventions, such as the ideal frequency, intensity, or duration of therapy. Large scale CBT and IPT effectiveness trials like the ROSE Scale-Up trial[256] with reproducible protocols are needed to explore the degree to which these interventions can be scaled up, as well as their applicability to average-risk general populations. Furthermore, there were few counseling trials with good quality ratings (k=4),[147, 158, 159, 186] as the majority of trials were at moderate risk of bias for missing data and inadequate reporting on randomization or group baseline characteristics. The field would benefit from more consistent reporting of randomization procedures and allocation concealment, ensuring that outcomes assessment is blinded (and reporting it as such), retaining participants for followup assessment even when they do not complete the intervention, and reporting depression diagnoses made by structured or semi-structured clinical interview. Furthermore, trials reporting long term depression and other mental health outcomes in perinatal women as well as their children are needed.

A major limitation of the evidence was the small number of trials examining potentially valuable interventions such as physical activity interventions, infant sleep interventions, complementary interventions, and prophylactic antidepressants. A limited number of trials with relatively few total participants examined physical activity interventions, but these trials showed promising results, with reductions in depression status and improvements in depression symptoms. There were a larger number of studies on education interventions, however, these education trials showed reductions in depression status but not depression symptom changes. Instruments for diagnosis in these trials were reliant on cutoffs in questionnaires as a proxy for incidence, which is not as reliable as diagnosis based on a clinical interview.

Half of the included counseling trials recruited participants from United States populations with low SES and/or Black and Latina women.[93, 108, 133, 145, 154, 158, 159, 171, 172, 184-186] Furthermore, several counseling programs were adapted for culturally diverse populations: the Mother and Babies Program,[133, 145, 171, 172] the REACH program,[158, 159] and the ROSE program.[185, 186] The Mother and Babies trials included culturally tailored interventions for racially and ethnically underrepresented groups.[133, 145, 171, 172] Nonetheless, more information is needed on effective interventions among traditionally underrepresented racial and ethnic groups, particularly as interventions are scaled up for broader dissemination. More research is also needed on the prophylactic use of antidepressants, particularly SSRIs, in women at highest risk for PND during the pregnant and postpartum periods (e.g., those with history of recurrent PND) although given the potential risks on the fetus, recruitment may be challenging.

An important concern with the included evidence was the relatively larger effects seen for dichotomous depression status outcome measures compared with continuous symptom severity scores. While most counseling trials that reported statistically significant improvement in symptom severity also reported significantly improved depression status, a few trials showed

benefits for either depression status or depression severity. However, in all of these cases, the depression status variable was either incidence or prevalence, which we believe to be a more reliable outcome than symptom severity. Furthermore, incidence and prevalence based on clinical interviews are more reliable outcomes compared to thresholds on self-administered questions.

Conclusions

Counseling interventions can be effective in preventing PND, although most evidence was limited to women at increased risk for PND. Trials studying a variety of other intervention approaches provided some evidence of effectiveness, but a robust evidence base is lacking, and further research is needed. Of these other interventions, educational and physical activity interventions show the most promising results with the current evidence base showing reductions in depressive status for educational interventions and reductions in depression status and symptoms for physical activity interventions.

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Figure 1. Analytic Framework

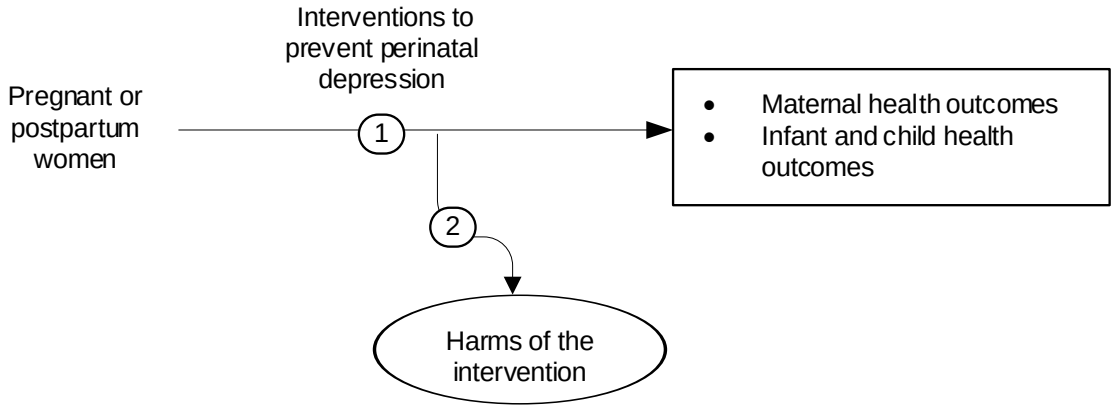
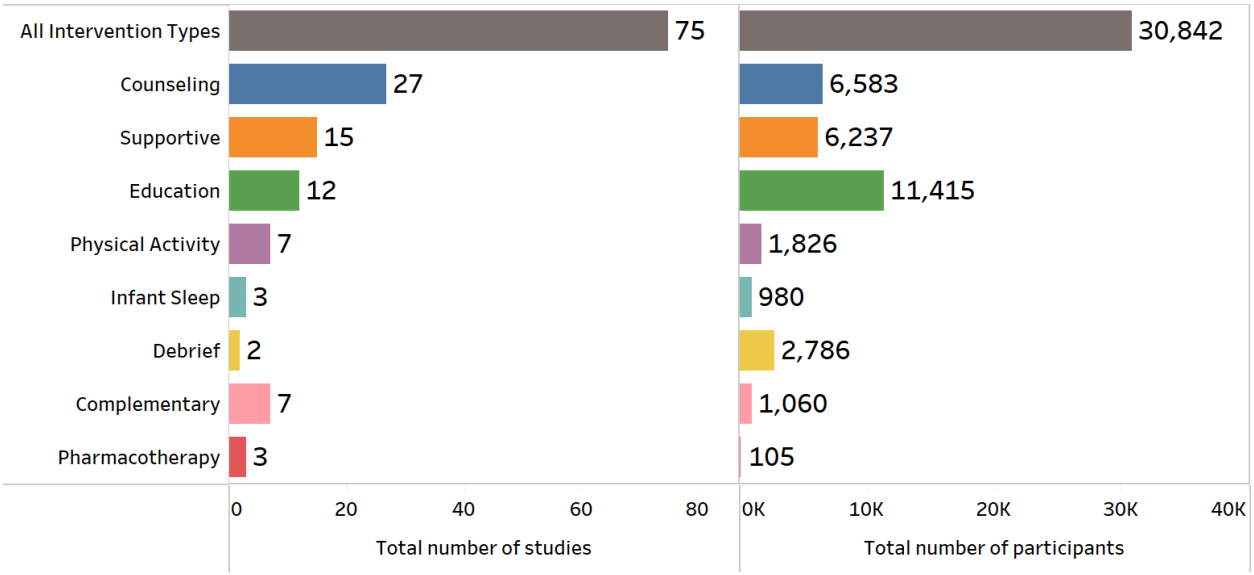


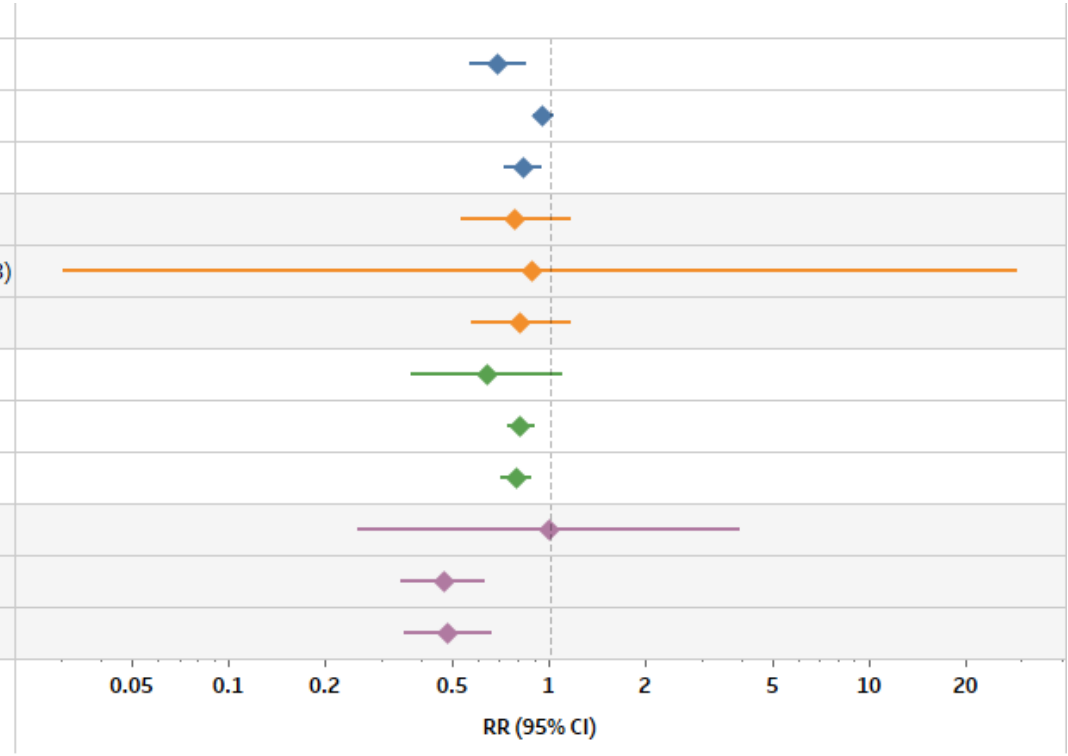
Figure 2. Summary of Included Trials



Abbreviations: K = number of studies; N = number of participants randomized; no. = number

Figure 3. Summary of Meta-Analysis Results for Depression Status by Intervention Category: Combining Depression Incidence, Prevalence, or Symptom Scale Cut-Off With Risk Groups

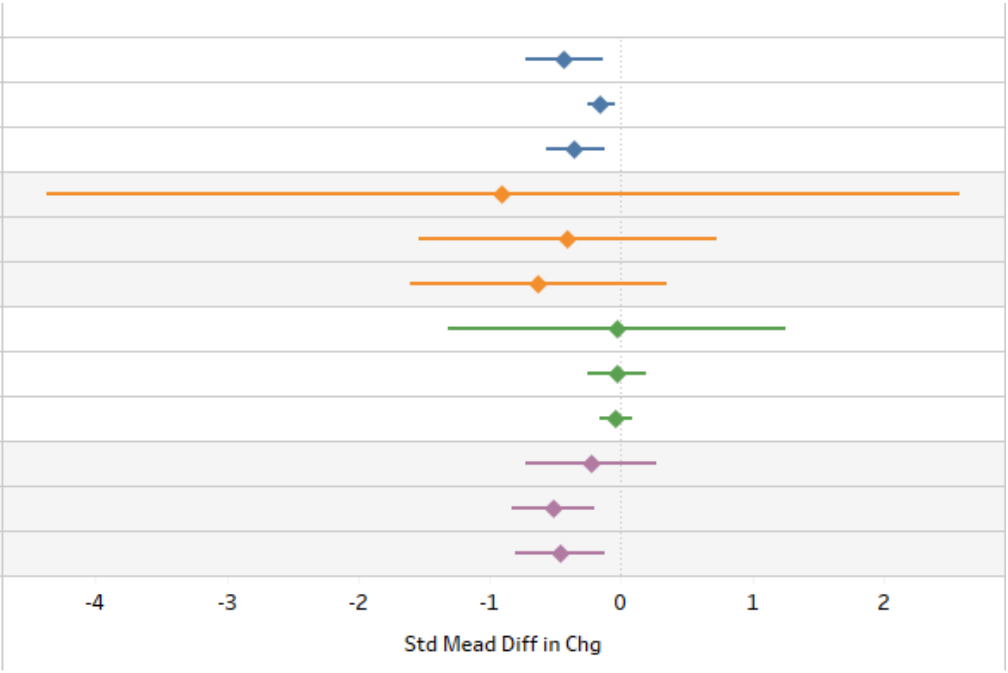
IG Category	Risk group	K	N	RR (95% CI)
Behavioral counseling	Selected	17	2661	0.69 (0.56, 0.85)
	Unselected	4	2314	0.95 (0.89, 1.03)
	Total	21	4975	0.83 (0.72, 0.95)
Supportive	Selected	6	1737	0.78 (0.53, 1.16)
	Unselected	2	1348	0.88 (0.03, 29.03)
	Total	8	3085	0.81 (0.57, 1.16)
Education	Selected	1	423	0.64 (0.37, 1.10)
	Unselected	6	7896	0.81 (0.74, 0.90)
	Total	7	8319	0.79 (0.70, 0.88)
Physical Activity	Selected	1	300	1.0 (0.25, 3.92)
	Unselected	5	1274	0.47 (0.34, 0.63)
	Total	6	1574	0.48 (0.35, 0.66)



Abbreviations: CI = Confidence interval; IG = Intervention group; K = Number of studies; RR = Relative risk

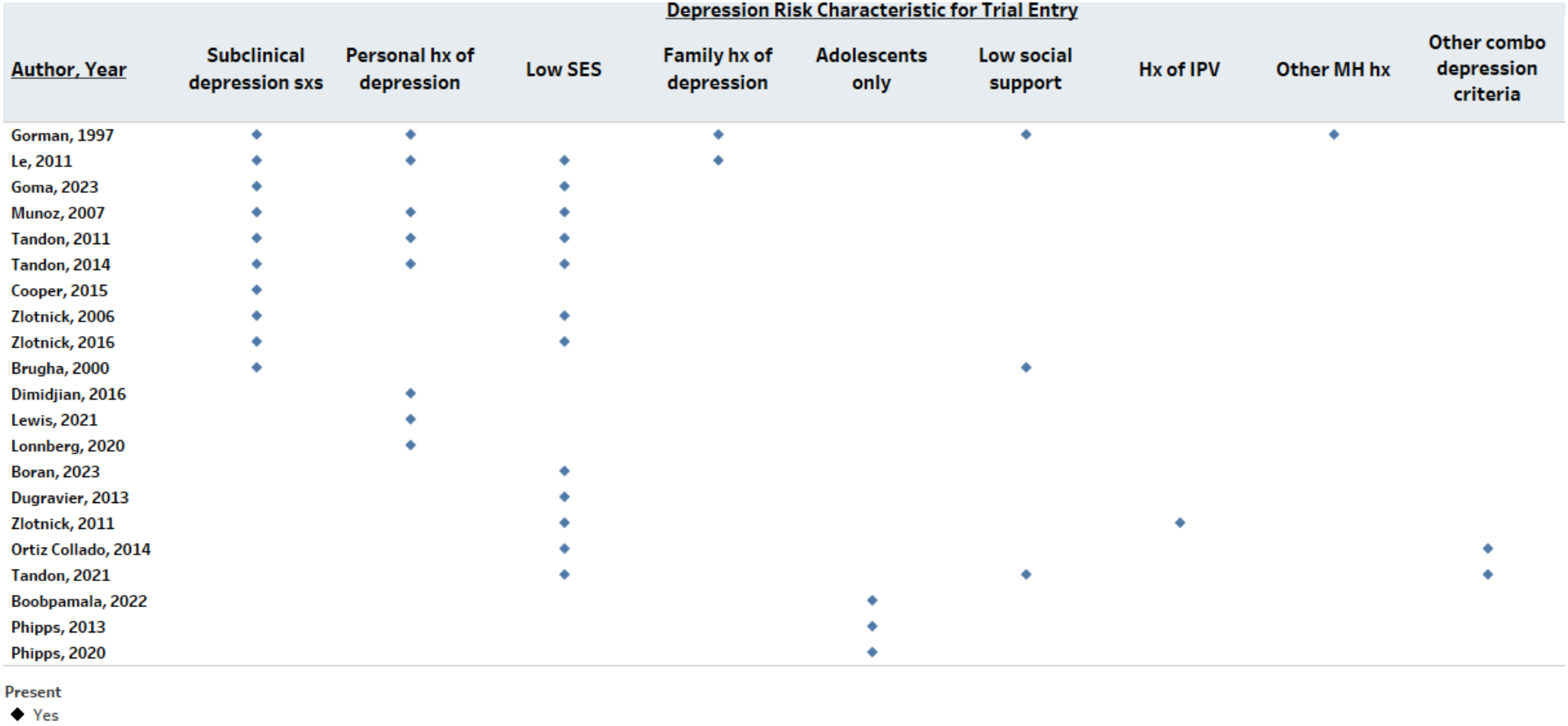
Figure 4. Summary of Pooled Standardized Mean Differences of Depression Scores by Interventions (Includes Risk Groups)

IG Category	Risk group	K	N	Std Mean Diff in Chg
Behavioral counseling	Selected	15	1830	-0.43 (-0.73, -0.13)
	Unselected	5	859	-0.15 (-0.25, 0.05)
	Total	20	2689	-0.35 (-0.57, -0.12)
Supportive	Selected	3	566	-0.90 (-4.37, 2.57)
	Unselected	3	492	-0.41 (-1.54, 0.73)
	Total	6	1058	-0.63 (-1.61, 0.35)
Education	Selected	2	187	-0.02 (-1.31, 1.26)
	Unselected	4	6105	-0.03 (-0.25, 0.19)
	Total	6	6292	-0.04 (-0.16, 0.09)
Physical Activity	Selected	1	62	-0.23 (-0.72, 0.27)
	Unselected	2	302	-0.51 (-0.83, -0.20)
	Total	3	364	-0.46 (-0.80, -0.12)



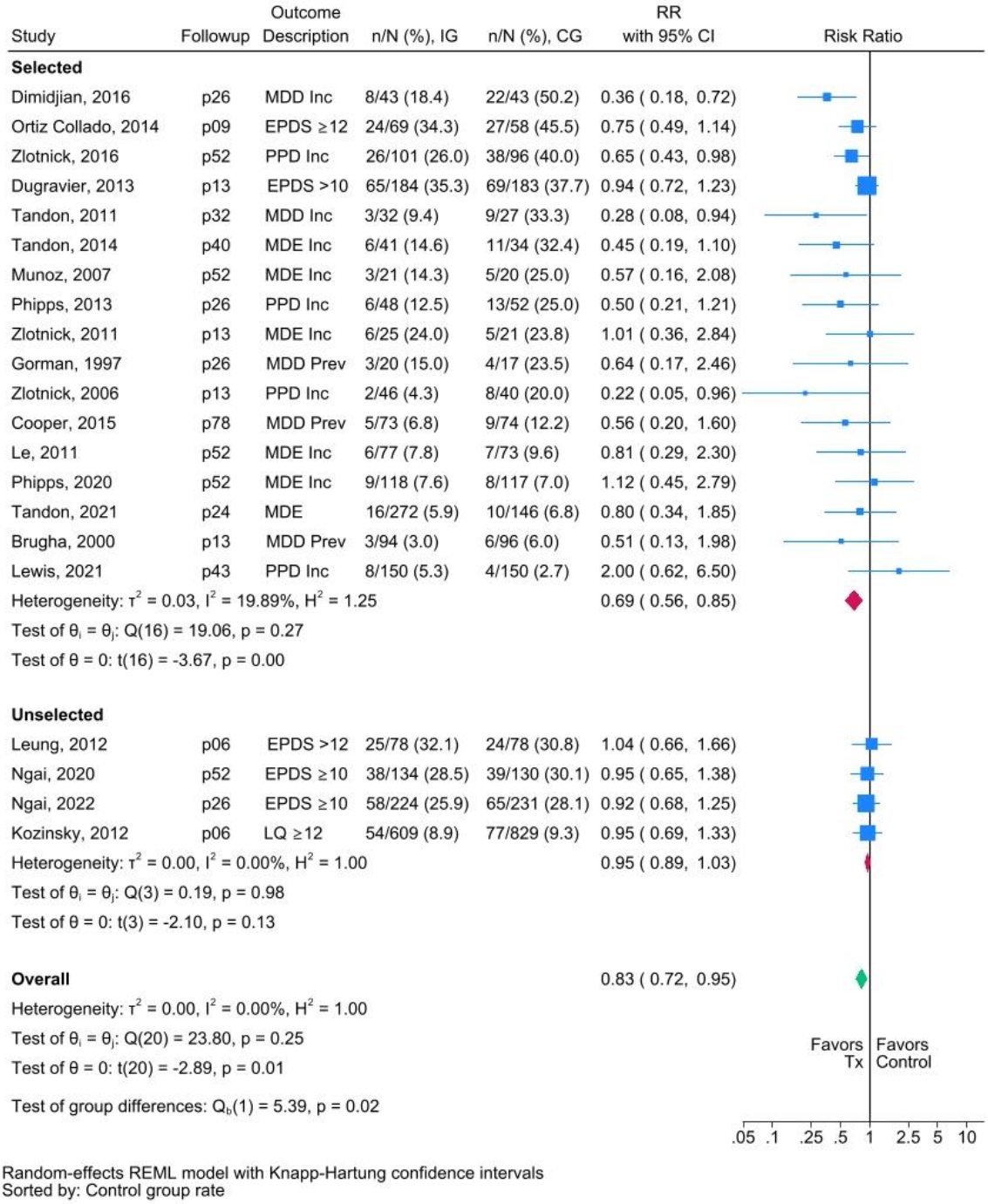
Abbreviations: Chg = Change; Diff = Difference; IG = Intervention group; K = Number of studies; SMD = Standardized mean difference; Std = Standardized

Figure 5. Counseling Intervention RCTs: Depression Risk Criteria in Trials Limited to Women at Increased Risk for Depression, Sorted by Depression Risk Characteristic



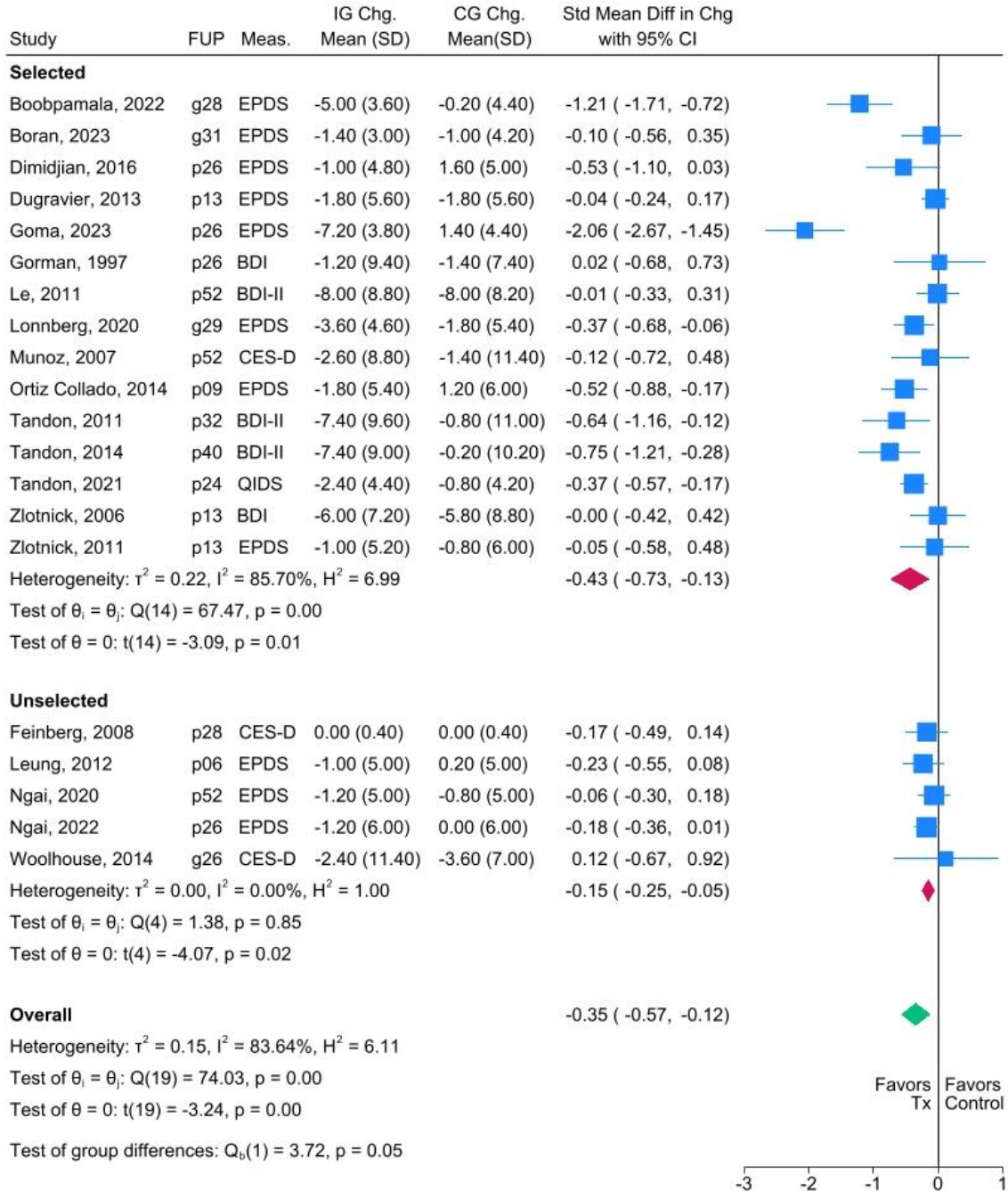
Abbreviations: BDI = Beck Depression Index; CESD = Center for Epidemiologic Studies Depression Scale; Fam = family; GHQ = General Health Questionnaire; depr = depression; Hx = history; SES = socio-economic status; sx = symptoms

Figure 6. Counseling Intervention RCTs: Pooled Analysis of Depression Incidence, Prevalence, or Exceeding a Symptom Cut-Off at Longest Followup, Sorted by Risk (k=21; n=4974)



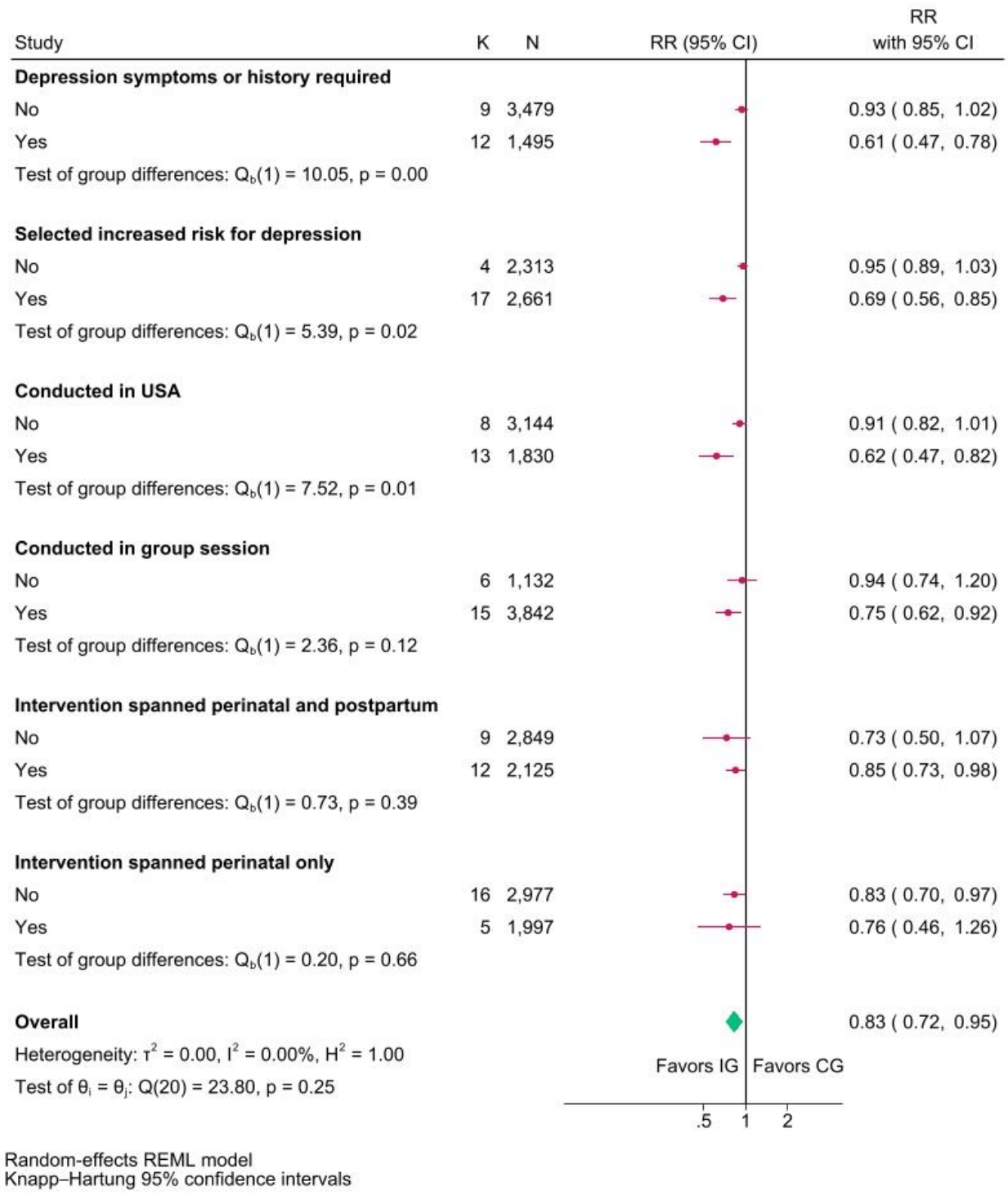
Abbreviations: CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; G = Weeks gestation; Inc = incidence; IG = Intervention group; K = Number of studies; LQ = Leverton Questionnaire; MDD = major depressive disorder; MDE = major depressive episode; Meas = Measure; P = Weeks postpartum; PPD = postpartum depression; Prev = prevalence; RCT = Randomized controlled trial; RR = relative risk; SD = Standard deviation; Std = Standardized; Tx = Treatment

Figure 7. Counseling Intervention RCTs: Pooled Analysis of Standardized Mean Difference in Change in Depression Symptom Scores at Longest Followup, Sorted by Risk (k=20; n=2880)



Abbreviations: BDI = The Beck Depression Inventory; CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; g = Weeks gestation; IG = Intervention group; K = Number of studies; Meas = Measure; p = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation; Std = Standardized; Tx = Treatment

Figure 8. Pooled Analysis for Prespecified Subgroups of Behavioral Counseling Trials for Depression Incidence at the Longest Followup Compared With Controls



NOTE: Not shown: two highly heterogeneous studies conducted intervention during postpartum only.

Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; K = number of studies; N = number of participants; ; REML = restricted maximum likelihood; RR = relative risk

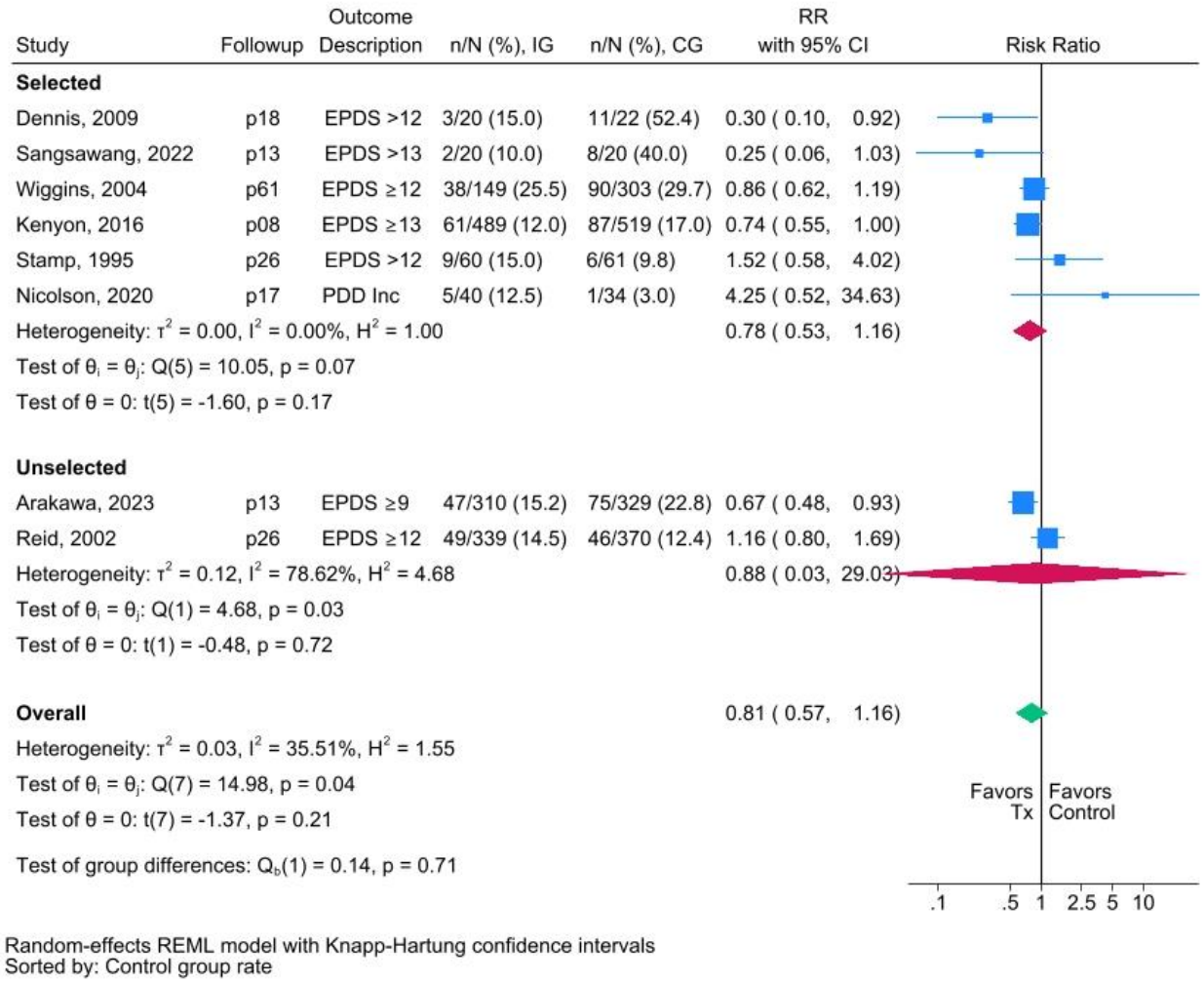
Figure 9. Other Intervention RCTs: Depression Risk Criteria in Trials Limited to Women at Increased Risk of Depression in Non-Counseling Intervention Trials

IG Category	Author, Year	Increased Risk Criteria	Depression Risk Characteristic for Trial Entry: Subclinical depression sxs	Personal hx of depression	Low SES	Adolescents only	Other MH hx
Supportive	Dennis, 2003	EPDS >9	◆				
	Dennis, 2009	EPDS >9	◆				
	Shorey, 2019	EPDS ≥9	◆				
	Nicolson, 2020	EPDS ≥10 or PASS ≥26 or sig hx of mental illness	◆	◆			
	Stamp, 1995	Antenatal screening questionnaire ≥2	◆				
	Kenyon, 2016	Low SES			◆		
	Wiggins, 2004	Low SES			◆		
	Sangsawang, 2022	Adolescents only				◆	
Education	Howell, 2012	Low SES			◆		
	Ochoa, 2021	Low SES			◆		
	Rohder, 2022	Other psych hx					◆
Physical activity	Teychenne, 2021	EPDS ≥10	◆				
	Lewis, 2021	Hx of depr		◆			
Infant sleep	Werner, 2016	Cooper predictive index >24	◆				
Complementary	Davis, 2015	EPDS ≥ 9	◆				
	Hassdenteufel, 2023	EPDS >9	◆				
	Little, 2023	Recruited from low-income community			◆		
Prophylactic psychotropic pharmacotherapy	Wisner, 2001	Hx of postpartum-onset depr		◆			
	Wisner, 2004	Hx of postpartum-onset depr		◆			

Present
◆ Yes

Abbreviations: EPDS = Edinburgh Postnatal Depression Scale; Fam = family; GHQ = General Health Questionnaire; depr = depression; Hx = history; PASS = perinatal anxiety screening scale; SES = socio-economic status; sig = significant; sx = symptoms

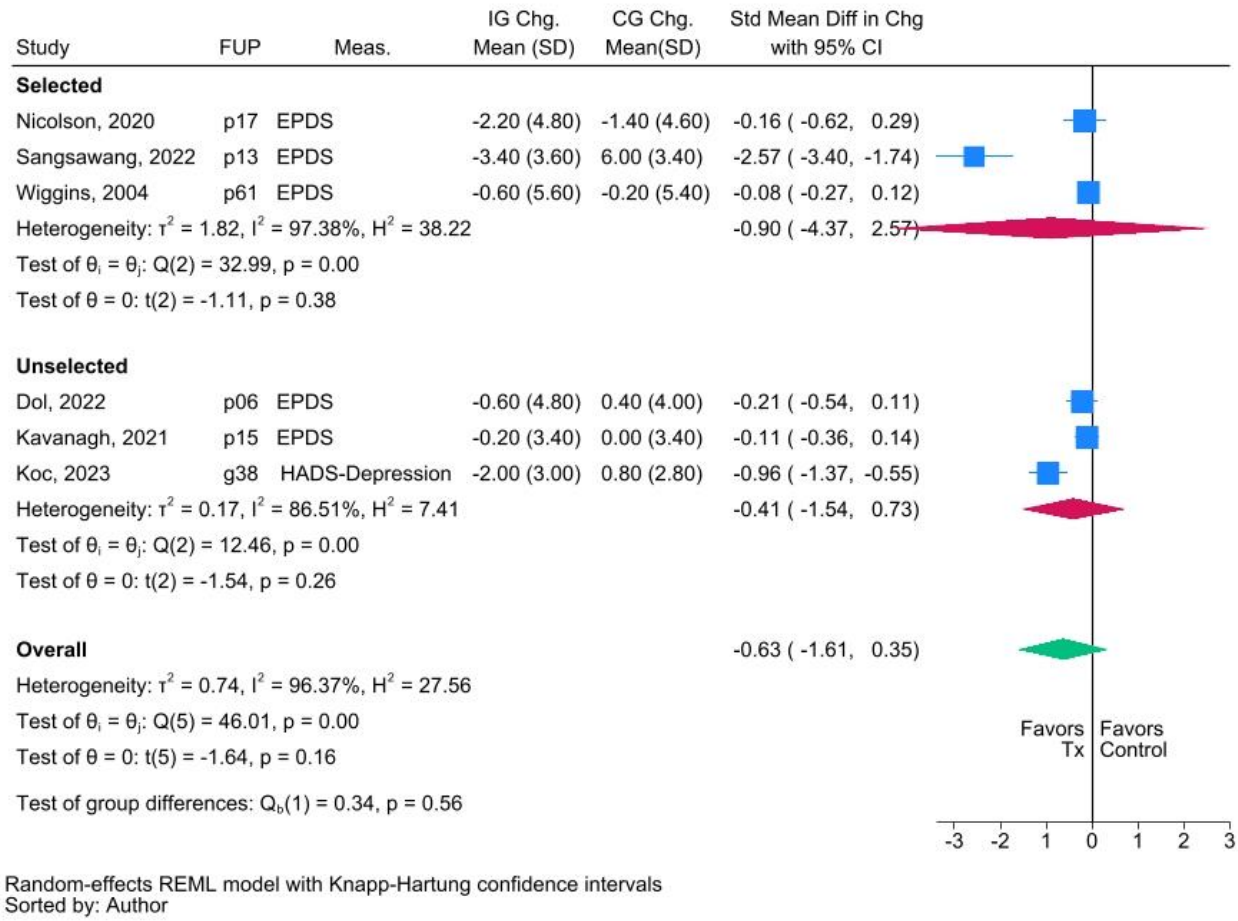
Figure 10. Supportive Intervention RCTs: Pooled Analysis of Depression Incidence, Prevalence, or Exceeding a Symptom Cut-Off at Longest Followup, Sorted by Risk (k=8; n=3085)



Random-effects REML model with Knapp-Hartung confidence intervals
Sorted by: Control group rate

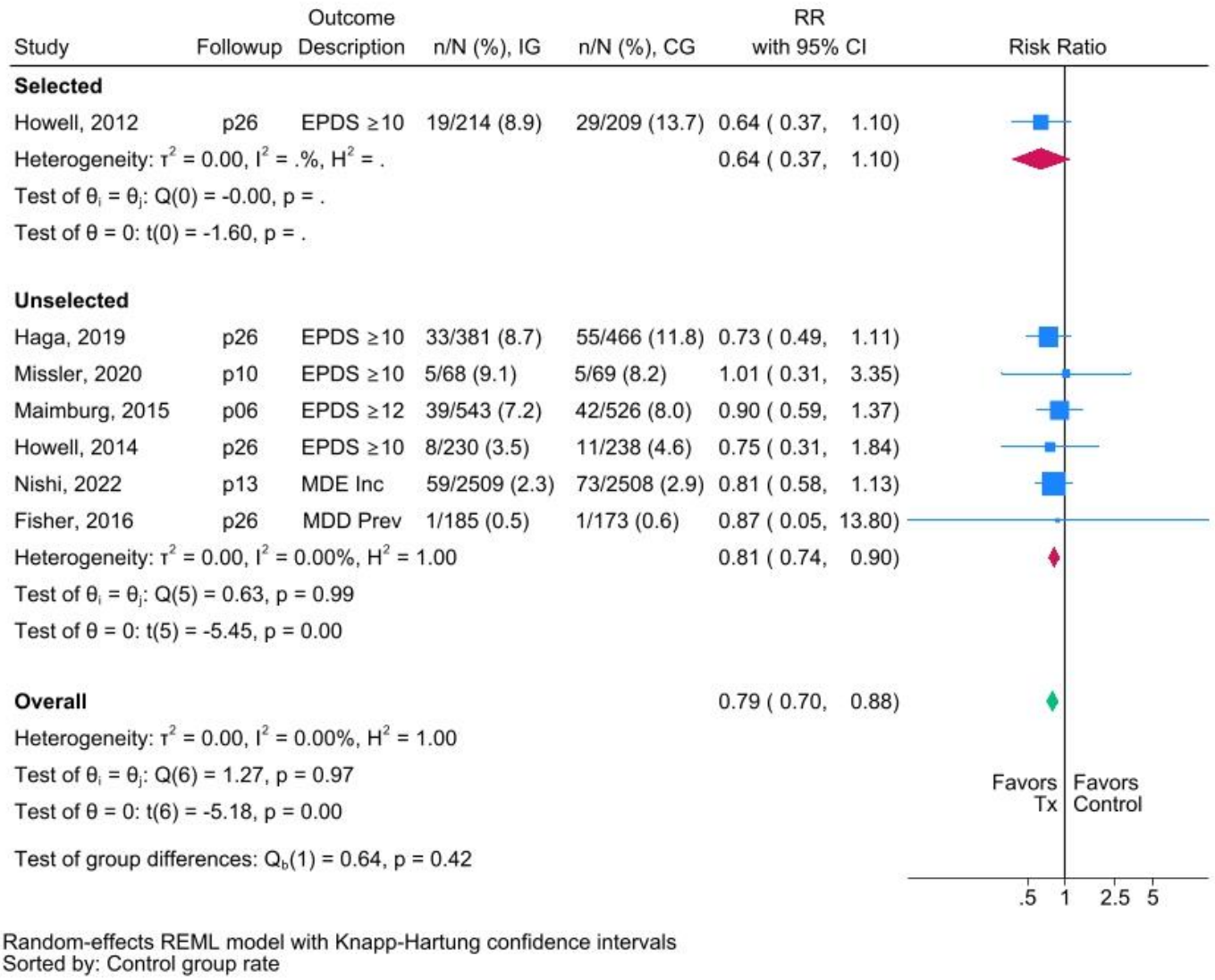
Abbreviations: CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; G = Weeks gestation; IG = Intervention group; K = Number of studies; LQ = Leverton Questionnaire; MDD = major depressive disorder; MDE = major depressive episode; Meas = Measure; P = Weeks postpartum; PPD = postpartum depression; RCT = Randomized controlled trial; RR = relative risk; SD = Standard deviation; Std = Standardized; Tx = Treatment

Figure 11. Supportive Intervention RCTs: Pooled Analysis of Standardized Mean Difference in Change in Depression Symptom Scores at Longest Followup, Sorted by Risk (k=6; n=1058)



Abbreviations: BDI = The Beck Depression Inventory; CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; g = Weeks gestation; IG = Intervention group; K = Number of studies; Meas = Measure; p = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation; Std = Standardized; Tx = Treatment

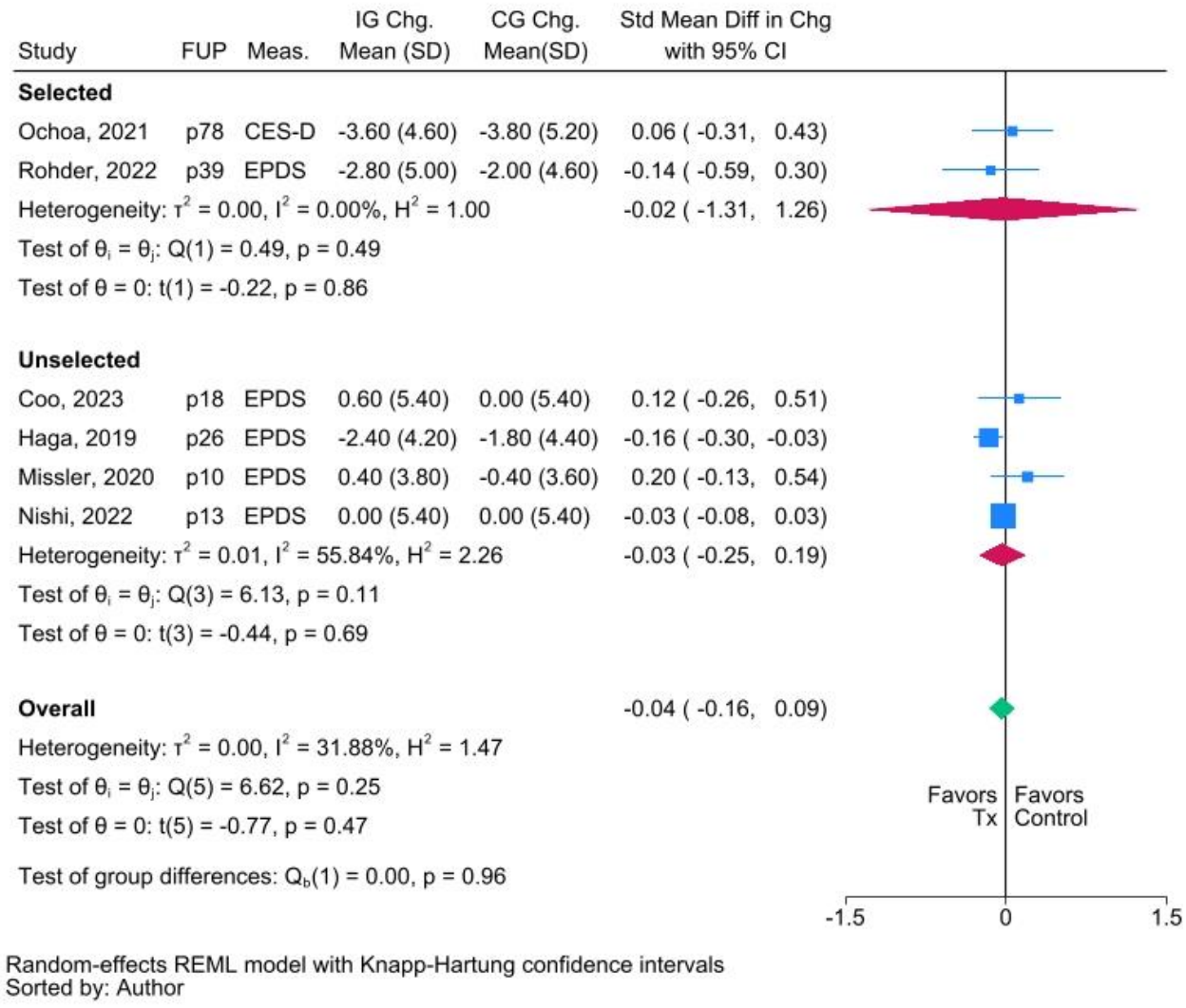
Figure 12. Education Intervention RCTs: Pooled Analysis of Depression Incidence, Prevalence, or Exceeding a Symptom Cut-Off at Longest Followup, Sorted by Risk (k=7; n=8319)



Random-effects REML model with Knapp-Hartung confidence intervals
Sorted by: Control group rate

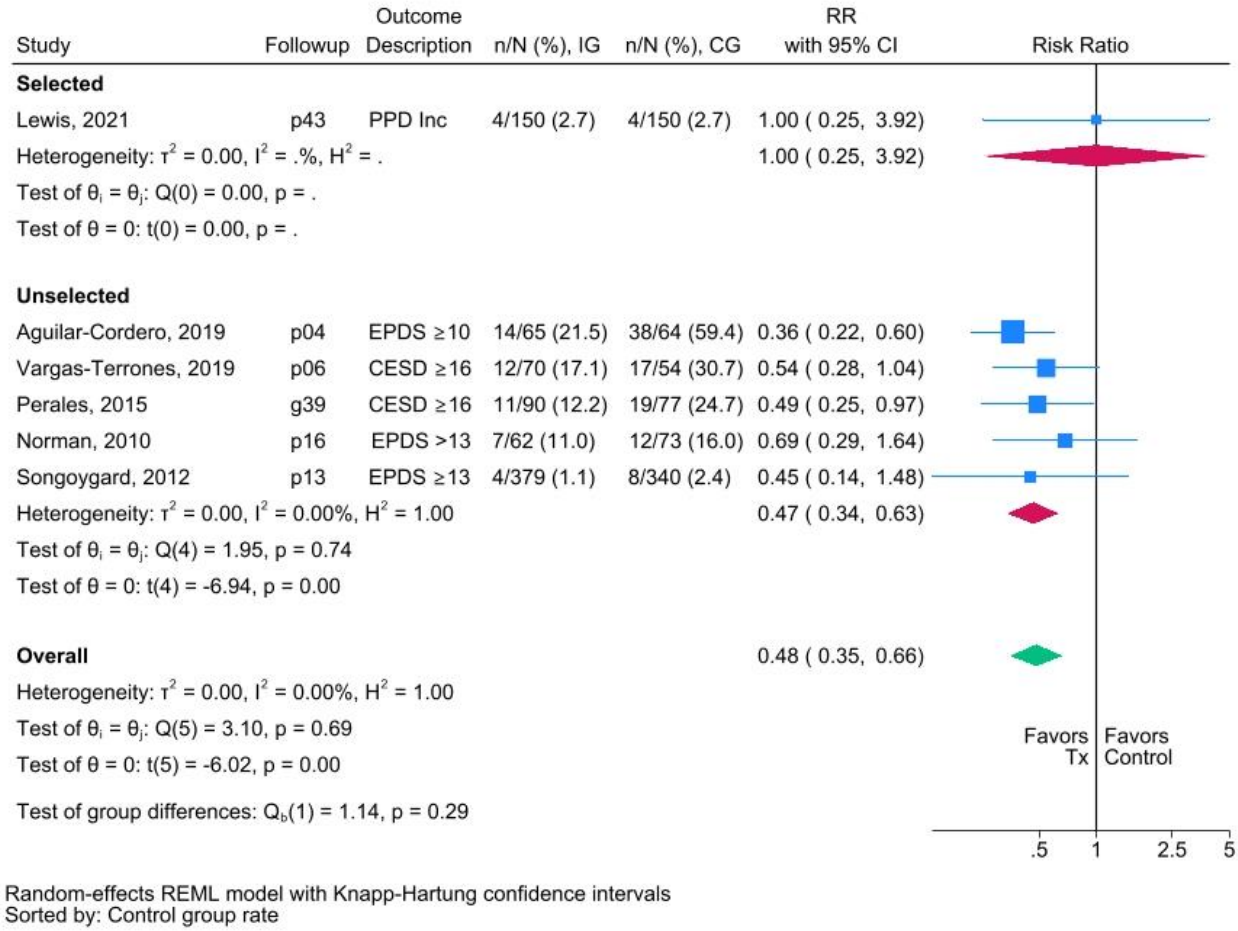
Abbreviations: CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; G = Weeks gestation; Inc = incidence; IG = Intervention group; K = Number of studies; LQ = Leverton Questionnaire; MDD = major depressive disorder; MDE = major depressive episode; Meas = Measure; P = Weeks postpartum; PPD = postpartum depression; Prev = prevalence; RCT = Randomized controlled trial; RR = relative risk; SD = Standard deviation; Std = Standardized; Tx = Treatment

Figure 13. Education Intervention RCTs: Pooled Analysis of Standardized Mean Difference in Change in Depression Symptom Scores at Longest Followup, Sorted by Risk (k=6; n=6,292)



Abbreviations: BDI = The Beck Depression Inventory; CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; g = Weeks gestation; IG = Intervention group; K = Number of studies; Meas = Measure; p = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation; Std = Standardized; Tx = Treatment

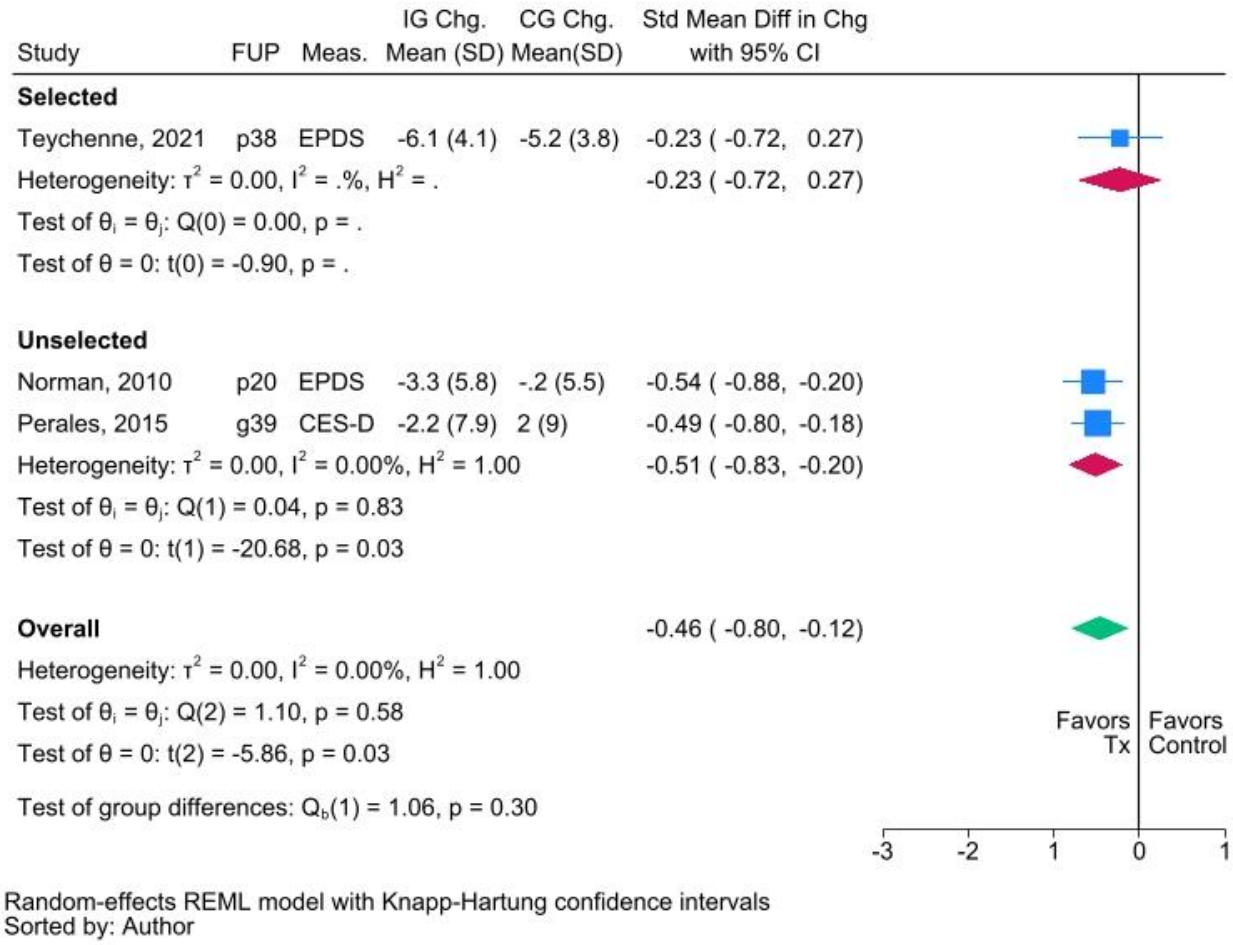
Figure 14. Physical Activity Intervention RCTs: Pooled Analysis of Depression Incidence, Prevalence, or Exceeding a Symptom Cut-Off at Longest Followup, Sorted by Risk (k=6; n=1574)



Random-effects REML model with Knapp-Hartung confidence intervals
Sorted by: Control group rate

Abbreviations: CG = Control group; CESD = Center for Epidemiologic Studies Depression Scale; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; G = Weeks gestation; Inc = incidence; IG = Intervention group; K = Number of studies; LQ = Leverton Questionnaire; MDD = major depressive disorder; MDE = major depressive episode; Meas = Measure; P = Weeks postpartum; PPD = postpartum depression; Prev = prevalence; RCT = Randomized controlled trial; RR = relative risk; SD = Standard deviation; Std = Standardized; Tx = Treatment

Figure 15. Physical Activity Intervention RCTs: Pooled Analysis of Standardized Mean Difference in Change in Depression Symptom Scores at Longest Followup, Sorted by Risk (k=3; n=364)



Abbreviations: BDI = The Beck Depression Inventory*;* CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FUP = Followup; g = Weeks gestation; IG = Intervention group; K = Number of studies; Meas = Measure; p = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation; Std = Standardized; Tx = Treatment

Table 1. Summary of Study and Participant Characteristics, All Interventions

Intervention category	Total K	Rand n (range)	Good QR, k (%)	US studies, k (%)	Limited to population with depression sx or hx, k (%)	Limited to other increased risk criteria, k (%)	Age, weighted mean	IG spanned, k (%)	IG weeks duration, weighted mean (range)
Counseling	27	6583 (32-1438)	5 (19)	14 (52)	14 (52)	7 (26)	26.7	Preg: 9 (333) PP: 3 (11) Both: 14 (52)	15.1 (4-70)
Supportive	15	6237 (42-1324)	5 (33)	0 (0)	5 (33)	3 (20)	27	Preg: 2 13) PP: 10 (67) Both: 3 (20)	25.6 (4-52)
Education	12	11,415 (78-5017)	4 (33)	3 (25)	0 (0)	3 (25)	29.8	Preg: 3 (25) PP: 4 (33) Both: 5 (42)	21.6 (1 session-75)
Physical Activity	7	1826 (62-855)	1 (14)	1 (14)	2 (29)	0 (0)	31.1	Preg: 4 (57) PP: 3 (43) Both: 0 (0)	17.0 (8-30)
Infant Sleep	3	980 (54-770)	0 (0)	1 (33)	1 (33)	0 (0)	33.0	Preg: - PP: 2 (67) Both: 1 (33)	12.4 (12-20)
Debriefing	2	2786 (1041-1745)	0 (0)	0 (0)	0 (0)	0 (0)	NR	Preg: - PP: 2 (100) Both: -	1 session (both)
Complementary	7	1060 (46-280)	1 (14)	2 (29)	2 (29)	1 (14)	31.1	Preg: 5 (71) PP: - Both: 2 (29)	8.4 (5-14)
Prophylactic pharmacotherapy	3	105 (22-58)	0 (0)	3 (100)	2 (67)	0 (0)	32.0	Preg: 1 (33) PP: 2 (67) Both: -	20 (AD, both) 1 session (ketamine)

Abbreviations: AD = Antidepressants; IG = Intervention group; Hx = History; K = Number of studies; PP = Postpartum; Preg = Pregnancy; QR = Quality rating; Rand = Randomized; Sx = Symptoms; US = United States

Table 2. Brief Study and Intervention Description, by Intervention Type

IG type	Author, year	Quality rating	N rand	Country	Group	Intervention
Counseling	Boobpamala, 2022[92]	Fair	78	THA	IG1	Four, 60-90 min group sessions (including family members), educational videos, and online/telephone counseling sessions.
	Boran, 2023[93]	Fair	88	TUR	IG1	One 90-min introductory group session and four 60-min group sessions with antenatal nurse
	Brugha, 2000[95]	Fair	209	GBR	IG1	Eight 2-hour weekly CBT antenatal group classes
	Cooper, 2015[99]	Fair	301	GBR	IG1	11 home visits providing supportive counseling, parenting skills, education about infant development and behavior
	Dimidjian, 2016[105]	Fair	86	USA	IG1	Eight weekly, 2-hour group sessions of mindfulness-based cognitive therapy for perinatal depression plus materials given for yoga and at-home meditation guide
	Dugravier, 2013[108]	Fair	367	FRA	IG1	14 home visits to support effective parenting skills and use of health, community, and social support systems
	Feinberg, 2008[110]	Fair	169	USA	IG1	Four prenatal psychoeducational group sessions, followed by 4 postnatal group sessions promoting positive joint parenting
	Goma, 2023[113]	Fair	72	ESP	IG1	8, 90-min Interdisciplinary online therapeutic group intervention
	Gorman, 1997[114]	Fair	45	USA	IG1	Five psychoeducation & IPT sessions during late pregnancy and first four weeks postpartum.
	Kozinsky, 2012[130]	Fair	1438	HUN	IG1	Four 3-hour group IPT/CBT sessions
	Le, 2011[133]	Fair	217	USA	IG1	Eight 120-minute weekly group CBT Mothers and Babies Course prenatal sessions and three individual postpartum booster sessions
	Leung, 2012[134]	Fair	156	HKG	IG1	Four 90-minute group sessions targeting interpersonal issues and intergenerational conflict
	Lewis, 2021[135]	Fair	300	USA	IG1	Telephone-based general wellness intervention, 11 sessions (duration NR)
	Lonnberg, 2020[137]	Fair	193	SWE	IG1	Eight weekly 135-min mindfulness group sessions with meditations
	Munoz, 2007[145]	Fair	41	USA	IG1	12 weekly group CBT prenatal mood management sessions and 4 individual postpartum booster sessions
	Ngai, 2020[147]	Good	388	HKG	IG1	One 180-minute CBT group session and two 30-minute follow-up phone sessions (couples)
					IG2	One 180-minute CBT group session and two 30-minute follow-up phone sessions (women alone)
	Ngai, 2022[146]	Good	455	HKG	IG1	3 weekly, 2-hr in person antenatal counseling sessions delivered to groups of couples, with two, 30-min postpartum, individual telephone sessions (for each parent)
	Ortiz Collado, 2014[154]	Fair	184	FRA,ESP	IG1	Ten 135-min couples' psychosomatic humanist group sessions, ten follow-up phone calls

Table 2. Brief Study and Intervention Description, by Intervention Type

IG type	Author, year	Quality rating	N rand	Country	Group	Intervention
	Phipps, 2013[158]	Good	106	USA	IG1	Five 60-minute prenatal IPT sessions (delivered in group and individual format), one postpartum session delivered in hospital after delivery
	Phipps, 2020[159]	Good	250	USA	IG1	Five, 1-hr prenatal counseling sessions + 1 postpartum booster session
Counseling continued	Tandon, 2011[172]	Fair	98	USA	IG1	Six 120-minute CBT group sessions and five 5-10 minute during one-on-one home visits
	Tandon, 2014[171]	Fair	78	USA	IG1	Six 120-minute group CBT Mothers and Babies Course sessions, five 5-10 minute home visit reinforcements, two group booster sessions
	Tandon, 2021[170]	Fair	874	USA	IG1	Six 90-min group sessions of the Mothers & Babies program delivered by mental health professional
					IG2	Six 90-min group sessions of the Mothers & Babies program delivered by home visitor
	Woolhouse, 2014[182]	Fair	32	AUS	IG1	Six 120-minute weekly mindfulness-based group therapy sessions
	Zlotnick, 2006[185]	Fair	99	USA	IG1	Four 60-minute prenatal group IPT sessions and one 50-minute postpartum individual booster session.
	Zlotnick, 2011[184]	Fair	54	USA	IG1	Four weekly 60-minute prenatal individual IPT sessions followed by one 60-minute booster sessions within 2 weeks of delivery
	Zlotnick, 2016[186]	Good	205	USA	IG1	Four weekly 90-minute IPT prenatal group sessions and one 50-minute individual postnatal session
Supportive	Arakawa, 2023[91]	Good	734	JPN	IG1	Access to mHealth consultation service throughout pregnancy and postpartum periods
	Dennis, 2003[102]	Fair	701	CAN	IG1	Minimum of 4 peer phone support contacts
	Dennis, 2009[101]	Fair	42	CAN	IG1	Telephone-based peer support, length or number of sessions at discretion of peer volunteers.
	Dol, 2022[106]	Fair	171	CAN	IG1	53 text messages (1-2 per day) sent over 6 weeks that provided information related to newborn care and maternal mental health
	Kavanagh, 2021[125]	Good	248	AUS	IG1	Web-based program for couples covering parental mental and physical well-being plus baby care
	Kenyon, 2016[126]	Good	1324	GBR	IG1	Case management by lay pregnancy outreach worker, including support and advice (sessions NR)
	Koc, 2023[128]	Fair	100	TUR	IG1	Access to telehealth counseling for 6 weeks
	Kocak, 2021[129]	Fair	124	TUR	IG1	App-based intervention, included newborn and maternal self-care information and option to request support from healthcare clinician
	Morrell, 2000[143]	Fair	623	GBR	IG1	Ten 3-hour support worker visits per day over the first 28 days postpartum, providing practical and emotional support

Table 2. Brief Study and Intervention Description, by Intervention Type

IG type	Author, year	Quality rating	N rand	Country	Group	Intervention
	Nicolson, 2020[148]	Fair	111	AUS	IG1	Three, 20-40 min in-person Newborn Behavioral Observation sessions over 4 weeks, aimed at supporting infant, parent, and their relationship.
	Reid, 2002[162]	Fair	1004	GBR	IG1	Weekly 2-hour support non-directive group sessions (only 18% attended any meetings)
	Sangsawang, 2022[164]	Good	42	THA	IG1	3 x 60-90 min in-person sessions, plus 4 x 20-25 min phone calls, 1 x 60-90 min home visit
	Shorey, 2019[165]	Fair	138	SGP	IG1	Technology-based (phone call, SMS, or email) peer-support program over 4 weeks.
	Stamp, 1995[169]	Fair	144	AUS	IG1	Two antenatal non-directive, practical, and supportive group sessions held at 32- and 36-weeks' gestation and at 6-weeks postpartum
	Wiggins, 2004[180]	Good	731	GBR	IG1	IG1: Up to 22 in-person supportive listening home visits
	Wiggins, 2004[180]	Good	731	GBR	IG2	IG2: Referral to community support organizations for their standard service; services varied by community organization.
Education	Coo, 2023[96]	Good	128	CHL	IG1	Psychoeducation program delivered via 14 online modules 3x/wk for 5 wks, with virtual individual and group support available
	Fisher, 2016[111]	Good	400	AUS	IG1	Single 6-hour psychoeducational group session for couples that are first-time parents
	Haga, 2019[115]	Fair	1342	NOR	IG1	44 x 10-min internet-based depression prevention sessions over 11.5 months
	Hayes, 2001[118]	Fair	206	AUS	IG1	One PPD informational session reviewing an educational package with an experienced midwife
	Howell, 2012[121]	Fair	540	USA	IG1	15 minute in-person PPD educational session in the hospital post-delivery and follow-up phone call
	Howell, 2014[122]	Fair	540	USA	IG1	15 minute in-person PPD educational session in the hospital post-delivery and follow-up phone call
	Maimburg, 2015[138]	Good	1193	DNK	IG1	Three 3-hour prenatal group education sessions, including a didactic session on PPD
	Missler, 2020[141]	Good	138	NLD	IG1	One prenatal home visit, one postnatal phone call, informational booklet and video
	Nishi, 2022[150]	Fair	5017	JPN	IG1	A 6-week, smartphone-based six-module iCBT program for pregnant women
	Ochoa, 2021[153]	Fair	132	USA	IG1	Six general educational intervention books, 1 delivered prenatally, 5 postnatally.
	Rohder, 2022[163]	Fair	78	DNK	IG1	Nine 90-min home visits with health nurse including an attachment-based parenting intervention
	Trillingsgaard, 2021[174]	Fair	1701	DNK	IG1	Twelve 120-min group parent education sessions with health visitor and other professionals
Physical activity	Aguilar-Cordero, 2019	Fair	140	ESP	IG1	Three, 1hr group aquatic exercise sessions each week for 17 weeks

Table 2. Brief Study and Intervention Description, by Intervention Type

IG type	Author, year	Quality rating	N rand	Country	Group	Intervention
	Lewis, 2021[135]	Fair	300	USA	IG2	Telephone-based exercise intervention, 11 sessions (length NR)
	Norman, 2010[152]	Fair	161	AUS	IG1	Eight 60-minute group exercise sessions followed by 30-minute education sessions
	Perales, 2015[156]	Good	184	ESP	IG1	Ninety 60-minute group exercise sessions (three times per week for 30 weeks)
	Songoygard, 2012[167]	Fair	855	NOR	IG1	Twelve 60-minute group exercise sessions with instructions for home exercise and dietary advice
	Teychenne, 2021[173]	Fair	62	NZL	IG1	12-week, home-based physical activity program which included free exercise equipment at home, access to smartphone web-app and an online forum.
	Vargas-Terrones, 2019[176]	Fair	124	ESP	IG1	Three 60-min group exercise sessions per week for an estimated 15 weeks.
Sleep	Hiscock, 2002[120]	Fair	156	AUS	IG1	Three private consultation sessions to promote infant sleep
	Hiscock, 2014[119]	Fair	770	AUS	IG1	One mailed information packet focused on infant crying and sleeping, and parent self-care; One telephone call (minutes NR); One 1.5-hour group session
	Werner, 2016[178]	Fair	54	USA	IG1	Three in-person sessions plus 1 phone session teaching skills to manage infant crying and promote sleep, plus psychological support
Complementary	Cooijmans, 2022[97]	Fair	127	NLD	IG1	Skin-to-skin contact with 2 home visits
	Little, 2023[136]	Fair	100	USA	IG1	Received an ergonomic infant carrier and instructions on proper use during one home visit
	Davis, 2015[100]	Fair	46	USA	IG1	Eight 75-minute yoga sessions
	Ertekin Pinar, 2018[109]	Fair	220	TUR	IG1	Three 30-40 min home visits with breathing and muscle relaxation exercises
	Hassdenteufel, 2023[117]	Fair	280	DEU	IG1	Electronic mindfulness-based intervention which included 8 weekly, 45min sessions
	Pan, 2019[155]	Good	104	TWN	IG1	Eight 180-minute weekly plus 7-hr 1-day mindfulness training sessions
	Zhang, 2023[183]	Fair	183	HKG	IG1	Nine, mindfulness-based childbirth and parenting group sessions, half-day retreat, and audio mindfulness practices
Prophylactic pharm	Monks, 2022[142]	Fair	25	USA	IG2	One-time, 40-min IV ketamine (40ml) and subcutaneous injection 0.5 mg/kg saline
	Monks, 2022[142]	Fair	25	USA	IG1	One-time subcutaneous injection 0.5 mg/kg ketamine and 40-min IV saline
	Wisner, 2001[51]	Fair	58	USA	IG1	Oral nortriptyline 20-75 mg/day for 20 weeks
	Wisner, 2004[52]	Fair	22	USA	IG1	Oral sertraline (25 to 75mg/day) for 20 weeks

Abbreviations: AUS = Australia; CAN = Canada; CBT = cognitive behavioral therapy; ESP = Spain; DNK = Denmark; FRA = France; GBR = Great Britain; *HKG = Hong Kong;* HUN = Hungary; iCBT = internet-based cognitive behavioral therapy; IG = intervention group; IPT = Interpersonal therapy; JPN = Japan; KOR = Korea; NLD = Netherlands; NOR = Norway; NR = not reported; NZL = New Zealand; pharm = pharmacotherapy; PPD = Postpartum depression; SES = Socioeconomic status; SGP = Singapore; SMS = short message service (text); SWE = Sweden; THA = Thailand; TUR = Türkiye; TWN = Taiwan; USA = United States of America

Table 3. Summary of Pooled Results and Subgroup Analyses for Depression Status Outcome* in Counseling Trials

Variable comparison	Groups for analysis	K (n analyzed)	Effect [RR (95% CI)]	p-values	p-values of group difference†
Total for counseling trials	All	21 (4974)	0.83 (0.72 to 0.95)	0.01	NA
Participant selection for risk: trials limited to selected population vs unselected	Selected (depression history & Other)	17 (2661)	0.69 (0.56 to 0.85)	0.002	0.020
	Unselected	4 (2313)	0.95 (0.88 to 1.02)	0.126	-
Participant selection for risk: trials limited to population selected for increased depression symptoms or history vs populations without this requirement	Depression symptom history	12 (1495)	0.61 (0.47 to 0.78)	0.001	0.002
	No Depression symptom history (includes Low SES and adolescents)	9 (3479)	0.93 (0.85 to 1.02)	0.119	-
Country	USA	13 (1830)	0.62 (0.47 to 0.82)	0.003	0.006
	Non-USA	8 (3144)	0.91 (0.82to 1.01)	0.074	-
Format of delivered sessions	Any group sessions	15 (3842)	0.75 (0.62 to 0.92)	0.008	0.125
	No group session	6 (1132)	0.94 (0.74 to 1.20)	0.564	
Timing of intervention delivery: Interv spanned pregnancy & postpartum vs only spanned single period	Intervention during pregnancy & postpartum period	12 (2125)	0.85 (0.73 to 0.98)	0.033	0.391
	Intervention during single period only (pregnancy or postpartum)	9 (2849)	0.73 (0.50 to 1.07)	0.093	-
Timing of intervention delivery: Interv spanned postpartum period vs pregnancy or pregnancy & postpartum	Intervention during postpartum period only	2 (718)	1.15 (0.00 to 347.57)	0.812	0.440
	Intervention during any other period (pregnancy or both)	19 (4256)	0.81 (0.70 to 0.94)	0.007	-
Timing of intervention delivery: Interv spanned pregnancy vs spanned postpartum period of both pregnancy & postpartum	Intervention in pregnancy period only	5 (1997)	0.76 (0.46 to 1.26)	0.207	0.657
	Intervention during any other period (postpartum or both)	16 (2977)	0.83 (0.70 to 0.97)	0.025	-
Duration of Intervention	NA	21 (4974)	1.00 (0.99 to 1.01)	0.848	NA
# of sessions	NA	21 (4974)	0.99 (0.96 to 1.02)	0.538	NA
Publication year	NA	21 (4974)	1.02 (0.98 to 1.05)	0.21	NA

*Depression status outcome: incidence, prevalence, or the proportion of participants who scored above a prespecified cutoff on a continuous depression symptom severity scale such as the Edinburgh Postnatal Depression Scale (EPDS)
†Bivariate p-values derived from Q test of between subgroups heterogeneity (based on random effects model).

Abbreviations: CI = Confidence interval; Interv = intervention K = Number of studies; NA = Not applicable; RR = Relative risk; SES = Socioeconomic status; USA = United States of America

Table 4. Summary of Evidence

Intervention	Number of included studies	Summary of findings	Consistency and precision	Other limitations	Strength of evidence*	Applicability
Counseling	k=27 n randomized= 6583	*Depression Status:* RR 0.83 (95% CI, 0.72 to 0.95); I^2=0.0% k=21, n analyzed=4974	Consistent, precise	Greater benefit seen in depression status compared to symptom reduction. Few trials report harms.	Moderate for benefit	Mostly pregnant populations at increased risk for PND most commonly based on depressive symptoms; also based on adolescent age, or low SES Interventions most commonly used CBT/IPT approaches.
		Depression Sx Score Changes: SMD -0.35 (95% CI, -0.57 to -0.12); I^2=84% k=20, n analyzed=2880	Consistent, precise			
		Harms: k=3; n analyzed=484 2 trials reported no serious AEs. 1 trial reported no diff in withdrawals due to AEs.	Consistent, imprecise		Low for no serious harms based on low theoretical potential for harm and based on no signal of paradoxical effects on mental health or QOL measures	
Supportive	k=13 n randomized = 5403	*Depression Status:* RR 0.81 (95% CI, 0.57 to 1.16); I^2=36% k=8, n analyzed=3085	Inconsistent, imprecise	Heterogeneous content, format, intensity for supportive interventions.	Low no benefit	Mostly post-partum populations at increased risk for PND most commonly based on depressive symptoms; also based on adolescent age, or low SES
		Depression Sx Score Changes: SMD -0.63 (95% CI, -1.61 to 0.32); I^2=96% k=6, n analyzed=1058	Inconsistent, imprecise			
		Harms: k=1; n analyzed=74 No AE in either group.	Consistency NA, precision NA		Low for no serious harms based on low theoretical potential for harm and based on no signal of paradoxical effects on mental health or QOL measures	
Education	k=11 n randomized = 11,287	*Depression Status:* RR 0.79 (95% CI, 0.70 to 0.88); I^2=0.0% k=7, n analyzed=8319	Consistent, precise	Heterogeneous educational intervention protocols. Instruments for diagnosis were reliant on cut offs	Moderate for benefit in depression status and low for no benefit in depression symptoms	Most trial participants were pregnant unselected for risk and were at lower than average general
		Depression Sx Score Changes: SMD -0.04 (95% CI, -0.16 to 0.09); I^2=32% k=6, n analyzed=6292	Inconsistent imprecise			

Table 4. Summary of Evidence

Intervention	Number of included studies	Summary of findings	Consistency and precision	Other limitations	Strength of evidence*	Applicability
		Harms: No studies reported this outcome	NA	in questionnaires as a proxy for diagnosis.	Low for no serious harm based on low theoretical potential for harm and based on no signal of paradoxical effects on mental health or QOL measures.	US risk estimates
Physical Activity	k=7 n randomized = 1826	*Depression Status:* RR 0.48 (95% CI, 0.35 to 0.66); I^2=0.0% k=6, n analyzed=1574	Consistent, precise	Heterogeneous physical activity intervention protocols. Instruments for diagnosis were reliant on cut offs in questionnaires as a proxy for diagnosis.	Low for benefit	Most trial participants were pregnant with some postpartum women unselected for risk and were at lower than average general US risk estimates
		Depression Sx Score Changes: SMD -0.46 (95% CI, -0.80 to -0.12); I^2=0% k=3, n analyzed=364	Consistent, precise			
		Harms: No trials reported this outcome	NA		Insufficient	
Infant Sleep	k=3 n randomized = 980	*Depression Status:* Study reported OR 0.57 (0.34 to 0.97); p=0.03 k=1, n analyzed=NR	Consistency NA, imprecise	Few trials. Small study sizes.	Insufficient	Pregnant and postpartum women. Most trial participants were unselected for risk and were at lower than average general US risk estimates
		Depression Sx Score Changes: At the longest followup (ranging from 16 to 42 weeks postpartum), trials reported nonstatistically significant results, with MD in change ranging from -1.88 (95% CI, -3.96 to 0.20) in the PHQ-9 to -0.60 (95% CI, -2.02 to 0.82) in the EPDS k=2, n analyzed=199	Consistent, imprecise			
		Harms: No trials reported this outcome	NA		Low for no serious harm based on low theoretical potential for harm and based on no signal of paradoxical effects on mental health or QOL measures	

Table 4. Summary of Evidence

Intervention	Number of included studies	Summary of findings	Consistency and precision	Other limitations	Strength of evidence*	Applicability
Debrief	k=2 n randomized = 2786	*Depression Status:* RR 0.99 (95% CI, 0.87 to 1.11) k=1, n analyzed=1745 Study reported OR 1.24 (0.87 to 1.77) k=1, n analyzed=917	Inconsistent, imprecise	Few trials.	Low for no benefit	All were postpartum. Most trial participants were unselected for risk and were at lower than average general US risk estimates
		Depression Sx Score Changes: No trials reported this outcome	NA			
		Harms: No trials reported this outcome	NA		Insufficient	
Complementary	k=7 n randomized = 1060 3 mindfulness 2 parent-infant attachment 1 yoga 1 breathing/ relaxation	*Depression Status:* Mindfulness: RR 1.20 (95% CI, 0.62 to 2.34) k=1, n analyzed=96 Parent-infant attachment: RR 0.54 (95% CI, 0.14 to 2.11) k=1, n analyzed=78	Consistency NA, imprecise	One trial for each for complementary intervention. Small study sizes.	Insufficient	All were pregnant. Most trial participants were unselected for risk
		Depression Sx Score Changes: Range MDs in Change at longest followup: -2.53 (-4.37 to -0.70) to -0.53 (-3.47 to 2.41) k=4, n analyzed = 453	Consistent NA, imprecise			
		Harms: Mindfulness trials reported no serious adverse events k=2, n=437	NA		Insufficient	
Prophylactic psychotropic pharm	k=3 n randomized = 105	*Depression Status:* Sertraline RR 0.43 (95% CI, 0.13 to 1.45) k=1, n analyzed=22 Nortriptyline RR 0.96 (95% CI, 0.36 to 2.59) k=1, n analyzed=51	Consistency NA, imprecise	One trial for each medication type. Small study sizes.	Insufficient	Women with prior history of postpartum depression studied in antidepressant trials

Table 4. Summary of Evidence

Intervention	Number of included studies	Summary of findings	Consistency and precision	Other limitations	Strength of evidence*	Applicability
		Depression Sx Score Changes: ketamine MDs in Change -1.13 (95% CI, -6.98 to 4.72) [for IG2: -0.51 (95% CI, -5.22 to 4.20)] k=1, n analyzed=15	Consistency NA, imprecise			
		Harms: *Withdrawal due to AE:* Sertraline RR 4.20 (95% CI, 0.24 to 72.29) k=1, n analyzed=22 Nortriptyline RR 1.00 (95% CI, 0.07 to 15.21) k=1, n analyzed=56; *Self-reported AE*:* ketamine IG1 & IG2: RR 0.77 (95% CI, 0.49 to 1.20) k=1, n analyzed=23	Consistency NA, imprecise		Insufficient	

*Self-reported AEs include: nausea, vomiting, shivering, sedation, blurred vision, diplopia, dizziness, anxiety, pruritus, euphoria, amnesia, hallucinations, and nystagmus

Abbreviations: AE = Adverse events; CI = Confidence Interval; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; K = Number of studies; MD = Mean difference; NA = Not applicable; NR = Not reported; PHQ = Patient Health Questionnaire; RR = Relative risk; SMD = Standardized mean difference; Sx = Symptoms

Table 5. Number Needed to Treat to Prevent One Case of Depression With a Counseling Intervention

% developing PND in control group	Number needed to treat	95% CI
13.2*	34.4	21.6 to 108.2
17.0†	26.7	16.8 to 84.0
23.5‡	19.3	12.2 to 60.8

*PND rate in the United States according to 2018 PRAMS data[9]
†PND rate among WIC participants according to 2018 PRAMS data
‡PND rate in the state with the highest PND rates in the United States according to 2018 PRAMS data

Abbreviations: CI = Confidence interval; PND = Perinatal depression

Appendix A. Detailed Methods

Literature Search Strategies for Primary Literature

Bridge search – Date delivered 1/2/2024
Original search – Date delivered 2/9/2023

Sources Searched: database and platform 2016 to present
MEDLINE via Ovid
PsycInfo via Ovid
Cochrane Central Register of Controlled Clinical Trials via Wiley
CINAHL via Ebsco

Search filters used:

Ayiku L, Levay P, Hudson T. The NICE OECD countries' geographic search filters: Part 1-methodology for developing the draft MEDLINE and Embase (Ovid) filters. J Med Libr Assoc. 2021 Apr 1;109(2):258-266. doi: 10.5195/jmla.2021.978. PMID: 34285668; PMCID: PMC8270368

Key:

/ = MeSH subject heading
$ = truncation
ti = word in title
ab = word in abstract
pt = publication type
* = truncation
kw = keyword

MEDLINE via Ovid

Ovid MEDLINE(R) ALL <1946 to February 08, 2023>

1	Pregnancy/	974046
2	Pregnant women/	13644
3	Prenatal care/	31970
4	Perinatal care/	5277
5	Postnatal care/	6370
6	Postpartum period/	30191
7	Peripartum period/	1697
8	Maternal Health Services/	16102
9	Puerperal Disorders/	11639
10	pregnan$.ti,ab,kf.	599354
11	prenatal.ti,ab,kf.	112173
12	pre natal.ti,ab,kf.	1420
13	perinatal.ti,ab,kf.	85148
14	peri natal.ti,ab,kf.	218
15	antenatal.ti,ab,kf.	43497
16	ante natal.ti,ab,kf.	639
17	antepartum.ti,ab,kf.	6611
18	ante partum.ti,ab,kf.	483

19 postnatal.ti,ab,kf. 117626
20 post natal.ti,ab,kf. 8279
21 postpartum.ti,ab,kf. 66779
22 post partum.ti,ab,kf. 13463
23 new mother$.ti,ab,kf. 2128
24 puerperal.ti,ab,kf. 7472
25 or/1-24 1269773
26 Depression/ 147010
27 Depressive Disorder/ 74894
28 Depressive Disorder, Major/ 37344
29 Dysthymic Disorder/ 1172
30 Anxiety/ or Sadness/ 103790
31 depress$.ti,ab,kf. 551652
32 dysthym$.ti,ab,kf. 3315
33 (anxiety or anxious).ti,ab,kf. 261009
34 (blues or sadness).ti,ab,kf. 9033
35 or/26-34 741111
36 25 and 35 39134
37 Depression, Postpartum/ 7208
38 36 or 37 39949
39 prevent$.ti,ab,kf. 1723598
40 ((reduc$ or decreas$) adj5 (risk or incidence$ or symptom$)).ti,ab,kf. 404376
41 ((reduc$ or decreas$) adj5 (depress$ or unhapp$ or melanchol$ or despond$ or despair or grief or malaise)).ti,ab,kf. 31510
42 relaps$.ti,ab,kf. 216289
43 38 and (39 or 40 or 41 or 42) 6870
44 Depression, Postpartum/pc [Prevention & Control] 872
45 43 or 44 7267
46 (clinical trial or adaptive clinical trial or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or equivalence trial or pragmatic clinical trial or Meta-Analysis).pt. 1111100
47 clinical trials as topic/ or adaptive clinical trials as topic/ or clinical trials, phase iii as topic/ or clinical trials, phase iv as topic/ or controlled clinical trials as topic/ or non-randomized controlled trials as topic/ or randomized controlled trials as topic/ or equivalence trials as topic/ or intention to treat analysis/ or pragmatic clinical trials as topic/ or meta-analysis as topic/ 387406
48 control groups/ or double-blind method/ or single-blind method/ or random allocation/ or placebos/ 324741
49 (random$ or placebo or phase iii or phase 3).ti,ab. 1502637
50 (RCT or sham or dummy or single blind$ or double blind$ or allocated or allocation or triple blind$ or treble blind$).ti,ab. 438433
51 ((control$ or clinical) adj3 (study or studies or trial$ or group$)).ti,ab. 1821703
52 (Nonrandom$ or non random$ or non-random$ or quasi-random$ or quasirandom$).ti,ab. 52374
53 ((open label or open-label) adj5 (study or studies or trial$)).ti,ab. 43434
54 ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial$)).ti,ab. 10922har
55 (pragmatic study or pragmatic studies).ti,ab. 557
56 ((pragmatic or practical) adj3 trial$).ti,ab. 5540

57 ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial$)).ti,ab. 11507
58 (metaanaly$ or meta analy$).ti,ab. 259350
59 cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/ or retrospective studies/ 2444797
60 longitudinal.ti,ab. 311514
61 (follow up or followup).ti,ab. 1185949
62 (prospective$ or retrospective$).ti,ab. 1747954
63 (comparison group$ or matched comparison).ti,ab. 23554
64 observational.ti,ab. 251003
65 population$.ti,ab. 2082559
66 Registries/ 107178
67 (registr$ or register$).ti,ab. 527055
68 cohort.ti,ab. 745881
69 pool$.ti,ab. 271728
70 or/46-69 8089411
71 45 and 70 4051
72 limit 71 to (english language and yr="2018 -Current") 1840
73 remove duplicates from 72 1829
74 73 not (animals/ not humans/) 1781
75 afghanistan/ or africa/ or africa, northern/ or africa, central/ or africa, eastern/ or "africa south of the sahara"/ or africa, southern/ or africa, western/ or albania/ or algeria/ or andorra/ or angola/ or "antigua and barbuda"/ or argentina/ or armenia/ or azerbaijan/ or bahamas/ or bahrain/ or bangladesh/ or barbados/ or belize/ or benin/ or bhutan/ or bolivia/ or borneo/ or "bosnia and herzegovina"/ or botswana/ or brazil/ or brunei/ or bulgaria/ or burkina faso/ or burundi/ or cabo verde/ or cambodia/ or cameroon/ or central african republic/ or chad/ or exp china/ or comoros/ or congo/ or cote d'ivoire/ or croatia/ or cuba/ or "democratic republic of the congo"/ or cyprus/ or djibouti/ or dominica/ or dominican republic/ or ecuador/ or egypt/ or el salvador/ or equatorial guinea/ or eritrea/ or eswatini/ or ethiopia/ or fiji/ or gabon/ or gambia/ or "georgia (republic)"/ or ghana/ or grenada/ or guatemala/ or guinea/ or guinea-bissau/ or guyana/ or haiti/ or honduras/ or independent state of samoa/ or exp india/ or indian ocean islands/ or indochina/ or indonesia/ or iran/ or iraq/ or jamaica/ or jordan/ or kazakhstan/ or kenya/ or kosovo/ or kuwait/ or kyrgyzstan/ or laos/ or lebanon/ or liechtenstein/ or lesotho/ or liberia/ or libya/ or madagascar/ or malaysia/ or malawi/ or mali/ or malta/ or mauritania/ or mauritius/ or mekong valley/ or melanesia/ or micronesia/ or monaco/ or mongolia/ or montenegro/ or morocco/ or mozambique/ or myanmar/ or namibia/ or nepal/ or nicaragua/ or niger/ or nigeria/ or oman/ or pakistan/ or palau/ or exp panama/ or papua new guinea/ or paraguay/ or peru/ or philippines/ or qatar/ or "republic of belarus"/ or "republic of north macedonia"/ or romania/ or exp russia/ or rwanda/ or "saint kitts and nevis"/ or saint lucia/ or "saint vincent and the grenadines"/ or "sao tome and principe"/ or saudi arabia/ or serbia/ or sierra leone/ or senegal/ or seychelles/ or singapore/ or somalia/ or south africa/ or south sudan/ or sri lanka/ or sudan/ or suriname/ or syria/ or taiwan/ or tajikistan/ or tanzania/ or thailand/ or timor-leste/ or togo/ or tonga/ or "trinidad and tobago"/ or tunisia/ or turkmenistan/ or uganda/ or ukraine/ or united arab emirates/ or uruguay/ or uzbekistan/ or vanuatu/ or venezuela/ or vietnam/ or west indies/ or yemen/ or zambia/ or zimbabwe/ 1270384
76 "Organisation for Economic Co-Operation and Development"/ 502
77 australasia/ or exp australia/ or austria/ or baltic states/ or belgium/ or exp canada/ or chile/ or colombia/ or costa rica/ or czech republic/ or exp denmark/ or estonia/ or europe/ or finland/ or exp france/ or exp germany/ or greece/ or hungary/ or iceland/ or ireland/ or israel/ or exp italy/ or exp japan/ or korea/ or latvia/ or lithuania/ or luxembourg/ or mexico/ or netherlands/ or new zealand/ or

north america/ or exp norway/ or poland/ or portugal/ or exp "republic of korea"/ or "scandinavian and nordic countries"/ or slovakia/ or slovenia/ or spain/ or sweden/ or switzerland/ or turkey/ or exp united kingdom/ or exp united states/ 3464454
78 European Union/ 17521
79 Developed Countries/ 21295
80 or/76-79 3480211
81 75 not 80 1181557
82 74 not 81 1573

PsycInfo via Ovid
APA PsycInfo <1806 to January Week 5 2023>

1 Pregnancy/ 26149
2 Expectant Mothers/ 938
3 Prenatal Care/ 2158
4 Perinatal Period/ 3821
5 Postnatal Period/ 6137
6 Mother Child Relations/ 22860
7 pregnan$.ti,ab,id. 54302
8 prenatal.ti,ab,id. 22085
9 pre natal.ti,ab,id. 275
10 perinatal.ti,ab,id. 12644
11 peri natal.ti,ab,id. 75
12 antenatal.ti,ab,id. 4283
13 ante natal.ti,ab,id. 66
14 antepartum.ti,ab,id. 401
15 ante partum.ti,ab,id. 12
16 postnatal.ti,ab,id. 22251
17 post natal.ti,ab,id. 1239
18 postpartum.ti,ab,id. 14397
19 post partum.ti,ab,id. 1411
20 new mother$.ti,ab,id. 1498
21 puerperal.ti,ab,id. 537
22 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 116329
23 Major Depression/ 144341
24 Dysthymic disorder/ 1522
25 Anxiety/ 73548
26 depress$.ti,ab,id. 349232
27 dysthym$.ti,ab,id. 3968
28 (anxiety or anxious).ti,ab,id. 236627
29 (blues or sadness).ti,ab,id. 10793
30 23 or 24 or 25 or 26 or 27 or 28 or 29 496264
31 22 and 30 22192
32 Postpartum Depression/ 5686
33 31 or 32 22652
34 preventive mental health services/ or exp Prevention/ 71372
35 prevent$.ti,ab,id. 262132

36 ((reduc$ or decreas$) adj5 (risk or incidence$ or symptom$)).ti,ab,id. 65329
37 ((reduc$ or decreas$) adj5 (depress$ or unhapp$ or melanchol$ or despond$ or despair or grief or malaise)).ti,ab,id. 21259
38 relaps$.ti,ab,id. 31988
39 "Promotion & Maintenance of Health & Wellness".cc. 71387
40 or/34-39 401194
41 exp randomized controlled trials/ or placebo/ or random sampling/ or experiment controls/ or meta analysis/ or (meta analysis or metasynthesis).md. 40406
42 (random$ or placebo or phase iii or phase 3).ti,ab. 258233
43 (RCT or sham or dummy or single blind$ or double blind$ or allocated or allocation or triple blind$ or treble blind$).ti,ab. 76363
44 ((control$ or clinical) adj3 (study or studies or trial$ or group$)).ti,ab. 250600
45 (Nonrandom$ or non random$ or non-random$ or quasi-random$ or quasirandom$).ti,ab. 6208
46 ((open label or open-label) adj5 (study or studies or trial$)).ti,ab. 5115
47 ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial$)).ti,ab. 1150
48 (pragmatic study or pragmatic studies).ti,ab. 134
49 ((pragmatic or practical) adj3 trial$).ti,ab. 1038
50 ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial$)).ti,ab. 6697
51 (metaanaly$ or meta analy$).ti,ab. 48219
52 longitudinal studies/ or prospective studies/ or followup studies/ or retrospective studies/ or between groups design/ 31015
53 ("followup study" or "longitudinal study" or "prospective study" or "retrospective study").md. 243796
54 longitudinal.ti,ab. 133809
55 (follow up or followup).ti,ab. 137325
56 (prospective$ or retrospective$).ti,ab. 123816
57 (comparison group$ or matched comparison).ti,ab. 15358
58 observational.ti,ab. 32818
59 population$.ti,ab. 394635
60 (registr$ or register$).ti,ab. 50778
61 cohort.ti,ab. 82275
62 pool$.ti,ab. 28088
63 or/41-62 1221725
64 33 and 40 and 63 2381
65 limit 64 to (english language and yr="2018 -Current") 737
66 65 not (animal not human).po. 709

Cochrane Central Register of Controlled Clinical Trials (CENTRAL) via Wiley
Date Run: 09/02/2023 18:41:00

ID Search Hits
#1 pregnan*:ti,ab,kw 79738
#2 prenatal:ti,ab,kw 8122
#3 pre natal:ti,ab,kw 249
#4 perinatal:ti,ab,kw 6713
#5 peri natal:ti,ab,kw 27

#6 antenatal:ti,ab,kw 5383
#7 ante natal:ti,ab,kw 83
#8 antepartum:ti,ab,kw 660
#9 ante partum:ti,ab,kw 56
#10 postnatal:ti,ab,kw 6039
#11 post natal:ti,ab,kw 555
#12 postpartum:ti,ab,kw 12539
#13 post partum:ti,ab,kw 1993
#14 (new next mother*):ti,ab,kw 299
#15 puerperal:ti,ab,kw 1127
#16 1-#15 89817
#17 depress*:ti,ab,kw 103690
#18 dysthym*:ti,ab,kw 1030
#19 (anxiety or anxious):ti,ab,kw 67132
#20 (blues or sadness):ti,ab,kw 966
#21 #17 or #18 or #19 or #20 135424
#22 prevent*:ti,ab,kw 265527
#23 (reduc* or decreas*):ti,ab,kw near/5 (risk or incidence* or symptom*):ti,ab,kw 98748
#24 (reduc* or decreas*):ti,ab,kw near/5 (depress* or unhapp* or melanchol* or despond* or despair or grief or malaise):ti,ab,kw 11702
#25 relaps*:ti,ab,kw 45401
#26 #22 or #23 or #24 or #25 366659
#27 #16 and #21 and #26 with Publication Year from 2018 to present, in Trials 1075
#28 #27 NOT conference:pt 974
#29 #28 NOT (clinicaltrials or trialsearch):so 601

CINAHL via Ebsco

Query Limiters/Expanders Last Run Via Results
S18 S16 NOT S17 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 1,229
S17 (MH animals NOT MH humans) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 97,675
S16 S12 AND S15 Limiters - Published Date: 20180101-; English Language
Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 1,233
S15 S13 OR S14 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 2,802,755
S14 (MH "Case Control Studies+") OR (MH "Prospective Studies+") OR (MH "Evaluation Research+") OR (MH "Retrospective Design") OR (MH "Cross Sectional Studies") OR (MH "Multivariate Analysis") OR (MH "Chi Square Test+") OR (MH "Multiple Logistic Regression") OR (MH "Observational Methods+") OR

(TI (case control* OR cohort OR longitudinal OR follow-up OR followup OR prospective* OR comparison group* OR control group* OR observational OR retrospective* OR database* OR nonrandomi* OR non-randomi* OR population* OR registr* OR register* OR cross-sectional OR multivariate OR pool* OR logistic regression OR pre-post OR "pre and post*" OR matching OR sub-group analys$ or "we observed" OR (matched N2 compar$))) OR (AB (case control* OR cohort OR longitudinal OR follow-up OR followup OR prospective* OR comparison group* OR control group* OR observational OR retrospective* OR database* OR nonrandomi* OR non-randomi* OR population* OR registr* OR register* OR cross-sectional OR multivariate OR pool* OR logistic regression OR pre-post OR "pre and post*" OR matching OR sub-group analys$ or "we observed" OR (matched N2 compar$))) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 2,361,895
S13 (MH "Clinical Trials+") OR (MH "Meta Analysis") OR (MH "Placebos") OR (MH "Random Sample+") OR (MH "Control Group") OR (MH "Pretest-Posttest Design+") OR (MH "Cluster Sample+") OR (MH "Sample Size") OR (MH "Comparative Studies+") OR (MH "Crossover Design") OR PT (Clinical Trial OR Meta Analysis OR Meta Synthesis OR Randomized Controlled Trial OR Systematic Review) OR (TI (random* OR placebo OR randomly OR "phase iii" OR "phase 3" OR RCT OR sham OR dummy OR double blind* OR allocated OR allocation OR triple blind* OR treble blind* OR Nonrandom* OR quasirandom* OR pragmatic study OR pragmatic studies OR metaanaly* OR meta analy*)) OR (AB (random* OR placebo OR randomly OR "phase iii" OR "phase 3" OR RCT OR sham OR dummy OR double blind* OR allocated OR allocation OR triple blind* OR treble blind* OR Nonrandom* OR quasirandom* OR pragmatic study OR pragmatic studies OR metaanaly* OR meta analy*)) OR (TI ((control* OR clinical) N3 (study OR studies OR trial* OR group*))) OR (TI ((open label OR open-label) N5 (study OR studies OR trial*))) OR (TI ((equivalence OR superiority OR non-inferiority OR noninferiority) N3 (study OR studies OR trial*))) OR (TI ((pragmatic OR practical) N3 trial*)) OR (TI ((quasiexperimental OR quasi-experimental) N3 (study OR studies OR trial*))) OR (AB ((control* OR clinical) N3 (study OR studies OR trial* OR group*))) OR (AB ((open label OR open-label) N5 (study OR studies OR trial*))) OR (AB ((equivalence OR superiority OR non-inferiority OR noninferiority) N3 (study OR studies OR trial*))) OR (AB ((pragmatic OR practical) N3 trial*)) OR (AB ((quasiexperimental OR quasi-experimental) N3 (study OR studies OR trial*))) OR (MH (sample size) AND AB (assigned OR allocated OR control)) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 1,386,715
S12 S10 OR S11 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 4,049
S11 (MH "Depression, Postpartum/PC") Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 1,014
S10 S5 AND S9 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 3,461
S9 S6 OR S7 OR S8 Expanders - Apply equivalent subjects

Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 599,806
S8 TI (((reduc* or decreas*) N5 (depress* or unhapp* or melanchol* or despond* or despair or grief or malaise))) OR AB (((reduc* or decreas*) N5 (depress* or unhapp* or melanchol* or despond* or despair or grief or malaise))) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 13,732
S7 TI (((reduc* or decreas*) N5 (risk or incidence* or symptom*))) OR AB (((reduc* or decreas*) N5 (risk or incidence* or symptom*))) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 146,141
S6 TI (prevent* or relaps*) OR AB (prevent* or relaps*) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 482,842
S5 S3 OR S4 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 20,288
S4 (MH "Depression, Postpartum") Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 6,891
S3 S1 AND S2 Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 18,795
S2 (MH "Depression") OR (MH "Dysthymic Disorder") OR (MH "Sadness") OR (MH "Anxiety") OR TI (depress* OR dysthym* OR anxiety OR anxious OR blues OR sadness) OR AB (depress* OR dysthym* OR anxiety OR anxious OR blues OR sadness) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 284,945
S1 (MH "Pregnancy") OR (MH "Perinatal Period") OR (MH "Postnatal Period") OR (MH "Postnatal Care") OR (MH "Prenatal Care") OR (MH "Maternal Health Services") OR (MH "Puerperal Disorders") OR TI (pregnan* OR prenatal OR "pre natal" OR perinatal OR "peri natal" OR antenatal OR "ante natal" OR antepartum OR "ante partum" OR postnatal OR "post natal" OR postpartum OR "post partum" OR "new mother*" OR puerperal) OR AB (pregnan* OR prenatal OR "pre natal" OR perinatal OR "peri natal" OR antenatal OR "ante natal" OR antepartum OR "ante partum" OR postnatal OR "post natal" OR postpartum OR "post partum" OR "new mother*" OR puerperal) Expanders - Apply equivalent subjects
Search modes - Boolean/Phrase Interface - EBSCOhost Research Databases
Search Screen - Advanced Search
Database - CINAHL with Full Text 327,270

Appendix A Table 1. Common Depression Symptom Severity Scales

Instrument	Number of Items	Scoring Range	Administration Time	Typical Cut-Points
Beck Depression Inventory (BDI/BDI-II)	21	0-63	10 minutes	11 = mild 17 = borderline clinical 21 = moderate 31 = severe 40 = extreme
Center for Epidemiologic Studies Depression Scale (CES-D)	20	0-60	10 minutes	16
Edinburgh Postnatal Depression Scale (EPDS)	10	0-30	5 minutes	0-9 = mild distress 10-12 = moderate distress 13 = high likelihood of diagnosis
General Health Questionnaire (GHQ)	60 (full questionnaire)	Varied	6-8 minutes	Varied
Geriatric Depression Scale (GDS Long Form)	30	0-30	5 minutes	0-9 = normal 10-19 = mild 20-30 = severe
Geriatric Depression Scale, 15 item (GDS Short Form)	15	0-15	5-7 minutes	≥ 6
Hamilton Depression Rating Scale (HDRS/HAM-D)	17	0-54	15 minutes	7-17 = mild 18-24 = moderate ≥24 = severe
Hospital Anxiety and Depression Scale (HADS)	14 (7 specific to depression)	0-21	2-5 minutes	≥ 8
Leverton Questionnaire (LQ)	24	0-48	NR	11-14 = risk of minor depression 15+ = risk of major depression
Montgomery-Asberg Depression Rating Scale (MADRS)	10	0-60	15 minutes	15 = mild 25 = moderate 31 = severe 44 = very severe
Patient Health Questionnaire– Depression (PHQ-9)	9	0-27	5-10 minutes	<5 = minimal 5-9 = mild 10-14 = moderate 15-19 = moderately severe 20-27 = severe
Profile of Mood States (POMS)	65 The depression subscale (POMS-D) contains 15 items	0-60	8-10 minutes	Not established
Symptom Checklist (SCL-90-r)	90	NR	12-15 minutes	NR

Appendix A Table 2. Inclusion and Exclusion Criteria

Category	Included	Excluded
Aim/ Objective	Studies with a primary aim to prevent perinatal depression	Studies restricted to screening for and treatment of depression during pregnancy or in the postpartum period
Population	Pregnant and postpartum (≤1 year) individuals; may target individuals with mental health symptoms or disorders (see exceptions under exclusion criteria)	• Studies limited to perinatal individuals currently experiencing or being treated for a depressive episode • Studies limited to women with psychotic or development disorders (e.g., schizophrenia, pervasive development disorder) • Studies limited to individuals with a medical condition (e.g., HIV/AIDS) • Studies limited to spouses or domestic partners • Studies limited to individuals in institutions (e.g., psychiatric inpatients, prison inmates, juvenile detention centers, foster homes, group homes) • Studies limited to persons in long-term care or residential facilities Studies in mixed populations that include >50% of any of the above populations will be excluded
Interventions	Interventions to reduce the risk of perinatal depression initiated during pregnancy or the first year postpartum, including: • Behavioral counseling, educational, or supportive interventions • Physical activity • Prophylactic psychotropic pharmacotherapy • Infant/parent sleep promotion • Complementary therapies (e.g., yoga, light therapy)	• Interventions within closed preexisting social networks (e.g., church, worksite) • General parenting education without a mental health component (e.g., prenatal or infant care classes) • Dietary supplements • Hormonal therapies • Care delivery model interventions
Comparators	• No intervention • Usual care • Waitlist • Attention control • Minimal intervention (e.g., usual care limited to no more than 15 minutes of information) • Placebo required for medication trials	

Appendix A Table 2. Inclusion and Exclusion Criteria

Category	Included	Excluded
Outcomes	**KQ 1:** Maternal health outcomes: • Depression incidence or symptoms (required) • Suicide deaths, attempts, or ideation, including self-harm • Anxiety incidence or symptoms • Health-related quality of life, including stress • Functioning, including maternal functioning • ED visits & hospital admission admissions, including psychiatric hospital admissions • Marital discord and family function Infant/child health outcomes (for newborn infant or other children in the family): • Mortality • Neglect or abuse • Physical, social, emotional, or behavioral development • Attachment or bonding • Achievement of recognized developmental milestones • Health care utilization (e.g., emergency department visits, hospital admissions, neonatal intensive care unit stays/number of days) **KQ 2**: • Serious maternal or fetal/infant harms related to antidepressant use. • Neonatal intensive care unit admission • Serious harms reported in trials of treatment benefit. • Withdrawals due to adverse events in trials of treatment benefit	**KQ 1**: Maternal behavioral intermediate outcomes (e.g., physical activity levels, dietary intake)
Timing of Outcome Assessment	**KQ 1**: ≥6 weeks after baseline assessment or intervention initiation **KQ 2**: ≥6 weeks after baseline assessment or intervention initiation For prophylactic psychotropic pharmacotherapy interventions only: Any time after the intervention is initiated	**KQ 1**: <6 weeks after baseline assessment or intervention initiation

Appendix A Table 2. Inclusion and Exclusion Criteria

Category	Included	Excluded
Settings	• Primary care settings • Virtual (e.g., Web-based interventions) • Mental health clinic settings • Community settings • Home visits	• Correctional facilities • School classrooms • Worksites • Inpatient/residential/long-term care facilities • Emergency departments
Study Designs	**KQ 1:** RCTs **KQ 2:** RCTs; for medications determined to be efficacious in KQ1 evidence: RCTs, existing systematic reviews.	All other study designs (e.g., case report, case series)
Countries	Countries categorized as "Very High" on the 2021 Human Development Index, as defined by the United Nations Development Programme	Countries not categorized as "Very High" on the Human Development Index
Languages	English	Languages other than English
Quality	Fair or good, according to design-specific criteria	Poor, according to design-specific criteria

Abbreviations: ED = Emergency department; KQ = Key question; RCT = Randomized, controlled trials

Appendix A Table 3. Study-Design Quality Rating Criteria

Study Design	Adapted Quality Criteria
Randomized clinical trials*, adapted from U.S. Preventive Services Task Force Manual[2]	**Bias arising in the randomization process or due to confounding** • Valid random assignment/random sequence generation method used • Allocation concealed • Balance in baseline characteristics **Bias due to departures from intended interventions** • Fidelity to the intervention protocol • Low risk of contamination between groups • Participants were analyzed as originally allocated **Bias from missing data** • No, or minimal, post-randomization exclusions • Outcome data are reasonably complete and comparable between groups • Reasons for missing data are similar across groups • Missing data are unlikely to bias results **Bias in measurement of outcomes** • Outcomes are measured using consistent and appropriate procedures and instruments across treatment groups • No evidence of biased use of inferential statistics **Bias in reporting results selectively** No evidence that the measures, analyses, or subgroup analyses are selectively reported

*Good quality studies generally meet all quality criteria. Fair quality studies do not meet all the criteria but do not have critical limitations that could invalidate study findings. Poor quality studies have a single fatal flaw or multiple important limitations that could invalidate study findings. Critical appraisal of studies using *a priori* quality criteria are conducted independently by at least two reviewers. Disagreements in final quality assessment are resolved by consensus, and, if needed, consultation with a third independent reviewer.

Abbreviations: KQ = Key Question; U.S. = United States

Appendix A Figure 1. Risk of Bias in Counseling Trials, by Domain

Quality	Author Year	Domain: Randomization process/confounding	Intervention deviations	Missing data	Outcome measurement(s)	Selective reporting
Good	Ngai, 2020	✓	✓	✓	✓	✓
	Ngai, 2022	✓	✓	✓	✓	✓
	Phipps, 2013	✓	✓	✓	✓	✓
	Phipps, 2020	✓	✓	✓	✓	✓
	Zlotnick, 2016	✓	✓	✓	✓	✓
Fair	Boobpamala, 2022	▲	✓	✓	✓	✓
	Boran, 2023	✓	✓	▲	✓	✓
	Brugha, 2000	▲	✓	✓	✓	✓
	Cooper, 2015	▲	▲	✓	✓	✓
	Dimidjian, 2016	✕	✓	✓	✓	✓
	Dugravier, 2013	✓	✓	▲	✓	✓
	Feinberg, 2008	▲	✓	▲	✓	✓
	Goma, 2023	✕	✓	✓	✓	✓
	Gorman, 1997	▲	✓	▲	✓	✓
	Kozinsky, 2012	▲	✓	▲	✓	✓
	Le, 2011	▲	✓	▲	▲	✓
	Leung, 2012	✓	✓	▲	✓	✓
	Lewis, 2021	✓	✓	▲	✓	✓
	Lonnberg, 2020	✓	✓	▲	▲	✓
	Munoz, 2007	✓	✓	▲	✓	✓
	Ortiz Collado, 2014	✓	✓	✕	✓	✓
	Tandon, 2011	✕	✓	✕	✓	✓
	Tandon, 2014	▲	▲	✕	✓	✓
	Tandon, 2021	▲	✓	✓	✓	✓
	Woolhouse, 2014	▲	▲	▲	✓	✓
	Zlotnick, 2006	▲	✓	▲	✓	✓
	Zlotnick, 2011	✓	✓	▲	✓	✓

Risk of Bias
✕ High
✓ Low
▲ Moderate

Appendix A Figure 2. Risk of Bias in Supportive and Education Trials, by Domain

IG category	Quality	Author Year	Domain: Randomization process/confounding	Domain: Intervention deviations	Domain: Missing data	Domain: Outcome measurement(s)	Domain: Selective reporting
Supportive	Good	Arakawa, 2023	✓	✓	✓	✓	✓
		Kavanagh, 2021	✓	✓	✓	✓	✓
		Kenyon, 2016	✓	✓	✓	✓	✓
		Sangsawang, 2022	✓	✓	✓	✓	✓
		Wiggins, 2004	✓	✓	✓	✓	✓
	Fair	Dennis, 2003	✓	▲	✓	✓	✓
		Dennis, 2009	▲	✓	✓	✓	✓
		Dol, 2022	✓	✓	▲	✓	✓
		Koc, 2023	✓	▲	✕	✓	✓
		Kocak, 2021	✓	✓	▲	✓	✓
		Morrell, 2000	▲	✓	▲	✓	✓
		Nicolson, 2020	✓	✓	▲	✓	✓
		Reid, 2002	✓	▲	▲	✓	▲
		Shorey, 2019	▲	✓	✓	✓	✓
		Stamp, 1995	✓	▲	▲	✓	✓
Education	Good	Coo, 2023	✓	✓	✓	✓	✓
		Fisher, 2016	✓	✓	✓	✓	✓
		Maimburg, 2015	✓	✓	✓	✓	✓
		Missler, 2020	✓	✓	✓	✓	✓
	Fair	Haga, 2019	✓	✓	▲	✓	✓
		Hayes, 2001	✓	✓	▲	▲	✓
		Howell, 2012	▲	✓	▲	✓	✓
		Howell, 2014	▲	✓	▲	✓	✓
		Nishi, 2022	✓	✕	▲	✓	▲
		Ochoa, 2021	✓	✓	▲	✓	✓
		Rohder, 2022	▲	✓	✓	▲	✓
		Trillingsgaard, 2021	✓	✓	▲	▲	✓

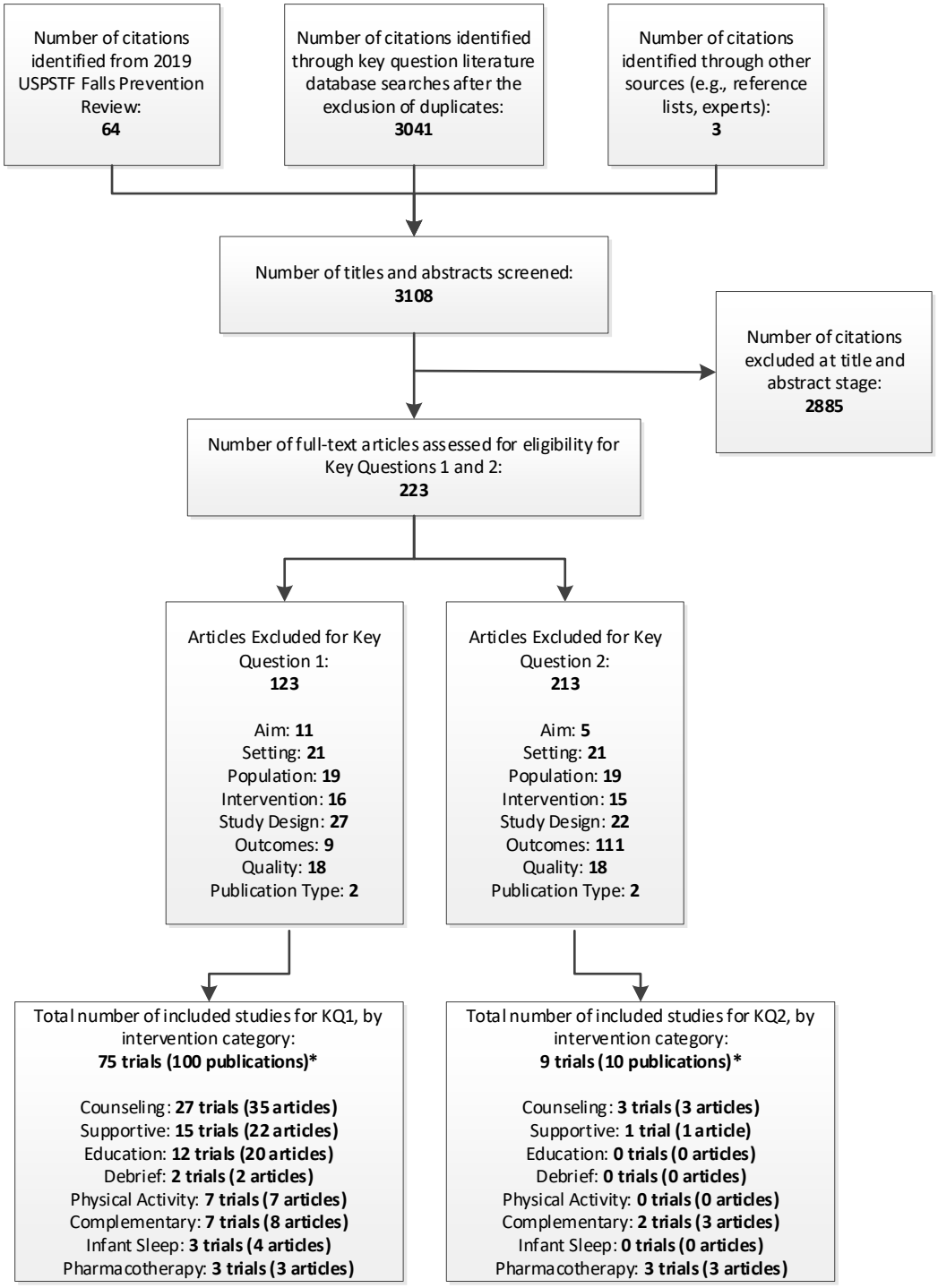
Risk of Bias
✕ High
✓ Low
▲ Moderate

Appendix A Figure 3. Risk of Bias in Other Intervention Trials, by Domain

IG category	Quality	Author Year	Domain: Randomization process/confounding	Intervention deviations	Missing data	Outcome measurement(s)	Selective reporting
Infant sleep	Fair	Hiscock, 2002	✓	▲	✓	✓	✓
		Hiscock, 2014	✓	✓	▲	✓	✓
		Werner, 2016	▲	▲	▲	▲	✓
Debrief	Fair	Priest, 2003	✓	▲	▲	✓	✓
		Small, 2000	✓	▲	✓	✓	✓
Complementary	Good	Pan, 2019	✓	✓	✓	✓	✓
	Fair	Cooijmans, 2022	✓	✓	✓	▲	✓
		Davis, 2015	▲	✓	✓	✓	✓
		Ertekin Pinar, 2018	▲	▲	✓	▲	✓
		Hassdenteufel, 2023	▲	✓	✕	✓	✓
		Little, 2023	▲	✓	✓	✓	✓
		Zhang, 2023	✓	✓	✕	✓	✓
Physical Activity	Good	Perales, 2015	✓	✓	✓	✓	✓
	Fair	Aguilar-Cordero, 2019	▲	✓	✓	✓	✓
		Lewis, 2021	✓	✓	▲	✓	✓
		Norman, 2010	▲	✓	✕	✓	✓
		Songoygard, 2012	✓	▲	✓	✓	✓
		Teychenne, 2021	▲	✓	✓	✓	✓
		Vargas-Terrones, 2019	✓	✓	▲	✓	✓
Prophylactic psychotropic pharmacotherapy	Fair	Monks, 2022	▲	✓	▲	✓	✓
		Wisner, 2001	✕	✓	▲	✓	✓
		Wisner, 2004	✕	✓	✕	✓	✓

Risk of Bias
✕ High
✓ Low
▲ Moderate

Appendix B Figure 1. Literature Flow Diagram



*Study may appear in more than one intervention category.

Included studies List, by Intervention Type

Ancillary publication(s) indented under primary article

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Appendix D. Excluded Studies List

Reason for Exclusion*
E1. Study Relevance: Not applicable/relevant to key question
E1a. Depression not a primary aim
E2: Setting: Conducted in an ER, school/classroom, inpatient facility, institutional/residential facility, workplace, church, or other closed social network
E2a: Setting: Conducted in a non-very-high HDI country
E3: Comparative effectiveness (multiple active interventions, no control condition, including pharmacogenetic studies and other studies looking at treatment matching)
E4: Insufficient followup time (<6 weeks)
E5: Outcome: No relevant outcomes
E5a. Ancillary article but Primary publication is excluded
E6a: Population: Study is limited to (or primarily comprised of) perinatal women currently experiencing or being treated for a depressive episode
E6b: Population: Study is limited to women with psychotic or development disorders (e.g., schizophrenia, pervasive development disorder)
E6c: Population: Other population exclusion
E7a: Intervention: General parenting education without a mental health component (e.g., prenatal or infant care classes)
E7b: Intervention: Target of intervention is the partner's depression
E7c: Intervention: Not one of the specified interventions or not feasible/referable
E7d: Intervention: Other intervention exclusion
E7e: Harms RCT of a Non-included intv (pharm)
E8: Study Design: [KQ1: Not an RCT; KQ2: Not an RCT from KQ1; Not a ESR]
E9a: Study Quality
E10: Non-English
E11: Unable to locate article
E12: Conference and/or presentation abstract

* Assigned at full-text phase, except for quality which was assigned after risk of bias assessment

1. Aguilar-Cordero, M. J.,Sanchez-Garcia, J. C.,Rodriguez-Blanque, R.,Sanchez-Lopez, A. M.,Mur-Villar, N. (2019). Moderate Physical Activity in an Aquatic Environment During Pregnancy (SWEP Study) and Its Influence in Preventing Postpartum Depression Journal of the American Psychiatric Nurses Association, 25(2), 112-121. PMID: 29490560. https://dx.doi.org/10.1177/1078390317753675. **KQ1E1a**, **KQ2E1a**
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B.,Feinberg, M. E. (2022). Promoting parenting in home visiting: A CACE analysis of Family Foundations Journal of Family Psychology, 36(2), 225-235. PMID: 34166030. https://dx.doi.org/10.1037/fam0000888. **KQ1E3**, **KQ2E5**

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8. Baziyants, G. A.,Dodge, K. A.,Bai, Y.,Goodman, W. B.,O'Donnell, K.,Murphy, R. A. (2023). The effects of a universal short-term home visiting program: Two-year impact on parenting behavior and parent mental health Child Abuse & Neglect, 140(#issue#), 106140. PMID: 36963242. https://dx.doi.org/10.1016/j.chiabu.2023.106140 **KQ1E7aKQ2E7a**
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28. Ertekin Pinar, S.,Daglar, G.,Duran Aksoy, O. (2022). The effect of stress management training on perceived stress, anxiety and hopelessness levels of women with high-risk pregnancy Journal of Obstetrics & Gynaecology, 42(1), 17-22. PMID: 33892613.

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Appendix E Table 1. Study and Population Characteristics for Counseling RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Boobpamala, 2022[3] the Early Depressive Prevention Program (EDPP)	Fair	THA	78	Pregnant Thai adolescents, aged 15-19, <26 weeks' gestation	Other characteristic (not depr)	Adolescents only	Pregnant	17	18 (15 to 19)
Boran, 2023[4] Thinking Healthy Program – Brief Group version (THP-BGV)	Fair	TUR	88	Low-income pregnant women, ≥18 years of age and 12-30 weeks' gestation	Other characteristic (not depr)	Low SES	Pregnant	21	29 (≥18)
Brugha, 2000[5] Preparing for Parenthood (PFP)	Fair	GBR	209	Primiparous, 12-20 weeks' gestation, at increased risk of PPD	Depr Sx or Hx	Not specified, but most participants had GHQ-D ≥2 or low social support	Pregnant	16	19 (16 to 38)
Cooper, 2015[6]	Fair	GBR	301	Primiparous women scoring at risk of developing PPD	Depr Sx or Hx	Cooper predictive index >15 (indicating 30% risk of PPD)	Pregnant	30	28 (15 to 39)
Dimidjian, 2016[7]	Fair	USA	86	Pregnant adult women, up to 32 weeks' gestation, history of depression	Depr Sx or Hx	History of MDD	Pregnant	16	30 (NR)
Dugravier, 2013[8] Parental Skills and Attachment in Early Childhood (CAPEDP)	Fair	FRA	367	First-time mothers age <26 and high-risk based on SES, 12-27 weeks gestation	Other characteristic (not depr)	Low SES	Pregnant	19.5	22 (<26)
Feinberg, 2008[9] Family Foundations	Fair	USA	169	Heterosexual couples living together expecting first child	Unselected	(none)	Pregnant	22.9	28 (≥18)

Appendix E Table 1. Study and Population Characteristics for Counseling RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Goma, 2023[10] Grupo Interdisciplinar Online (GIO)	Fair	ESP	72	Pregnant or postpartum women (20-32 weeks' gestation to 2 mo postpartum), aged 18 and older who met high-risk criteria for anxiety or depression	Depr Sx or Hx; Low SES	EPDS≥9 results and/ or STAI-trait and state>39; recruited from Low SES community	Pregnant	NR	31 (19 to 42)
Gorman, 1997[11]	Fair	USA	45	Pregnant women in third trimester, high risk based on personal or family history of depression, low support, or life events	Depr Sx or Hx + other characteristic	High risk for PPD (history of depression, BDI≥12, first degree relative treated for a psychiatric illness, DAS<100, unmarried/without a partner, or ≥2 significant negative life events).	Pregnant	32	28 (NR)
Kozinsky, 2012[12]	Fair	HUN	1438	Hungarian women, 25 weeks' gestation, only abstracted non-depressed subgroup, LQ≤11	Unselected	(none)	Pregnant	25	27 (NR)
Le, 2011[13] Mothers and Babies (MB)	Fair	USA	217	Latinas, ≤24 weeks gestation, at high risk for depression (CESD ≥16 or personal or family history of depression)	Depr Sx or Hx	CESD ≥16 or a personal or family history of depression	Pregnant	14	25 (18 to 35)
Leung, 2012[14]	Fair	HKG	156	Pregnant women at 14-32 weeks' gestation	Unselected	(none)	Pregnant	20.2	31 (≥18)
Lewis, 2021[15]	Fair	USA	300 [IG1 & CG]	Postpartum women with a history of depression but not currently depressed	Depr Sx or Hx	Previous history of depression (diagnosed by a healthcare provider or prescribed antidepressant medication), per self-report	Postpartum	4.4	31 (≥18)
Lonnberg, 2020[16] Mindfulness-Based Childbirth and	Fair	SWE	193	First-time pregnant women, 15-22 weeks' gestation, history of depression or anxiety	Depr Sx or Hx	History of depression	Pregnant	19	32 (≥18)

Appendix E Table 1. Study and Population Characteristics for Counseling RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Parenting (MBCP)									
Munoz, 2007[17] Mothers and Babies (MB)	Fair	USA	41	Low-income women, primarily immigrant Latina, 12-32 weeks' gestation, meeting high-risk criteria for MDE	Depr Sx or Hx	Met high-risk criteria for MDE (i.e., a past history of MDE and/or ≥16 on the CES-D)	Pregnant	16	25 (≥18)
Ngai, 2020[18]	Good	HKG	388	First-time parents, second or third trimester of singleton pregnancy	Unselected	(none)	Pregnant	NR (recruited g12-38)	32 (>18)
Ngai, 2022[19]	Good	HKG	455	First-time parents, 12–30-week singleton uncomplicated pregnancy	Unselected	(none)	Pregnant	NR (recruited g12-30)	33 (>18)
Ortiz Collado, 2014[20]	Fair	FRA; ESP	184	Low SES women, ≤20 weeks' gestation, at moderate to high risk of PPD (≥3 on risk rating scale)	Depr Sx or Hx	Righetti-Veltema antenatal PPD risk interview score ≥3	Pregnant	12	29.3 (18 to 43)
Phipps, 2013[21] Relaxation, Encouragement, Appreciation, Communication, Helpfulness program (REACH)	Good	USA	106	Adolescents (age ≤17 years at conception), <25 weeks' gestation, no current affective disorder.	Depr Sx or Hx	Adolescents only	Pregnant	20.5	16 (13 to 18)
Phipps, 2020[22] Relaxation, Encouragement, Appreciation, Communication, and Helpfulness 2 (REACH2)	Good	USA	250	Adolescents, less than 25 weeks of gestation at their first prenatal visit	Other characteristic (not Depr)	Adolescents only	Pregnant	14.7	17 (≤18)
Tandon, 2011[23] Mothers & Babies (MB)	Fair	USA	98	Low income, pregnant and up to 26-weeks postpartum, elevated depressive symptoms (CES-D ≥16) and/or lifetime depressive episode (but were not	Depr Sx or Hx	CES-D ≥16 or a lifetime depressive episode	Both	13	23 (NR)

Appendix E Table 1. Study and Population Characteristics for Counseling RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
				currently exhibiting a depressive episode)					
Tandon, 2014[24] Mothers and Babies (MB)	Fair	USA	78	Low income, pregnant and up to 26 weeks postpartum, elevated depressive symptoms (CES-D ≥ 16) and/or lifetime depressive episode (but not currently exhibiting a depressive episode)	Depr Sx or Hx	CES-D ≥16 or a lifetime depressive episode	Both	8	24 (NR)
Tandon, 2021[25] Mothers and Babies (MB)	Fair	USA	874	Pregnant women ≥16 years old, enrolled in a home visiting program	Low SES; Other characteristic (not Depr)	HV program recipient (Women served by HV are characterized by many of the same risk factors as PPD, including lower income, limited social support, stressful life events, and poor marital relationships)	Pregnant	23	26 (NR)
Woolhouse, 2014[26] MindBabyBody	Fair	AUS	32	Pregnant women, 11-33 weeks' gestation	Unselected	(none)	Pregnant	19	32 (18 to 50)
Zlotnick, 2006[27] Reach Out, Stand strong, Essentials for new mothers (ROSE)	Fair	USA	99	Pregnant women, 23-32 weeks' gestation, on public assistance and at risk for postpartum depression but not currently depressed	Depr Sx or Hx	Cooper predictive index ≥27	Pregnant	27.5	22.4 (NR)
Zlotnick, 2011[28]	Fair	USA	54	Pregnant women 18 to 40 years old with low SES and past-year intimate partner violence	Other characteristic (not depr)	Low SES and past-year intimate partner violence	Pregnant	21.3	24 (18 to 40)
Zlotnick, 2016[29] Reach Out, Stand strong, Essentials for	Good	USA	205	Pregnant women, 20-35 weeks' gestation, receiving public assistance and ≥27 on the CSQ and no current depression	Depr Sx or Hx	Cooper predictive index ≥27	Pregnant	27.1	23 (≥18)

Appendix E Table 1. Study and Population Characteristics for Counseling RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
new mothers (ROSE)									

Abbreviations: Avg = Average; AUS = Australia; BDI = The Beck Depression Inventory; BL = Baseline; CES-D = Center for Epidemiologic Studies Depression Scale; CG: Control Group; CSQ = Client Satisfaction Questionnaire; DAS = Depression, Anxiety, & Stress Scale; Depr = Depression; ESP = Spain; FRA = France; G = Weeks' gestation; GBR = Great Britain; Gest = Gestation; GHQ = General Health Questionnaire; *HKG* = Hong Kong; HUN = Hungary; Hx = History; IG = Intervention group; LQ = Leverton Questionnaire; MDD = Major depressive disorder; MDE = Major depressive disorder; NR = Not reported; PP = Postpartum; PPD = Postpartum depression; Rand = Randomized; RCT = Randomized controlled trial; SES = Socioeconomic status; SWE = Sweden; Sx = Symptoms; THA = Thailand; TUR = Türkiye; USA = United States of America; Wks = Weeks

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
Boobpamala, 2022[3] the Early Depressive Prevention Program (EDPP)	NR	<HS: 68 HS Grad: 21 College Grad: NR Post College Degree: NR	NR	79	21	NA	NR	First pregnancy, %: 85 Unplanned pregnancy, %: 80 Employment: Student, %: 25 Housewife, %: 56 General contractor, %: 19 Vocational certificate, %: 11	NR	NR
Boran, 2023[4]	NR	<HS: 22 HS Grad: 26 College Grad: 47 Post College Degree: 2	32	NR	NR	NR	67	NR	NR	NR
Brugha, 2000[5] Preparing for Parenthood (PFP)	White: 73 Black/AfrAm: 0 Hispanic/Latino: 0 Asian: 0 NA/AI: 0 Other: 27	NR	NR	NR	NR	NR	100	16.5% high (≥6) social support, 83.5% low (≥5) social support [Social Support measurement NR]	BL GHQ-D ≥3: 22.5 (depr defined as GHQ-D score ≥2) Depr hx: NR	NR
Cooper, 2015[6]	NR	<HS: 33 HS Grad: 40 College Grad: 27 Post College Degree: 0	85	NR	5	NR	100	NR	BL Cooper predictive index >15: 100 [per inclusion criteria] Depressed over last week: 55 Past hx of depr	33 (Anx during pregnancy)

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
									resulting in seeking professiona l help: 52	
Dimidjian, 2016[7]	White: 71 Black/AfrAm: NR Hispanic/Lati no: NR Asian: NR NA/AI: NR Other: NR	<HS: NR HS Grad: NR College Grad: 77 Post College Degree: NR	NR		NR	NR	49	Married or Cohabitating: 85% Primiparous: 49% Income ≥$50,000: 50%	BL depr sx: NR Past MDE, %: 100 [per inclusion criteria]	43 (Any current or lifetime anx disorder)
Dugravier, 2013[8] Parental Skills and Attachment in Early Childhood (CAPEDP)	NR	<HS: 84 HS Grad: NR College Grad: NR Post College Degree: NR	NR	NR	44	NR	100	Low income, %: 46.8 Additional risk factors: plans to raise child without child's father; low income; low educational level, %: 48	BL EPDS score >11: 45 Depr hx: NR	26 (Tobacco, alcohol, or drug use in pregnancy)
Feinberg, 2008[9] Family Foundations	White: 91 Black/AfrAm: NR Hispanic/Lati no: NR Asian: NR NA/AI: NR Other: NR	NR	NR	82	NR	NR	NR	Mean age of fathers = 29.76 Median annual income = $65,000 Average educational attainment was 15.06 years for mothers (SD 1.82) and 14.51 years for fathers (SD 2.19). 14.4% of mothers and 29.3% of fathers did not complete any post secondary school education	NR	NR
Goma, 2023[10] Grupo Interdisciplinar Online (GIO)	NR	No basic education, %: 23	NR	NR	NR	NR	NR	Participants were immigrants, %: 58 Lack of partner support, %: 19 Lack of family support, %: 28 Lack of social support, %: 16	BL depr, %: NR Per inclusion criteria, 100% EPDS≥9	Hx of mental health problems, %: 36

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
								Previous experience of violence, %: 13 Living in one room, %: 17	results and/ or STAI-trait and state >39 Depr hx, %: NR	
Gorman, 1997[11]	NR	NR	60	72	NR	NR	NR	Education years: 15 Income level <20,000: 33%	Current depression: 7 BL BDI >12: 46.7 Past major depression per SCID: 58 Depr hx: NR	DAS <100: 28.55% 2+ negative life events: 42.3%
Kozinsky, 2012[12]	NR	NR	NR	66	NR	NR	60	Education Primary: 13% Secondary: 46% Tertiary; 41%	Hx of major depr: 8	NR
Le, 2011[13] Mothers and Babies (MB)	White: 0 Black/AfrAm: 0 Hispanic/Latino: 100* Asian: 0 NA/AI: 0 Other: NR	NR	NR	63	36	NR	42	Mean years of education: 9 Mean years living in US: 4 Mean age immigrated to US: 22 Employment status husband/partner: 59% employed 90% of households had an annual income under $30k	BL CESD ≥16 or a personal or family history of depression: 100 [per inclusion criteria] BL BDI ≥20: 24 Depr hx: NR	NR

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
Leung, 2012[14]	NR	<HS: NR HS Grad: NR College Grad: 52 Post College Degree: NR	71	92	3	NR	74	Education College grad, %: 52	BL EPDS score >12: 35 Depr hx: NR	NR
Lewis, 2021[15]	White: 73 Black/AfrAm: 12 Hispanic/Latino: 0 Asian: 0 NA/AI: 0 Other: 15	<HS: 2 HS Grad: 6 College Grad: 42 Post College Degree: 28	NR	75	25	NR	32	Household Income, %: Under 10,000: 6 Between $10,000 and 19,999: 6 Between $20,000 and 29,999: 8 Between $30,000 and 39,999: 10 Between $40,000 and 50,000: 11 Over $50,000: 56	BL Depr sx: NR Depr hx: 100 [per inclusion criteria]	NR
Lonnberg, 2020[16]	NR	<HS: 0.5 HS Grad: 12 College Grad: 86 Post College Degree: NR	100	96	4	NR	100	Household income/month, %: < 25,000 SEK, 1% 25 - 40,000 SEK, 15% 40 - 50,000 SEK, 30% > 60,000 SEK, 53%	BL SSRI medication use: 7 Depr hx: NR	NR
Munoz, 2007[17] Mothers and Babies (MB)	"Primarily immigrant Latina"	NR	27	76	22	NR	NR	Mean years education: 10 Mean age immigrated to US: 19 Mean annual household income: $19,773.19 68% Spanish-speaking Assume population is 100% Latina but not explicitly stated in methods	MDE hx and/or CESD ≥16): 100 [per inclusion criteria] Hx of MDE: 54	NR
Ngai, 2020[18]	NR (Hong Kong residents)	NR	84	NR	NR	NR	100	Education level, n (%): - Secondary or below, 110 (28) - Tertiary, university or above, 278 (72) Monthly household	BL EPDS ≥10: 38 Depr hx: NR	NR

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
								income, n (%): - <HK$20,000 -- 75 (19) - HK$20,000 to HK$30,000 -- 72 (19) - HK$30,001 to HK$40,000 -- 89 (23) - HK$40,001 to HK$50,000 -- 61 (16) = >HK$50,000 -- 91 (24)		
Ngai, 2022[19]	NR (Hong Kong residents)	≤ Secondary: 14 Tertiary: 16 University or above: 70	89	100	0	NR	100	Monthly household income (HK$), %: <$30K: 20 $30-40K: 18 $40,001-50K: 14 >$50K: 48	NR	Per inclusion criteria, no current psychiatric disorder: 100
Ortiz Collado, 2014[20]	NR	<HS: 14 HS Grad: 29 College Grad: 12 Post College Degree: NR	NR	NR	NR	NR	NR	Primary education: 14% Secondary education: 29% Completed professional training: 16.4% Middle class ($24000-27400): 14.13% Low-middle class ($22000): 24.73% Working class ($18400-20000): 34.86% Poverty (≤10000): 26.28%	BL Righetti-Veltema antenatal PPD risk interview score ≥3: 100 [per inclusion criteria] Depr hx: NR	NR
Phipps, 2013[21] Relaxation, Encouragement, Appreciation, Communication, Helpfulness program (REACH)	White: 16 Black/AfrAm: 17 Hispanic/Latino: 53 Asian: NR NA/AI: NR Other: 14.2	<HS: NR HS Grad: 4 College Grad: NR Post College Degree: NR	NR	NR	NR	NR	92	18.9% had dropped out of school	BL depr sx: NR Prev dx of depr: 10	NR
Phipps, 2020[22] Relaxation,	White: 20 Black/AfrAm: 20	<HS: NA HS Grad: 21 College Grad:	NR	NR	NR	NR	96	Currently in school, %: 63	BL depr sx: NR	NR

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
Encouragement, Appreciation, Communication, and Helpfulness 2 (REACH2)	Hispanic/Latino: 58 Asian: 2 NA/AI: 3 Other: 34	NA Post College Degree: NA							Hx or depr: 24	
Tandon, 2011[23] Mothers and Babies (MB)	White: 8 Black/AfrAm: 86 Hispanic/Latino: NR Asian: NR NA/AI: NR Other: 6	<HS: NR HS Grad: 54 College Grad: NR Post College Degree: NR	24	NR	82	NR	NR	NR	BL CES-D ≥16 or lifetime depressive episode (not currently meeting criteria for depr): 100 [per inclusion criteria]	NR
Tandon, 2014[24] Mothers and Babies (MB)	White: 12 Black/AfrAm: 83 Hispanic/Latino: NR Asian: NR NA/AI: NR Other: 5	<HS: 40 HS Grad/GED: 30 College Grad: NR Post College Degree: NR	28	20	80	NR	28	NR	CES-D ≥16 or lifetime depressive episode (not currently meeting criteria for depr): 100 [per inclusion criteria]	NR
Tandon, 2021[25] Mothers and Babies (MB)	Racial/ethnic minority, %: 70 Born outside US, %: 12	At least some college education, %: 40	35	NR	NR	NR	36	Income, %: <$25,000: 71 $25,000–$49,999: 18 $50,000–$74,999: 4 $75,000–$99,999: 2 $100,000 +: 2 Unplanned pregnancy, %: 63	NR	NR
Woolhouse, 2014[26]	NR	<HS: NR HS Grad: NR	91	66	3	NR	NR	NR	NR	NR

Appendix E Table 2. Detailed Population Characteristics for Counseling RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr, % or Depr hx, %	Other Mental Health Hx
MindBabyBody		College Grad: 41 Post College Degree: 44								
Zlotnick, 2006[27] Reach Out, Stand strong, Essentials (ROSE)	White: 28 Black/AfrAm: 17 Hispanic/Latino: 44 Asian: 2 NA/AI: NR Other: 8	<HS: NR HS Grad: 67 College Grad: NR Post College Degree: NR	NR	NR	67	NR	NR	NR	BL Cooper predictive index ≥27: 100 (per inclusion criteria) Prev MDEs: 31	NR
Zlotnick, 2011[28]	White: 39 Black/AfrAm: 11 Hispanic/Latino: 43 Asian: NR NA/AI: NR Other: 7	<HS: 26 HS Grad: 57 College Grad: 13 Post College Degree: NR	NR	24	44	NR	43	Household income ranged from 22% on public assistance to 16.7% with incomes between $30,000-$49,000. All met the low-income threshold for their household based on the US Housing and Urban Development threshold for low-income in Rhode Island. On Medicaid, %: 52%	NR	70.4% reported at least one act of severe IPV abuse in the past year
Zlotnick, 2016[29]	White: 28 Black/AfrAm: 23 Hispanic/Latino: 38 Asian: 2 NA/AI: 4 Other: 6	<HS: 28 HS Grad: 42 College Grad: 3 Post College Degree: NR	37	8	53	NR	51	NR	BL Cooper predictive index ≥27: 100 [per inclusion criteria] Depr hx: NR	NR

*The majority were from Central and South America (54.4% El Salvador, 11.1% Honduras, 10.1% Guatemala; 8.7% other), 15.7% were from Mexico, and two were born in the United States.

Abbreviations: AfrAm = African American; Anx = Anxiety; BL = baseline; Depr = Depression; Dx = Diagnosis; EPDS = Edinburgh Postnatal Depression Scale**;** GED = General Equivalency Diploma; Grad = Graduate; HK = Hong Kong Dollar; HS = High school; Hx = History; MDE = Major depressive disorder; NA = Not

applicable; NA/AI = Native American/Alaska Native; NR = Not reported; Prev = Prevention; SCID = Structured Clinical Interview; SD = Standard deviation; SES = Socioeconomic status; SSRI = Selective serotonin reuptake inhibitors; SEK = Swedish Krona; US = United States

Appendix E Table 3. Intervention Characteristics for Counseling RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depression focused only	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Boobpamala, 2022[3]	Four, 60-90min group sessions (including family members), educational videos, and online/telephone counseling sessions.	Pregnant	NR	Group (family); Individual	In-person, Phone, Video	Research Staff	No	7	4, 60-90min group sessions, 4 individual counseling (duration NR)	Usual care
Boran, 2023[4]	One 90-min introductory group session and four 60-min group sessions with antenatal nurse	Pregnant	Virtual	Group	Virtual	Nurse	No	5	1 x 90 min virtual group session = 90 min 4 x 60 min virtual group session =240 min total: 330 min x 5 wks	Usual care
Brugha, 2000[5]	Eight 2-hour weekly CBT antenatal group classes	Pregnant	OB-GYN	Group	In-person, Print	Nurse	Yes	8	7, 120 min (group) sessions x 8wks	Usual care
Cooper, 2015[6]	11 home visits (2 antenatally and 9 postnatally) providing supportive counseling, parenting skills, education about infant development and behavior	Both	Home	Individual	In-person	Midwife, Nurse	No	20	11 session (individual) (length NR) x 20wks	Usual care
Dimidjian, 2016[7]	Eight weekly, 2-hour group sessions of mindfulness-based cognitive therapy for perinatal depression plus materials given for yoga and at-home meditation guide	Pregnant	Other Medical	Group	In-person	Psychologist, Other Mental Health provider, Research Staff	Yes	8	8 session (group) (length 120 min) x 8wks	Usual care
Dugravier, 2013[8]	14 home visits to support effective parenting skills and use of health, community, and social support systems	Both	Home	Individual	In-person	Psychologist	Yes	25	14 session (individual) (length NR) x 25wks	Usual care
Feinberg, 2008[9]	Four prenatal psychoeducational group sessions, followed by 4 postnatal	Both	Other Medical	Groups of couples	In-person	NR	No	8	8 session (8 (length NR) x 8wks	None

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	group sessions promoting positive joint parenting									
Goma, 2023[10] Grupo Interdisciplinar Online (GIO)	8, 90-min Interdisciplinary online therapeutic group intervention	Both	Virtual	Group	Phone, Virtual	Midwives, Nurse, Psychologist	Yes	8	8 x 90 min group sessions	Waitlist
Gorman, 1997[11]	Five psychoeducation & IPT sessions during late pregnancy and first four weeks postpartum.	Both	NR	Individual	In-person	NR	Yes	5	5 session (5 (length NR) x 5wks	None
Kozinsky, 2012[12]	Four 3-hour group IPT/CBT sessions	Pregnant	NR	Group, Groups of couples (offered)	In-person	Psychiatrist, Other Mental Health Provider	Yes	4	4 session (group) (length 180) x 4wks	Attention Control
Le, 2011[13] Mothers and Babies (MB)	Eight 120-minute weekly group CBT Mothers and Babies Course prenatal sessions and three individual postpartum booster sessions	Both	NR	Individual, Group	In-person	Research Staff	Yes	68	8 (group), 3 session (individual booster) (length 120 (group)) x 68wks	Usual care
Leung, 2012[14]	Four 90-minute group sessions targeting interpersonal issues and intergenerational conflict	Pregnant	NR	Group	In-person	NR	Yes	4	4 session (group) (length 90) x 4wks	Usual care
Lewis, 2021[15]	Telephone-based general wellness intervention, 11 sessions (duration NR)	Postpartum	Home	Individual	Print, Phone	Health Educator	No	26	11 session (length NR) x 26 wks	Usual care
Lonnberg, 2020[16]	Eight weekly 135-min mindfulness group sessions with meditations	Pregnant	OB-GYN	Group	In-person	Health Educator	No	8	8 x 135 = total plus a reunion, after post-intervention assessment over 8wks	Attention Control
Munoz, 2007[17] Mothers and Babies (MB)	12 weekly group CBT prenatal mood management sessions and 4 individual	Both	NR	Individual, Group	In-person	Psychologist	Yes	70	12 (prenatal group), 4 session (postpartum booster) (length NR) x 70wks	Usual care

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	postpartum booster sessions									
Ngai, 2020[18]	IG1: One 180-minute CBT group session (couples) and two 30-minute follow-up phone sessions (for each parent)	Both	OB-GYN	Individual, Group of couples	In-person, Phone	Midwife	Yes	16	1 x 180 min in-person group (couples) session 2 x 30-min individual phone session	Usual care
	IG2: One 180-minute CBT group (participants only) session and two 30-minute follow-up phone sessions	Both	OB-GYN	Individual, Group	In-person, Phone	Midwife	Yes	16	1 x 180 min in-person group session 2 x 30-min individual phone session	
Ngai, 2022[19]	3 weekly, 2-hr in person antenatal counseling sessions delivered to groups of couples, with two, 30-min postpartum, individual telephone sessions (for each parent)	Both	OB-GYN	Individual, Group of couples	In-person, Phone	Midwife	Yes	32	2 x 120 min in-person group (couples) sessions, 2 x 30 min individual phone session	Usual care
Ortiz Collado, 2014[20]	Ten 135-min couples' psychosomatic humanist group sessions, 10 followup phone calls	Pregnant	Other medical	Group of couples	In-person, Phone	Midwife	Yes	10	10 (group couples), 10 session (phone) (length 135 (group), NR (phone)) x 10wks	Usual care
Phipps, 2013[21]	Five 60-min prenatal IPT sessions (delivered in group and individual format), one postpartum session delivered in hospital after delivery	Both	In-hospital post delivered; NR	Individual; Group	In-person, Video	NR	Yes	20	5 (group/individual), 1 session (individual) (length 60) x 20wks	Attention Control
Phipps, 2020[22]	Five, 1hr prenatal counseling session + 1 postpartum booster session	Both	In-hospital post delivery; NR	Individual	In-person, Print	Research Staff	Yes	27	6 x 60 min in-person sessions	Attention Control
Tandon, 2011[23]	Six 120-min CBT group sessions and five 5-10	Unclear	Home, NR	Individual, Group	In-person	Psychologist, Other Mental	Yes	6	6 (group), 5-10 session (individual) (length 120	Minimal

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Mothers and Babies (MB)	min during one-on-one home visits					Health Provider			(group), 5-10 (individual)) x 6wks	
Tandon, 2014[24] Mothers and Babies (MB)	Six 120-min group CBT Mothers and Babies Course sessions, five 5-10 min home visit reinforcements, two group booster sessions	Unclear	Home, NR	Individual, Group	In-person	Psychologist, Other Mental Health Provider	Yes	32	6 (group), 5 session (individual) (length 120 (group), 5-10 (individual)) x 6wks	Minimal
Tandon, 2021[25] Mothers and Babies (MB)	IG1: Six 90-min group sessions of the Mothers & Babies program delivered by mental health professional	Postpartum	Other medical	Group	In-person	Psychologist	Yes	6	6, 90-min group sessions	Usual care
	IG2: Six 90-min group sessions of the Mothers & Babies program delivered by home visitor	Postpartum	Other medical	Group	In-person	Other Mental Health Provider	Yes	6	6, 90-min group sessions	Usual care
Woolhouse, 2014[26]	Six 120-min weekly mindfulness-based group therapy sessions	Pregnant	NR	Group	In-person	Psychologist, Psychiatrist	No	6	6 session (6 (length 120) x 6wks	Usual care
Zlotnick, 2006[27]	Four 60-min prenatal group IPT sessions and one 50-min postpartum individual booster session.	Both	OB-GYN	Individual, Group	In-person	Nurse	Yes	19	5 session (4 group, 1 individual) (length 50-60) x 19wks	Usual care
Zlotnick, 2011[28]	Four weekly 60-minute prenatal individual IPT sessions followed by one 60-min booster sessions within 2 wks of delivery	Both	NR	Individual	In-person	Research Staff	Yes	6	5 session (individual) (length 60) x 6wks	Usual care
Zlotnick, 2016[29]	Four weekly 90-min IPT prenatal group sessions and one 50-min individual postnatal session	Both	NR	Individual, Group	In-person	Nurse. Research Staff	Yes	15	4 (group), 1 session (individual) (length 90 min (group), 50 min (individual)) x 15wks	Usual care

Abbreviations: CG = Control group; CBT = Cognitive Behavioral Therapy; Hr = Hour; IG = Intervention group; IPT = Interpersonal therapy; Min = Minutes; NR = Not reported; OBGYN = Obstetrics and Gynecology; Wks = Weeks

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
Boobpamala, 2022[3]	IG1	The Early Depressive Prevention Program (EDPP) was based on social support theory, self-esteem, and empowerment concepts, and the needs of the participants. The group participating in the EDPP was 4 to 10 adolescents and family members, and each of the four sessions took 60 to 90min, followed by independent practice. Intervention sessions were help in groups including family members. Online and telephone counseling throughout the EDPP intervention, in private and group form which focused on participants problems and followed up after the consultation. Educational video clips to advice while participating in the intervention. Video clips consisted of the following: (1) Physical and mental changes during pregnancy, (2) self-care during pregnancy, (3) self-care in the 3rd trimester, (4) complications and depressive symptoms during pregnancy. The EDPP focused on empowerment of the participants for problem-solving using five strategies: (1) Open mind: promotion of self-esteem, (2) Reinforce positive power: critical reflection and power and emotional awareness, (3) Go together: goal setting, (4) Go to the future: checking competence, (5) Evaluation of assessment outcomes. Participants also received usual care. If PI found any participants with EPDS ≥11, they were referred to a physician in secondary care and tertiary care following the guidelines of system services for treatment.	Counseling: CBT and related approaches	NR	NR	Routine care in the health system including vital signs checkups, health assessment, health education. They attended antenatal care clinic every month until gestational age of 28 wks, then every 2 wks from 28 to 36 and every wk after 36wks until delivery.
Boran, 2023[4]	IG1	Thinking Healthy Program - Brief Group version (THP-BGV) was incorporated into routine antenatal educational classes and	Counseling: CBT and related approaches	Number of attended sessions, %: 0, 18%	Acceptability was assessed from 12 participants, a	Five routine online educational group pregnancy classes

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		adapted to be delivered online. This intervention employed cognitive behavior therapy strategies to achieve three main goals: a) To identify and modify maladaptive styles of thinking and behaving – in particular those leading to poor self-esteem, inability to care for their infants, and disengagement from social networks; b) behavioral activation – adopting behaviors, such as self-care, attention to diet, and positive interactions with the infant, and practicing these between sessions; c) problem-solving to overcome barriers to practicing such strategies. An additional element was support from the facilitator and other group members. The intervention consisted of five group sessions: 1) Engagement and introduction to the program; 2) psychoeducation and problem-management skills; 3) focusing on one's personal health and well-being; 4) establishing the mother-infant bond, and; 5) reactivating relationships with others and closing the therapy. The intervention group sessions lasted one hour, on average, except the introduction session which lasted 90 minutes.		1, 9% 2, 9% 3, 11% 4, 30% 5, 23%	subgroup. Overall, most participants were satisfied with the intervention.	provided online access to education about pregnancy, birth, newborn care and included basic information about PND, and how to identify it and seek help. The women in the control arm were able to access all usual care and support offered by the participating hospitals.
Brugha, 2000[5]	IG1	PFP draws on established psychological models for tackling depression using cognitive and problem solving approaches together with emerging models for enhancing social support at an individual level. PFP consists of six structured 2 hour long, weekly antenatal classes, preceded by an initial introductory meeting with the participant and her partner. PFP ends with a post-natal reunion class when the babies are about 8 weeks old. Nurses and occupational therapists, with extensive experience in hospital and community general psychiatry, but without specialist experience in psychological interventions,	Counseling: CBT and related approaches	42/94 (45.6%) who completed FU assessment categorized as 'attenders': attending ≥2 sessions in addition to session 3 (which focused on post-natal depression). Attendance at later sessions of each course dropped to 4-6 per group.	"Additional data collected showed that women who participated enjoyed the intervention and believed it to be beneficial"	Standard antenatal care only

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		were selected and trained to conduct PFP. General education was given rather than formal lectures; each group included three or four exercises in which women were encouraged to share and discuss principles and topics using personal examples of their own. There were two role-plays. A problem-solving model and other key constructive behaviours were reinforced regularly and women were encouraged to practice new skills between sessions. The woman's partner or ' significant other' was encouraged to attend session 3, for which a male course leader was present. PFP classes commenced soon after the 28th week of gestation. Classes were scheduled not to clash with the traditional midwife-led Parentcraft classes, which tend to focus on obstetric and infant care and start at around bout week 32. The sessions were held on the same day of the week, at the same time, in the same room, as much as possible. Course registration ranged from 8 to 16 women per group depending on numbers screening positive, motivation, consent and the need to schedule courses ahead of time. Women not attending any sessions were sent an abbreviated set of PFP handouts including information on post-natal depression symptoms and social support. A participant missing a session without an explanatory message was sent the session handouts. After two consecutive unexplained absences, a participant was no longer sent missed session handouts.				
Cooper, 2015[6]	IG1	Participants received a total of 11 home visits: 2 antenatally and 9 in the first 16 weeks PP. The intervention was comprised of supportive counseling, as well as specific strategies to sensitize the mothers to their infants' characteristics. Specifically, focusing on infant responsiveness to the social and	Counseling: CBT and related approaches	NR	Intervention group felt better supported than the controls, both emotionally and practically ($p < 0.004$) and also felt their relationship with their	Usual care

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		non-social environment (e.g., visual tracking, responding to the mother's voice), as well as individual differences in infant capacities for regulating their state and behavioral responses (e.g., habituation). In addition, specific help was provided to the mothers in managing infant behavioral problems (i.e., sleeping, feeding, crying).			infant to have been better facilitated ($p < 0.001$). Range of mean satisfaction scores was 2.47 to 2.80 on a 0-3 scale (vs. 2.05 to 2.54 in the CG).	
Dimidjian, 2016[7]	IG1	8-session Mindfulness-based cognitive therapy for perinatal depression (MBCT-PD); standard MBCT modified for use in the context of pregnancy. Class size ranged from 3 to 9 participants and were approximately 2hr in length and held weekly. Participants were also permitted to complete make-up sessions by phone. In addition to sessions, participants given audio-recorded files to guide mindfulness meditation practices at home and a DVD was provided to guide yoga practice. At-home practice was assigned for 6 days each week between Sessions 1 and 7 (42 total days). Weekly topics: A recipe for mindfulness (enhancing motivation, developing group cohesion, psycho-ed about mindfulness theory and connection to depression); The body, the mind, and the breath (key skills highlighted being gentle and kind with oneself and identifying the power of making interpretations); Rhythms of motherhood (strengthening skills of mindfulness in the context of breath-focused meditation and walking meditation and yoga); Opening to difficulty and uncertainty (increasing awareness of thoughts, emotions, and sensations rather than engaging automatic patterns; increasing understanding of signs or depression and anxiety); Thoughts are not facts (recognizing patterns of thoughts that tend to recur; shifting from being caught up in one's thoughts to seeing thoughts as mental events that are not necessarily valid truths); How can I best care for myself	Counseling: CBT and related approaches Mindfulness therapy (MT)	Completion for in-person sessions was defined as having attended four or more of the eight MBCT-PD sessions; Of the 37 participants who started MBCT-PD, 33 (89%) completed the intervention (as defined by attending at least four sessions), with an average of 6.89 (SD 2.04) sessions completed. For the homework, completion was assessed using daily written reports on which participants recorded the number of times and type of practice (e.g., formal, informal); among participants who started MBCT-PD, 29 participants (67%) reported practice data. Of those reporting practice data, participants engaged frequently in at-home practices, reporting, on average, at least some practice on 30 (SD	Participant satisfaction assessed using 8-item self-report Client Satisfaction Questionnaire @ 8wk and 6mo postpartum, yielding "a homogeneous estimate of general satisfaction with services"; Participants assigned to MBCT-PD reported a high degree of satisfaction on the CSQ-8 at the end of the intervention (29/32 at both followups).	Treatment as usual participants were free to continue or initiate mental health care (as were those in IG). Participants were notified by telephone or in person at time of assessment when their depressive symptom levels were elevated. Participants also assisted with referrals to behavioral health care in the KP systems.

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		(increasing self-care, focusing on the use of non-judgmental attention during meditation; use of lovingkindness meditation; awareness of the influence of activities on mood; awareness of relapse signatures); Expanding circles of care (interpersonal relationships, social support, beliefs that interfere with accessing social support, skill-building asking for help; important or reaching out to others to support wellness and prevent relapse); Looking to the future (consolidating relapse prevention plans, reinforced links between mindfulness practices and prevention of depression). Following the 8 sessions, participants were given the option of attending a monthly follow up class.		11.85) out of the 42 assigned days		
Dugravier, 2013[8]	IG1	Women received a total of 14 home visits: 6 in the prenatal period beginning at the 7th month and 8 times during the first 3 months of the child's life. The intervention was tailored to empower mothers in terms of developing parenting skills, using the health and social care system, and making the most of their personal networks and local community services. A team of home visiting psychologists was specifically trained to promote mental health and attachment quality, provide social and emotional support within a solid working alliance, and address depression should it occur. Interventionists had a series of discussion topics to be raised during home visits in the prenatal period: recognizing, understanding and handling the symptoms of depression; understanding the importance of social support; and accessing care as soon as needed. The women were given an information sheet on understanding "baby blues" and what to do if they felt that they were experiencing symptoms such as moodiness, sadness, difficulty sleeping, irritability, appetite changes or concentration	Counseling: Non-directive	Of the 6 planned prenatal visits, an average (SD) of 3.2 (2.0) visits actually took place; in the first 3 months postpartum, mothers received 3.7 (2.6) of the 8 planned visits.	NR	Patients had access to the nation-wide, community-based, mother-child support and prevention services program, as well as community mental health networks with no out of pocket payment, free antenatal maternity screenings, and a variety of social benefits.

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		problems. If depressive symptoms were identified by the interventionist they would bring it up to their supervisor, be prepared to make additional visits, and if necessary refer the participant to a community health center. During the post-natal period the interventionists were reminded to pay attention to symptoms of maternal depression and to use active listening approaches with any mother presenting what might be initial symptoms of depression. If symptoms persisted or worsened, an individual care protocol was developed.				
Feinberg, 2008[9]	IG1	Intervention couples received the FF program (consisting of four prenatal and four postnatal sessions). FF was manualized, with didactic material, exercises, and behavioral rehearsal included in the curriculum for each session. Instead of focusing on the parents' romantic or marital relationship (as in the federal government's Healthy Marriage Initiative), FF focuses on emotional self-management, conflict management, problem solving, communication, and mutual support strategies that foster positive joint parenting of an infant. Each group consisted of 6–10 couples, and sessions were led by a male–female team.	Counseling: Couples counseling	The average number of sessions attended by each couple in the intervention group was 5.50 for mothers and 5.38 for fathers. Most couples (66% of mothers and 63% of fathers) attended 5 or more sessions. Twelve percent of mothers and 12% of fathers attended 1 or 2 sessions, and 3% of mothers and 5% of fathers attended no sessions. Seventy percent of intervention group couples attended at least 1 of the 4 postnatal sessions. Couples attended sessions together; only in a few cases did a parent attend a session when the partner was unavailable (e.g., because of work schedule or postpartum recovery).	NR	The couples in the no-treatment control group were mailed a brochure about selecting quality childcare

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Goma, 2023[10] Grupo Interdisciplinar Online (GIO)	IG1	GIO was offered to mothers who experienced depressive-anxiety symptomatology in their PCC visits following the inclusion criteria. Patient groups are composed of five to eight pregnant women (prenatal intervention) or mother-infant dyads (postpartum intervention), led by two health professionals from different specialties: psychotherapist and midwife or pediatric nurse. After an initial individual telephone session with the group psychotherapist, eight weekly online group sessions lasting 90 min are scheduled, using a Zoom assistant screen. These are closed groups, it means that once the GIO were initiated, they were closed to new participants. Each session starts by attending to physical issues during 10 min each session (prevention on pelvic floor pain, babies' development exercises, postural hygiene, baby carrying positions, etc.), relaxation (breathing techniques, visualization and contact with one's own emotions), and singing (lullabies from their own experience) and moved on to the expression of emotions and feelings between the participants and therapists. A short presentation of about 20 min is given on mothers' themes and worries gathered from a previous session. The fnal part was 60 min of free discussion, where women can express their distress, insecurities, and fears. Quality of the intervention is guaranteed by the small size of the group but also because of video attendance, guidance of the exercises, and participation during the sessions. In the pregnant mothers' group, the baby accompanied the sessions from the womb. The mother communicates with the fetus continuously and shares her emotions with the baby and the group. The prepartum GIO intervention concludes before the birth. With	Counseling: NR	An average of 7.16 sessions of participation in the groups was found (SD 0.89; mode 7, minimum 5 sessions and maximum 8)	"Results in both mother and baby health outcomes and patient satisfaction were very positive."	Received treatment as usual and was composed of women in a waiting-list

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		the postpartum GIO intervention, the baby was also present, frequently in the mother's lap where they could hear, see, and participate.				
Gorman, 1997[11]	IG1	The intervention consisted of five sessions: two sessions occurred between 32 wks gestation and delivery and the remaining three occurred in the postpartum period, beginning at the second week postpartum. Efforts were made to schedule the three postpartum sessions between the second and fourth wks following delivery. The sessions that took place during pregnancy sought to inform and educate the woman about postpartum mood disorders and included discussion about changes or difficulties related to any of the four interpersonal target domains in IPT (e.g., grief, interpersonal disputes, role transitions, and interpersonal skills deficits) that she anticipated occurring following delivery. Although the intervention involved a didactic component in the first two sessions, the woman was strongly encouraged to discuss her current and anticipated concerns regarding mood changes and/or interpersonal difficulties. After identifying and exploring the patient's interpersonal problems in the four target domains, specific techniques are employed in effort to decrease depressive symptoms, including elicitation of feelings, problem solving, and role playing.	Counseling: IPT	Women in the intervention group received an average of 4.55 sessions. The average number of sessions that took place during pregnancy was 1.75 (SD = 0.44) and the mean number of postpartum sessions was 2.80 (SD = 0.41). The integrity of the intervention was evaluated using a 21-item rating scale (IIRS) designed to assess critical components of the intervention.	NR	Assessment only
Kozinsky, 2012[12]	IG1	Four 3-hour group sessions were delivered during pregnancy consisting of psycho-education and psychotherapy for PPD utilizing group therapy, interpersonal psychotherapy, and cognitive-behavioral therapy elements. Sessions took place over 4 consecutive weeks from the 25th week of gestation and were limited to 15 participants per group. Information covered during	Counseling: CBT and related approaches, IPT	NR	NR	Four group meetings providing routine education on pregnancy, childbirth, and baby care.

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		sessions included: general education (including background on PPD), PPD screening and coping skills, recognizing distress and seeking help, and recapitulation and relaxation. The fathers were allowed to attend with the mothers.				
Le, 2011[13] Mothers and Babies (MB)	IG1	The MB course consisted of eight weekly two-hr CBT psychoeducational group sessions during pregnancy, teaching women mood regulation skills to prevent perinatal depression. Participants also received three postpartum individual booster sessions (6 weeks, 4 and 12 months postpartum) to review the main course concepts and to generalize these techniques to their role as new mothers.	Counseling: CBT and related approaches	55% (62/112) attended ≥4 sessions. IG ppts attended an average of 4.1 (SD 2.9) of eight classes during pregnancy and average of two of the three booster sessions (SD 1.3).	NR	Usual care
Leung, 2012[14]	IG1	The intervention targeted interpersonal issues identified in qualitative studies of Chinese women in the perinatal period, including intergenerational conflicts and role transition. The intervention consisted of 4 weekly group sessions lasting 1.5 hr per session. At the end of each session, participants were given a homework assignment to practice the skills or behaviors discussed in the session. Participants reported their practice at the beginning of the subsequent session, providing an opportunity for peer support and problem solving. Session 1 focused on motivating participants to achieve a better relationship with the grandparents who were expected to be involved in childcare; reviewed current problems and difficulties in the relationship that was associated with stress and depression. Session 2 identified the consequences of poor and effective communications, set goals in managing the relationship and practiced skills of	Counseling: IPT	76/78 completed the intervention	NR	All participants received routine antenatal care from the MCHC, which included a physical examination and brief individual interview with a midwife during which participants could raise any health or pregnancy related questions or concerns.

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		developing partnership in childcare. Session 3 discussed interpersonal problem areas of role transitions and disputes in childcare, applied interpersonal techniques in role play, practiced specific communication and conflict management skills such as effective listening, identification of common goals and expression of concerns assertively and in non-threatening ways. Session 4 focused on emotional control and discussed the importance of managing one's own emotions, which are more controllable than the external environment and others' responses in interactions.				
Lewis, 2021[15]	IG1	The telephone-based wellness intervention consisted of 11 sessions (weekly during the first month, bi-weekly during months 2 and 3, and monthly for the next three months). The telephone sessions were delivered by trained health educators with master's degrees who were supervised by a licensed psychologist. The wellness/support intervention addressed topics related to health and well-being including stress prevention, time management, healthy sleep, coping with fatigue, weight management, nutrition, and healthy home topics (i.e., creating a safe home for baby that could help reduce stress for the participant). To control for nonspecific factors such as rapport and empathy, the same health educators were used for the exercise and wellness/support interventions. The health educators provided support to the participants through active listening and empathy. The health educators engaged in problem solving strategies to help reduce the impact of stressors that typically occur during the postpartum phase. The health educators did not discuss exercise with participants in the wellness/support condition. Participants in the wellness/support intervention received	Other General wellness support and psychoeducation	NR	NR	Usual care

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		mailings addressing health and wellness/support topics on the same schedule as participants in the exercise intervention.				
Lonnberg, 2020[16]	IG1	Mindfulness-Based Childbirth and Parenting (MBCP) originally developed in the USA was shortened to 8 weekly group sessions and a reunion, each 2 h and 15 min long. Groups numbered 8-14 persons. Participants also had free access to maternity health care, consisting of a program with visits to a midwife who provided support and information. Throughout the MBCP program, the practice of mindfulness was integrated with antenatal education that included breastfeeding and role of the partner and how to best support a woman in labor. The practices included body scan, mindful movement, sitting and walking meditation (e.g., reflecting on one's own childhood and expectations of parenthood and gender-roles), loving kindness meditation and informal meditation in daily life. MBCP curriculum especially included the practices of interpersonal mindful speaking and listening inquiry, methods to increase awareness of the baby and to cope with pain during labor. All sessions included a 15 min snack break, which opened up for networking and peer support. For each session, an informative text was handed out which included home-practice assignments and links to audio-files with guided mindfulness practices. Participants were asked to do formal practice 30 min/day throughout the program as well as informal practice whenever they sensed fetal movements and during various other daily activities. The practices were reflected upon and discussed within the group. After post-intervention assessment, a reunion occurred to share experiences of	Counseling: Mindfulness therapy (MT)	Of the 8 sessions, average attendance was 6.81 sessions (SD=1.202); In between sessions, practices of formal mindfulness, averaged 62.20 min/week (SD=46.89); and practices of informal mindfulness, averaged 41.03 min/week (SD=43.80)	NR	Participants participated in a Lamaze program focusing on the methods to cope specifically with stress and pain during labor. The program consisted of 3 group meetings, each 3 hours long. During the first 2 sessions the couples learned breathing and relaxation techniques, how to prepare mentally for birth and how the partner can be supportive during labor by coaching and giving calming massage for pain relief. The participants were encouraged to practice breathing and relaxation techniques at home before birth. The theme of the third session was 'parenting an infant' and focused on breastfeeding, sleeping, and eating routines, as

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		childbirth and early parenthood. It was approached with kindness and curiosity and included practice sitting meditation/being with the baby.				well as the couple relationship.
Munoz, 2007[17] Mothers and Babies (MB)	IG1	The preventive intervention condition involved a 12-week cognitive-behavioral mood management course, and four booster sessions conducted at approximately 1, 3, 6, and 12 months postpartum. Its intent was to teach participants to recognize which thoughts, behaviors, and social contacts had influence on their mood, the effect of mood on health, and the benefits of strengthening maternal-infant bonding. The intervention was administered in Spanish or English to four groups of three to eight pregnant women, led by two group facilitators. The content of the Mothers and Babies Course was taught from a detailed training manual and included a relaxation component to manage the challenges of pregnancy, labor, birth, and caring for a newborn. In addition, concepts based on attachment theory were also incorporated into the intervention as a way of fostering healthy development in the children born to the women in the study. Throughout the 12 lessons of the course, we discussed: (a) how parents bond with their children even before they are born, (b) how parents can develop and strengthen this emotional bond following birth, (c) the different forms of parenting that are conducive to the development of secure attachment in the infants, and (d) the relationship between maternal depression and disruptions in attachment. In addition to attending the 12-week course, women in the intervention condition also participated in four booster sessions conducted at approximately 1, 3, 6, and 12 months postpartum. The purpose of these sessions was to review the core concepts	Counseling: CBT and related approaches	Women completed a mean of 6.7 sessions (SD=3.8) out of 12 possible sessions. Participants also completed a mean of 1.4 (SD=1.1) out of 4 possible postpartum booster sessions	Most women (>90%) reported that they planned to use the techniques discussed in class in their everyday lives. Focus group data conducted after the 12-session course suggested that the participants appreciated and understood the content of the course.	Participants received usual medical care from their health care provider and were provided with information on locally available social services, upon request, during the 12-week period in which the intervention group received the Mothers and Babies Course

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		taught in the Mothers and Babies Course and to address any concerns that women had after the birth of their child. The booster sessions were held in individual sessions, either at the clinic or during a home visit, because of feasibility issues (i.e., women delivered at different time periods).				
Ngai, 2020[18]	IG1	Adapted cognitive behavioral intervention from a locally developed CBT for postnatal depression manual was delivered to couples. The program consisted of a 3-hour antenatal group session and two 30-minute follow-up sessions on the telephone within the first month after delivery and covered: (1) an overview of stressors in the postnatal period and the signs and symptoms of postnatal depression; (2) cognitive restructuring techniques for modifying and challenging irrational thinking and negative thoughts that were depressogenic in the postnatal period; (3) problem-solving, goal-setting, and decision making skills to manage common neonatal problems; and (4) communication skills training to improve interpersonal relationships. The information provided in the antenatal session was reinforced by two structured telephone follow-up sessions, about 30 minutes for each, conducted separately with each parent at 2 and 4 weeks postpartum by the same midwife. A structured protocol was developed to guide the intervention and maintain consistency.	Counseling: CBT and related approaches; Counseling: Couples counseling	100% completed antenatal group session 90.3% (n=121) completed one phone session 88.1% (n=118) completed both phone sessions	NR	Routine antenatal classes were offered
Ngai, 2020[18]	IG2	Adapted cognitive behavioral intervention from a locally developed CBT for postnatal depression manual was delivered to mothers alone. The program consisted of a 3-hour antenatal group session and two 30-minute follow-up sessions on the telephone within the first month after delivery and covered: (1) an overview of stressors in the postnatal period and the signs and	Counseling: CBT and related approaches	100% completed antenatal group session 90.3% (n=121) completed one phone session 88.1% (n=118) completed both phone sessions.	NR	Routine antenatal classes were offered

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		symptoms of postnatal depression; (2) cognitive restructuring techniques for modifying and challenging irrational thinking and negative thoughts that were depressogenic in the postnatal period; (3) problem-solving, goal-setting, and decision making skills to manage common neonatal problems; and (4) communication skills training to improve interpersonal relationships. The information provided in the antenatal session was reinforced by two structured telephone follow-up sessions, about 30 minutes for each, conducted separately with each parent at 2 and 4 weeks postpartum by the same midwife. A structured protocol was developed to guide the intervention and maintain consistency.				
Ngai, 2022[19]	IG1	The intervention consisted of three weekly 2-hour in-person antenatal sessions and two 30-minute telephone follow-up sessions delivered within 4 weeks postpartum. The aims of the intervention were to relieve the couples' depressive symptoms during the perinatal period and to help them improve their interpersonal functioning and social support networks, so that they could better manage their interpersonal distress. The contents of the antenatal sessions include: an overview of the changes associated with the role transition of parenthood; an introduction to the coping skills relating to role transition and parenting; a discussion of common postpartum and interpersonal difficulties, such as conflicts with partners or extended family; the teaching of effective communication skills for resolving interpersonal conflicts and maintaining good interpersonal relationships; and the building of family strengths and resources, such as reassessing the challenges of the new role, applying problem solving techniques to deal	Counseling: IPT; Counseling: Couples counseling	80% of mothers completed all 3 antenatal sessions, 81% received all 2 telephone FU sessions. 20% of mothers completed 2 antenatal sessions, 19 received one telephone FU session.	NR	Received the standard prenatal and postnatal care

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		with role transition and interpersonal problems, and developing new social support. Common IPT techniques, namely communication analysis and role-playing, were used to help the couples analyse their interpersonal problems, brainstorm new interpersonal options and role-play the options in rehearsal for real life. The couples attended the antenatal sessions together in groups of 8–10. The sessions were led and facilitated by experienced midwives who had a master's degree in family counselling and had received 20 h of training in IPT for childbearing couples. The information given in the antenatal sessions was then reinforced in the postpartum follow-up sessions, which were conducted separately with each parent. To ensure treatment integrity, a structured manual was developed prior to intervention delivery, and all of the intervention sessions were audiotaped and reviewed by the research team to ensure adherence to the treatment manual. Both the control and experimental groups received the standard prenatal and postnatal care. The women received regular antenatal check-ups at the hospitals or maternal and child health clinics. Postpartum women usually stayed at the hospital for less than 48 h after a vaginal birth, and for 72 h after a Caesarean section. They were offered a follow-up check-up 6 weeks after birth at the hospitals or maternal and child health clinics. The majority of public hospitals (including the two study hospitals) and maternal and child health clinics provide screening for postnatal depression using EPDS at the 6-week postpartum followup.				

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		Women who score above 9 on the EPDS will be referred for counseling or psychiatric services.				
Ortiz Collado, 2014[20]	IG1	The IG couples participated in 10 small group sessions (6–8 couples assigned to each group). The group sessions involved work on individual feelings and affective bonds, with specific objectives for the man and the woman in each participating couple. The weekly sessions began during the second term of pregnancy and lasted two hours and 15 minutes. The sessions were carried out at the end of the afternoon to facilitate participation by those who work. Each session consisted of an interactive exchange of information (60%) and practical exercises (40%). Between sessions, a follow-up phone call was included to avoid participant attrition and to record any unusual incident. The experimental programme took a psychosomatic approach based on a humanist intervention theory that develops awareness of feelings and body sensations, their differentiation and their interrelationship. The intervention uses humanistic and cognitive techniques such as: developing a therapeutic alliance based on the participant's perspective, normalizing antenatal somatic symptoms, developing alternative explanations for their sensations and experience, and connecting somatic symptoms to emotion. Each session has two or more specific objectives which are worked toward in progressive stages, as well as exercises for reasoning with somatic symptoms and childbirth model; sessions number five and seven are open and without topic, and serve to answer questions and clarify doubts from previous sessions.	Counseling: Tourne psychosomatic approach; Counseling: Couples counseling	89/92 received the allocated intervention.	NR	In the control group (CG), participants were free to choose whether or not to participate in standard antenatal education programmes in accordance with the existing protocol at their centre of reference. These programmes offer eight sessions of two hours each during the third term of pregnancy; the focus is childbirth and pregnancy health. No information is included about body sensations or individual experience, neither for men nor women, and no followup phone calls are made. There are no open sessions without topic. Each group is open and can receive 12 couples or more (at least twice the size of the EG programme). Each session includes a time for giving information

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
						(75%) and a time of relaxation exercises (20%), with the other 5% for questions. The duration of the session is similar to the EG session; however, the schedule and content of the CG sessions prevented regular or frequent participation by men with a standard work schedule.
Phipps, 2013[21]	IG1	The REACH program intervention was an adaptation of an interpersonal therapy–based prevention intervention, and has been tailored extensively and refined to be culturally appropriate and appealing to adolescents from diverse racial and ethnic backgrounds. The REACH program is a highly structured, adolescent-oriented intervention that is delivered over the course of 5 one-hour prenatal sessions with a postpartum booster session that includes multimedia (video snippets), interactive (role-playing) components, and homework with feedback. The content of the REACH program focused on the development of effective communication skills to manage relationship conflicts before and after the birth of the baby, expectations about motherhood, stress management, “baby blues” vs depression, development of a support system, development of healthy relationships, goal setting, and psychosocial resources for new mothers. The structured format and detailed facilitator manual ensured that specific defining elements of interpersonal therapy such as enhancing	Counseling: IPT	51/54 received the REACH intervention	NR	The attention and dose-matched control condition involved using the Baby Basics book as a guide for the didactic control program. This program included information about maternal health throughout pregnancy and the early postpartum period, fetal development, nutrition, preparation for labor, and preparation of the home for taking a baby home. The control condition had no overlapping content with the

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		social support and therapeutic strategies (eg, role-playing, communication analysis) remain the central features of the intervention. Each participant was given the book "Baby Basics: Your Month by Month Guide to a Healthy Pregnancy," which is a comprehensive pregnancy guide that was developed by the What to Expect Foundation.				REACH program curriculum.
Phipps, 2020[22]	IG1	The REACH2 intervention focused on reducing postpartum major depressive episodes, was developed to be acceptable and relevant to adolescents. The core elements of the REACH2 Program were derived from the principles of interpersonal therapy. The REACH2 Program incorporates interpersonal therapy elements into a highly-structured, adolescent-oriented intervention for delivery over the course of five individual 1-hour prenatal sessions with an in-hospital postpartum booster session. In addition to didactic components, the intervention includes multimedia (eg, video snippets), interactive (eg, role-playing) components and homework with feedback. Session content covered areas such as expectations about motherhood, stress management, “baby blues” compared with depression, development of a support system, identifying and resolving interpersonal conflict, communication skills, healthy relationships, goal setting, and psychosocial resources for new mothers. At recruitment, all participants (in both groups) were provided with the book Baby Basics: Your Month by Month Guide to a Healthy Pregnancy, a comprehensive pregnancy guide developed by the What to Expect Foundation. The control condition, focused on prenatal education using the Baby Basics book, was attention and time	Counseling: IPT	Participants who remained in the study through delivery (n=236) completed the five sessions in their assigned programs with the exception of one participant who delivered before completing her sessions.	Participant satisfaction with both the REACH2 and control programs was high, with more than 94% being mostly or very satisfied with the program at the post session visit or first postpartum visit. More than 98% of participants rated the programs as good or excellent, and at least 93% responded affirmatively to questions about benefits from participation, help during pregnancy, and help dealing effectively with problems.	At recruitment, all participants were provided with the book Baby Basics: Your Month by Month Guide to a Healthy Pregnancy, a comprehensive pregnancy guide developed by the What to Expect Foundation. The control condition, focused on prenatal education using the Baby Basics book, was attention and time matched to mirror the number of sessions and time in the intervention condition.

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		matched to mirror the number of sessions and time in the intervention condition.				
Tandon, 2011[23] Mothers and Babies	IG1	The MB intervention consists of six 2-hr intervention sessions delivered weekly in a group format by either a licensed clinical social worker or clinical psychologist. The six sessions are divided into three two-session modules that map onto core CBT concepts: pleasant activities, thoughts, and contact with others. Each session contains didactic instruction on core content, as well as activities and group discussion. Session themes: pleasant activities and my mood (stress affects mother-baby relationship, how pleasant activities affect mood), pleasant activities help make a healthy reality for myself and my baby (generating list of pleasant activities, overcoming obstacles, personal commitment to do pleasant activities), thoughts and my mood (how thoughts affect mood, helpful and harmful thoughts related to pregnancy, how to "talk back" to harmful thoughts), fighting harmful thoughts and increasing helpful thoughts (helpful and harmful thoughts related to parenting, ways to change harmful thought patterns and increase helpful thoughts), contact with others and my mood (how contact with others affects mood, people who support mother and baby, how to get your needs met/communication style), interpersonal relationships and my mood (role changes and impact on mood, managing interpersonal relationships, safety in relationships, graduation). Intervention participants were provided with transportation, childcare (if needed), and a meal at each session. To ensure attendance at each intervention session, the study coordinator attempted to contact each participant twice by phone and once by e-mail prior to a session.	Counseling: CBT and related approaches	The mean number of sessions attended was 4.8, and the mode was 6, indicating excellent participant engagement in the intervention.	NR	Women randomized to the control arm received standard home visiting services plus information on perinatal depression.

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		In addition the group sessions, the intervention included one-on-one home visitor reinforcement of group materials. Reinforcement cards were developed for home visitors that summarized key points of each group session and the personal projects given to participants at the end of each session. Reinforcements took place during home visitors' regularly scheduled visits with all clients who were intervention participants and were designed to take 5–10 min per visit. Reinforcements took place after each of the first five intervention sessions.				
Tandon, 2014[24] Mothers and Babies (MB)	IG1	Intervention participants received standard home visiting services plus the adapted 6-session version of the Mothers and Babies Course (MB Course), consisting of six two-hour intervention sessions delivered weekly in a group format by either a licensed clinical social worker or clinical psychologist. The six sessions were divided into three two-session modules that mapped onto core CBT concepts: pleasant activities, thoughts, and contact with others. Each session contained didactic instruction on core content, along with activities and group discussion. The activities and group discussion focused largely on introducing and practicing the use of core skills (e.g., strategies to reduce harmful thought patterns, ways to effectively ask for support). In keeping with the CBT orientation of the intervention, at the end of each session a personal project was assigned which asked participants to practice using one or more of the skills taught during the session. The format for each session remained constant: general announcements, review of key concepts from previous session, review of personal projects, introduction of new material, and introduction of personal projects. Home visitors were asked to	Counseling: CBT and related approaches	Across intervention groups, the mean number of sessions attended was 4.5 (SD = 1.36, range 1–6) and there were two modes, with 12 participants attending five and six sessions, respectively. Most intervention participants (78%) attended at least one booster session and 51% attended both. Home visitors conducted weekly reinforcements with 71% (29/41) of study participants, with an average of 3.0 reinforcements conducted (max = 5).	NR	All women randomized to the usual care condition received standard home visiting services plus a packet of information on perinatal depression.

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		reinforce group material for five to ten minutes during each of their regularly scheduled home visits with intervention participants. To facilitate this reinforcement, study investigators developed laminated index cards for home visitors. Booster sessions were conducted at 3-months and 6-months post-intervention. These sessions focused on reinforcing key content from intervention sessions, discussing challenges group participants had applying intervention skills in their lives, and brainstorming approaches to facilitate subsequent use of these skills. Intervention participants were provided with transportation, childcare (if needed), and a meal at each session. Intervention participants were provided with transportation, childcare (if needed), and a meal at each session.				
Tandon, 2021[25] Mothers and Babies (MB)	IG1	Participants in the MHP-led arm received MB delivered by a MHP trained on MB. MHPs were recruited from HV programs, or from state professional organizations when HV programs did not have staff meeting MHP facilitator criteria. A MHP was required to have at least 5 years' experience working with families and children, and at least a master's degree in a mental health–related field. The MB group intervention consists of six sessions (i.e., one "cohort"). Sessions 1 and 2 introduce the importance of managing one's mood and CBT content related to pleasant activities, including strategies for overcoming obstacles to engaging in pleasant activities by oneself and/or with others. Sessions 3 and 4 focus on identifying helpful and unhelpful thought patterns and introducing strategies for reframing unhelpful thoughts, while sessions 5 and 6 focus on promoting positive social interactions by helping clients expand their	Counseling: CBT and related approaches	The mean (SD) number of sessions attended was 3.3 (2.3).	NR	NR

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Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		support networks, encouraging use of assertive communication to meet one's needs, and understanding how to manage stress associated with role changes of having a new child in the home. Sessions were delivered on a weekly basis, with some exceptions due to holidays or weather. Sessions were held at the HV program or another community location on a day and time convenient for participants and facilitators. Cohorts had an average of three participants and were, on average, 86 min long. MB is a group-based cognitive-behavioral intervention that promotes healthy mood management by teaching skills to increase frequency of thoughts and behaviors that lead to positive mood states and help manage stress and depressive symptoms. Each cohort meets weekly for 6 consecutive weeks at the HV program site.				
	IG2	Participants in the HVP-led arm received MB led by a HVP employed at the participating HV program; we defined a HVP as someone with no more than a bachelor's degree in child development, mental health, or related field. The principal investigator (PI) led one- or one-anda-half-day trainings with 53 individuals (32 HVPs, 21 MHPs) who delivered MB during this study. To promote intervention fidelity, facilitators received supervision from the PI while implementing their first cohort. Supervision involved weekly group calls with facilitators (HVP and MHP) to debrief the completed intervention session and plan for the subsequent session. The PI provided ongoing support as needed for facilitators delivering subsequent cohorts. The MB group intervention consists of six sessions (i.e., one "cohort"). Sessions 1 and	Counseling: CBT and related approaches	The mean (SD) number of sessions attended was 3.3 (2.3).	NR	NR

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		2 introduce the importance of managing one's mood and CBT content related to pleasant activities, including strategies for overcoming obstacles to engaging in pleasant activities by oneself and/or with others. Sessions 3 and 4 focus on identifying helpful and unhelpful thought patterns and introducing strategies for reframing unhelpful thoughts, while sessions 5 and 6 focus on promoting positive social interactions by helping clients expand their support networks, encouraging use of assertive communication to meet one's needs, and understanding how to manage stress associated with role changes of having a new child in the home. Sessions were delivered on a weekly basis, with some exceptions due to holidays or weather. Sessions were held at the HV program or another community location on a day and time convenient for participants and facilitators. Cohorts had an average of three participants and were, on average, 86 min long. MB is a group-based cognitive-behavioral intervention that promotes healthy mood management by teaching skills to increase frequency of thoughts and behaviors that lead to positive mood states and help manage stress and depressive symptoms. Each cohort meets weekly for 6 consecutive weeks at the HV program site.				
Woolhouse, 2014[26]	IG1	The MindBabyBody program is a 6-session mindfulness-based group therapy program developed specifically for pregnancy. Participants were introduced to the mindfulness approach and strategies, including formal and informal mindfulness practices, mindful movement, and cognitive exercises. Sessions ran for 2 hours and occurred weekly for six weeks. Participants were encouraged to attend all sessions, but	Counseling: Mindfulness therapy (MT)	76.5% (13/17) completed program and followup	The experience of being in the group was identified as somewhat challenging initially, but ultimately enjoyable.	Care as usual involved regular appointments with midwives in the antenatal clinic. These appointments included routine psychosocial screening, and

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		were considered to have completed the program if they attended four of the six sessions. Briefly, each session includes a formal meditation practice (15–20 mins), a discussion of home mindfulness practices, the mindful movement sequence, a weekly discussion topic, and a breathing space. Each week suggestions were given for home practice with repetition emphasized as a significant reinforcer of new skills. Week 1 included time to get to know each other, an introduction to mindfulness and a mindful breathing practice. Week 2 focused on mindfulness of the body, including a body scan, and the importance of the body in communicating with babies. Week 3 introduced ideas related to mindfulness of pain (physical and emotional), and how this might be relevant to labor. Week 4 focused on an ice meditation where participants were given experience practicing mindfulness of painful sensations. Week 5 focused on mindfulness of thoughts, and Week 6 was centered on self-compassion, and the use of mindfulness skills in motherhood.				monitoring of mental and physical health by primary care professionals, with referral to specialized health professionals where appropriate.
Zlotnick, 2006[27]	IG1	The ROSE Program, a psychoeducational group program based on Interpersonal Psychotherapy, consisted of four 60-minute group sessions over a 4-week period and a 50-minute individual booster session after delivery. Groups of 3–5 women were conducted at the prenatal clinic; booster sessions were completed either at the clinic or at participants' homes. There was no monetary incentive for completing the groups or the booster. The first of the four group sessions provided an interpersonal rationale for the program, a review of the course outline, ground rules for the group, and the signs and symptoms of	Counseling: IPT	Of the five sessions of the intervention, the mean number of sessions attended was 3.3 (SD=1.97), and the mode was 5	NR	Standard antenatal care offered by the prenatal clinic included no systematic assessment of depression and no groups for mental health issues, but offered optional classes on breastfeeding, infant safety, and parenting

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		"baby blues" and PPD. Women shared with the group stories of their own or others' experience of the postpartum period. Session two addressed stress management skills, managing role transitions into motherhood, and the development of a support system. Women exchanged ideas about how to reduce stress and how to build and use a support system. Session three identified types of interpersonal conflicts common around childbirth and techniques for resolving them. Women role-played different situations in their lives in group and provided feedback to each other. Session four continued to teach skills for resolving interpersonal conflicts and also focused on setting goals and reviewing the main themes of the intervention. Each session, women would share their successes/skills in resolving interpersonal conflicts. Homework was given at the end of each session. Women reported how well they accomplished their homework and provided feedback to others. The "booster" session individually administered soon after delivery reviewed the content of the previous sessions and addressed how current and anticipated mood changes were associated with interpersonal difficulties in the IPT target areas				
Zlotnick, 2011[28]	IG1	The IPT-based intervention involved four 60-min individual sessions over a 4-week period before delivery and followed by one 60-min individual "booster" session within 2 weeks of delivery. Consistent with the aims of IPT, the intervention was designed to help participants improve their significant interpersonal relationships, change their expectations about them, assist them in building, or improving their social support networks, and master their role transition to motherhood since deficits in these areas appear to play a salient role in the onset of	Counseling: IPT	Women in the intervention attended on average, three out of the five available intervention sessions.	NR	Women in the standard care condition received the usual medical care provided for pregnant women at their clinic as well as the educational material and a listing of resources for IPV.

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		perinatal depression and PTSD. Other components of the intervention were based on the empowerment and stabilization models—intervention models that experts in the field have recommended for women with interpersonal violence. The content of the intervention sessions consisted of the following: The first session focused on topics that included a rationale for the program, review of the course outline, evaluation of healthy relationships, types of interpersonal disputes, and abusive relationships. Topics for session 2 included stress management skills, consequences of abuse, cycle of abuse, and making a safety plan. Topics for session 3 included emotional risks of abuse—signs and symptoms of "baby blues," and postpartum depression, PTSD and substance use, and the management of role transitions with an emphasis on transition to motherhood and self-care. Topics for session 4 included the development of a support system, techniques for asking for support, resolving interpersonal conflicts, and goal-setting. The last session (within 2 weeks of delivery) provided an opportunity to review and reinforce the content of the previous sessions ("booster" session) and address any new issues related to the birth of the infant.				
Zlotnick, 2016[29]	IG1	The IPT–based intervention, ROSE (Reach Out, Stand strong, Essentials for new mothers) Program, was designed to be administered antenatally to women in small groups (2–5 women), was highly structured, contained psychoeducational components, and IPT-based skills for improving relationships and building social support, that included role playing and homework with feedback. The intervention consisted of four, 90-minute group sessions over a 4-	Counseling: IPT	84.6% (88/104) women received the intervention. On average, 3.5 sessions (out of a total of 5 sessions) were attended by women randomized to the intervention condition.	NR	Treatment as usual (standard antenatal care alone)

Appendix E Table 4. Detailed Intervention Characteristics for Counseling RCTs, by Author

Author, year	IG	Detailed IG description	Therapeutic approach	IG Adherence	IG Acceptability	CG description
		week period and a 50-minute individual booster session within 2 weeks after delivery. The content of the intervention focused on managing role transitions with an emphasis on transition to motherhood, developing a support system, developing effective communication skills to manage relationship conflicts before and after the birth of their baby, goal setting, and psychosocial resources for new mothers.				

Abbreviations: CG = Control group; CBT = Cognitive Behavioral Therapy; EPDS = Edinburgh Postnatal Depression Scale; FF = Family Foundations; FU = Followup; Hr = Hour; IG = Intervention group; IPV = Intimate partner violence; KP = Kaiser Permanente; Min = Minutes; Mo = Months; NR = Not reported; PI = Primary investigator; PND = Perinatal depression; PP = Postpartum; PPD = Postpartum depression; Ppts = Participants; PTSD = Post traumatic stress disorder; SD = Standard deviation; USA = United States of America; Wks = Weeks

Appendix E Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Counseling RCTs, by Author

Author, year	Outcome description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Brugha, 2000[5]	ICD-10 Depression diagnosis per SCAN	IG1	All Participants	p13	3/94 (3.0)	6/96 (6.0)	0.51 (0.13 to 1.98)
	EPDS ≥11	IG1	All Participants	p13	15/94 (16.0)	18/96 (18.0)	0.85 (0.46 to 1.59)
	GHQ-D ≥2	IG1	All Participants	p13	24/94 (26.0)	21/96 (22.0)	1.17 (0.70 to 1.95)
Cooper, 2015[6]	SCID (% depressed)	IG1	All Participants	<p08	26/82 (31.7)	21/83 (25.3)	1.25 (0.77 to 2.04)
				p08	15/82 (18.3)	11/76 (14.5)	1.26 (0.62 to 2.58)
				p18	16/80 (20.0)	15/79 (19.0)	1.05 (0.56 to 1.98)
				p52	10/75 (13.3)	12/83 (14.5)	0.92 (0.42 to 2.01)
				p78	5/73 (6.8)	9/74 (12.2)	0.56 (0.20 to 1.60)
Dimidjian, 2016[7]	Depressive Relapse/Recurrence	IG1	All Participants	p26	8/43 (18.4)	22/43 (50.2)	0.36 (0.18 to 0.72)
Dugravier, 2013[8]	EPDS Score > 10	IG1	All Participants	p13	65/184 (35.3)	69/183 (37.7)	0.94 (0.72 to 1.23)
Gorman, 1997[11]	Major depression prevalence per SCID for DSM-III-R	IG1	All Participants	p04	0/20 (0.0)	5/20 (25.0)	0.09 (0.01 to 1.54)
				p26	3/20 (15.0)	4/17 (23.5)	0.64 (0.17 to 2.46)
Kozinsky, 2012[12]	LQ ≥12	IG1	All Participants	p06	54/609 (8.9)	77/829 (9.3)	0.95 (0.69 to 1.33)
Le, 2011[13]	MDE prevalence per MMS	IG1	All Participants	g32	0/94 (0.0)	3/92 (3.3)	0.14 (0.01 to 2.67)
				p06	1/89 (1.1)	2/91 (2.2)	0.51 (0.05 to 5.54)
				p17	1/87 (1.1)	1/87 (1.1)	1.00 (0.06 to 15.73)
				p52	1/77 (1.3)	1/73 (1.4)	0.95 (0.06 to 14.88)
	BDI ≥20	IG1	All Participants	0	28/112 (25.0)	25/105 (24.0)	1.05 (0.66 to 1.68)
				g32	9/94 (10.0)	16/92 (18.0)	0.55 (0.26 to 1.18)

Appendix E Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Counseling RCTs, by Author

Author, year	Outcome description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
				p06	8/89 (9.0)	11/91 (12.0)	0.74 (0.31 to 1.76)
				p17	10/87 (12.0)	8/87 (9.0)	1.25 (0.52 to 3.02)
				p52	4/77 (5.0)	2/73 (3.0)	1.90 (0.36 to 10.04)
	Experienced MDE (cumulative)	IG1	All Participants	p52	6/77 (7.8)	7/73 (9.6)	0.81 (0.29 to 2.30)
Leung, 2012[14]	EPDS >12	IG1	All Participants	0	32/78 (41.0)	23/78 (29.5)	1.39 (0.90 to 2.15)
				g24	28/78 (35.9)	27/78 (34.6)	1.04 (0.68 to 1.59)
				p06	25/78 (32.1)	24/78 (30.8)	1.04 (0.66 to 1.66)
Lewis, 2021[15]	PPD Dx per SCID for DSM IV	IG1	All Participants	p30	2/150 (1.3)	5/150 (3.3)	0.40 (0.08 to 2.03)
				p43	8/150 (5.3)	4/150 (2.7)	2.00 (0.62 to 6.50)
Munoz, 2007[17]	MDE prevalence per MMS	IG1	All Participants	p04	0/21 (0.0)	0/20 (0.0)	0.95 (0.02 to 45.95)
				p13	2/21 (9.5)	0/20 (0.0)	4.77 (0.24 to 93.67)
				p26	0/21 (0.0)	2/20 (10.0)	0.19 (0.01 to 3.75)
				p52	2/21 (9.5)	5/20 (25.0)	0.38 (0.08 to 1.74)
	Experienced MDE per MMS	IG1	All Participants	p52	3/21 (14.3)	5/20 (25.0)	0.57 (0.16 to 2.08)
Ngai, 2020[18]	EPDS ≥10	IG1	All Participants	0	55/134 (41.0)	48/130 (36.9)	1.11 (0.82 to 1.50)
				p06	40/134 (29.9)	62/130 (47.7)	0.63 (0.46 to 0.86)
				p26	32/134 (24.1)	39/130 (29.7)	0.80 (0.53 to 1.19)
				p52	38/134 (28.5)	39/130 (30.1)	0.95 (0.65 to 1.38)
		IG2	All Participants	0	43/124 (34.7)	48/130 (36.9)	0.94 (0.68 to 1.31)
				p06	52/124 (42.2)	62/130 (47.7)	0.88 (0.67 to 1.16)

Appendix E Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Counseling RCTs, by Author

Author, year	Outcome description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
				p26	37/124 (30.2)	39/130 (29.7)	0.99 (0.68 to 1.45)
				p52	30/124 (23.8)	39/130 (30.1)	0.81 (0.54 to 1.21)
Ngai, 2022[19]	EPDS ≥10	IG1	All Participants	0	77/224 (34.4)	69/231 (30.0)	1.15 (0.88 to 1.50)
				p06	57/224 (25.4)	109/231 (47.3)	0.54 (0.41 to 0.70)
				p26	58/224 (25.9)	65/231 (28.1)	0.92 (0.68 to 1.25)
Ortiz Collado, 2014[20]	EPDS ≥12	IG1	All Participants	p09	24/69 (34.3)	27/58 (45.5)	0.75 (0.49 to 1.14)
Phipps, 2013[21]	PPD Dx per SCID-KID	IG1	All Participants	p26	6/48 (12.5)	13/52 (25.0)	0.50 (0.21 to 1.21)
Phipps, 2020[22]	Onset of MDE per SCID-KID	IG1	All Participants	p52	9/118 (7.6)	8/117 (7.0)	1.12 (0.45 to 2.79)
Tandon, 2011[23]	MDD per MMS	IG1	All Participants	p32	3/32 (9.4)	9/27 (33.3)	0.28 (0.08 to 0.94)
	Experienced major depressive episode per SCID-CV	IG1	All Participants	p40	6/41 (14.6)	11/34 (32.4)	0.45 (0.19 to 1.10)
Tandon, 2021[25]	MDE	IG1	All Participants	p12	15/275 (5.5)	10/146 (6.8)	0.73 (0.31 to 1.72)
				p24	16/272 (5.9)	10/146 (6.8)	0.80 (0.34 to 1.85)
		IG2	All Participants	p12	24/367 (6.5)	10/146 (6.8)	0.85 (0.38 to 1.87)
				p24	24/365 (6.6)	10/146 (6.8)	0.85 (0.39 to 1.88)
Zlotnick, 2006[27]	Developed PPD per LIFE	IG1	All Participants	p13	2/46 (4.3)	8/40 (20.0)	0.22 (0.05 to 0.96)
Zlotnick, 2011[28]	Experienced MDE per LIFE	IG1	All Participants	p13	6/25 (24.0)	5/21 (23.8)	1.01 (0.36 to 2.84)
Zlotnick, 2016[29]	Onset of PPD per LIFE	IG1	All Participants	p26	16/101 (16.0)	30/96 (31.0)	0.51 (0.30 to 0.87)
				p52	26/101 (26.0)	38/96 (40.0)	0.65 (0.43 to 0.98)

Appendix E Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Counseling RCTs, by Author

Abbreviations: BDI = The Beck Depression Inventory; CG = Control group; DSM = diagnostic and statistical manual of mental disorders; Dx = Diagnosis; EPDS = Edinburgh Postnatal Depression Scale; G = Weeks gestation; GHQ = General Health Questionnaire; ICD = International Classification of Diseases; IG = Intervention group; LIFE = Longitudinal Interval Follow-up Examination; LQ = Leverton Questionnaire ; MDE = Major depressive disorder; MMS = The Maternal Mood Screener; P = Weeks postpartum; PPD = Postpartum depression; RR = Relative risk; SCAN = the Schedules for Clinical Assessment in Neuropsychiatry; SCID = Structured Clinical Interview

Appendix E Table 6. Depression Symptom Scores for Counseling RCTs, by Author

Author, Year	Outcome	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff change (95% CI)
Boobpamala, 2022[3]	EPDS	All Participants	g24	36	7.0 (4.1)	4.5 (2.6)	36	6.7 (4.0)	6.4 (4.3)	-2.50 (3.57)	-0.33 (4.17)	-2.17 (-3.96 to -0.38)
			g26	36	7.0 (4.1)	4.0 (2.6)	36	6.7 (4.0)	6.0 (4.0)	-3.03 (3.56)	-0.75 (4.03)	-2.28 (-4.04 to -0.52)
			g28	36	7.0 (4.1)	2.0 (2.1)	36	6.7 (4.0)	6.6 (4.6)	-5.00 (3.53)	-0.16 (4.32)	-4.84 (-6.66 to -3.02)
Boran, 2023[4]	EPDS	All Participants	g31	35	6.2 (3.1)	4.9 (2.9)	38	6.0 (3.4)	5.0 (4.6)	-1.31 (2.98)	-0.94 (4.10)	-0.37 (-2.03 to 1.29)
Cooper, 2015[6]	EPDS	All Participants	p08	82	NR (NR)	7.4 (4.7)	83	NR (NR)	7.6 (4.8)	NR (NR)	NR (NR)	study reported p-value: >0.857
			p18	80	NR (NR)	6.9 (5.0)	79	NR (NR)	6.7 (4.5)	NR (NR)	NR (NR)	study reported p-value: >0.857
			p52	75	NR (NR)	6.3 (4.8)	76	NR (NR)	6.4 (4.6)	NR (NR)	NR (NR)	study reported p-value: >0.857
			p78	73	NR (NR)	5.9 (4.4)	74	NR (NR)	6.1 (4.3)	NR (NR)	NR (NR)	study reported p-value: >0.857
Dimidjian, 2016[7]	EPDS	All Participants	g24	24	6.0 (4.0)	4.7 (4.0)	31	5.1 (4.9)	6.4 (3.8)	-1.31 (3.95)	1.32 (4.46)	-2.63 (-4.89 to -0.37)
			p04	21	6.0 (4.0)	5.5 (5.5)	31	5.1 (4.9)	7.1 (4.9)	-0.50 (4.94)	2.06 (4.91)	-2.56 (-5.28 to 0.16)
			p26	21	6.0 (4.0)	4.9 (5.2)	29	5.1 (4.9)	6.6 (4.9)	-1.08 (4.72)	1.55 (4.93)	-2.63 (-5.35 to 0.09)
Dugravier, 2013[8]	EPDS	All Participants	p13	184	10.5 (5.6)	8.6 (5.4)	183	11.1 (5.6)	9.4 (5.4)	-1.90 (5.50)	-1.70 (5.50)	0.85 (0.35 to 1.34)
		BL EPDS <8	p13	184	NR (NR)	NR (NR)	183	NR (NR)	NR (NR)	NR (NR)	NR (NR)	1.66 (0.17 to 3.15)*
Feinberg, 2008[9]	CES-D	All Participants	p28	79	0.4 (0.5)	0.3 (0.3)	73	0.4 (0.4)	0.4 (0.2)	-0.09 (0.42)	-0.02 (0.37)	-0.07 (-0.20 to 0.06)
Goma, 2023[10]	EPDS	All Participants	p26	37	12.7 (3.8)	5.5 (3.7)	27	11.3 (3.9)	12.6 (4.9)	-7.20 (3.80)	1.40 (4.40)	-8.50 (95% CI: -10.52 to -6.48)
Gorman, 1997[11]	BDI	All Participants	p04	17	11.9 (8.8)	9.1 (6.7)	15	12.7 (6.9)	11.3 (6.0)	-2.80 (7.96)	-1.40 (6.50)	-1.40 (-6.48 to 3.68)
			p26	13	11.9 (8.8)	10.7 (9.9)	17	12.7 (6.9)	11.3 (7.8)	-1.20 (9.40)	-1.40 (7.39)	0.20 (-5.80 to 6.20)
	EPDS	All Participants	p26	13	NR (NR)	7.9 (5.2)	17	NR (NR)	8.0 (5.6)	NR (NR)	NR (NR)	NR (NR)

Appendix E Table 6. Depression Symptom Scores for Counseling RCTs, by Author

Author, Year	Outcome	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff change (95% CI)
	SCL-90-R Depression	All Participants	p04	17	11.9 (8.8)	0.7 (0.6)	17	1.0 (0.6)	1.0 (0.6)	-11.19 (8.50)	-0.04 (0.59)	-11.15 (-15.20 to -7.10)
			p26	13	11.9 (8.8)	1.1 (0.8)	17	1.0 (0.6)	1.1 (0.8)	-10.78 (8.42)	0.05 (0.75)	-10.83 (-14.83 to -6.83)
Le, 2011[13]	BDI-II	All Participants	g32	94	15.7 (10.0)	10.6 (7.8)	92	14.9 (9.3)	12.7 (9.6)	-5.15 (9.09)	-2.23 (9.44)	-2.92 (-5.58 to -0.26)
			p06	89	15.7 (10.0)	9.9 (8.0)	91	14.9 (9.3)	9.6 (8.6)	-5.79 (9.15)	-5.28 (8.95)	-0.51 (-3.16 to 2.14)
			p17	87	15.7 (10.0)	9.2 (8.1)	87	14.9 (9.3)	8.5 (7.8)	-6.50 (9.21)	-6.38 (8.65)	-0.12 (-2.78 to 2.54)
			p52	77	15.7 (10.0)	7.7 (6.1)	73	14.9 (9.3)	6.9 (5.9)	-8.03 (8.73)	-7.97 (8.16)	-0.06 (-2.77 to 2.65)
Leung, 2012[14]	EPDS	All Participants	g24	78	8.5 (5.2)	8.0 (5.4)	78	7.4 (4.5)	7.8 (5.1)	-0.46 (3.06)	0.39 (3.83)	-0.85 (-1.94 to 0.24)
			p06	78	8.5 (5.2)	7.6 (4.8)	78	7.4 (4.5)	7.7 (5.6)	-0.91 (4.93)	0.26 (5.07)	-1.17 (-2.74 to 0.40)
		EPDS >12 at BL	g24	32	13.5 (3.1)	12.3 (4.7)	23	13.0 (2.6)	12.3 (4.8)	-1.16 (4.13)	-0.66 (4.18)	-0.50 (-2.73 to 1.73)
			p06	32	13.5 (3.1)	9.6 (4.8)	23	13.0 (2.6)	10.6 (5.7)	-3.85 (4.18)	-2.39 (4.97)	-1.46 (-3.88 to 0.96)
Lewis, 2021[15]	EPDS	All Participants	p30	150	9.0 (19.0)†	7.0 (18.0)†	150	8.0 (19.0)†	7.0 (20.0)†	NR (NR)	NR (NR)	study reported p=0.03
			p43	150	9.0 (19.0)†	7.0 (18.0)†	150	8.0 (19.0)†	7.0 (17.0)†	NR (NR)	NR (NR)	study reported NSD
Lonnberg, 2020[16]	EPDS	All Participants	g29	75	9.9 (4.8)	6.3 (4.1)	89	10.1 (5.1)	8.3 (5.5)	-3.61 (4.51)	-1.77 (5.30)	-1.84 (-3.36 to -0.32)
Munoz, 2007[17]	CES-D	All Participants	g28	21	16.0 (8.6)	15.1 (12.3)	20	16.8 (8.1)	16.4 (8.5)	-0.91 (10.93)	-0.39 (8.28)	-0.52 (-6.48 to 5.44)
			p04	21	16.0 (8.6)	13.3 (9.6)	20	16.8 (8.1)	13.4 (8.8)	-2.75 (9.15)	-3.44 (8.43)	0.69 (-4.70 to 6.08)
			p13	21	16.0 (8.6)	16.4 (8.4)	20	16.8 (8.1)	16.4 (12.8)	0.36 (8.48)	-0.46 (11.18)	0.82 (-5.23 to 6.87)
			p26	21	16.0 (8.6)	16.2 (10.6)	20	16.8 (8.1)	17.7 (12.0)	0.20 (9.73)	0.88 (10.58)	-0.68 (-6.90 to 5.54)
			p52	21	16.0 (8.6)	13.4 (8.9)	20	16.8 (8.1)	15.4 (13.0)	-2.62 (8.75)	-1.38 (11.37)	-1.24 (-7.43 to 4.95)
	EPDS	All Participants	p04	21	NR (NR)	6.5 (.8)	20	NR (NR)	9.0 (4.8)	NR (NR)	NR (NR)	NR (NR)

Appendix E Table 6. Depression Symptom Scores for Counseling RCTs, by Author

Author, Year	Outcome	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff change (95% CI)
			p13	21	NR (NR)	7.7 (5.3)	20	NR (NR)	9.2 (5.2)	NR (NR)	NR (NR)	NR (NR)
			p26	21	NR (NR)	8.2 (4.1)	20	NR (NR)	9.3 (4.9)	NR (NR)	NR (NR)	NR (NR)
			p52	21	NR (NR)	7.4 (3.8)	20	NR (NR)	9.1 (5.5)	NR (NR)	NR (NR)	NR (NR)
Ngai, 2020[18]	EPDS	All Participants (IG1)	p06	134	8.4 (0.04)‡	7.3 (0.4)‡	130	8.1 (0.4)‡	9.0 (0.4)‡	-1.08 (4.60)	0.90 (4.53)	-1.71 (-3.13 to -0.29)*
			p26	134	8.4 (0.04)‡	6.4 (0.4)‡	130	8.1 (0.4)‡	7.0 (0.4)‡	-2.00 (4.60)	-1.13 (4.53)	-0.03 (-1.19 to 0.14)*
			p52	134	8.4 (0.04)‡	7.2 (0.5)‡	130	8.1 (0.4)‡	7.3 (0.5)‡	-1.16 (4.96)	-0.87 (4.97)	-0.02 (-1.34 to 1.29)*
	EPDS	All Participants (IG2)	p06	124	8.0 (0.04)‡	8.8 (0.4)‡	130	8.1 (0.4)‡	9.0 (0.4)‡	0.80 (4.60)	0.90 (4.53)	-0.25 (-1.44 to 0.94)*
			p26	124	8.0 (0.04)‡	7.1 (0.4)‡	130	8.1 (0.4)‡	7.0 (0.4)‡	-0.91 (4.54)	-1.13 (4.53)	0.07 (-1.12 to 1.26)*
			p52	124	8.0 (0.04)‡	6.6 (0.5)‡	130	8.1 (0.4)‡	7.3 (0.5)‡	-1.42 (5.11)	-0.87 (4.97)	-0.70 (-2.38 to 0.98)*
Ngai 2022[19]	EPDS	IG1	p06	224	8.1 (5.7)	7.4 (6.1)	231	8.0 (5.6)	9.3 (6.1)	-0.80 (6.00)	1.40 (5.80)	-1.91 (95% CI: -2.71 to -1.11)*
			p26	224	8.1 (5.7)	7.0 (6.4)	231	8.0 (5.6)	7.9 (6.2)	-1.20 (6.00)	0.00 (6.00)	-0.89 (95% CI: -1.74 to -0.04)*
Ortiz Collado, 2014[20]	EPDS	All Participants	p09	69	11.2 (5.8)	9.3 (5.2)	58	10.0 (5.8)	11.1 (6.1)	-1.89 (5.49)	1.11 (5.95)	-3.00 (-4.99 to -1.01)
Phipps, 2020[22]	CDRS-R	All Participants	p52	115	NR (NR)	NR (NR)	117	NR (NR)	NR (NR)	NR (NR)	NR (NR)	Study reported: pvalue NSD
Tandon, 2011[23]	BDI-II	All Participants	p20	32	15.9 (9.2)	11.3 (10.9)	27	13.0 (11.1)	13.0 (11.0)	-4.60 (10.16)	0.00 (11.05)	-4.60 (-10.02 to 0.82)
			p32	32	15.9 (9.2)	8.5 (9.9)	27	13.0 (11.1)	12.2 (10.7)	-7.40 (9.57)	-0.80 (10.91)	-6.60 (-11.82 to -1.38)
Tandon, 2014[24]	BDI-II	All Participants	p15	40	16.3 (8.7)	11.7 (10.1)	37	13.4 (10.2)	14.8 (8.4)	-4.60 (9.48)	1.40 (9.43)	-6.00 (-10.23 to -1.77)
			p27	41	16.3 (8.7)	9.1 (10.2)	35	13.4 (10.2)	12.2 (10.5)	-7.20 (9.54)	-1.20 (10.35)	-6.00 (-10.48 to -1.52)
			p40	41	16.3 (8.7)	8.9 (9.2)	34	13.4 (10.2)	13.2 (10.1)	-7.40 (8.96)	-0.20 (10.15)	-7.20 (-11.53 to -2.87)

Appendix E Table 6. Depression Symptom Scores for Counseling RCTs, by Author

Author, Year	Outcome	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff change (95% CI)
Tandon, 2021[25]	QIDS-SR16	IG1	p24	272	7.8 (4.3)	5.3 (4.5)	146	6.7 (3.6)	5.8 (4.6)	-2.40 (4.40)	-0.80 (4.20)	-1.60 (95% CI: -2.47 to -0.73)
		IG2	p24	365	8.6 (4.3)	5.9 (4.5)	146	6.7 (3.6)	5.8 (4.6)	-2.80 (4.40)	-0.80 (4.20)	-1.80 (95% CI: -2.63 to -0.97)
Woolhouse, 2014[26]	CES-D	All Participants	g26	13	14.4 (10.1)	12.1 (4.2)	10	13.7 (8.0)	10.1 (8.7)	-2.33 (11.48)	-3.60 (6.99)	1.27 (-6.82 to 9.36)
Zlotnick, 2006[27]	BDI	All Participants	p13	46	15.3 (7.0)	9.4 (7.4)	40	16.0 (7.8)	10.1 (9.4)	-5.91 (7.20)	-5.90 (8.71)	-0.01 (-3.37 to 3.35)
Zlotnick, 2011[28]	EPDS	All Participants	p02	28	7.2 (4.4)	6.7 (5.5)	26	8.8 (6.1)	7.1 (5.2)	-0.50 (5.05)	-1.63 (5.68)	1.13 (-1.73 to 3.99)
			p13	28	7.2 (4.4)	6.1 (5.9)	26	8.8 (6.1)	8.0 (5.7)	-1.06 (5.27)	-0.77 (5.91)	-0.29 (-3.27 to 2.69)

*Mean Difference (95% CI)
†Median (range)
‡Mean (SE)

Abbreviations: BL = Baseline; BDI = The Beck Depression Inventory; CDRS-R = Children's Depression Rating Scale, Revised; CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; DASS = Depression Anxiety Stress Scales; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; G = Weeks gestation; IG = Intervention group; NR = Not reported; NSD = No significant difference; P = Weeks postpartum; QIDS-SR16 = The Quick Inventory of Depressive Symptomatology-Self Report RCT = Randomized controlled trial; SCL-90-R = Symptom Checklist-90-Revised; SD = Standard deviation

Appendix E Table 7. Other Continuous Outcomes for Counseling RCTs, by Outcome Type

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chng (95% CI)
Anxiety	Boran, 2023[4]	GAD-7	All Participants	g31	35	4.7 (3.4)	3.2 (2.7)	38	4.3 (3.9)	4.3 (3.5)	-1.46 (3.12)	0.08 (3.74)	-1.54 (-3.13 to 0.05)
	Feinberg, 2008[9]	Taylor Manifest Anxiety Scale	All Participants	p28	79	7.1 (3.4)	6.5 (4.4)	73	6.9 (4.2)	6.6 (4.5)	-0.60 (4.02)	-0.35 (4.36)	-0.25 (-1.58 to 1.08)
	Goma, 2023[10]	STAI	All Participants	p26	37	69.4 (22.1)	51.6 (22.4)	27	62.8 (21.9)	69.7 (20.9)	-17.80 (22.20)	7.00 (21.40)	-24.72 (95% CI: -35.59 to -13.85)
	Gorman, 1997[11]	SCL-90-R Anxiety	All Participants	p04	17	0.5 (0.5)	0.2 (0.2)	15	0.4 (0.3)	0.3 (0.3)	-0.28 (0.45)	-0.15 (0.30)	-0.13 (-0.40 to 0.14)
				p26	13	0.5 (0.5)	0.7 (0.6)	17	0.4 (0.3)	0.5 (0.6)	0.16 (0.57)	0.07 (0.48)	0.09 (-0.28 to 0.46)
	Woolhouse, 2014[26]	DASS anxiety	All Participants	g26	13	8.6 (7.7)	4.6 (4.0)	10	7.0 (8.3)	4.8 (5.9)	-4.00 (5.48)	-2.20 (4.36)	-1.80 (-5.95 to 2.35)
		STAI	All Participants	g26	13	35.9 (14.1)	32.8 (7.1)	10	34.8 (11.5)	33.0 (12.8)	-3.08 (16.72)	-1.78 (0.19)	-1.30 (-11.72 to 9.12)
Child development	Cooper, 2015[6]	BSQ	All Participants	p78	52	NR (NR)	3.8 (3.1)	59	NR (NR)	3.9 (3.3)	NR (NR)	NR (NR)	study reported pvalue: >0.765
Family functioning	Gorman, 1997[11]	DAS	All Participants	p04	16	106.9 (15.1)	106.8 (19.9)	15	111.1 (16.3)	110.0 (19.1)	-0.10 (17.99)	-1.10 (17.87)	1.00 (-11.63 to 13.63)
				p26	13	106.9 (15.1)	99.5 (21.1)	16	111.1 (16.3)	107.4 (15.0)	-7.40 (18.83)	-3.70 (15.69)	-3.70 (-16.26 to 8.86)
	Leung, 2012[14]	Cooperation	All Participants	g24	78	5.6 (1.8)	5.8 (1.7)	78	5.8 (1.8)	5.7 (1.8)	0.25 (1.80)	-0.04 (1.33)	0.29 (-0.21 to 0.79)
				p06	78	5.6 (1.8)	5.8 (1.8)	78	5.8 (1.8)	5.8 (1.9)	0.22 (1.78)	0.02 (1.67)	0.20 (-0.34 to 0.74)
			EPDS >12 at baseline	g24	32	5.2 (1.8)	5.5 (1.8)	23	5.5 (2.1)	5.3 (2.3)	0.28 (1.80)	-0.17 (2.18)	0.45 (-0.60 to 1.50)
				p06	32	5.2 (1.8)	5.5 (1.9)	23	5.5 (2.1)	5.0 (2.2)	0.34 (1.86)	-0.48 (2.17)	0.82 (-0.25 to 1.89)

Appendix E Table 7. Other Continuous Outcomes for Counseling RCTs, by Outcome Type

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chng (95% CI)
		Managing conflict	All Participants	g24	78	31.4 (6.6)	31.5 (6.7)	78	32.9 (6.3)	32.2 (6.0)	0.18 (3.90)	-0.66 (3.42)	0.84 (-0.31 to 1.99)
				p06	78	31.4 (6.6)	30.9 (6.4)	78	32.9 (6.3)	32.3 (6.2)	-0.50 (5.86)	-0.57 (6.62)	0.07 (-1.89 to 2.03)
			EPDS >12 at baseline	g24	32	28.3 (5.8)	29.8 (6.3)	23	31.8 (5.9)	30.1 (6.3)	1.47 (6.07)	-1.70 (6.08)	3.17 (-0.08 to 6.42)
				p06	32	28.3 (5.8)	29.9 (5.8)	23	31.8 (5.9)	29.5 (5.8)	1.60 (5.78)	-2.31 (5.87)	3.91 (0.79 to 7.03)
	Ortiz Collado, 2014[20]	DASS (women's)	All Participants	p09	69	119.9 (26.0)	109.0 (24.6)	58	116.4 (24.5)	103.6 (29.0)	-10.93 (25.32)	-12.77 (27.01)	1.84 (-7.27 to 10.95)
	Zlotnick, 2011[28]	Intimate Partner Violence	All Participants	p02	26	33.4 (28.4)	7.3 (11.6)	26	38.7 (39.0)	5.9 (9.0)	-26.10 (24.73)	-32.80 (35.37)	6.70 (-9.89 to 23.29)
				p13	26	33.4 (28.4)	16.3 (28.6)	26	38.7 (39.0)	12.1 (23.1)	-17.10 (28.50)	-26.60 (33.97)	9.50 (-7.54 to 26.54)
Functioning	Boran, 2023[4]	WHO-DAS	All Participants	g31	35	9.5 (5.6)	10.3 (6.7)	38	8.5 (6.4)	10.6 (6.7)	0.83 (6.20)	2.08 (6.56)	-1.25 (-4.19 to 1.69)
	Zlotnick, 2006[27]	LIFE-RIFT	All Participants	p13	46	10.9 (3.3)	8.8 (2.6)	40	11.4 (6.5)	10.2 (3.3)	-2.10 (2.99)	-1.16 (5.60)	-0.94 (-2.80 to 0.92)
General distress severity	Gorman, 1997[11]	Global Severity Index	All Participants	p04	17	0.7 (0.5)	0.4 (0.3)	15	0.6 (0.4)	0.5 (0.3)	-0.28 (0.45)	-0.06 (0.33)	-0.22 (-0.50 to 0.06)
				p26	13	0.7 (0.5)	0.7 (0.4)	17	0.6 (0.4)	0.7 (0.6)	-0.05 (0.47)	0.07 (0.53)	-0.12 (-0.49 to 0.25)
Maternal functioning	Gorman, 1997[11]	PPAQ	All Participants	p04	18	NR (NR)	2.3 (0.3)	15	NR (NR)	2.2 (0.2)	NR (NR)	NR (NR)	NR
				p26	13	NR (NR)	2.3 (0.3)	17	NR (NR)	2.3 (0.3)	NR (NR)	NR (NR)	NR
PTSD	Zlotnick, 2011[28]	Davidson Trauma Scale	All Participants	p02	28	10.0 (10.6)	6.0 (7.8)	26	16.1 (23.5)	10.1 (16.1)	-3.92 (9.52)	-6.02 (20.80)	2.10 (-6.42 to 10.62)
				p13	28	10.0 (10.6)	8.4 (14.0)	26	16.1 (23.5)	9.2 (14.2)	-1.52 (12.64)	-6.92 (20.49)	5.40 (-3.61 to 14.41)
QOL	Leung, 2012[14]	Perceived health		g24	78	3.5 (0.8)	3.6 (0.9)	78	3.5 (0.9)	3.5 (0.8)	0.03 (0.84)	-0.03 (0.84)	0.06 (-0.20 to 0.32)

Appendix E Table 7. Other Continuous Outcomes for Counseling RCTs, by Outcome Type

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chng (95% CI)
			All Participants	p06	78	3.5 (0.8)	3.5 (0.8)	78	3.5 (0.9)	3.4 (0.8)	0.01 (0.81)	-0.07 (0.85)	0.08 (-0.18 to 0.34)
			EPDS >12 at baseline	g24	32	3.3 (0.1)	3.3 (0.1)	23	3.0 (0.2)	3.1 (0.2)	0.06 (0.13)	0.05 (0.19)	0.01 (-0.07 to 0.09)
				p06	32	3.3 (0.1)	3.2 (0.8)	23	3.0 (0.2)	3.3 (0.9)	-0.06 (0.74)	0.26 (0.80)	-0.32 (-0.73 to 0.09)
		Subjective happiness scale	All Participants	g24	78	4.6 (0.7)	4.6 (0.7)	78	4.6 (0.7)	4.4 (0.8)	-0.01 (0.54)	-0.21 (0.54)	0.20 (0.03 to 0.37)
				p06	78	4.6 (0.7)	4.6 (4.6)	78	4.6 (0.7)	4.4 (0.9)	-0.06 (0.68)	-0.17 (0.86)	0.11 (-0.13 to 0.35)
			EPDS >12 at baseline	g24	32	4.4 (0.6)	4.3 (0.7)	23	4.3 (0.9)	4.1 (1.0)	-0.11 (0.68)	-0.18 (0.94)	0.07 (-0.36 to 0.50)
				p06	32	4.4 (0.6)	4.4 (0.5)	23	4.3 (0.9)	4.3 (0.9)	-0.04 (0.58)	0.03 (0.92)	-0.07 (-0.47 to 0.33)
Social support	Ortiz Collado, 2014[20]	Functional Social Support Questionnaire	All Participants	p09	69	26.8 (8.3)	27.4 (8.3)	58	26.6 (8.1)	29.0 (9.1)	0.60 (8.29)	2.43 (8.62)	-1.83 (-4.78 to 1.12)
	Tandon, 2014[24]	Interpersonal Support Evaluation List	All Participants	p15	40	60.6 (NR)	60.8 (NR)	37	56.9 (NR)	57.7 (NR)	0.20 (NR)	0.80 (NR)	study reported Betacoeff (SE): -0.62 (3.52), NSD
				p27	41	60.6 (NR)	61.7 (NR)	37	56.9 (NR)	58.6 (NR)	1.10 (NR)	1.70 (NR)	study reported Betacoeff (SE): -0.76 (3.50); NSD
				p40	41	60.6 (NR)	62.6 (NR)	37	56.9 (NR)	52.1 (NR)	2.00 (NR)	-4.80 (NR)	study reported Betacoeff (SE): 6.67 (3.53), pvalue<0.10
Stress	Leung, 2012[14]	PSS	All Participants	g24	78	6.8 (1.9)	6.5 (2.1)	78	6.6 (1.9)	6.8 (1.7)	-0.34 (1.28)	0.23 (1.67)	-0.57 (-1.04 to -0.10)
				p06	78	6.8 (1.9)	6.7 (2.3)	78	6.6 (1.9)	6.8 (1.8)	-0.17 (2.16)	0.23 (1.67)	-0.40 (-1.01 to 0.21)
			EPDS >12 at baseline	g24	32	7.8 (1.2)	7.3 (1.0)	23	7.7 (1.8)	7.7 (1.8)	-0.53 (1.12)	-0.06 (1.82)	-0.47 (-1.25 to 0.31)
				p06	32	7.8 (1.2)	7.3 (2.0)	23	7.7 (1.8)	7.6 (1.2)	-0.49 (1.77)	-0.11 (1.60)	-0.38 (-1.29 to 0.53)
	Lewis, 2021[15]	PSS	All Participants (IG1)	p30	150	25.0 (38.0) *	23.0 (30.0) *	150	25.0 (39.0) *	22.0 (36.0) *	NR (NR)	NR (NR)	study reported NSD
				p43	150	25.0 (38.0) *	23.0 (37.0) *	150	25.0 (39.0) *	22.0 (39.0) *	NR (NR)	NR (NR)	study reported NSD

Appendix E Table 7. Other Continuous Outcomes for Counseling RCTs, by Outcome Type

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chng (95% CI)
	Lonnberg, 2020[16]	PSS	All Participants	g29	75	26.9 (7.2)	20.8 (6.5)	89	27.0 (7.5)	23.2 (7.8)	-6.07 (6.88)	-3.80 (7.69)	-2.27 (-4.52 to -0.02)
	Ortiz Collado, 2014[20]	Stressful events	All Participants	p09	69	212.1 (131.4)	190.1 (123.5)	58	189.7 (114.7)	203.3 (115.0)	-21.99 (127.63)	13.61 (114.81)	-35.60 (-78.18 to 6.98)
	Woolhouse, 2014[26]	DASS stress	All Participants	g26	13	16.1 (11.3)	12.9 (5.0)	10	13.4 (10.8)	9.0 (4.9)	-3.23 (11.53)	-4.40 (10.19)	1.17 (-7.88 to 10.22)
		PSS	All Participants	g26	13	17.9 (7.1)	16.5 (6.1)	10	16.9 (7.1)	14.4 (8.4)	-1.38 (9.18)	-2.50 (5.42)	1.12 (-5.30 to 7.54)

*Median (range)

Abbreviations: BL = Baseline; BSQ = Body Shape Questionnaire; CG = Control group; CI = Confidence Interval; DASS = Depression Anxiety Scales; Diff = Difference; FU = Followup; G = Weeks gestation; GAD = Generalized anxiety disorder; IG = Intervention group; LIFE-RIFT = Longitudinal Interval Follow-up Evaluation - Range of Impaired Functioning Tool; NR = Not reported; NSD = No significant difference; P = Weeks postpartum; PPAQ = Pregnancy Physical Activity Questionnaire; PSS = Perceived Stress Scale; RCT = Randomized controlled trial; SCL-90-R = Symptom Checklist-90-Revised; SD = Standard deviation; SE = Standard error; STAI = State-Trait Anxiety Inventory; WHO-DAS = World Health Organization Disability Assessment Schedule

Appendix E Table 8. Other Dichotomous Outcomes for Counseling RCTs, by Outcome Type

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Child attachment	Cooper, 2015[6]	Relationship Problems (instrument NR)	All Participants	p08	22/82 (32.3)	32/83 (42.7)	0.70 (0.44 to 1.09)
				p18	24/80 (32.4)	33/79 (44.0)	0.72 (0.47 to 1.10)
				p52	20/75 (28.6)	21/76 (30.9)	0.97 (0.57 to 1.63)
Child development	Cooper, 2015[6]	Behavior Problems (instrument NR)	All Participants	p08	45/82 (56.2)	39/83 (48.8)	1.17 (0.86 to 1.58)
				p18	28/80 (35.4)	31/79 (40.3)	0.89 (0.59 to 1.34)
				p52	23/75 (32.9)	32/76 (45.1)	0.73 (0.47 to 1.12)
Functioning	Brugha, 2000[5]	Many vs few difficulties with ADL (instrument NR)	All Participants	p13	1/94 (1.1)	6/96 (6.2)	0.17 (0.02 to 1.39)
Healthcare use	Zlotnick, 2016[29]	Mental health treatment per TSR	All Participants	p13	10/104 (10.0)	23/101 (23.0)	0.42 (0.21 to 0.84)
				p26	11/104 (11.0)	23/101 (23.0)	0.46 (0.24 to 0.90)
				p52	21/104 (20.0)	25/101 (25.0)	0.82 (0.49 to 1.36)

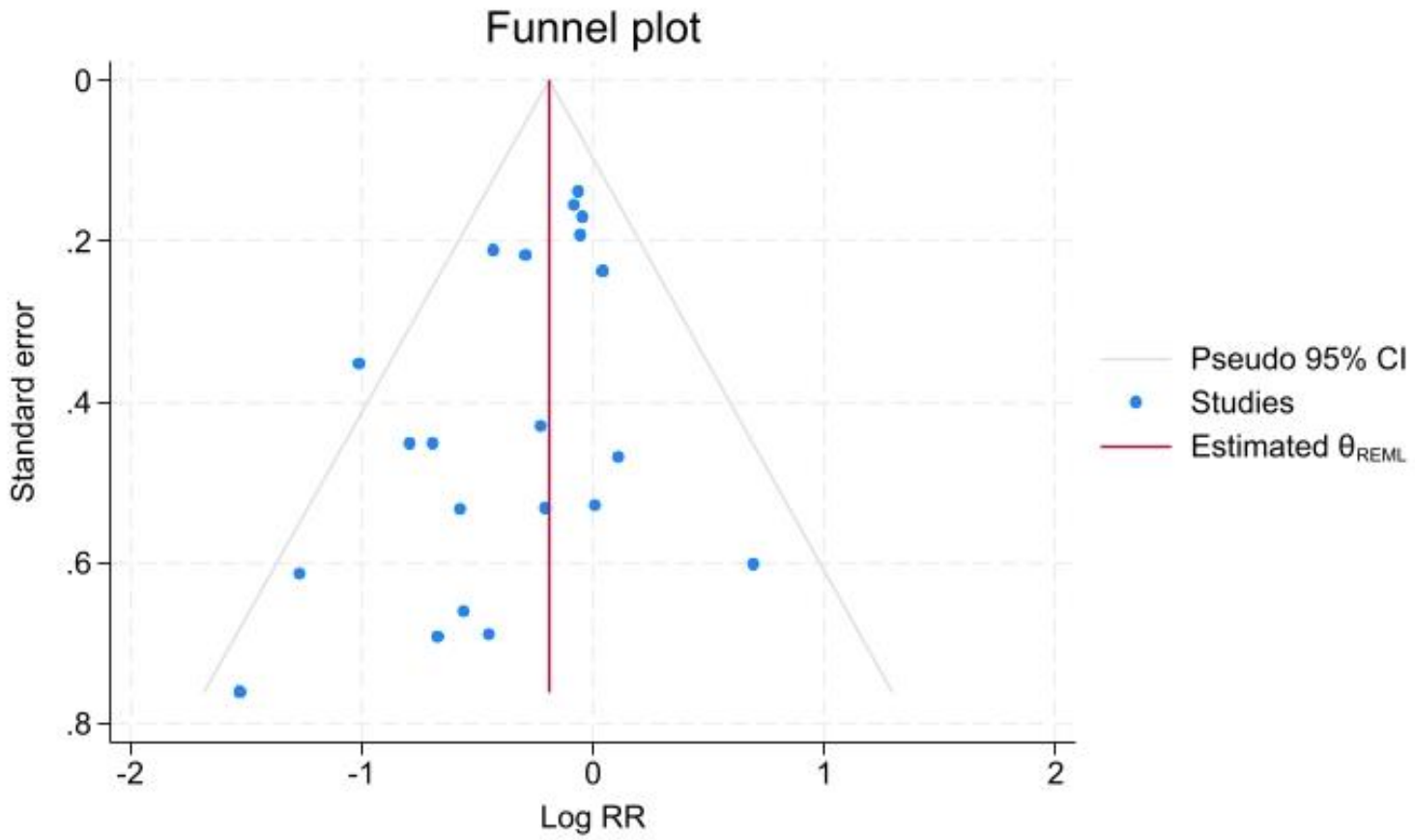
Abbreviations: ADL = Activities of daily living; CG = Control group; CI = Confidence Interval; IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative risk; TSR = Traumatic stress relief

Appendix E Table 9. Harms Outcomes in Counseling RCTs, by Outcome

Author, year	Outcome description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Boran, 2023[4]	SAE	IG1	All Participants	g31	0/44 (0.0)	0/44 (0.0)	1.00 (0.02 to 49.31)
Phipps, 2020[22]	SAE, including suicidal, infanticidal, or homicidal attempts or completions or participant hospitalizations	IG1	All Participants	p52	0/115 (0.0)	0/117 (0.0)	1.02 (0.02 to 50.84)
Lonnberg, 2020[16]	Withdrawal due to AE	IG1	All Participants	g29	1/75 (1.3)	0/89 (0.0)	3.55 (0.15 to 85.94)

Abbreviations: AE = Adverse events; CG = Control group; CI = Confidence Interval; G = Weeks gestation; IG = Intervention group; RCT = Randomized controlled trial; RR = Relative risk; SAE = Serious adverse events

Appendix E Figure 1. Funnel Plot for Behavioral Counseling Intervention of Dichotomous Depression Outcome (Any of Incidence, Prevalence, and Exceeding Symptom Scale Cut-Off)



Abbreviations: CI = Confidence interval; REML = Restricted maximum likelihood; RR = Relative risk;

Appendix E Figure 1. Funnel Plot for Behavioral Counseling Intervention of Dichotomous Depression Outcome (Any of Incidence, Prevalence, and Exceeding Symptom Scale Cut-Off)

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Arakawa, 2023[30]	Good	JPN	734	Pregnant women living in Yokohama city	Unselected	(none)	Pregnant	NR	33 (NR)
Dennis, 2003[31]	Fair	CAN	701	New mothers, 2 weeks postpartum, high risk of PPD (EPDS >9)	Depr Sx or Hx	EPDS >9	Postpartum	2	NR (≥18)
Dennis, 2009[32]	Fair	CAN	42	8-12 weeks postpartum, at high-risk for postpartum depression (EPDS >9)	Depr Sx or Hx	EPDS >9	Postpartum	10	NR (≥18)
Dol, 2022[33] Essential Coaching for Every Mother program	Fair	CAN	171	Pregnant and postpartum women, aged 18+ years, 37 weeks pregnant to 10 days postpartum	Unselected	(none)	Both	0.5	31 (≥18)
Kavanagh, 2021[34] Baby Steps Wellbeing	Good	AUS	248	First-time couples, 26-38 weeks' gestation	Unselected	(none)	Pregnant	31	32 (≥18)
Kenyon, 2016[35]	Good	GBR	1324	Nulliparous women, <28 weeks' gestation, with social risk factors	Other char (not depr)	Low SES	Pregnant	13	22 (≥16)
Koc, 2023[36]	Fair	TUR	100	Healthy pregnant women aged >18 years	Unselected	(none)	Pregnant	32	25 (>18)
Kocak, 2021[37]	Fair	TUR	124	Postnatal women, aged 18 years or older, gave birth at term with no complications	Unselected	(none)	Postpartum	0	27 (NR)
Morrell, 2000[38]	Fair	GBR	623	Postnatal women aged 17 and older	Unselected	(none)	Postpartum	0	27.8 (≥17)
Nicolson, 2020[39] The Newborn Behavioral Observations (NBO)	Fair	AUS	111	Pregnant, first-time mothers, aged 20+ years with current anxiety or depression symptoms or past mental illness, <36 weeks' gestation	Depr Sx or Hx	EPDS ≥10 or PASS (anxiety measure) ≥26 or significant history of mental illness for which they had sought professional support.	Pregnant	18	31 (21 to 40)

Appendix E Figure 1. Funnel Plot for Behavioral Counseling Intervention of Dichotomous Depression Outcome (Any of Incidence, Prevalence, and Exceeding Symptom Scale Cut-Off)

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Reid, 2002[40]	Fair	GBR	1004	Primiparous women, 34-37 weeks' gestation	Unselected	(none)	Postpartum	35.5	26.5 (NR)
Sangsawang, 2022[41] Midwife-Family Provided Social Support programme (MFPSS programme)	Good	THA	42	Postnatal adolescents, first-time mothers	Other char (not depr)	Adolescents only	Postpartum	0	17 (10 to 19)
Shorey, 2019[42] Peer-support Intervention Program (PIP)	Fair	SGP	138	Postpartum women at risk of PND (EPDS ≥9)	Depr Sx or Hx	EPDS ≥9	Postpartum	0	32 (≥21)
Stamp, 1995[43]	Fair	AUS	144	Pregnant women, <24 weeks' gestation, risk of postnatal depression	Depr Sx or Hx	≥2 on antenatal screening questionnaire to predict PPD	Pregnant	14	26 (NR)
Wiggins, 2004[44] Social Support and Family Health (SSFH) Study	Good	GBR	731	Women ≤10 weeks postpartum, and living in economically deprived districts	Other char (not depr)	Low SES	Postpartum	9	30 (NR)

Abbreviations: AUS = Australia**;** Avg = Average; BL = Baseline; CAN = Canada; EPDS = Edinburgh Postnatal Depression Scale; GBR = Great Britain; Gest = Gestation; Hx = History; NR = Not reported; PPD = Postpartum depression; Rand = Randomized; PASS = Perinatal Anxiety Screening Scale; PND = Postnatal depression; PP = Postpartum; RCT = Randomized controlled trial; SES = Socioeconomic status; SGP = Singapore; Sx = Symptoms; THA = Thailand; TUR = Turkey; Wks = Weeks

Appendix F Table 2. Detailed Population Characteristics for Supportive RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Arakawa, 2023[30]	NR	<16 years (Under university): 23 ≥16 years (University or higher): 77	NR	100	0	NR	62	Equivalent household income, %: Low (≤2.5 million yen): 16 Intermediate (>2.5 &≤4.5 million yen): 50 High (>4.5 million yen): 18	BL EPDS ≥13: 7 EPDS ≥9: 21 Hx of depr: NR	Past mental health problems: 9
Dennis, 2003[31]	NR	<HS: 3 HS Grad: 20 College Grad: 38 Post College Degree: 15	NR	93	NR	17	59	The majority (78%) of women were 20-34. Married % includes cohabitating. Annual household income ($C): 0-19 999 = 10% 20 000-39 999= 15.5% 40 000-59 999 = 15.5% 60 000-79 999= 17.5% ≥80 000 = 41.5%	BL EPDS >9: 100 [per inclusion criteria] Hx of any depr: 69 Hx of PPD, 8	NR
Dennis, 2009[32]	NR	<HS: 0 HS Grad: 26 College Grad: 74 Post College Degree: 0	NR	100	NR	NR	59	76.5% of women between 25-34 years of age Annual household income (CAN): 0-$39,999: 52.5% $40,000-79,999: 35.5% $80,000+: 12% 83.5% Born in Canada	BL EPDS >9: 100 [per inclusion criteria] Hx of PPD: 19	NR
Dol, 2022[33]	White: 88 NonWhite (included Black, Chinese, Filipino, Latin American, Greek, and Indigenous), %: 12	<HS: 0 HS Grad: 10 College Grad: 65 Post College Degree: 25	NR	95	5	NR	53	Household income (CAN), %: < $74,999: 31 $75,000–$149,999: 47 Over $150,000: 17 Landed immigrant, %: 12	BL depr sx: NR Hx of depr/anx: 31	NR

Appendix F Table 2. Detailed Population Characteristics for Supportive RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Kavanagh, 2021[34]	NR	<HS: NR HS Grad: NR College Grad: 73 Post College Degree: NR	76	81	NA	NR	NR	Part-time/casual employment, %: 14 Unpaid leave, retired, %: 10	NR	NR
Kenyon, 2016[35]	White: 52 Black/AfrAm: 12 Hispanic/Latino: 0 Asian: 29 NA/AI: 0 Other: 7	NR	NR	NR	NR	NR	100	Index of multiple deprivation from postcode at recruitment Quintile 1: 74% Quintile 2: 16% Quintile 3: 8% Quintile 4: 2% Quintile 5: 0.4%	NR	Past or present mental illness: 15% 3 (Drug misuse) 1 (Alcohol misuse)
Koc, 2023[36]	NR	<HS: 31 HS Grad: 41 College Grad: 28 Post College Degree: NR	77	NR	NR	NR	100	Level of income, %: Income lower than expense: 29 Income equal to expense: 63 Income higher than expense: 8 Health insurance, %: Insured: 92	NR	Diag of any psychiatric disease: 0 [per inclusion criteria]
Kocak, 2021[37]	NR	<HS: 52 HS Grad: 30 College Grad: 18 Post College Degree: NR	10	NR	NR	79	NR	Assessment of monthly income status, %: Good: 32 Moderate/Bad: 68 Type of family, %: Nuclear family: 67 Extended family: 33	NR	NR

Appendix F Table 2. Detailed Population Characteristics for Supportive RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Morrell, 2000[38]	NR	NR	61	NR	NR	18	NR	29% receiving housing benefit 56% homeowner 34% rented 93% central heating in home 77% car available for use	NR	NR
Nicolson, 2020[39]	White: 62 (Caucasian or European cultural identity) Black/AfrAm: 0 Hispanic/Latino: 0 Asian: 12 NA/AI: 0 Other: 6 Middle Eastern: 2.7	<HS: 5 HS Grad: NR College Grad: 72 Post College Degree: NR Trade or post-school certificate, %: 15	63	92	4	32	100	Unemployed, %: 11 Home duties, %: 7 'Other' employment, %: 13 Students, %: 4 Income >80K AUD, %: 65 Received government benefit, %: 14 First time mothers, %: 100	BL EPDS ≥10 or elevated anx sx or MH hx: 100 [per inclusion criteria] BL EPDS ≥10: 55 Depr hx: NR	NR
Reid, 2002[40]	NR	NR	NR	NR	NR	22	100	NR	NR	NR
Sangsawang, 2022[41]	NR	Education level, %: Primary school: 30 Junior HS: 40 Senior HS: 30	25	NR	28	NR	100	Marital status, %: Partnered: 73 Living with, %: Parents and family members: 38 Parents, family members and partner: 18 Partner and partner's family: 45	BL EPDS >13: 0 Depr hx: NR	NR
Shorey, 2019[42] Peer-support Interventio	White: 0 Black/AfrAm: 0 Hispanic/Latino: 0 Asian: 88 NA/AI: 0 Other: 12	<HS: 11 HS Grad: 29 College Grad: 60 Post College	NR	96	NR	35	59	First time mother, %: 59 Maternity leave (yes), %: 70 Monthly household income (SGD $)--	EPDS ≥9: 100 [per inclusion criteria] Depr hx: NR	NR

Appendix F Table 2. Detailed Population Characteristics for Supportive RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
n Program (PIP)		Degree: NR						<3K, %: 32 3K+, %: 68		
Stamp, 1995[43]	NR	NR	NR	78	22	15	61	NR	≥2 on antenatal screening questionnaire to predict PPD: 100 [per inclusion criteria Depr hx: NR	NR
Wiggins, 2004[44] Social Support and Family Health (SSFH) Study	White: 58 Black/AfrAm: NR Hispanic/Latino: NR Asian: NR NA/AI: NR Other: NR	<HS: 9 HS Grad: NR College Grad: NR Post College Degree: NR	NR	NR	26	NR	49	Weekly household income <=200 (pounds): 48.4%	NR	NR

Abbreviations: Afr/Am = African American; AUD = Australian dollar; CAN = Canadian; Depr = Depression; HS = High school; Hx = History; MH = Mental health; NA/NI = Native American/Alaska Native; NR = Not reported; PPD = Postpartum depression; RCT = Randomized controlled trial; SES = Socioeconomic status; SGD = Singapore dollar; Sx = Symptoms

Appendix F Table 3. Intervention Characteristics for Supportive RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider (s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Arakawa, 2023[30]	Access to mHealth consultation service throughout pregnancy and postpartum periods	Both	Phone (support available)	Individual	Email, text, phone	Physician, midwife	No	44	NR (open access to the app during the intervention period)	Usual care
Dennis, 2003[31]	Minimum of 4 peer phone support contacts	Postpartum	Phone	Individual	Phone	Peer	Yes	12	9 session (mean) (length 14 (mean)) x 12wks	Usual care
Dennis, 2009[32]	Telephone-based peer support, length or number of sessions at discretion of peer volunteers.	Postpartum	Phone	Individual	Phone	Peer	Yes	8	Avg 5 session (sessions (length Avg 34.4 (SD 20) min, range 6-90) x 8wks	Usual care
Dol, 2022[33]	53 text messages (1-2 per day) sent over 6 wks that provided information related to newborn care and maternal mental health	Postpartum	Phone	Individual	Email or Text	NA	No	6	53 text messages over 6 wks	Usual care
Kavanagh, 2021[34]	Web-based program for couples covering parental mental and physical well-being plus baby care	Both	Virtual, self-driven	Individual, Couples	Web	Self-driven	No	10	Self-directed (9 modules), minutes NR	Attention Control
Kenyon, 2016[35]	Case management by lay pregnancy outreach worker, including support and advice (sessions NR)	Both	Home	Individual	Email or Text, In-person, Phone	Peer	No	33	NR session (NR (length NR) x 33 wks	Usual care

Appendix F Table 3. Intervention Characteristics for Supportive RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider (s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Koc, 2023[36]	Access to telehealth counseling for 6 weeks	Pregnancy	Phone (support available)	Individual	Phone	Midwife	No	6	NR (Access to individual telehealth counseling for 6 weeks (available as needed))	Usual care
Kocak, 2021[37]	App-based intervention, included newborn and maternal self-care information and option to request support from healthcare clinician	Postpartum	Virtual, self-driven, virtual support available	Individual	Web	Self-driven	No	6	NR (Self-directed app)	Usual care
Morrell, 2000[38]	Ten 3-hour support worker visits per day over the first 28 days postpartum, providing practical and emotional support	Postpartum	Home	Individual	In-person	Maternity support worker	No	4	10 session (individual) (length 180) x 4wks	Minimal
Nicolson, 2020[39]	Three, 20-40 min in-person Newborn Behavioral Observation sessions over 4 wks, aimed at supporting infant, parent, and their relationship.	Postpartum	Home	Individual	In-person	Midwife	No	4	3, 20-40min in-person sessions over 4wks	Usual care
Reid, 2002[40]	Weekly 2-hour support non-directive group sessions (only 18% attended any meetings)	Postpartum	Community	Group	In-person, Print	Midwife	No	26	Most attended 3 sessions (any (length 120) x 26wks	Minimal

Appendix F Table 3. Intervention Characteristics for Supportive RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider (s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Sangsawang, 2022[41]	3 x 60-90 min in-person sessions, plus 4 x 20-25 min phone calls, 1 x 60-90 min home visit	Postpartum	Home, In-hospital post delivery	Individual, Family	In-person, Phone	Midwife	No	4	3 x 60-90 min in-person sessions, plus 4 x 20-25 min phone calls, 1 x 60-90 min home visit	Waitlist
Shorey, 2019[42]	Technology-based (phone call, SMS, or email) peer-support program over 4 wks.	Postpartum	Phone	Individual	Email or Text, Phone	Peer	Yes	4	at least 1 contact per week for 4 weeks, length NR or NA	Usual care
Stamp, 1995[43]	Two antenatal non-directive, practical, and supportive group sessions held at 32- and 36-wks' gestation and at 6-wks postpartum	Pregnant	Other Medical	Group	In-person	Midwife	No	14	3 session (group) (length NR) x 14wks	Usual care
Wiggins, 2004[44]	IG 1: Up to 22 in-person supportive listening home visits	Postpartum	Home	Individual	In-person	Nurse	No	52	0-22 session (individual) (length Most visits 30 to 120 mins) x 52wks	Usual care
	IG2: Referral to community support organizations for their standard service; services varied by community organization.	Postpartum	Community	Group	In-person, Phone	NR	Yes	52	Avg 4.0 (home visit), 4.5 (drop-in), 1.3 session (phone) (length Avg 114 (home visit), 128 (drop-in), 10 (phone)) x 52wks	Usual care

Abbreviations: CG = Control group; IG = Intervention group; Min = Minutes; NA = Not applicable; NR = Not reported; RCT = Randomized controlled trial; Wks = Weeks

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
Arakawa, 2023[30]	IG1	mHealth consultation services provided by Kids Public, Inc. The service provider had developed and offered mHealth consultation services in other regions but never investigated the effectiveness of their services in preventing depression before this study. Participants in the mHealth group could consult healthcare professionals free of charge using their mobile device without restrictions on the frequency, from the time of assignment until four months after childbirth, funded by the City of Yokohama. The service included general consultation and emotional support related to pregnancy and childcare and did not provide formal medical diagnosis or prescription. This service was delivered through the LINE platform—the most popular mobile social network service (used by over 95% of women of childbearing age in Japan) —or telephone calls. The consultants were obstetrician–gynecologists, pediatricians, and midwives with at least three years of clinical experience in maternity or childcare. The consultants provided general advice to address the participant's health-related concerns according to the consultants' medical specializations. The consultants shared supportive communication skills and knowledge of preventive care for mental health problems; however, no procedures on the qualification of their skills were implemented. mHealth group participants could book available 10-min consultation times and select their preferred available consultants and methods (voice calling, text messaging/chat, and video calling) between 6 p.m. and 10 p.m. on weekdays. After childbirth, they could also have chat consultations with midwives without booking or time restrictions between 1 p.m. and 5 p.m. on Mondays, Wednesdays, and Fridays. The service provider regularly sent magazines to all users with helpful information on maternity and childcare as a push-type service, with advice to promote service use for women who needed help.	NR	NR	Usual care group were not provided with the mHealth consultation services. Instead, they were offered access to a website created by a research team where they could easily access information on pregnancy and childcare provided by the City of Yokohama or other public organizations, such as national hospitals.
Dennis, 2003[31]	IG1	Women allocated to the intervention group had access to all standard postpartum care in addition to being matched with a peer volunteer. Peer volunteers were recruited from all health regions and the number recruited was based on region size and ranged from 12 to 66. Peers were women from the community who volunteered and met the selection criteria: ability to speak and understand English and self-reported history of and recovery from postnatal depression, and attended 4hr training. The volunteer coordinator matched participants and peer volunteers based on residency and ethnicity if the mother desired. Telephone	To document initiation of the intervention, the volunteer coordinator interacted with the peer volunteer one week after matching to confirm that contact was made with the participant. All peer volunteers were requested to complete an activity log	Overall, 81% (n=161) of women were satisfied with their experience.	Access to standard community postpartum care, which could have included, if available, the mother proactively seeking the service from public health nurses, physicians, other

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		contact was to be initiated in the 48-72 hours after trial randomization. The peer volunteers were requested to make a minimum of four contacts and then to interact as deemed necessary. Each peer volunteer who actively participated in the trial and was matched with a participant (n=175) on average supported two women (mean 1.97, SD 1.50), with a range from one to seven. The training session for peers focused primarily on developing telephone support and referral skills and included role-playing, verifying problem-solving skills, and developing the ability to refer mothers to an appropriate professional service. The author developed a 118-page handbook for distribution to all peer volunteers. This handbook outlined professional services available for referral and was to be used as a reference guide. It also incorporated various topics, including a definition of peer support, potential benefits, how to develop a relationship, skills and techniques for effective telephone support, general PPD information, and the helping process.	for each woman supported to document specific intervention activities and duration to 12 weeks postpartum. Mothers received a mean of 8.8 (SD 6.0) contacts with their peer volunteers. Half calls were telephone conversations initiated by the peer volunteer, with a mean duration of 14.1 minutes (SD 18.5, range 1-180).		providers, and various community resources, including drop-in centers
Dennis, 2009[32]	IG1	"Mothers Helping Mothers with Postpartum Depression." Mothers were paired with a peer volunteer, based on residency and availability. Peer support was defined as a specific type of social support that incorporates informational, appraisal (feedback), and emotional assistance. Peer volunteers also had a list of professional services available for referral. Peer volunteers met the following selection criteria: history of and recovery from PPD, desire to help new mothers, and completion of a 4-hour training session. Peer volunteers were contacted within 1 to 2 days of a participant's enrollment and provided with her telephone number and address. Peer volunteers were asked to contact the new mother within 48 hours and as frequently thereafter as the individual mother deemed necessary. To individualize the intervention to each mother's specific needs and to give credibility to the peer volunteers' experiential knowledge, contact frequency was not standardized.	16 of 20 activity logs from volunteer peers returned: showed that during the 2 months monitored, peer volunteers logged 5 or more actual connections (mean 5.4, SD 3.5) and 5 attempted connections (mean 5.6, SD 2.6) for most mothers. The mean duration of a telephone connection was 34.4 minutes (SD 20), with a range of 6 to 90 minutes; 12 (75%) peer–mother relationships actively continued past the 2 months monitored.	Of the 16 mothers in the experimental group who evaluated the intervention, 87.5% were satisfied with their peer-support experience. Table 4 reports maternal perceptions of intervention. 88% to 100% strongly agreed to 14 positive attributes of their peer support experience, 75% to 94% rated "strongly agree" on 13 items covering perceived benefits and satisfaction with care.	Standard community postpartum care
Dol, 2022[33]	IG1	The Essential Coaching for Every Mother program included 53 standardized evidence-based text messages that provided information related to newborn care and maternal mental health in	NR	NR	Participants allocated to the control group did not receive any

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		the first six-weeks postpartum. Participants allocated to the intervention were sent messages from birth to six-weeks postpartum, with two messages sent per day in the first two weeks (one at 10 a.m. and one at 5 p.m.) and a daily message (at 10 am) for weeks 3 through 6. The messages were sent automatically based on newborn age, and the total number of messages received varied depending on when the participant enrolled. Participants were able to self-select breastfeeding or formula feeding messages and if needed, they could indicate their choice to switch during the program, which modified the breastfeeding/formula feeding content of their subsequent messages. No change in the provision of health care was required when enrolled in the program and participants communicated with health care professionals as they wished.			text messages aside from recruitment and survey requests. All participants, both intervention and control, were able to seek additional postpartum support outside of the study as needed/wanted.
Kavanagh, 2021[34]	IG1	After allocation, participants received four text messages at 2, 4, 7, and 10 weeks to remind them to log into the web program, Baby Steps Wellbeing, and select tips to apply. Text also included a recommendation to review goals and plans. Baby Steps Wellbeing was an interactive web-based program that included the four Baby Care program modules (i.e., information and tips on getting prepared, feeding and soothing their baby, and improving their baby's sleeping habits) as well as the five additional modules on physical and emotional self-care, their relationship with their partner, changing roles, and interacting with their baby, as well as the module meant especially for fathers (i.e., a total of 9 modules). The program promoted parental well-being, and utilized interactive tools for the enhancement of well-being. Participants could identify goals, solve problems, develop a plan, set times to take action, and record their successful completion. A list of successfully completed plans was available. A web-based scrapbook was used to store photos of good times with their baby, and their dashboard presented due dates for their action plans, together with a rotating quiz question about baby care, a tip, and a scrapbook photo. The participants were not given advice on the number of modules to access, and there was no limitation on the pace of module access.	54% mothers used program at least twice; 44% mothers set a goal An average of 3 of 9 modules were viewed.	72% participants' overall satisfaction	After allocation, participants received four text messages at 2, 4, 7, and 10 weeks to remind them to log into the web-based program, Baby Care. It consisted of four informational modules giving information and tips on getting prepared, feeding and soothing their baby, and improving their baby's sleeping habits. A Get Help tab provided a list of relevant digital or telephone support services.
Kenyon, 2016[35]	IG1	Lay pregnancy outreach workers (POWs) were integrated into standard midwifery teams and provided individual case management including home visits. Objectives of case management during pregnancy were to encourage women to attend antenatal appointments, make healthy lifestyle choices, to provide social/emotional support, and help ensure benefits, housing	Individuals received a median of 25 contacts (19 antenatal and 6 postnatal) with a median of 7 face to face contacts. The majority of face-to-face	NR	Standard UK maternity care included provision for referring women with social risk factors to specialist midwives or

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		difficulties, and mental health problem were managed. In the postnatal period (to 6 weeks postpartum) POWs provided breast feeding and infant care advice.	sessions were in the woman's home and lasted 30 minutes to 2 hours. Other contacts were <30 minutes. The most common types of support given were financial/ benefit/legal, health matters (diet/ smoking/ lifestyle), emotional, and housing. 2% of women received support related to mental health.		directing them to other agencies.
Koc, 2023[36]	IG1	The intervention group received telecounseling as needed between 08:00 h and 20:00 h for 6 weeks at home. Counseling included topics related to the mother and the fetus. In cases that required treatment or care for problems that could not be solved by phone, participants were directed to the obstetric outpatient clinic to continue the process.	In total, 265 interviews were conducted with 50 pregnant women. Average time for phone calls was 13 min.	NR	Only received routine care in the hospital
Kocak, 2021[37]	IG1	In addition to the routine care, the mothers in the IG received support and counseling with the Postpartum Mobile Support Application named “BebekveBiz”. While the application provides information on topics mothers may need such as maternal care, baby care and breastfeeding, it includes a consultancy service aiming to support mothers at any time with the "Request Support" interface. In addition, the application sends notifications at 5-10 hour intervals including reminders aimed at increasing the motivation of the mothers. The researcher monitored when and for which topics the mothers used the application. The mothers were set free to use the application. According to the recommendations of the Ministry of Health the Postpartum Care and World Health Organization, the contents included in the postpartum mobile support application: newborn baby care, mother care, breast milk and breastfeeding, vaccinations calendar, and the motivational messages ('the baby knows only you and not compare you with the others', 'breastmilk is the best nutrition for baby', 'If you need help do not hesitate please' etc.). The mobile support application which could easily be installed on a phone. It had a web admin panel where the mobile application content was transferred, and thus the content arrangement was provided through this web page. The intensity of	NR	NR	The mothers in the CG continued to receive routine care. In Turkey, postpartum care is given at Family Health Centers after the first week, and the midwife, nurses and doctors follow-up the mother and the baby and provide counseling. According to the Republic of Turkey, Ministry of Health, Postpartum Care Guide, the first three postpartum care is given at 0-1 hours, 1-6 hours, 6-24 hours in the hospital. The fourth follow-up is on the second to fifth

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		information within the application was presented in a simple and concise manner that the mothers could understand. Mothers reached at certain time intervals with reminder notifications and small tips to be integrated into the application. The support button in the application allowed parents to communicate with the researcher (expert Gynecology and Obstetric Nursing). When the support button was touched by the mother, the notification was visible on the web page used by the research team. The researcher contacted the mother between 1- and 8 hours and offered support to the mother online.			days following birth, while the fifth follow-up is on the 13th-17th days after birth, and the sixth follow-up is on the 30th-42nd days following birth. All the follow-ups are held at home or in a health center. While the pre-test data of the mothers in the control group were collected in the postpartum clinic as in the experimental group, the post-test data were obtained online at the end of the 6th week as the mothers answered the questions in the survey web base through the online link sent to them.
Morrell, 2000[38]	IG1	The planned postnatal intervention aimed to help women rest and recover after childbirth. Support workers aimed to provide effective practical and emotional support, including helping the mother gain confidence in caring for her baby and reinforcing midwifery advice on infant feeding. All women in the trial were offered postnatal care at home by community midwives. The intervention group were also offered 10 visits from a support worker for up to 3 hours per day in the first 28 postnatal days. The support workers achieved their national vocational qualification (level 2) postnatal care award and completed endorsement units accredited to the domiciliary care award and competence in the care of young children.	Most women received six visits from a support worker, and 48 (15%) received 10 visits. Thirty-eight women (12%) declined all visits but were included in the follow up and analysis. The length of visits ranged from 10 to 375 minutes, with most time spent on housework (38%), talking with the mother (23%), dealing with the baby (9%), dealing with other siblings (8%), bottle feeding (7%), talking about the baby	70% were "very satisfied" with the support workers for self and baby at 6 weeks; additional 22-24% were "fairly satisfied"	All women in the trial were offered postnatal care at home by community midwives

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
			(6%), and discussing breast feeding (3%).		
Nicolson, 2020[39]	IG1	The Newborn Behavioral Observations (NBO) is a brief intervention supporting the infant, the parent and their relationship. Three NBO sessions and a study endpoint assessment, as well as TAU. The NBO sessions utilize 18 passive and interactive observations to draw out the baby's neuro-developmental strengths and challenges and caregiving needs and preferences. Sessions take 20–40 min. The clinician adjusts the content, pace and order of observations according to the infant's state, stress signs and responsiveness. The clinician also supports parental emotional responses, involvement and insights. Fathers and extended family participate if present. The clinician and parent(s) reflect together on the meaning of the baby's observed behaviors and caregiving implications. NBO sessions were timed to coincide with routine maternal-infant health care. They included one session in the first week of life in hospital or participants' homes, and two sessions at infant aged 2 and 4 weeks in participants' homes. An NBO accredited midwife or MCH nurse provided the sessions.	Of 51 eligible families in the intervention group, 48 (94%) received all three NBO sessions; and had two or more with the same clinician. Of 50 NBO sessions conducted in the first week of life/T4, 21 (42%) occurred in hospital before discharge. A total of 150 sessions were completed, lasting an average 60 min (range = 15–90 with no significant variation between the first, second and final sessions $F(2,147) = 1.9$, $p = 0.15$). Most sessions (144/150 or 96%) were provided by an NBO-trained nurse. Due to nurse unavailability, four sessions were provided by a general practitioner and two by a child and adolescent psychiatrist.	Mothers rated 86%–88.5% of sessions (n = 147) as having helped them "quite a bit" or "a lot" to feel closer to baby, feel more confident parenting and get to know their baby more; 94.5% of sessions as helping them relate to the clinician "quite a bit" or "a lot"; and mothers rated the overall learning experience as excellent (85%), good (12%), fair (3%), and poor (0%).	Participants offered TAU which involves referral to, assessment, and treatment, at the recruitment site's perinatal mental health service. Depending on the women's history and preference, this may involve allocation to an individual psychiatrist/ psychologist/ mental health nurse, or clinician-facilitated group care. TAU includes review and follow-up after birth as required. Frequency and duration of visits depend upon need and acceptance of mental health support.
Reid, 2002[40]	IG1	Women received an invitation to attend a support group. The groups were run on a weekly basis in six central locations in each health board. The premise of the group work was that the agenda of the groups should be drawn up with the attendees; pilot sessions indicated that topics tended to center on those associated with the baby; however women were also encouraged to talk about issues that related to their own health and wellbeing. Feedback from the group facilitators (the subject of a further paper) suggests that they did so. Facilitators ran each group for a two-hour period. Women were encouraged to attend with a colorful invitation with the date and venue of their nearest group; this was re-sent to inform them of the date of the next group session in their locality. Half of the women also received a self-help manual ("pack"), as did half of the control	18% of those invited to attend the groups attended any sessions. The main reasons for non-attendance were lack of convenience of the group (either through timing or location) and women not wishing to attend on their own, either because they felt shy or they might not know anyone at the group. Majority who attended	When asked if they would pay for the group, 71% responded positively.	Half were usual care only, half received a mailed self-help manual ("pack"), which provided supportive information and advice geared to new mother and baby (mother's health, sleep and support needs, baby crying etc). The packs were

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		group women. Women did not receive any additional incentives relating to the self-help manual.	came to 3 or more groups, 40% attended 6 or more.		devised in collaboration with women and piloted with multiethnic and social class readerships in mind. Information is presented in a woman-friendly format with illustrations, quizzes and so on.
Sangsawang, 2022[41]	IG1	The midwives or researchers delivered the program to both the adolescent mothers and their families. The program consisted of the following two sessions: (1) social support activities for the adolescent mothers during their hospitalization with telephone contacts and home visits after they returned home by the midwives and (2) social support activities for the mothers after they returned home by the primary family members. In Session 1, social support activities were provided three times for 60–90 min at a time during the 1st–3rd days after childbirth in the postpartum unit, plus 20–25 min of four telephone contacts during the 1st–4th weeks, and 60–90 min for one home visit at the first week. In Session 2, social support activities were provided to adolescent mothers over 4 weeks (1st–4th week). Therefore, the time period for the intervention was approximately 4 weeks. Session 1 was provided by midwives who gave social support for the adolescent mothers and their family members to prevent PPD through the program as follows: Informational support: (a) education about PPD for the adolescent mothers and their family members; (b) explanation about the importance of social support in preventing PPD Informational support: (a) education about PPD for the adolescent mothers and their family members; (b) explanation about the importance of social support in preventing PPD. Emotional support: providing care, attention and verbal encouragement, while asking questions and listening to the various problems of the adolescent mothers, then following up on the problem-solving of the adolescent mothers concerning infant care and seeking assistance from their families. 3. Instrumental support: providing assistance for adolescent mothers to practice newborn care such as holding, bathing, performing infant eyes and umbilical cord care, changing clothes, changing diapers	NR	NR	The adolescent mothers in the control group received routine nursing care only during the postpartum period at the postpartum unit by staff nurses who were not involved with the study. The mothers were instructed by the staff nurses with verbal instruction regarding the topics of maternal and infant health care throughout the early postpartum period (i.e. maternal-infant complications, breastfeeding, infant care skills, etc.). For the ethical consideration, those mothers in the control group were free to receive the program after finishing the study at 3-month postpartum.

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		and feeding, etc., along with practicing ways to seek assistance from others. 4. Appraisal support: four follow-up telephone contacts and one home visit were aimed at making assessments and listening to the problems of the adolescent mothers and family members under real-living conditions at participant's home, while offering verbal encouragement, support and admiration of the good things done by the adolescent mothers and their families in addition to offering opportunities for the adolescent mothers to ask questions and offering advice on solving their problems at the time. Once the adolescent mothers had returned home, their families took on a significant role in providing social support in which the adolescent mothers had to select one person in the family to act as the primary family member to provide the mothers with social support after they returned home. The primary members who provided social support, assistance and care for the adolescent mothers who had been discharged from hospital as follows: Informational support: advice was provided for the adolescent mothers about postpartum self-care such as changing sanitary napkins and breast care, etc. Suggestions were also provided on infant care such as breastfeeding, holding, bathing, wiping infants' eyes, umbilical cord care, changing clothes and changing diapers, etc. 2. Emotional support: providing care and attention, offering love, asking about problems, emotions, feelings and needs for various types of assistance for the adolescent mothers in combination with listening, understanding and accepting the things shared by the adolescent mothers. 3. Instrumental support: providing assistance in terms of general care for the adolescent mothers such as preparing food, doing laundry, cleaning house, providing financial aid and taking to the hospital by appointment, etc. The mothers also received help with newborn care to ease their burdens by holding their babies, putting the babies to bed, bathing, wiping the infants' eyes, performing umbilical cord care, changing clothes and changing diapers, etc. 4. Appraisal support: providing feedback, admiration and confidence for the adolescent mothers when they were able to perform self-care and care for their newborn infants.			
Shorey, 2019[42]	IG1	In addition to standard routine postnatal care by the hospital, IG participants received a technology-based peer-support program for 4 weeks postpartum. The intervention involved correspondence with a trained peer volunteer at least once a week (for 4 weeks) via phone calls, emails, or mobile communication applications (e.g., WhatsApp), depending	NR	NR	Standard routine postnatal care by the hospital, which included in-hospital care by an obstetrician, nurses,

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		on each mother's preference and convenience. Mothers were contacted 2 to 3 days after their discharge from the hospital. During the introductory phone session, both sides shared their experience regarding emotional distress during the early postpartum period and extra efforts were made by the peer volunteer to build a strong relationship with the mother. Mothers were also informed that health care professionals would be notified if the mothers became too stressed during the correspondence. Subsequent sessions were individualized based on the unique needs of the mothers (e.g., how to seek help from the family members and sharing one's feelings with their partners). Peer volunteers, who had a self-reported history of and recovery from PND, facilitated the intervention program. Peer volunteers underwent a half-a-day training session by a psychiatrist. The training session inculcated roleplaying and strategizing to hone skills required in administering successful technology-based peer support. Volunteers were also taught to conduct appropriate referrals to health care professionals, should the need arise. A training booklet was prepared and given to each peer volunteer for future references. Peer volunteer recruitment criteria: Peer volunteers were recruited through a blasting of emails to the study venue's working community and by word of mouth based on the following inclusion criteria: (1) mothers who were aged at least 21 years, (2) proficient in verbal and written English, (3) delivered a healthy baby in the past, (4) had a self-reported history of and recovery from PND, (5) had a mobile phone and were willing to share their number and call needy mothers as instructed by the research team, and (6) planned to stay in Singapore for the next 6 months after recruitment to administer the peer-support intervention. Peer volunteers were excluded if they had any physical or mental conditions that interfered with their ability to participate in the study.			and a lactation consultant. Posthospital discharge, the only continuity of care provided, was in the form of appointments with obstetricians or neonatologists and breastfeeding hotline numbers.
Stamp, 1995[43]	IG1	The intervention group received two special antenatal groups (32 and 36 weeks' gestation) and a postnatal group (6 weeks postpartum). The groups included a practical and emotional emphasis on planning for and expectations of life changes precipitated by the arrival of a new baby. A nondirective, practical, and supportive approach was used, acknowledging the abilities and resourcefulness of the women themselves. Its focus was on access to information, preparation and support, the extension and development of women's existing networks, and goal setting.	The rate for the three groups was 65 (31 %) of 213 possible sessions. No difference was found in attendance rates by parity at any assessment point	NR	Routine care: antenatal classes and a videotape with information about postnatal depression at 6 weeks' postpartum.

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		Emphasis was given to the context in which the birth would occur in women's lives, and ample time was scheduled for women to talk, if they wished to, about their individual circumstances. Women were given simple suggestions to reduce stress after the birth of the baby, including to ignore unwanted advice, obtain support from one or two trusted people, form a relationship with supportive professionals, and keep the list of resources and goals in an obvious place. The six-week group was structured as a time for women to tell their birth stories, talk about the impact of a new baby on their lives, and if resources had been used, discuss what had worked and what had not. This was a time for mutual support, the educator's role being to facilitate and listen but not to offer advice unless it was directly sought. Group size was limited to 10 persons, including partners, who were encouraged to set goals with specific ideas of how they could be supportive. The groups met in a comfortable room, physically removed from the location of the hospital antenatal class. Partners were welcome to attend because of their emotional significance in a woman's life, potentially supportive role, and evidence of improved outcomes when they attended. A particular aspect of the program was developed to encourage partners to set goals with specific ideas of how they could be supportive. The groups were in addition to the antenatal classes offered by the hospital, which at the time did not include specific information about postnatal depression until six weeks' postpartum, when a videotape was shown.			
Wiggins, 2004[44]	IG1	The support health visitor (SHV) intervention consisted of the offer of a year of monthly supportive listening visits to take place in the woman's home, beginning when the baby was about 10 weeks old. The SHVs' primary focus was on the woman rather than her child; listening to her requests and responding to her needs rather than addressing a predetermined agenda. The SHVs also provided practical support and information on request. Interpreters were available to the SHVs when making home visits.	Uptake of the SHV intervention was high, with 172 of the 183 women allocated having at least one visit (94%).	87% of the women felt that the number of visits was "just right" and 54% found the SHV to be very helpful. Also, 85% agreed the SHV "has given me good advice", 97% "has listened to me", 2% "has made me feel worried about my baby". 4% "have	Routine NHS health visiting services were available to women in the control group and both intervention arms.

Appendix F Table 4. Detailed Intervention Characteristics for Supportive RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
				not liked her visiting me".	
Wiggins, 2004[44]	IG2	The community group support (CGS) intervention entailed being assigned to one of eight community groups that offered services for mothers with children less than 5 years in the study area. The groups offered a combination of services: drop-in sessions, home visiting, and/or telephone support. They made their standard package of services available to study women for one year. Groups in the CGS arm of the trial used whatever interpreting services were a normal part of their support; they were not provided with additional interpreting resources as part of their trial participation.	Only 35 women of the 184 allocated (19%) used the groups	45% rated their contacts as being "quite helpful"	Routine NHS health visiting services were available to women in the control group and both intervention arms.

Abbreviations: CG = Control group; Hr = Hour; IG = Intervention group; NHS = National Health Service; NR = Not reported; PND = Perinatal depression; PPD = Postpartum depression; RCT = Randomized controlled trial; SD = Standard deviation; UK = United Kingdom

Appendix F Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Supportive RCTs, by Author

Author, Year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Arakawa, 2023[30]	EPDS ≥9	IG1	All participants	p13	47/310 (15.2)	75/329 (22.8)	0.67 (0.48 to 0.93)
Dennis, 2009[32]	EPDS >9	IG1	All Participants	p14	9/20 (45.0)	16/22 (72.7)	0.62 (0.36 to 1.07)
				p18	7/20 (35.0)	16/22 (76.2)	0.48 (0.25 to 0.92)
	EPDS >12	IG1	All Participants	p14	2/20 (10.0)	9/22 (40.9)	0.24 (0.06 to 1.00)
				p18	3/20 (15.0)	11/22 (52.4)	0.30 (0.10 to 0.92)
Kenyon, 2016[35]	EPDS ≥13	IG1	All Participants	p08	61/489 (12.0)	87/519 (17.0)	0.74 (0.55 to 1.01)
			1 social risk factor	p08	13/128 (10.0)	24/159 (15.0)	0.67 (0.36 to 1.27)
			≥2 social risk factors	p08	48/361 (13.0)	63/360 (18.0)	0.76 (0.54 to 1.07)
Nicolson, 2020[39]	EPDS ≥13	IG1	All Participants	p17	6/40 (15.0)	7/34 (20.6)	0.73 (0.27 to 1.96)
	SCID-5 PND Dx	IG1	All Participants	p17	5/40 (12.5)	1/34 (3.0)	4.25 (0.52 to 34.63)
Reid, 2002[40]	EPDS ≥12	IG1	All Participants	p0	65/399 (16.3)	67/435 (15.4)	1.06 (0.77 to 1.45)
	EPDS ≥12	IG1	All Participants	p13	55/344 (16.0)	46/388 (11.9)	1.35 (0.94 to 1.94)
	EPDS ≥12	IG1	All Participants	p26	49/339 (14.5)	46/370 (12.4)	1.16 (0.80 to 1.69)
Sangsawang, 2022[41]	EPDS >13	IG1	All Participants	0	0/20 (0.0)	0/20 (0.0)	1.00 (0.02 to 48.09)
				p04	0/20 (0.0)	5/20 (25.0)	0.09 (0.01 to 1.54)
				p06	1/20 (5.0)	6/20 (30.0)	0.17 (0.02 to 1.26)
				p13	2/20 (10.0)	8/20 (40.0)	0.25 (0.06 to 1.03)
Stamp, 1995[43]	EPDS >9	IG1	All Participants	p06	22/64 (34.4)	22/64 (34.4)	1.00 (0.62 to 1.61)
				p12	14/63 (22.2)	17/65 (26.2)	0.85 (0.46 to 1.57)
				p26	14/60 (23.3)	10/61 (16.4)	1.42 (0.69 to 2.95)
	EPDS >12	IG1		p06	8/64 (12.5)	11/64 (17.1)	0.73 (0.31 to 1.69)

Appendix F Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Supportive RCTs, by Author

Author, Year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
			All Participants	p12	7/63 (11.1)	10/65 (15.4)	0.72 (0.29 to 1.78)
				p26	9/60 (15.0)	6/61 (9.8)	1.52 (0.58 to 4.02)
Wiggins, 2004[44]	EPDS ≥12	IG1	All Participants	p61	38/149 (25.5)	90/303 (29.7)	0.86 (0.62 to 1.19)
	EPDS ≥12	IG2	All Participants	p61	43/155 (27.7)	90/303 (29.7)	0.93 (0.69 to 1.27)

Abbreviations: CG = Control group; CI = Confidence Interval; Dx = Diagnosis; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; P = Weeks postpartum; PND = Perinatal depression; RCT = Randomized controlled trial; RR = Relative risk; SCID = Structured Clinical Interview

Appendix F Table 6. Depression Symptom Score Outcomes for Supportive RCTs, by Author

Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	MD in Change (95% CI)
Arakawa, 2023[30]	EPDS	All Participants	p13	310	NR	4.7 (3.9)	329	NR	5.6 (4.5)	NR	NR	-0.84 (95% CI: -1.50 to -0.18)†
Dennis, 2003[31]	EPDS	All Participants	p12	316	NR (NR)	7.9 (4.7)	316	NR (NR)	8.9 (5.2)	NR (NR)	NR (NR)	Study reported T test, and p-value: 0.02
			p24	289	NR (NR)	7.0 (4.7)	311	NR (NR)	7.6 (4.6)	NR (NR)	NR (NR)	Study reported T test, and p-value: 0.10
Dol, 2022[33]	EPDS	All Participants	p06	74	9.1 (5.9)	8.3 (5.1)	70	7.9 (4.8)	8.3 (4.9)	-0.62 (4.78)	0.32 (3.90)	-0.94 (-2.37 to 0.49)
Kavanagh, 2021[34]	EPDS	All Participants	p02	124	5.4 (0.3)*	6.3 (0.3)*	124	5.5 (0.3)*	6.3 (0.3)*	0.91 (3.46)	0.79 (3.46)	0.12 (-0.74 to 0.98)
			p15	124	5.4 (0.3)*	5.1 (0.3)*	124	5.5 (0.3)*	5.5 (0.3)*	-0.30 (3.46)	0.07 (3.46)	-0.37 (-1.23 to 0.49)
Kenyon, 2016[35]	EPDS	All Participants	p08	489	NR (NR)	6.8 (0.2)*	519	NR (NR)	7.3 (0.2)*	NR (NR)	NR (NR)	-0.59 (-1.24 to 0.06)
		1 social risk factor	p08	128	NR (NR)	6.8 (0.5)*	159	NR (NR)	6.9 (0.4)*	NR (NR)	NR (NR)	-0.14 (-1.38 to 1.10)†
		≥2 social risk factors	p08	361	NR (NR)	6.8 (0.3)*	360	NR (NR)	7.6 (0.3)*	NR (NR)	NR (NR)	-0.79 (-1.56 to -0.02)†
Koc, 2023[36]	HADS	g38	50	5.5 (3.1)	3.5 (2.8)	50	4.9 (2.9)	5.8 (2.8)	-2.00 (3.00)	0.80 (2.80)	g38	-2.82 (95% CI: -3.96 to -1.68)
Kocak, 2021[37]	EPDS	All Participants	p0	62	NR (NR)	5.8 (5.6)	50	NR (NR)	6.1 (6.4)	NR (NR)	NR (NR)	NA
			p06	62	NR (NR)	6.7 (6.5)	48	NR (NR)	8.8 (8.3)	NR (NR)	NR (NR)	study reported BG F stat p=0.244
Morrell, 2000[38]	EPDS	All Participants	p06	276	NR (NR)	7.4 (5.2)	266	NR (NR)	6.7 (5.5)	NR (NR)	NR (NR)	0.70 (-0.20 to 1.60)†
			p26	252	NR (NR)	6.6 (5.1)	229	NR (NR)	6.7 (5.6)	NR (NR)	NR (NR)	-0.10 (-1.00 to 1.90)†
Nicolson, 2020[39]	EPDS	All Participants	p17	40	10.1 (4.9)	8.0 (4.9)	34	9.3 (4.5)	8.0 (4.8)	-2.11 (4.89)	-1.32 (4.63)	-0.79 (-2.97 to 1.39)
Reid, 2002[40]	EPDS	All Participants	p13	336	NR (NR)	6.1 (5.2)	379	NR (NR)	5.8 (4.5)	NR (NR)	NR (NR)	0.00 (-0.62 to 0.60)†
			p26	336	NR (NR)	5.3 (5.4)	360	NR (NR)	5.3 (4.8)	NR (NR)	NR (NR)	0.10 (-0.59 to 0.81)†
Sangsawang, 2022[41]	EPDS	All Participants	p04	20	7.0 (2.4)	5.3 (2.7)	20	7.1 (2.1)	11.1 (3.9)	-1.75 (2.57)	4.00 (3.40)	-5.75 (-7.62 to -3.88)

Appendix F Table 6. Depression Symptom Score Outcomes for Supportive RCTs, by Author

Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	MD in Change (95% CI)
			p06	20	7.0 (2.4)	4.0 (3.8)	20	7.1 (2.1)	11.9 (3.8)	-3.00 (3.29)	4.80 (3.28)	-7.80 (-9.84 to -5.76)
			p13	20	7.0 (2.4)	3.7 (4.2)	20	7.1 (2.1)	13.1 (4.0)	-3.35 (3.61)	5.95 (3.48)	-9.30 (-11.50 to -7.10)
Shorey, 2019[42]	EPDS	All Participants	p13	54	NR (NR)	9.8 (2.2)	57	NR (NR)	12.0 (2.3)	NR (NR)	NR (NR)	-2.11 (-4.00 to -0.30)†
Wiggins, 2004[44]	EPDS	All Participants (IG1)	p61	149	8.8 (5.7)	8.2 (5.4)	303	9.1 (5.3)	9.0 (5.3)	-0.52 (5.53)	-0.10 (5.32)	-0.75 (-1.75 to 0.35)†
		All Participants (IG2)	p61	155	8.8 (5.2)	8.5 (5.9)	303	9.1 (5.3)	9.0 (5.3)	-0.25 (5.57)	-0.10 (5.32)	-0.48 (-1.59 to 0.61)†

*Mean (SE)
†Mean Difference (95%CI)

Abbreviations: BG = Between group; BL = Baseline; CG = Control group; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; HADS = Hospital Anxiety and Depression Scale; IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation

Appendix F Table 7. Other Dichotomous Outcomes for Supportive RCTs, by Outcome

Outcome type	Author, year	Outcome description	IG Allocation	Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Above anxiety cut-off	Nicolson, 2020[39]	PASS ≥ 26	IG1	All Participants	p17	10/40 (25.0)	15/34 (44.1)	0.57 (0.29 to 1.09)
Depression Treatment	Wiggins, 2004[44]	Antidepressant use in the past week	IG1	All Participants	p61	8/164 (4.9)	15/324 (4.6)	1.05 (0.46 to 2.43)
					p87	5/145 (3.4)	17/298 (5.7)	0.60 (0.23 to 1.61)
		Antidepressant use in the past week	IG2	All Participants	p61	7/163 (4.3)	15/324 (4.6)	0.93 (0.39 to 2.23)
					p87	3/158 (1.9)	17/298 (5.7)	0.33 (0.10 to 1.12)
Healthcare Use	Morrell, 2000[38]	Use of A&E services (infant)	IG1	All Participants	p06	17/278 (6.1)	19/261 (7.3)	0.84 (0.45 to 1.58)
					p26	32/259 (12.4)	30/229 (13.1)	0.94 (0.59 to 1.50)
		Use of inpatient services (infant)	IG1	All Participants	p06	13/210 (6.2)	8/191 (4.2)	1.48 (0.63 to 3.49)
					p26	17/260 (6.5)	19/233 (8.2)	0.80 (0.43 to 1.51)
		Use in inpatient services (mother)	IG1	All Participants	p06	11/279 (3.9)	9/265 (3.4)	1.16 (0.49 to 2.76)
					p26	3/260 (1.2)	5/233 (2.1)	0.54 (0.13 to 2.23)
		Use of A&E services (mother)	IG1	All Participants	p06	6/279 (2.2)	6/262 (2.3)	0.94 (0.31 to 2.88)
					p26	8/229 (3.5)	8/229 (3.5)	1.00 (0.38 to 2.62)
	Wiggins, 2004[44]	Infant A&E visits	IG2	All Participants	p61	40/150 (26.7)	19/312 (26.6)	1.00 (0.73 to 1.38)
					p87	35/157 (22.3)	13/296 (17.6)	1.17 (0.80 to 1.70)
		Infant A&E visits	IG1	All Participants	p61	45/159 (28.9)	83/312 (26.6)	1.09 (0.80 to 1.48)
					p87	28/144 (19.4)	52/296 (17.6)	1.03 (0.68 to 1.54)
		Infant injury requiring medical attention in past 6 months	IG1	All Participants	p61	24/164 (14.6)	48/326 (14.7)	0.99 (0.63 to 1.56)

Appendix F Table 7. Other Dichotomous Outcomes for Supportive RCTs, by Outcome

Outcome type	Author, year	Outcome description	IG Allocation	Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
					p87	12/145 (8.3)	27/295 (9.2)	0.90 (0.47 to 1.73)
			IG2	All Participants	p61	19/161 (11.8)	48/326 (14.7)	0.80 (0.49 to 1.32)
					p87	14/156 (9.0)	27/295 (9.2)	0.98 (0.53 to 1.81)
		Infant overnight hospital stay	IG1	All Participants	p61	13/164 (7.9)	19/326 (5.8)	1.36 (0.69 to 2.68)
					p87	7/144 (4.9)	13/296 (4.4)	1.11 (0.45 to 2.70)
			IG2	All Participants	p61	13/162 (8.0)	19/326 (5.8)	1.38 (0.70 to 2.72)
					p87	6/157 (3.8)	13/296 (4.4)	0.87 (0.34 to 2.25)
	Kenyon, 2016[35]	Admission to NICU	IG1	All Participants	p0	77/604 (13.0)	81/616 (13.0)	0.97 (0.72 to 1.30)

Abbreviations: A&E = Accident & emergency services; CG = Control group; CI = Confidence Interval; IG = Intervention group; NICU = Neonatal intensive care unit; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative risk

Appendix F Table 8. Other Continuous Outcomes for Supportive RCTs, by Outcome

Outcome	Author, year	Outcome description	Group	Time point FU	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff in Change (95% CI)
Anxiety Score	Dennis, 2003[31]	STAI	All Participants	p12	297	NR (NR)	35.1 (11.9)	316	NR (NR)	36.9 (12.8)	NR (NR)	NR (NR)	Study reported p-value: 0.08
				p24	289	NR (NR)	33.6 (11.0)	311	NR (NR)	34.4 (12.1)	NR (NR)	NR (NR)	Study reported p-value: 0.41
	Dol, 2022[33]	PSAS	All Participants	p06	74	106.9 (22.6)	102.4 (24.0)	70	101.4 (20.5)	104.8 (21.1)	-4.09 (16.98)	2.82 (13.45)	-6.91 (-11.93 to -1.89)
	Koc, 2023[36]	HADS	All Participants	g38	50	7.6 (3.2)	5.3 (2.7)	50	5.6 (2.6)	7.2 (2.9)	-2.40 (3.00)	1.60 (2.80)	-3.90 (95% CI: -5.02 to -2.78)
	Kocak, 2021[37]	STAI	All Participants	p0	62	NR (NR)	48.6 (0.7)	50	NR (NR)	49.7 (0.7)	NR (NR)	NR (NR)	NA
				p06	62	NR (NR)	42.3 (0.8)	48	NR (NR)	42.5 (0.8)	NR (NR)	NR (NR)	study reported BG F stat p=0.522
	Nicolson, 2020[39]	PASS	All Participants	p17	40	27.5 (17.1)	20.7 (12.7)	34	22.9 (14.6)	23.9 (13.5)	-6.74 (15.39)	1.00 (14.09)	-7.74 (-14.51 to -0.97)
	Shorey, 2019[42]	STAI	All Participants	p13	50	NR (NR)	79.8 (11.3)	52	NR (NR)	87.7 (11.3)	NR (NR)	NR (NR)	-7.89 (-16.40 to 0.70)†
Child development	Nicolson, 2020[39]	Bayley-III	All Participants	p17	38	NR (NR)	NR (NR)	29	NR (NR)	NR (NR)	NR (NR)	NR (NR)	study reported p>0.05
		Bayley-III Cognition	All Participants	p17	38	NR (NR)	97.4 (18.3)	29	NR (NR)	99.3 (20.9)	NR (NR)	NR (NR)	study reported Cohens D: 0.10 (-0.38, 0.58) p=0.58
		Bayley-III Language	All Participants	p17	38	NR (NR)	102.3 (9.3)	29	NR (NR)	106.3 (9.8)	NR (NR)	NR (NR)	study reported Cohens D: 0.43 (-0.07, 0.91) p=0.09
		Bayley-III Motor	All Participants	p17	38	NR (NR)	100.2 (12.1)	29	NR (NR)	100.3 (14.0)	NR (NR)	NR (NR)	study reported Cohens D: 0.01 (-0.47, 0.49) p=0.96
		Bayley-III Social Emotional	All Participants	p17	38	NR (NR)	96.4 (9.6)	29	NR (NR)	98.3 (12.2)	NR (NR)	NR (NR)	study reported Cohens D: 0.17 (-0.31, 0.65) p=0.65
Child Attachment	Kenyon, 2016[35]	Mother-to-infant Bonding	All Participants	p08	457	NR (NR)	1.4 (0.1)*	489	NR (NR)	1.7 (0.1)*	NR (NR)	NR (NR)	study reported p-value=0.05

Appendix F Table 8. Other Continuous Outcomes for Supportive RCTs, by Outcome

Outcome	Author, year	Outcome description	Group	Time point FU	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff in Change (95% CI)
QOL	Kavanagh, 2021[34]	Psychosocial Super Dimension Scale	All Participants	p02	124	0.4 (0.0)*	0.4 (0.0)*	124	0.4 (0.0)*	0.4 (0.0)*	0.00 (0.17)	0.00 (0.17)	0.00 (-0.05 to 0.04)
				p15	124	0.4 (0.0)*	0.5 (0.0)*	124	0.4 (0.0)*	0.5 (0.0)*	0.06 (0.17)	0.04 (0.17)	0.03 (-0.02 to 0.07)
	Morrell, 2000[38]	EQ-5D	All Participants	p26	244	NR (NR)	86.2 (17.0)	209	NR (NR)	85.9 (19.3)	NR (NR)	NR (NR)	0.30 (-3.10 to 3.60)†
		SF-36 General health perception	All Participants	p06	276	NR (NR)	75.1 (18.4)	263	NR (NR)	76.7 (18.6)	NR (NR)	NR (NR)	-1.60 (-4.70 to 1.40)†
				p26	255	NR (NR)	76.0 (19.4)	230	NR (NR)	76.9 (20.4)	NR (NR)	NR (NR)	-0.90 (-4.50 to 2.70)†
		SF-36 Health change	All Participants	p06	282	NR (NR)	63.9 (26.1)	269	NR (NR)	65.6 (26.2)	NR (NR)	NR (NR)	-2.00 (-6.00 to 3.20)†
				p26	259	NR (NR)	67.4 (23.0)	232	NR (NR)	64.8 (24.2)	NR (NR)	NR (NR)	2.60 (-1.60 to 6.70)†
		SF-36 Mental health	All Participants	p06	282	NR (NR)	72.0 (17.5)	227	NR (NR)	74.0 (17.5)	NR (NR)	NR (NR)	-0.70 (-3.80 to 2.20)†
				p26	254	NR (NR)	72.8 (17.3)	268	NR (NR)	72.7 (17.8)	NR (NR)	NR (NR)	-1.20 (-4.30 to 1.80)†
		SF-36 Physical functioning	All Participants	p06	278	NR (NR)	86.9 (16.0)	265	NR (NR)	89.1 (15.4)	NR (NR)	NR (NR)	-2.20 (-4.60 to 0.50)†
				p26	258	NR (NR)	89.8 (16.8)	230	NR (NR)	91.2 (15.1)	NR (NR)	NR (NR)	-1.50 (-4.20 to 1.20)†
		SF-36 Role limitation-emotional	All Participants	p06	275	NR (NR)	77.3 (35.3)	259	NR (NR)	77.4 (36.6)	NR (NR)	NR (NR)	-0.10 (-6.50 to 6.10)†
				p26	257	NR (NR)	82.4 (31.7)	228	NR (NR)	79.5 (35.5)	NR (NR)	NR (NR)	2.80 (-3.40 to 8.30)†
		SF-36 Role limitation-physical	All Participants	p06	275	NR (NR)	65.2 (39.4)	260	NR (NR)	73.2 (38.8)	NR (NR)	NR (NR)	-7.90 (-14.60 to 0.90)†
				p26	259	NR (NR)	80.2 (32.5)	229	NR (NR)	82.1 (32.6)	NR (NR)	NR (NR)	-1.90 (-7.20 to 3.50)†
		SF-36 Social functioning	All Participants	p06	281	NR (NR)	76.4 (24.1)	268	NR (NR)	80.2 (23.8)	NR (NR)	NR (NR)	-3.80 (-7.70 to 0.30)†
				p26	257	NR (NR)	83.6 (22.0)	233	NR (NR)	84.0 (23.6)	NR (NR)	NR (NR)	-0.40 (-4.70 to 4.00)†
	Reid, 2002[40]	SF-36 Mental health	All Participants	p0	503	NR (NR)	72.2 (17.0)	501	NR (NR)	73.3 (15.1)	NR (NR)	NR (NR)	NA
				p13	336	NR (NR)	75.6 (16.8)	379	NR (NR)	76.6 (15.1)	NR (NR)	NR (NR)	0.10 (-1.79 to 2.06)†

Appendix F Table 8. Other Continuous Outcomes for Supportive RCTs, by Outcome

Outcome	Author, year	Outcome description	Group	Time point FU	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean change (SD)	CG mean change (SD)	Mean Diff in Change (95% CI)
				p26	336	NR (NR)	76.5 (17.0)	360	NR (NR)	76.0 (15.5)	NR (NR)	NR (NR)	-1.10 (-3.19 to 1.05)†
		SF-36 Physical functioning	All Participants	p0	503	NR (NR)	86.0 (18.1)	501	NR (NR)	84.5 (17.9)	NR (NR)	NR (NR)	NA
				p13	336	NR (NR)	90.8 (14.5)	379	NR (NR)	90.8 (13.4)	NR (NR)	NR (NR)	0.61 (-1.19 to 2.39)†
				p26	336	NR (NR)	93.7 (11.7)	360	NR (NR)	92.7 (14.0)	NR (NR)	NR (NR)	-0.60 (-2.36 to 1.23)†
		SF-36 Role emotional	All Participants	p0	503	NR (NR)	73.9 (37.4)	501	NR (NR)	74.7 (37.0)	NR (NR)	NR (NR)	NA
				p13	336	NR (NR)	79.9 (34.7)	379	NR (NR)	82.7 (31.9)	NR (NR)	NR (NR)	2.20 (-2.47 to 6.86)†
				p26	336	NR (NR)	86.1 (29.5)	360	NR (NR)	86.3 (29.8)	NR (NR)	NR (NR)	-0.20 (-4.49 to 4.14)†
		SF-36 Role physical	All Participants	p0	503	NR (NR)	56.6 (41.7)	501	NR (NR)	53.2 (41.4)	NR (NR)	NR (NR)	NA
				p13	336	NR (NR)	82.7 (30.9)	379	NR (NR)	83.6 (30.7)	NR (NR)	NR (NR)	1.90 (-2.43 to 6.17)†
				p26	336	NR (NR)	87.6 (26.0)	360	NR (NR)	87.9 (26.2)	NR (NR)	NR (NR)	1.10 (-2.67 to 4.95)†
		SF-36 Social functioning	All Participants	p0	503	NR (NR)	72.1 (24.3)	501	NR (NR)	72.8 (22.5)	NR (NR)	NR (NR)	NA
				p13	336	NR (NR)	84.9 (20.4)	379	NR (NR)	85.9 (19.1)	NR (NR)	NR (NR)	0.90 (-1.77 to 3.58)†
				p26	336	NR (NR)	88.4 (19.5)	360	NR (NR)	87.9 (18.8)	NR (NR)	NR (NR)	-0.70 (-3.38 to 2.02)†
Social Support	Dennis, 2003[31]	UCLA loneliness scale	All Participants	p12	297	NR (NR)	19.6 (6.2)	316	NR (NR)	20.1 (6.3)	NR (NR)	NR (NR)	Study reported p-value: 0.28
				p24	289	NR (NR)	18.8 (6.3)	311	NR (NR)	19.4 (6.0)	NR (NR)	NR (NR)	Study reported p-value: 0.17
	Morrell, 2000[38]	DUFSS	All Participants	p06	260	NR (NR)	16.7 (6.7)	225	NR (NR)	16.7 (7.3)	NR (NR)	NR (NR)	0.00 (-1.30 to 1.30)†
				p26	240	NR (NR)	17.1 (6.8)	253	NR (NR)	16.6 (7.4)	NR (NR)	NR (NR)	0.40 (-0.90 to 1.80)†

*Mean (SE)
†Mean Difference (95% CI)

Abbreviations: BG = Between group; BL = Baseline; CG = Control group; CI = Confidence Interval; Diff = Difference; DUFSS = Duke–University of North Carolina Functional Social Support Questionnaire; FU = Followup; HADS = Hospital Anxiety and Depression Scale; IG = Intervention group; NA = Not applicable; NR = Not reported;

Appendix F Table 8. Other Continuous Outcomes for Supportive RCTs, by Outcome

P = Weeks postpartum; PASS = Perinatal Anxiety Screening Scale; PSAS = Postpartum Specific Anxiety Scale; QOL = Quality of life; RCT = Randomized controlled trial; SD = Standard deviation; SF-36 = Short form-36; STAI = State-Trait Anxiety Inventory

Appendix F Table 9. Harms Outcomes for Supportive RCTs, by Outcome

Author, Year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Nicolson, 2020[39]	Any adverse effects	IG1	All Participants	p17	0/40 (0.0)	0/34 (0.0)	0.85 (0.02 to 41.92)

Abbreviations: CG = Control group; CI = Confidence Interval; IG = Intervention group; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative risk

Appendix G Table 1. Study and Population Characteristics for Education RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg weeks PP or Gest at BL	Mean age (range)
Coo, 2023[45] m-Health "What Were We Thinking?" (mWWWT)	Good	CHL	128	Chilean first-time mothers who have a healthy infant 4–10 weeks old	Unselected	(none)	Postpartum	NR (recruited 4-10 weeks postpartum)	25 (18 to 50)
Fisher, 2016[46] What Were We Thinking (WWWT)	Good	AUS	400	Primiparous women, <6 weeks postpartum	Unselected	(none)	Postpartum	6	32 (NR)
Haga, 2019[47] Mamma Mia	Fair	NOR	1342	Pregnant women (up to gestational week 25), at least 18 years of age	Unselected	(none)	Both	NR (recruited 21-25 weeks' gestation)	31 (≥18)
Hayes, 2001[48]	Fair	AUS	206	First-time mothers, 12-28 weeks' gestation	Unselected	(none)	Pregnant	20	26 (NR)
Howell, 2012[49]	Fair	USA	540	Black/African American or Hispanic/Latino postpartum women, 0-3 days postpartum	Other characteristic (not depr)	Low SES	Postpartum	0	28 (18 to 46)
Howell, 2014[50]	Fair	USA	540	White or Asian women, 0-2 days postpartum	Unselected	(none)	Postpartum	0	33 (18 to 48)
Maimburg, 2015[51] Ready For Child	Good	DNK	1193	Nulliparous women, 10-22 weeks' gestation	Unselected	(none)	Pregnant	24	29.3 (≥18)
Missler, 2020[52]	Good	NLD	138	Pregnant women, <34 weeks' gestation	Unselected	(none)	Pregnant	28	32 (NR)
Nishi, 2022[53] iPDP trial	Fair	JPN	5017	Pregnant women at 16–20 weeks' gestation without MDE who are current users of the Luna Luna Baby app	Unselected	(none)	Pregnant	17	30 (≥20)
Ochoa, 2021[54] Baby Books project	Fair	USA	132	Low-income, first-time mothers at least 18 years of age and in their third trimester.	Other char (not depr)	Low SES	Pregnant	35	23 (18 to 40)

Appendix G Table 1. Study and Population Characteristics for Education RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg weeks PP or Gest at BL	Mean age (range)
Rohder, 2022[55]	Fair	DNK	78	Pregnant women with psychosocial vulnerabilities	Other char (not depr)	Complex psychological / psychiatric problems and/or difficult social problems with a need for interdisciplinary perinatal care	Pregnant	NR (recruited 13-29 weeks' gestation)	NR (≥18)
Trillingsgaard, 2021[56] The Family Startup Program (FSP)	Fair	DNK	1701	Primiparous women age 18 and older, 12-19 weeks' gestation	Unselected	(none)	Pregnant	NR (recruited 12-19 weeks' gestation)	29 (≥18)

Abbreviations: AUS = Australia; Avg = Average; BL = Baseline; CHL = Chile; Depr = Depression; DNK = Denmark; EPDS = Edinburgh Postnatal Depression Scale; Hx = History; JPN = Japan; MDE = Major depressive episode; NLD = Netherlands; NOR = Norway; NR = Not reported; PP = Postpartum; Rand = Randomized; RCT = Randomized controlled trial; SES = Socioeconomic status; Sx = Symptoms; TWN = Taiwan; USA = United States of America

Appendix G Table 2. Detailed Population Characteristics for Education RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Coo, 2023[45] m-Health "What Were We Thinking?" (mWWWT)	Hispanic/Latino: 100*	<HS: 10 HS Grad: 29 College Grad: 13 Post College Degree: NR	51	66	13	51	100	Unplanned pregnancy, %: 72	NR	NR
Fisher, 2016[46] What Were We Thinking (WWWT)	NR	<HS and HS grad: 18% Post-secondary trade training or certificate: 19% College grad and post college: 62%	NR	96	NR	NR	100	Married % includes "de facto" Speak only English at home: 83.2% Aboriginal and Torres Strait Islander: 0.75% Holds a Health Care card*: 13.8% *Health Care cards are held by people whose main income is a social protection benefit, who are unwaged students or have a very low household income	BL PHQ-9 ≥10: 7 Psychiatric hx of depr: 17	15 (Psychiatric hx or anx); 3 (Psychiatric hx of PTSD) 6 (GAD-7 ≥10)
Haga, 2019[47] Mamma Mia	NR	<HS: NR HS Grad: 15 College Grad: 57 Post College Degree: NR	NR	NR	NR	NR	58	⩽ HS, %: 15 1–3 years college or university: 28 ⩾4–5 years college or university: 57	BL EPDS ≥10: 24 Depr hx: NR	NR
Hayes, 2001[48]	White: 94 Black/AfrAm: 0 Hispanic/Latino: 0 Asian: 0	Education up to grade 12: 52% TAFE attempted/completed: 21%	NR	NR	18	NR	100	In a couple: 82% Similar rates of social support measured by the Norbeck questionnaire	NR	NR

Appendix G Table 2. Detailed Population Characteristics for Education RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
	NA/AI: 0 Other: 6	University attempted/completed: 27%								
Howell, 2012[49]	White: 0 Black/AfrAm: 38 Hispanic/Latino: 62 Asian: 0 NA/AI: 0 Other: NR	<HS: 22 HS Grad: 55 College Grad: 23 Post College Degree: 0	NR	62	38	NR	41	Medicaid or Medicaid managed care: 68% Earning ≤ $30,000: 56%	BL EPDS ≥10: 15 Hx of depr: 17	3 (Tx for depr this pregnancy)
Howell, 2014[50]	White: 89 Black/AfrAm: 0 Hispanic/Latino: 0 Asian: 9 NA/AI: 0 Other: 2	HS education or less: 14% Some college or more: 85%	NR	98	2	29	46	Medicaid/Medicaid managed care insurance: 3% Income ≤30,000: 11%	BL depr sx: NR Hx of depr: 22	6 (Tx for depr this pregnancy (including medication or therapy)
Maimburg, 2015[51] Ready For Child	NR	Educational level: 7-10 years: 7% >10 years: 93%	NR	99 (In relationship with partner: 99%; Living with partner: 0-5 years: 76%; >5 years: 24%)	NR	20	100	NR	NR	Psychiatric history: 11.5%
Missler, 2020[52]	NR	≥higher vocational education, %: 91	97	96	NR	11	91	Family income ≥4000 euro, %: 56 Fulltime employment, %: 35	BL EPDS ≥10: 9 Depr hx: NR	18 (HADS ≥8)
Nishi, 2022[53] iPDP trial	NR	<HS: 3 HS Grad: 36 College Grad: 57 Post	77	99	1	NR	66	Employed: Includes maternity leave (6%), part-time (16%), and full-time (55%) employment. Unemployed, %: 22	Hx of depr: 14 Current MDE (WHO-CIDI): 0 [per	NR

Appendix G Table 2. Detailed Population Characteristics for Education RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
		College Degree: 4						Unplanned pregnancy, %: 29 Primipara, %: 67	inclusion criteria]	
Ochoa, 2021[54] Baby Books project	White: 29 Black/AfrAm: 63 Hispanic/Latino: NR Asian: NR NA/AI: NR Other: 8	<HS: 25 HS Grad: 30 College Grad: 3 Post College Degree: 5	NR	17	83	NR	100	Per study recruitment from 'resident continuity clinics', authors describe participants as low-income. Some college or an associates degree, %: 36 Planned pregnancy, %: 20 Public assistance, %: 76 first time mother, %: 100	NR	NR
Rohder, 2022[55]	NR	<HS: NR HS Grad: 14 College Grad: NR Post College Degree: NR	67	86	NR	NR	NR	Vocational or short secondary (1-2 years), 40% Medium length or long secondary (3-7 years), 46%	NR	37% had psychiatric or psychological tx at baseline, 88% had previously received psychiatric or psychological treatment.
Trillingsgaard, 2021[56]	NR	<HS: NR HS Grad: 35 College Grad: NR Post College Degree: NR	66	17	NR	NR	100	Not married, %: 60 Missing marital info, %: 23 Education short or medium length, %: 39 Education long length, %: 18 Financial strain - yes, %: 14	NR	Any psychiatric condition/hx, %: 6

*All participants were Latin American, and the great majority were Chilean

Abbreviations: AfrAm = African American; Anx = Anxiety; Depr = Depression; HS = High school; Hx = History; MH = Mental health; NA/AI = Native American/Alaska Native; NR = Not reported; NTD = New Taiwan Dollar; PTSD = Post traumatic stress disorder; RCT = Randomized controlled trial; SES = Socioeconomic status; Tx = Treatment

Appendix G Table 3. Intervention Characteristics for Education RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Coo, 2023[45] m-Health "What Were We Thinking?" (mWWWT)	Psychoeducation program delivered via 14 online modules 3x/wk for 5 wks, with virtual individual and group support available	Postpartum	Virtual (self-driven), virtual	Individual, Group	Web	Self, Psychologist	No	5	14 modules with a 3- to 5-min videos, delivered 3x/ wk for 5 wks; 1, 1-hr grp session, Individual contact dose NR	Waitlist
Fisher, 2016[46] What Were We Thinking (WWWT)	Single 6-hour psychoeducational group session for couples that are first-time parents	Postpartum	OB-GYN	Group of Couples	In-person, Print	Nurse	No	0.14	1 session (1 (length 360) x 0.14wks	Usual care
Haga, 2019[47]	Fully-automated internet-based depression prevention program, consisting of 44, 10-min sessions over 11.5 months	Both	Virtual (self-driven)	Individual	Web	Self	Yes	50	NA (44 x 10 min self-driven, virtual sessions)	Usual care
Hayes, 2001[48]	One PPD informational session reviewing an educational package with an experienced midwife	Pregnant	Home or OB-GYN	Individual, Family	In-person, Print	Midwife	Yes	0.14	1 session (individual) (length NR) x 0.14wks	None
Howell, 2012[49]	15 minute in-person PPD educational session in the hospital post-delivery and	Postpartum	In-hospital post delivery, Home (phone)	Individual	In-person, Phone	Other MH	Yes	2	2 session (individual) (length 15) x 2wks	Minimal

Appendix G Table 3. Intervention Characteristics for Education RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
	follow-up phone call									
Howell, 2014[50]	15 minute in-person PPD educational session in the hospital post-delivery and follow-up phone call	Postpartum	In-hospital post delivery, Home (phone)	Individual	In-person, Phone	Other MH	Yes	2	2 session (individual) (length 15) x 2wks	Minimal
Maimburg, 2015[51]	Three 3-hour prenatal group education sessions, including a didactic session on PPD	Pregnant	NR	Group	In-person	Midwife	No	5	3 session (group) (length 180) x 5wks	Usual care
Missler, 2020[52]	One prenatal home visit, one postnatal phone call, informational booklet and video	Both	Home	Individual, Couples	In-person, Print, Phone, Video	Research Staff	No	14	1 x NR min home visit 1 x NR min phone call Plus, booklet and short video	Waitlist
Nishi, 2022[53]	A 6 week, smartphone-based six-module iCBT program for pregnant women	Pregnant	Virtual (Self-driven)	Individual	Web	Self	Yes	6	NA (6, 5-min virtual modules x 6wks)	Usual care
Ochoa, 2021[54]	Six general educational intervention books, 1 delivered prenatally, 5 postnatally.	Both	Home (self-driven)	Individual	Print	Self	No	57	NA (6 books given)	None
Rohder, 2022[55]	Nine 90-min home visits with health nurse including an	Both	Home	Individual, Couples	In-person	Nurse	No	42	9 x 90 min in-person home visits = 810 - min total over 42wks	Usual care

Appendix G Table 3. Intervention Characteristics for Education RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
	attachment-based parenting intervention									
Trillingsgaard, 2021[56]	Twelve 120-min group parent education sessions with health visitor and other professionals	Both	Community	Group	In-person	Health Educator, Nurse, Psychologist	No	75	12 (group) x 120 = 1440 total minutes over 75wks	Usual care

Abbreviations: CBT = Cognitive behavioral therapy; CG = Control group; IG = Intervention group; MH = Mental health; Min = Minutes; NR = Not reported; OB-GYN = Obstetrics and gynecology; PPD = Postpartum depression; RCT = Randomized controlled trial; Wks = Weeks

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
Coo, 2023[45] m-Health "What Were We Thinking?" (mWWWT)	Adapted, m-Health version of WWWT includes three components: (a) Psychoeducational information about infant care and about the interpersonal challenges that women and their partners—if present—face during the transition to parenthood. This information was delivered in 14 modules with a 3- to 5-min video, and an invitation to read and discuss some questions to promote self-reflection. The modules were delivered 3 times a week for a 5-week period via WhatsApp and included animated images as well as videos of parents and infants from image banks. The script was developed by the research team based on the original WWWT content and the audio was recorded by a professional actress; (b) Individual contact with the program facilitator to ask questions that arose from the psychoeducational modules. The facilitator was a psychologist with experience in perinatal mental health who contributed to the adaptation of the intervention. Women initiated contact voluntarily and the facilitator tailored the answers according to women's individual needs. Participant-facilitator interaction was conducted via WhatsApp; (c) a group, 1-hr virtual meeting with the program facilitator to offer participants and their partners (or support person) the opportunity to share their experiences about parenthood with other mothers. This group session was offered three times to women in the EG, who were grouped in cohorts of 15–20 participants. All the women received treatment as usual (TAU) provided by health centers, which involved health checks for mothers and their infants. TAU involves infant routine health checks conducted by a nurse every month from 0 to 4 months of age, and at 6, 8 and 12 months of age. The purpose of routine health checks is to monitor the child's development and growth, guide parents and/or caregivers regarding child development, health, and upbringing. Nurses also promote exclusive breastfeeding, healthy mother/child bonding and encourage paternal participation in the child´s care and upbringing. During the infant health check-ups at 2 and 6	All experimental group participants received the 14 psychoeducational videos and 82% of them reported having watched all of them. 91% of the women contacted the facilitator at least once to share their experience, comment on the information received, or pose a question. 12% of the women in the experimental group participated in the group session.	Only two mothers expressed difficulties accessing the videos at the beginning of the intervention, which were resolved with the help of the facilitator. No partners or support persons attended the group session, despite being invited.	Women in the control group conformed to a waiting list and received the intervention after completing the final assessment. All the women received treatment as usual (TAU) provided by health centers, which involved health checks for mothers and their infants.

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	months postpartum maternal symptoms of depression are screened for with the Edinburgh Postpartum Depression Scale (EPDS). Women who score above the EPDS cut-off score (i.e., 10) will be considered at risk and will be referred for mental health assessment and care.			
Fisher, 2016[46]	WWWT is a brief, structured, couple-focused psychoeducational intervention to address modifiable risks and thereby prevent common postnatal mental disorders among women. It is designed to be integrated into universal postnatal primary care as part of a parenting programme. The WWWT programme is implemented by trained maternal and child healthcare (MCH) nurse facilitators in a single day, 6 h session designed for groups of 5–7 families, each consisting of mother, partner (or other caregiver) and their infant(s). Content is delivered in a variety of formats, including didactic presentations, discussion, individual and couple learning activities, practical demonstration and individual practice. A folder contains programme content, which uses attractive images and non-psychiatric language, and includes worksheets that are used during the programme and taken home by participants for later reference. The programme has 15 modules, grouped into two sections: About Babies and About Parents. All study participants were given print materials. Invitations to attend a seminar, with their partners and babies as part of the first-time parents (FTP) programme, were sent by LGAs to eligible women registered for care at intervention MCHCs. Two MCHN-facilitators ran each seminar for groups of up to five couples with their babies, on a Saturday, in a 6 h session including refreshment breaks.	Post-intervention evaluation interviews were conducted with 21(66%) MCHNs. Mean scores for delivery quality and engagement were: About Babies: 4.6 and 4.4 and About Parents: 3.8 and 3.4. Some MCHNs already taught infant behaviour management skills, but 64% reported changing routine practice to include them and 93% said that since training they included partners, relationship topics and gender informed language routinely	Anonymous post-seminar participant surveys indicated that the WWWT content and learning activities were salient, useful and comprehensible (78–99% of women and 71–99% of men agreed with the statements) and that facilitators were knowledgeable. Some found the single-day seminar too long.	Usual care in these services comprises prescribed sets of child development and health assessments, and parenting information to families with children aged 0â€“5 years (5 visits in the first 6 months) and facilitated First Time Parents (FTP) Groups (8 sessions in the first year) to foster social connections, and promote caregiving confidence among primiparous women and their partners. Participation in MCH is voluntary and more than 95% of parents with babies attend these local services. All study participants were given print materials.
Haga, 2019[47]	Participants in the intervention received Mamma Mia; a universal preventive intervention for perinatal depressive symptoms. Mamma Mia was tailored specifically to the perinatal phase and targets risk and protective factors for perinatal depression symptoms such as attachment, couple satisfaction, social support, and subjective well-being. It is a fully automated internet-based program available free of charge. The intervention comprises three phases. The first phase consists of 11 sessions beginning in the second trimester in gestational week 21–25 and ends in gestational week 37. The second phase starts when the infant is 2–3-	A total of 678 participants received the Mamma Mia intervention. Of these, 226 (33%) completed all 44 sessions. As many as 345 (51%) completed 36 or more sessions (>80% of the intervention), and merely 41 (6%)	NR	NR

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	weeks-old, and lasts for 6 weeks, with three sessions per week. The final phase consists of 10 sessions over an 18-week period. In total, the intervention consists of 44 sessions over a period of 11.5 months. All sessions include themes specific to the perinatal period. Mamma Mia applied a tunneled design to guide the woman through the program in a step-by-step fashion in accordance with the psychological preparations of becoming a mother. The intervention was delivered by email and interactive websites, combining text, pictures, prerecorded audio files, and user input. Each session is designed to take about 10 min and must be completed before users can access the next session. This was done to ensure that relevant information has been reviewed and to create continuity and a narrative in the program.	participants did not initiate using the program.		
Hayes, 2001[48]	Between 28 and 36 weeks gestation women received an education package consisted of an information booklet designed and piloted for pregnant women, their partners, and extended family; a studio-quality audiotape of one woman's journey through postnatal clinical depression and back again; and an experienced midwife to guide women through the package. The booklet contained an exploration on the range of names for mood changes and information on the history, potential causes, prevalence, and symptoms (including intensity and frequency) of mood changes. Women were provided with guidance on when, how and where to see assistance and the development of a practical, personal plan for the woman to seek and gain assistance if required. Information targeted specifically at partners and extended friends and family was provided. Women had the option of receiving the information in either an interview-specific room in the antenatal clinic or in their own home.	NR	NR	No intervention
Howell, 2012[49]	Patients were given a 2-step behavioral educational intervention. The in-hospital component of the intervention involved a 15-minute, in hospital review of a patient education pamphlet and partner summary sheet by the mother with a masters-trained bilingual social worker. The pamphlet represented each potential trigger of depressive symptoms as a “normal” aspect of the postpartum experience, and provided specific simple "to do" suggestions for management. Postpartum and 3 month	261/270 (97%) received intervention in hospital, 9 were discharged before social worker could meet with them and reviewed materials over the phone. 250/270 (93%) could	NR	Enhanced usual care: Patients received routine postpartum hospital education, (i.e. discharge materials, television educational programs on infant care, breastfeeding, and peripartum care). Received a two-week post

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	rates and intermediate “to do” lists also were provided for other common postpartum events (e.g., c-section site pain, feeling sad and blue/depressive symptoms, infant colic). Mothers were provided with information on social support and “helpful organizations”. The partner summary sheet spelled out the typical pattern of experience for mothers postpartum and stressed the importance of social support for the patient. Mothers received a two-week post delivery call in which the social worker assessed patients’ symptoms, skills in symptom management, and other needs. The “to do” lists to help alleviate symptoms were reviewed when needed and patient and social worker created action plans to address current needs including accessing community resources.	be reached for 2 week phone call.		delivery call to inform them of future surveys and a list of health-related and community resources was mailed to them.
Howell, 2014[50]	Patients were given a 2-step behavioral educational intervention. The in-hospital component of the intervention involved a 15-minute, in hospital review of a patient education pamphlet and partner summary sheet by the mother with a masters-trained social worker. The pamphlet represented each potential trigger of depressive symptoms as a “normal” aspect of the postpartum experience, and provided specific simple "to do" suggestions for management. Postpartum and 3 month rates and intermediate “to do” lists also were provided for other common postpartum events (e.g., c-section site pain, feeling sad and blue/depressive symptoms, infant colic). Mothers were provided with information on social support and “helpful organizations”. The partner summary sheet spelled out the typical pattern of experience for mothers postpartum and stressed the importance of social support for the patient. Mothers received a two-week post delivery call in which the social worker assessed patients’ symptoms, skills in symptom management, and other needs. The “to do” lists to help alleviate symptoms were reviewed when needed and patient and social worker created action plans to address current needs including accessing community resources.	262/270 (97%) received intervention in hospital, 8 were discharged before social worker could meet with them and reviewed materials over the phone. 241/270 (89%) could be reached for 2 week phone call.	NR	Patients received routine postpartum hospital education, (i.e. discharge materials, television educational programs on infant care, breastfeeding, and peripartum care). Received a two-week post delivery call to inform them of future surveys and a list of health-related and community resources was mailed to them.
Maimburg, 2015[51]	The program comprised three modules of three hours. The sessions were held between the 30th and 35th weeks of gestation, and the woman’s partner was invited to participate. The content of the birth module included lectures on and discussion of labor onset, the birth process,	72% (435/603) received the full intervention, 85% attended the birth session, 80% the	NR	Standard care, which did not include any antenatal training program

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	the father's role during birth, pain relief, birth interventions and fear of childbirth, and a film on giving birth. The newborn module included lectures on and discussions of care for the newborn, breastfeeding, childhood diseases, vaccinations, and equipment and safety measures for the child. The parent module included lectures on and discussion of transition to parenthood, maternity leave, sexual relations, conflicts in parental relationship, the role of grandparents, family and friends, and PPD. The PPD lecture included information on prevalence, prevention, symptoms (shared and different symptoms in men and women), and PPD treatment.	newborn session and 79% the parent session. For the partners, the percentages were 72%, 66%, 67%, respectively		
Missler, 2020[52]	The intervention consisted of (1) an information booklet; (2) an online video, (3)a prenatal home visit; and (4) a postnatal phone call. The booklet and video were received during pregnancy, after the baseline assessment (T0). The booklet consisted of four chapters on (1) interpreting of, and sensitive responding to, the infant's needs and signals of distress; as well as adapting to the parental role and attending to own needs, taking a sufficient amount of rest, and seeking support; (2) patterns of crying and different soothing techniques; (3) the infant's hunger signals and feeding arrangements (e.g., breastfeeding, availability of professional breastfeeding courses and support services, pumping and the use of a breast pump, formula feeding); and (4) sleeping patterns and sleeping arrangements (e.g., infant sleep development and consolidation, room-sharing, bed-sharing, and solitary sleeping). The video provided illustrations of the topics described in the booklet. In the video, the experiences of upcoming parents were shown. An expert on infant development commented on the fragments, and parents were actively engaged in the video by stimulating them to think about and discuss with each other how they could implement the information within their own lives. Home visits offered both education and support were offered. The aims and reasons for visiting parents in their homes were 1) to discuss the information in the materials and to respond to the parent's questions; 2) to explain the parents that no part of the provided information was meant to be prescriptive; 3) to discuss how the information could	63 out of 68 mothers received the intervention (booklet, video, and home visit) Read booklet and watched video, %: 98	56% of the mothers reported using the information after the birth of their child daily or several times a week. Usefulness as indicated on a 1-5 Likert scale, M (SD): - Information booklet, 4.15 (0.87) - Video, 3.08 (1.00) - Home visit, 3.11 (0.93)	Received the psychoeducational materials after last assessment, about 10 weeks after the birth of their child.

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	be implemented in their lives; and 4) to facilitate their participation in the study and in the intervention (as parents did not have to travel to a clinic or parenting class). Furthermore, by visiting parents in their homes, fathers, especially, would be less of a barrier for participating in the study. About 4 weeks after the birth, a phone call was scheduled. The aim of this phone call was to ask how parents and their child were doing, and to discuss possible problems in the implementation of the provided information in their lives. Parents were given the opportunity to ask questions with regard to sensitive responsiveness and contact-seeking of the infant; and any issues in relation to the infant's crying, feeding, and sleeping behaviors. Parents were also given the opportunity to discuss their own well-being, such as feelings of depression, anxiety or stress. Both during the home visit and the postnatal phone call, as well as in the information booklet, the birth of a child was explicitly described as a major life change that can evoke different emotions and that adapting to the new situation takes time. The study also explained that many parents can feel tired, sad or frustrated during the first months after birth. Parents were encouraged to discuss their emotions and needs with their partner, and to seek additional support from their social network or support services when needed.			
Nishi, 2022[53]	Six modules included: (1) psychoeducation, (2) case formulation based on a cognitive-behavioral model, (3) behavioral activation, (4) self-compassion, (5) mindfulness, and (6) problem-solving. Presented at a rate of one per week, with each module taking about 5 min to complete. -Module 1: In this module, participants learn about the roles of what are generally called 'negative' emotions such as anxiety, depressive mood and anger. -Module 2: In this module, participants learn about a CB model, especially the five-part model (situation, thoughts, emotions, behavior and physical sensations) and a case formulation based on this model. -Module 3: Behavioural activation is a process to increase pleasurable and rewarding activities using behavioural strategies such as activity scheduling. This module provides a behavioural activation technique for enhancing participants' liveliness.	A total of 934 (37.2%) participants in the intervention group completed all six modules. Out of 2509 participants in the intervention group, 1995 (79.5%) completed module 1, 1800 (71.7%) completed module 2, 1734 (69.1%) completed module 3, 1,48 (65.7%) completed module 4, 1544 (61.5%) completed module 5,	NR	Participants in the control group will not receive any intervention programmes during the intervention and follow-up period. General information about mental health during pregnancy will be provided to participants in both the intervention group and the control group as a TAU.

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	-Module 4: In this module, participants learn the concept of self-compassion and how to express compassion towards themselves. -Module 5: In this module, participants learn about the concept of mindfulness and how to practice it through listening to voice guidance. -Module 6: In this module, participants learn about problem-solving skills to sort out the problem and make a list of solutions, and assertiveness to communicate with their partners confidently. The program was delivered to the participants via the Luna Luna Baby app; therefore, they did not have to download a separate app. Participants in the intervention groups will be required to complete the intervention programme up to 32 weeks gestation. Participants will be asked not to share this information through any social network. The participants will be reminded by a popup message to complete the programme if they have not already done so. Intervention programmes will be closed at 32 weeks gestation.	and 1402 (55.9%) completed module 6.		
Ochoa, 2021[54]	Women in the educational book group received an educational intervention book during their third trimester of pregnancy and additional books when their infant was 2, 4, 6, 9, and 12 months old. All books were written at a first-grade reading level. The Baby Books Project took educational anticipatory guidance (AG) content from the Bright Futures Guidelines for Health Supervision and embedded it into professionally illustrated board books that contained images of ethnically diverse families. The information was written in short, catchy stanzas that rhymed. The information corresponded to infant and toddler well-child visits. The educational information was focused on age-appropriate recommendations about infant physical, cognitive, and emotional development, safety practices in the home, car, and outside, benefits of breastfeeding, discipline strategies, and nutrition. The inside back cover of each educational book provided additional information about maternal self-care topics such as managing stress, eating well, and what to do when feeling	NR. Although women were encouraged to read the books, dosage information was not obtained.	NR	No book group

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	overwhelmed. The five postnatal books developed for this project corresponded to the AAP's well-child visits for the first year (i.e. 2, 4, 6, 9, and 12 months). All participants viewed a short video at each home visit about reading to young children and were encouraged to read to their child. Families that received books were asked to read those books as often as possible.			
Rohder, 2022[55]	In addition to usual care (three consultations with their general practitioner, two ultra-sound examinations, and four to seven consultations with midwives depending on parity), participants and their partners received two additional home visits before birth and seven additional visits after birth. The visits had a duration of 1.5 hours and consisted of eight chapters of the Circle of Security Parenting program (COS-P). The intervention consisted of four key components initiated during pregnancy and continued postnatal until nine months after the birth of the child. The components were: 1) detecting symptoms of mental illness and initiating treatment if indicated, 2) initiating a health nurse delivered, individual, attachment-based parenting program, 3) supporting breastfeeding decision and duration through education on techniques and strategies for successful breastfeeding, and 4) sharing knowledge and organizing treatment pathways for families across sectors to overcome a potential gap between pre-and postnatal care for pregnant and new mothers. The adaptation of COS-P intervention consisted of an alteration of the order of when chapters were presented to the parents. The chapters of COS-P were delivered individually by their health nurse and included the use of video material for identifying and addressing issues, such as attachment theory, regulating emotions and the parenting role. The COS-P chapters were presented at each visit in the following order, (visit): (1) Chapter 1 - Introduction to the Circle, (2) Chapter 3 (first half) – Managing your child's emotions, (3) Chapter 4 – Organizing your child's feelings, (4) Chapter 2 – Exploring your children's needs, (5) Chapter 3 (second half) – Managing your child's emotions, (6) Chapter 5 – The path to security, (7) Chapter 6 – Exploring our struggles, (8) Chapter 7 –	NR	NR	Participants were provided with three consultations with their general practitioner, two ultra-sound examinations, and four to seven consultations with midwives depending on parity. Postnatal infant examinations were performed regularly by the health nurse in the infant's home. Additional counseling home visits to families with psychosocial vulnerabilities after birth are generally provided by health visitors in all municipalities, with the number and content depending on families' specific needs.

Appendix G Table 4. Detailed Intervention Characteristics for Education RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	Rupture and repair in our relationships, and (9) Chapter 8 – Summary and celebration.			
Trillingsgaard, 2021[56]	The Family Startup Program (FSP) intervention was a group-based manualized program for implementing pre- and post-natal parenting support with the central goal of empowering parents through knowledge and network support. Participants were offered 12 group (consisting of 7-9 families) meetings. Two meetings took place before the birth of the child, starting around week 28 of the pregnancy, and nine meetings were scheduled during the child's first 10 months of life, and the last session (15 months) was scheduled as a follow-up session after the outcome measurement at 10 months' post-partum. Participants are introduced to a broad range of community resources by means of oral presentations from e.g., financial advisers, legal advisers, psychologists, physiotherapists, and family counselors providing them with information about the specific theme of the session. The program is delivered in two-hour face-to-face sessions with a health visitor as the permanent group leader who facilitates discussion and arranges exercises before and after the oral presentations. The timing of sessions and their content were as follows: 1) at 28 weeks' gestation - Introduction, finances, and needs of an infant; 2) at 32 weeks' gestation - how to ensure and insure each other and legal paternity; 3) at p04 – relationships, communication, sleep, and everyday life with an infant; 4) at p09 - infant's motor development and basic needs, and psychological reaction after the birth; 5) at p13 – family dynamics and interaction, help and support; 6) at p17 – food and meals, and child's medical check-up; 7) at p21 – preventing accidents, and when the child is sick; 8) at p26 – language development and child development; 9) p30 – the labor market and daycare, and sleep; 10) at p35 – personality of your child and independence and child's first tooth; 11) at p43 – family dynamics and the everyday life with your child; and 12) at p65 – Upbringing: everyday life and challenges in the family, and resilience.	92% of mothers received the intervention, defined as participating in at least two post-birth sessions and with an average of 8.4 meetings attended.	Depending on the specific theme of the day, between 43% and 59% of mothers reported that the sessions gave rise to further thought and between 76% and 86% of mothers found the environment respectful.	Participants were offered the tax-paid care as usual. This included two group-based sessions of birth preparation, 5 routine pregnancy visits to the midwife, two pregnancy and one post-natal visit to the general practitioners and 5 post-natal home visits by the health care nurse.

Abbreviations: CG = Control group; IG = Intervention group; MCHN = maternal and child healthcare nurse; NR = Not reported; P = Weeks postpartum; PPD = Postpartum depression; RCT = Randomized controlled trial; TAU = Treatment as usual; WWWT = What Were We Thinking

Appendix G Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Education RCTs, by Author

Author, year	Outcome description	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Fisher, 2016[46]	DSM IV diagnosis of Major depressive disorder prior 30 days per CIDI	All Participants	p26	1/185 (0.5)	1/173 (0.6)	0.87 (0.05 to 13.80)
	PHQ-9≥10	All Participants	0	15/162 (9.3)	7/152 (4.6)	1.76 (0.73 to 4.25)
			p26	12/162 (7.4)	6/152 (3.9)	1.62 (0.61 to 4.26)
			p78	9/162 (5.6)	9/152 (5.9)	0.88 (0.34 to 2.27)
Haga, 2019[47]	EPDS ≥10	All Participants	0	160/678 (23.6)	156/664 (23.5)	1.00 (0.83 to 1.22)
			g37	72/528 (13.6)	104/589 (17.7)	0.77 (0.59 to 1.02)
			p06	60/431 (13.9)	94/531 (17.7)	0.79 (0.58 to 1.06)
			p13	37/392 (9.4)	63/494 (12.8)	0.74 (0.50 to 1.09)
			p26	33/381 (8.7)	55/466 (11.8)	0.73 (0.49 to 1.11)
Howell, 2012[49]	EDPS ≥10	All Participants	p03	20/227 (8.8)	29/209 (13.7)	0.63 (0.37 to 1.09)
			p13	20/237 (8.4)	32/242 (13.2)	0.64 (0.38 to 1.08)
			p26	19/214 (8.9)	29/209 (13.7)	0.64 (0.37 to 1.10)
		Negative screen at baseline	p03	NR/NR (7.1)	NR/NR (14.4)	Study reported OR 0.37 (0.17 to 0.79)
			p13	NR/NR (6.3)	NR/NR (11.4)	Study reported OR 0.45 (0.21 to 0.92)
			p26	NR/NR (7.5)	NR/NR (13.1)	Study reported OR 0.51 (0.24 to 1.07)
Howell, 2014[50]	EPDS ≥10	All Participants	p03	15/249 (6.0)	14/251 (5.6)	1.08 (0.53 to 2.19)
			p13	12/235 (5.1)	15/232 (6.5)	0.79 (0.38 to 1.65)
			p26	8/230 (3.5)	11/238 (4.6)	0.75 (0.31 to 1.84)
Maimburg, 2015[51]	EPDS ≥12	All Participants	p06	39/543 (7.2)	42/526 (8.0)	0.90 (0.59 to 1.37)

Appendix G Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Education RCTs, by Author

Author, year	Outcome description	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Missler, 2020[52]	EPDS ≥10	All Participants	0	5/68 (3.3)	8/69 (12.1)	0.63 (0.22 to 1.84)
			p10	5/68 (9.1)	5/69 (8.2)	1.01 (0.31 to 3.35)
Nishi, 2022[53]	MDE Dx per CIDI	All Participants	p13	59/2509 (2.3)	73/2508 (2.9)	0.81 (0.58 to 1.13)

Abbreviations: CG = Control group; CI = Confidence Interval; CIDI = The Composite International Diagnostic Interview; DSM = diagnostic and statistical manual of mental disorders; Dx = Diagnosis; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; MDE = Major depressive disorder; P = Weeks postpartum; PHQ = Patient Health Questionnaire; RCT = Randomized controlled trial; RR = Relative risk

Appendix G Table 6. Depression Symptom Score Outcomes for Education RCTs, by Author

Author, year	Outcome instrument	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chg (95% CI)
Coo, 2023[45]	EPDS	All participants	p18	53	8.2 (4.9)	8.8 (5.8)	51	8.7 (5.2)	8.6 (5.7)	0.60 (5.40)	0.00 (5.40)	0.68 (95% CI: -1.41 to 2.77)
Fisher, 2016[46]	PHQ	All Participants	p26	162	3 (2.0 to 5.0)*	2 (1.0 to 5.0)*	152	2 (1.0 to 5.0)*	3 (1 to 4.5)*	NR (NR)	NR (NR)	NR
			p78	162	3 (2.0 to 5.0)*	3 (1.0 to 5.0)*	152	2 (1.0 to 5.0)*	3 (1 to 5)*	NR (NR)	NR (NR)	NR
Haga, 2019[47]	EPDS	All Participants	p13	392	6.5 (4.5)	4.1 (4.0)	494	6.2 (4.4)	4.5 (4.2)	-2.40 (4.27)	-1.70 (4.30)	-0.70 (-1.27 to -0.13)
			p26	381	6.5 (4.5)	4.0 (4.0)	466	6.2 (4.4)	4.4 (4.3)	-2.50 (4.27)	-1.80 (4.35)	-0.70 (-1.28 to -0.12)
			g37	528	6.5 (4.5)	5.2 (4.0)	589	6.2 (4.4)	5.8 (4.3)	-1.30 (4.27)	-0.40 (4.35)	-0.90 (-1.41 to -0.39)
			p06	431	6.5 (4.5)	5.2 (4.1)	531	6.2 (4.4)	5.8 (4.2)	-1.30 (4.31)	-0.40 (4.30)	-0.90 (-1.45 to -0.35)
Hayes, 2001[48]	POMS (depression)	All Participants	p08	95	5.0	5.0	93	5.0	4.0	NR (NR)	NR (NR)	study reported BG pvalue: 0.37
			p16	95	5.0	4.0	93	5.0	4.0	NR (NR)	NR (NR)	study reported BG pvalue: 0.37
Missler, 2020[52]	EPDS	All Participants	p06	68	4.5 (3.1)	5.5 (4.0)	69	4.9 (3.8)	5.7 (4.4)	1.05 (3.64)	0.81 (4.14)	0.24 (-1.07 to 1.55)
			p10	68	4.5 (3.1)	4.8 (4.2)	69	4.9 (3.8)	4.4 (3.3)	0.34 (3.77)	-0.42 (3.61)	0.76 (-0.48 to 2.00)
Nishi, 2022[53]	EPDS	All Participants	g32	2509	5.3 (0.1)†	5.6 (0.1)†	2508	5.1 (0.1)†	5.4 (0.1)†	0.29 (5.08)	0.34 (5.08)	-0.05 (-0.33 to 0.23)
			p13	2509	5.3 (0.1)†	5.2 (0.1)†	2508	5.1 (0.1)†	5.2 (0.1)†	-0.05 (5.42)	0.09 (5.42)	-0.14 (-0.44 to 0.16)
Ochoa, 2021[54]	CES-D	All Participants	p08	53	9.5 (4.4)	7.4 (4.2)	58	9.5 (5.1)	6.5 (4.2)	-2.12 (4.33)	-3.01 (4.74)	0.89 (-0.80 to 2.58)
			p17	53	9.5 (4.4)	6.4 (5.3)	58	9.5 (5.1)	6.8 (3.9)	-3.16 (4.92)	-2.73 (4.64)	-0.43 (-2.21 to 1.35)
			p26	53	9.5 (4.4)	6.1 (4.0)	58	9.5 (5.1)	5.8 (3.8)	-3.44 (4.23)	-3.67 (4.60)	0.23 (-1.42 to 1.88)
			p39	53	9.5 (4.4)	7.0 (5.6)	58	9.5 (5.1)	7.2 (5.2)	-2.50 (5.12)	-2.36 (5.15)	-0.14 (-2.05 to 1.77)
			p52	53	9.5 (4.4)	5.2 (3.9)	58	9.5 (5.1)	5.9 (2.9)	-4.31 (4.17)	-3.58 (4.44)	-0.73 (-2.34 to 0.88)

Appendix G Table 6. Depression Symptom Score Outcomes for Education RCTs, by Author

Author, year	Outcome instrument	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chg (95% CI)
			p78	53	9.5 (4.4)	6.0 (4.9)	58	9.5 (5.1)	5.6 (5.3)	-3.58 (4.69)	-3.89 (5.23)	0.31 (-1.54 to 2.16)
Rohder, 2022[55]	EPDS	All Participants	p39	38	8.3 (5.1)	NR (NR)	38	8.5 (5.1)	NR (NR)	-2.70 (5.10)	-2.00 (4.50)	-0.70 (-2.86 to 1.46)
Trillingsgaard, 2021[56]	EPDS	All Participants	p43	650	NR (NR)	3.8 (3.7)	584	NR (NR)	3.9 (3.7)	NR (NR)	NR (NR)	-0.13 (-0.54 to 0.29)‡

*Median (IQR)
†Mean (SE)
‡Mean Difference (95% CI)

Abbreviations: BG = Between group; BL = Baseline; CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; IG = Intervention group; NR = Not reported; P = Weeks postpartum; PHQ = Patient Health Questionnaire; POMS = Profile of Mood States; RCT = Randomized controlled trial; SD = Standard deviation

Appendix G Table 7. Other Dichotomous Outcomes for Education RCTs, by Outcome

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Above anxiety cut-off	Fisher, 2016[46]	GAD7 ≥10	All Participants	0	13/162 (8.0)	6/152 (4.0)	1.76 (0.68 to 4.58)
				p26	14/162 (8.6)	7/152 (4.6)	1.64 (0.67 to 3.99)
				p78	9/162 (5.6)	6/152 (4.0)	1.18 (0.42 to 3.31)
	Missler, 2020[52]	HADS ≥8	All Participants	0	11/68 (16.4)	14/69 (20.6)	0.80 (0.39 to 1.63)
				p10	7/68 (12.7)	13/69 (21.7)	0.55 (0.23 to 1.29)
Composite mental health outcomes	Fisher, 2016[46]	DSM IV diagnosis of depressive, anxiety, or adjustment disorders prior 30 days for CIDI	All Participants	p26	18/187 (9.7)	16/177 (9.3)	1.01 (0.52 to 1.95)
Child development outcomes	Fisher, 2016[46]	Unsettled infant behavior per BITSEA	All Participants	p26	92/187 (49.7)	87/177 (50.6)	0.97 (0.78 to 1.20)

Abbreviations: BITSEA = Brief Infant Toddler Social Emotional Assessment; CG = Control group; CI = Confidence Interval; CIDI = The Composite International Diagnostic Interview; DSM = diagnostic and statistical manual of mental disorders; GAD = Generalized anxiety disorder; HADS = Hospital Anxiety and Depression Scale; IG = Intervention group; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative risk

Appendix G Table 8. Other Continuous Outcomes for Education RCTs, by Outcome

Outcome type	Author, year	Outcome description	Group	Time point	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chg (95% CI)
Anxiety Score	Coo, 2023[45]	PASS	All participants	p18	53	27.9 (20.5)	30.5 (23.4)	51	29.2 (21.1)	27.9 (22.6)	2.60 (22.20)	-1.40 (21.80)	3.85 (95% CI: -4.61 to 12.31)
	Fisher, 2016[46]	GAD-7	All Participants	p26	162	3 (1.0 to 6.0)*	2 (1.0 to 4.0)*	152	2 (1.0 to 4.0)*	2 (1 to 5)*	NR (NR)	NR (NR)	NR
				p78	162	3 (1.0 to 6.0)*	2 (1.0 to 4.0)*	152	2 (1.0 to 4.0)*	2 (0 to 5)*	NR (NR)	NR (NR)	NR
	Missler, 2020[52]	HADS	All Participants	p06	68	5.1 (2.1)	5.7 (2.5)	69	5.3 (2.1)	6.1 (2.8)	0.59 (2.34)	0.70 (2.56)	-0.11 (-0.93 to 0.71)
				p10	68	5.1 (2.1)	5.6 (2.8)	69	5.3 (2.1)	5.5 (2.6)	0.54 (2.50)	0.15 (2.38)	0.39 (-0.43 to 1.21)
Child Attachment	Fisher, 2016[46]	Postnatal Attachment Total Score	All Participants	p26	187	NR (NR)	83.6 (6.9)	177	NR (NR)	84.1 (6.8)	NR (NR)	NR (NR)	0.04 (-1.43 to 1.51)
Child development	Rohder, 2022[55]	ASQ-SE	All Participants	p39	38	NR (NR)	34.8 (20.2)	38	NR (NR)	39.8 (18.1)	NR (NR)	NR (NR)	study reported Beta coefficient: -4.91 (-14.16, 4.35) p=0.30
Functioning	Fisher, 2016[46]	Fatigue Assessment Scale Score	All Participants	p26	187	NR (NR)	11.0 (3.9)	177	NR (NR)	10.3 (3.7)	NR (NR)	NR (NR)	0.25 (-0.45 to 0.95)
General distress severity	Nishi, 2022[53]	Psychological distress	All Participants	g32	2509	5.3 (0.1) †	6.2 (0.1) †	2508	5.8 (0.1) †	6.0 (0.1) †	0.37 (5.42)	0.19 (5.08)	0.18 (-0.11 to 0.47)
				p13	2509	5.3 (0.1) †	5.5 (0.1) †	2508	5.8 (0.1) †	5.5 (0.1) †	-0.35 (4.45)	-0.31 (4.45)	-0.04 (-0.29 to 0.21)
Stress	Missler, 2020[52]	PSI	All Participants	p06	68	33.0 (6.8)	39.0 (3.1)	69	33.0 (6.3)	38.6 (3.5)	6.06 (5.85)	5.58 (5.42)	0.48 (-1.41 to 2.37)
				p10	68	33.0 (6.8)	32.4 (8.4)	69	33.0 (6.3)	30.6 (7.6)	-0.55 (7.73)	-2.42 (7.00)	1.87 (-0.60 to 4.34)
	Ochoa, 2021[54]	PSI	All Participants	p08	53	NR (NR)	67.9 (17.6)	58	NR (NR)	62.2 (14.5)	NR (NR)	NR (NR)	study reported p<0.001

Appendix G Table 8. Other Continuous Outcomes for Education RCTs, by Outcome

Outcome type	Author, year	Outcome description	Group	Time point	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chg (95% CI)
				p26	53	NR (NR)	65.0 (16.8)	58	NR (NR)	60.5 (12.6)	NR (NR)	NR (NR)	study reported p<0.001
				p52	53	NR (NR)	62.1 (16.5)	58	NR (NR)	64.6 (14.3)	NR (NR)	NR (NR)	study reported p<0.001
				p78	53	NR (NR)	62.0 (15.2)	58	NR (NR)	63.5 (13.6)	NR (NR)	NR (NR)	study reported p<0.001
	Rohder, 2022[55]	PSI	All Participants	p39	38	NR (NR)	59.9 (14.2)	38	NR (NR)	68.5 (19.5)	NR (NR)	NR (NR)	study reported Beta coefficient: -8.51 (-16.60, -0.41) p=0.04
	Trillingsgaard, 2021[56]	PSS	All Participants	p43	652	NR (NR)	57.7 (6.1)	591	NR (NR)	57.9 (6.1)	NR (NR)	NR (NR)	-0.15 (-0.83 to 0.53)

*Median (IQR)
†Mean (SE)

Abbreviations: ASQ-SE = Ages & Stages Questionnaires: Social-Emotional; BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; FU = Followup; GAD = Generalized anxiety disorder; HADS = Hospital Anxiety and Depression Scale; IG = Intervention group; NR = Not reported; P = Weeks postpartum; PASS = Perinatal Anxiety Screening Scale; PSI = Psychological Screening Inventory; PSS = The Perceived Stress Scale; RCT = Randomized controlled trial; SD = Standard deviation

Appendix H Table 1. Study and Population Characteristics for Physical Activity RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Aguilar-Cordero, 2019[57] Study Pregnant Water Exercise (SWEP)	Fair	Spain	140	Pregnant women, 20 to 37 weeks gestation	Unselected	(none)	Pregnant	20	34 (21 to 43)
Lewis, 2021[15]	Fair	USA	300 [IG2 & CG]	Postpartum women with a history of depression but not currently depressed	Depr Sx or Hx	Previous history of depression (diagnosed by a healthcare provider or prescribed antidepressant medication), per self-report	Postpartum	4.4	31 (≥18)
Norman, 2010[58]	Fair	AUS	161	Women 6-10 weeks postpartum, ready for discharge from the postnatal ward	Unselected	(none)	Postpartum	8	30 (17 to 41)
Perales, 2015[59]	Good	ESP	184	Pregnant women 9-12 weeks' gestation	Unselected	(none)	Pregnant	10.5	31 (NR)
Songoygard, 2012[60]	Fair	NOR	855	Pregnant women, 18 weeks' gestation	Unselected	(none)	Pregnant	18	30.58 (≥18)
Teychenne, 2021[61] Mums on the Move	Fair	NZL	62	Women 18+ years of age, 3-9 months postpartum, with EPDS≥10 and insufficient physical activity	Depr Sx or Hx	EPDS≥10	Postpartum	NR (recruited 13-39 weeks postpartum)	33 (≥18)
Vargas-Terrones, 2019[62]	Fair	ESP	124	Women with a singleton pregnancy who were <16 weeks pregnant.	Unselected	(none)	Pregnant	NR (recruited <16 week's gestation)	33 (18 to 45)

Abbreviations: AUS = Australia; Avg = Average; BL = Baseline; CG= Control group; Depr = Depression; EPDS = Edinburgh Postnatal Depression Scale; ESP = Spain; Gest = Gestation; Hx = History; IG = Intervention group; KOR = Korea; NOR = Norway; NR = Not reported; NZL = New Zealand; PP = Postpartum; Rand = Randomized; RCT = Randomized controlled trial; Sx = Symptoms; USA = United States of America; Wks = Weeks

Appendix H Table 2. Detailed Population Characteristics for Physical Activity RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Aguilar-Cordero, 2019[57] Study Pregnant Water Exercise (SWEP)	NR	NR	NR	NR	NR	NR	71	NR	NR	NR
Lewis, 2021[15]	White: 73 Black/AfrAm: 12 Hispanic/Latino: 0 Asian: 0 NA/AI: 0 Other: 15	<HS: 2 HS Grad: 6 College Grad: 42 Post College Degree: 28	NR	75	25	NR	32	Household Income, %: Under 10,000: 6 Between $10,000 and 19,999: 6 Between $20,000 and 29,999: 8 Between $30,000 and 39,999: 10 Between $40,000 and 50,000: 11 Over $50,000: 56	BL depr sx: NR Hx of depr: 100 [per inclusion criteria]	NR
Norman, 2010[58]	NR	NR	9	NR	NR	NR	65	40% blue collar, 34% white collar, 24% homemaker, 1% student	BL EPDS >13: 19 Depr hx: NR	NR
Perales, 2015[59]	NR	NR	NR	NR	NR	20	57	NR	CES-D ≥16: 23 Depr hx: NR	NR
Songoygard, 2012[60]	NR	NR	NR	NR	NR	NR	58	SES class: 1 (lowest): 3.4% 2: 4.45% 3: 10.05% 4: 61% 5 (highest): 21.15%	NR	NR
Teychenne, 2021[61]	NR	<HS: NR HS Grad: NR	29	97	3	NR	NR	Employed: >0hrs working per week. Women working	NR	NR

Appendix H Table 2. Detailed Population Characteristics for Physical Activity RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Primi-parous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Mums on the Move		College Grad: 74 Post College Degree: NR						0 hrs per week, %: 71 English spoken at home, %: 95		
Vargas-Terrones, 2019[62]	NR	<HS: 7 HS Grad: 42 College Grad: 51 Post College Degree: 0	77	NR	NR	NR	72	Unemployed or home maker, %: 23 First pregnancy, %: 72	CES-D ≥16: 19 Previous postnatal depr: 0	NR

Abbreviations: AfrAm = African American; Grad = Graduate; HS = High school; Hx = History; MH = Mental health; NA/AI = Native American/Alaska Native; NR = Not reported; RCT = Randomized controlled trial; SES = Socioeconomic status

Appendix H Table 3. Intervention Characteristics for Physical Activity RCTs, by Author

Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depression focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Aguilar-Cordero, 2019[57] Study Pregnant Water Exercise (SWEP)	Three, 1hr group aquatic exercise sessions each week for 17 weeks	Pregnant	University (water sporting facilities)	Group	In-person	NR	No	17	3 weekly sessions (group) (length 60) x 17wks	Usual care
Lewis, 2021[15]	Telephone-based exercise intervention, 11 sessions (length NR)	Postpartum	Home	Individual	Print, Phone	Health Educator	No	26	11 session (length NR) x 26 wks	Usual care
Norman, 2010[58]	Eight 60-min group exercise sessions followed by 30-min education sessions	Postpartum	Other Medical	Group	In-person, Print	Midwife, PT, Psychologist	No	8	8 session (group) (length 90) x 8wks	Attention Control
Perales, 2015[59]	Ninety 60 min group exercise sessions (three times per week for 30 weeks)	Pregnant	Other Medical	Group	In-person	Fitness/ exercise instructor	No	30	90 session (group) (length 60) x 30wks	Usual care
Songoygard, 2012[60]	Twelve 60-min group exercise sessions with instructions for home exercise and dietary advice	Pregnant	Other Medical; home (indv)	Individual, Group	In-person	PT	No	12	12 session (group) (length 60) x 12wks	Minimal
Teychenne, 2021[61]	12 wk, home-based physical activity program which included free exercise equipment at home, access to smartphone web-app and an online forum.	Postpartum	Virtual, phone, or self-driven	Individual	Web	Research Staff, Self	No	12	12 weeks, self-directed home exercise (length, duration, and number of sessions NR)	Waitlist
Vargas-Terrones, 2019[62]	Three 60-min group exercise sessions per week for an estimated 15 weeks.	Pregnant	Other Medical	Group	In-person	Fitness/exercise instructor	No	23	72, 60 min group sessions for 23wks	Usual care

Abbreviations: CG = Control group; IG = Intervention group; Min = Minutes; NR = Not reported; PT = Physical therapist; RCT = Randomized controlled trial; Wks = Weeks

Appendix H Table 4. Detailed Intervention Characteristics for Physical Activity RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
Aguilar-Cordero, 2019[57] Study Pregnant Water Exercise (SWEP)	The EG conducted a program of moderate physical exercise in an aquatic environment. From Weeks 20 to 37 of gestation, three 1-hour sessions were performed each week. The sessions consisted of three phases: warm-up; the main phase, in which the activity is divided into an aerobic session followed by strength and endurance exercises; and final stretching and relaxation. The activity will be carried out in the water sporting facilities of the Faculty of Sports Science of the University of Granada, which have two pools suitable for our purposes: a 25-meter polyvalent pool and a 12.5-meter pool for training. These participants had the standard consultations with health providers (midwives, obstetricians, and family physicians) during pregnancy.	NR	NR	Usual recommendations during pregnancy, which included general guidance from the midwife on the positive effects of physical exercise. These participants had the standard consultations with health providers (midwives, obstetricians, and family physicians) during pregnancy.
Lewis, 2021[15]	The telephone-based exercise intervention consisted of 11 sessions (weekly during the first month, bi-weekly during months 2 and 3, and monthly for the next three months). The telephone sessions were delivered by trained health educators with master's degrees who were supervised by a licensed psychologist. The goal of the exercise intervention was for participants to engage in exercise five days per week for at least 30min per session. Exercise was defined as any activity lasting at least 10min that was in the moderate or vigorous intensity range. Participants were taught how to take their heart rate and told to keep their heart rate in the moderate (55–70% of heart rate maximum which is estimated at 220 minus their age) or vigorous intensity range (70–85% of maximum heart rate). They were also told that the exercise sessions should be at least 10min in length (could do three separate sessions in one day to obtain the 30min recommendation) and feel at least like a brisk walk. The exercise intervention was designed to motivate the participants to increase their exercise using strategies based on Social Cognitive Theory (SCT) and the Transtheoretical Model (intervention content was tailored to how ready the participant was to increase exercise). Specific topics included exercise safety, benefits of exercise, social support, enjoyment of exercise, increasing self-efficacy, making exercise a habit, and exercise maintenance. The health educator followed a specific manual that addressed topics related to exercise; however, the intervention was tailored to the participant and any topic related to exercise could be discussed.	NR	NR	Usual care

Appendix H Table 4. Detailed Intervention Characteristics for Physical Activity RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	The health educator processed emotions, thoughts, and behaviors related to exercise. Unlike general psychotherapy, a majority of the dialogue focused on exercise. Participants also received mailings related to the topic.			
Norman, 2010[58]	Each week participants undertook 1 hour of group exercise with their babies which involved cardiovascular and strength components. Each session was adapted for each woman depending on the type of delivery and her recovery. Participants also had a 30 minute education session delivered by healthcare professionals, including physical therapists, dietitians, speech pathologists, health psychologists, and midwives. In addition, women received written education materials mailed to them each week. Education topics covered baby massage, nutrition for mothers, introducing solids, adjusting to a new lifestyle, communicating with the baby, sun care for the baby, and play development. Contact details of health care personnel were also included. In the last week of the program, all of the speakers and the women and their babies gathered together for afternoon tea. They received a booklet containing diagrams of all the exercises provided over the course of the program, as well as a list of local gyms and community resources to assist them in continuing their exercise at home.	NR	NR	Women received written education materials mailed to them each week. Education topics covered baby massage, nutrition for mothers, introducing solids, adjusting to a new lifestyle, communicating with the baby, sun care for the baby, and play development. Contact details of health care personnel were also included.
Perales, 2015[59]	Women participated in a supervised exercise program that included three, 55-60 min sessions per week. Each session started with 5-8 min of walking and static stretching of most muscle groups to warm up. The warmup was followed by an aerobic dance section and specific exercises that targeted the major muscle groups in the legs, buttocks, and abdomen to stabilize the lower back (25 min); balancing exercises were also included (10 min). Each session concluded with pelvic floor training (10 min) and a cool down period (5-8 min). Exercises that involved the Valsalva maneuver, extreme stretching, joint overextension, ballistic movements, and jumping were specifically avoided. Exercises were performed in the supine position for no more than 2 min. Light- to moderate-intensity aerobic activity was prescribed, with the goal of achieving a 55-60% maximal heart rate. All subjects wore a heart rate monitor during the training sessions to ensure that the exercise intensity was light to moderate.	NR	NR	Women did not exercise during the study period; they received the usual information provided by their midwives or healthcare professionals.
Songoygard, 2012[60]	Between weeks 20 and 36 of pregnancy, women randomized to intervention attended exercise groups led by physiotherapists. The groups met once per week for 12 weeks, each session lasting	In the intervention group, 57% of the women adhered to the	NR	Received customary information provided by their midwife or GP.

Appendix H Table 4. Detailed Intervention Characteristics for Physical Activity RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
	60 minutes. In addition, the participants were instructed to complete a 45 min home exercise program at least twice a week (30 minutes endurance training and 15 minutes strength/balance exercises). Both groups received written information containing advice on diet, pelvic floor muscle exercises and pregnancy-related pelvic girdle pain.	study's recommended amount of exercise (i.e. three or more training sessions a week of moderate to high intensity), while 11% reported a similar amount of exercise in the control group..		Both groups received written information containing advice on diet, pelvic floor muscle exercises and pregnancy-related pelvic girdle pain.
Teychenne, 2021[61]	Intervention participants were provided with the Mums on the Move home-based physical activity intervention. This included provision of home exercise equipment (free treadmill or stationary bicycle hire based on personal preference), a logbook for goal setting and self-monitoring, access to an online forum for social support (facilitated by a research assistant with a PhD in behavioral epidemiology) and web-app access (purposely designed by the research team to provide motivational and informational material) for 12 weeks. The program was based on key behavior change principles (e.g. goal setting, self- monitoring, shaping knowledge, social support) and underpinned by the social ecological model, which posits that behavior is influenced by determinants at the individual, social and environmental levels. Behavior change technique components included (1) Feedback and monitoring: self-monitoring of behavior; feedback on behavior, (2) Goals and planning: goal setting; problem solving; action planning, (3) Shaping knowledge: instruction on how to perform behavior; information about antecedents, (4) Social support: practical and emotional, and (5) Antecedents: adding objects to the environment (i.e., free treadmill or stationary bicycle).	Non-exercise components of the program (e.g. web-app, online forum) had low compliance. Of intervention participants that used the web-app (n = 20, 63%), usage ranged from < 1 time per month (n = 12, 38%), 1-2 times per month (n = 6, 19%) to ≥ 1 time per week (n = 2, 6%). A total of 14 (44%) of intervention participants registered to use the online forum, with six women (19%) actively using the forum. Of those, the average number of times an active user posted was once. Logbook data from n = 20 intervention participants showed exercise equipment use remained stable across the duration of the intervention, although a slight downwards trend in calories burned over time	Almost all women liked that the program was convenient, accessible and flexible, with exercise equipment helping them overcome key barriers to physical activity including: being homebound (e.g. due to child/baby routines), poor weather, feeling self-conscious, and motivation. Just under half the women reported it was somewhat to very easy to fit using the exercise equipment into their daily life routine. 55% suggested they still faced difficulties in fitting the equipment into their daily routine, predominantly due to their baby's waking hours (either not napping for long or being clingy when they were awake), feeling fatigued (particularly in the evenings when the children were asleep and they had time to themselves), or having other priorities (e.g. preference for sedentary activities, spending time with partner, household chores).	Instructed (via email) to continue their usual routine during the intervention period, after which time they were provided with equipment hire company contact details and received access to the web-app.

Appendix H Table 4. Detailed Intervention Characteristics for Physical Activity RCTs, by Author

Author, year	Detailed IG description	IG Adherence	IG Acceptability	CG description
			A few women suggested they did not find using the exercise equipment enjoyable and preferred outdoor activities. A few also reported that space was a problem for fitting the equipment in their house, whilst one woman suggested that safety was a concern, given her child was now crawling.	
Vargas-Terrones, 2019[62]	Exercise program designed for healthy pregnant women. The exercise intervention program took place in a fitness room inside the hospital and consisted of three sessions per week from 12 to 16 gestational weeks to the end of the third trimester (weeks 38–40). In the event of no preterm delivery, between 66 and 78 sessions were planned for each participant. Each session lasted 60min, distributed as follows: a 10 min warm-up consisting of 5min walking and 5min light static stretching of most muscle groups and joint mobility exercises; 25min aerobic exercise developed at a moderate intensity through different choreographies; 10min muscle strengthening exercises; 5min of coordination and balance; 5min pelvic floor exercises; and at the end of each session, 5–10min were devoted to stretching and relaxation. The sessions were conducted in groups of 10–12 participants and were supervised by a qualified fitness specialist. Exercises where there were extreme stretches, Valsalva maneuver, ballistic movements and jumps were avoided. The exercises performed in the supine position did not exceed 2min in duration To facilitate compliance with the program, two to three daily sessions were offered four weekdays a week between 17:00 and 20:00. The exercise program was designed according to the standards of the American College of Obstetricians and Gynecologists. Women used the Polar FT7 heart rate monitor (Polar, Kempele, Finland) to maintain a heart rate intensity of 55%–60% of heart rate reserve using the Karvonen formula in the aerobic part of the session.	Among the 70 participants of the IG, the average of attendance to the program was 69.3% (around 50 sessions). Individually, 65.7% (n=46) of the participants attended more than 70% of the sessions, 22.8% (n=16) attended 30%–55%, and 11.4% (n=8) attended less than 30%.	NR	All women who participated in the study received usual care from health professionals of the hospital and the general recommendations of nutrition and exercise.

Abbreviations: CG = Control group; GP = General practitioner; IG = Intervention group; PE = Physical exercise; PT = Physical therapist; Min = Minutes; NR = Not reported; RCT = Randomized controlled trial

Appendix H Table 5. Depression Incidence Outcomes for Physical Activity RCTs, by Author

Author, year	Outcome Description	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Aguilar-Cordero, 2019[57]	EPDS ≥10	All participants	p04	14/65 (21.5)	38/64 (59.4)	0.36 (0.22 to 0.60)
	EPDS ≥16	All participants	p04	0/65 (0.0)	1/64 (1.6)	0.33 (0.01 to 9.91)
Lewis, 2021[15]	PPD Dx per SCID for DSM IV	All Participants	p30	4/150 (2.7)	5/150 (3.3)	0.80 (0.22 to 2.92)
			p43	4/150 (2.7)	4/150 (2.7)	1.00 (0.25 to 3.92)
Norman, 2010[58]	EPDS >13	All Participants	0	14/62 (22.0)	12/73 (16.0)	1.37 (0.69 to 2.75)
			p16	7/62 (11.0)	12/73 (16.0)	0.69 (0.29 to 1.64)
Perales, 2015[59]	CES-D ≥ 16	All Participants	0	22/90 (24.4)	17/77 (22.1)	1.11 (0.64 to 1.93)
			g39	11/90 (12.2)	19/77 (24.7)	0.49 (0.25 to 0.97)
Songoygard, 2012[60]	EPDS ≥ 10	All Participants	p13	14/379 (3.7)	17/340 (5.0)	0.74 (0.37 to 1.48)
	EPDS ≥ 13		p13	4/379 (1.1)	8/340 (2.4)	0.45 (0.14 to 1.48)
Vargas-Terrones, 2019[62]	CES-D ≥16	All Participants	0	14/70 (20.0)	10/54 (18.5)	1.08 (0.52 to 2.24)
			p06	12/70 (17.1)	17/54 (30.7)	0.54 (0.28 to 1.04)
			g38	13/70 (18.6)	19/54 (34.4)	0.53 (0.29 to 0.97)

Abbreviations: CES-D = Center for Epidemiologic Studies *Depression Scale*; CG = Control group; CI = Confidence Interval; DSM = diagnostic and statistical manual of mental disorders; Dx = Diagnosis; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; P = Weeks postpartum; PPD = Postpartum depression; RCT = Randomized controlled trial; SCID = Structured Clinical Interview; RR = Relative risk

Appendix H Table 6. Depression Symptom Score Outcomes for Physical Activity RCTs, by Author

Author, year	Outcome instument	Group	Time point	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	Mean CG score at BL (SD)	Mean CG score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chg (95% CI)
Aguilar, Cordero, 2019[57]	EPDS	All participants	p04	65	NR	6.4 (3.7)	64	NR	10.2 (2.4)	NR	NR	NR
Lewis, 2021[15]	EPDS	All Participants (IG2)	p30	150	7.0 (14.0)*	7.0 (17.0)*	150	8.0 (19.0)*	7.0 (17.0)*	NR (NR)	NR (NR)	study reported BG: NSD
			p43	150	7.0 (14.0)*	7.0 (17.0)*	150	8.0 (19.0)*	7.0 (17.0)*	NR (NR)	NR (NR)	study reported BG: NSD
Norman, 2010[58]	EPDS	All Participants	p16	62	8.0 (6.2)	5.5 (5.1)	73	6.8 (5.4)	6.8 (5.5)	-2.53 (5.71)	0.00 (5.48)	-2.53 (-4.42 to -0.64)
			p20	62	8.0 (6.2)	4.7 (5.3)	73	6.8 (5.4)	6.5 (5.6)	-3.27 (5.77)	-0.21 (5.53)	-3.06 (-4.97 to -1.15)
Perales, 2015[59]	CES-D	All Participants	g39	90	9.9 (8.9)	7.7 (8.3)	77	9.4 (8.1)	11.3 (9.7)	-2.20 (7.93)	1.96 (9.03)	-4.16 (-6.73 to -1.59)
Teychenne, 2021[61]	EPDS	All Participants	p34	32	12.1 (3.8)	6.0 (4.5)	30	12.6 (3.9)	6.9 (3.9)	-6.10 (3.66)	-5.70 (3.90)	0.10 (-1.70 to 1.90)†
			p38	32	12.1 (3.8)	6.0 (4.3)	30	12.6 (3.9)	7.4 (3.6)	-6.10 (4.07)	-5.20 (3.76)	-0.90 (-3.00 to 1.10)†
Vargas-Terrones, 2019[62]	CES-D	All Participants	g38	70	11.0 (7.7)	9.9 (NR)	54	10.1 (6.8)	11.6 (NR)	-1.10 (NR)	1.54 (NR)	NR, NSD
			p06	70	11.0 (7.7)	8.8 (NR)	54	10.1 (6.8)	10.9 (NR)	-2.20 (NR)	0.84 (NR)	NR, NSD

*Median (range)
†Mean Difference (95% CI)

Abbreviations: BG = Between group; CES-D = Center for Epidemiologic Studies Depression Scale; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; NR = Not reported; NSD = No significant difference; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation

Appendix H Table 7. Other Continuous Outcomes for Physical Activity RCTs, by Outcome

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	Mean CG score at BL (SD)	Mean CG score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in Chg (95% CI)
Anxiety Score	Teychenne, 2021[61]	GAD7	All Participants	p38	32	8.2 (4.6)	4.3 (2.2)	30	6.8 (2.4)	4.2 (2.9)	-3.90 (4.41)	-2.60 (2.69)	-0.10 (-1.90 to 1.70)*
Stress	Lewis, 2021[15]	PSS	All Participants (IG2)	p30	150	24.0 (33.0)†	20.0 (38.0)†	150	25.0 (39.0)†	22.0 (36.0)†	NR (NR)	NR (NR)	study reported BG p-value: 0.04
				p43	150	24.0 (33.0)†	22.0 (36.0)†	150	25.0 (39.0)†	22.0 (39.0)†	NR (NR)	NR (NR)	study reported BG: NSD
Well-being	Norman, 2010[58]	PABS	All Participants	p16	62	10.7 (2.2)	11.8 (2.1)	73	10.7 (2.2)	10.5 (2.3)	1.10 (2.14)	-0.20 (2.22)	1.30 (0.56 to 2.04)
				p20	62	10.7 (2.2)	11.9 (2.3)	73	10.7 (2.2)	10.5 (1.9)	1.21 (2.25)	-0.18 (2.05)	1.39 (0.66 to 2.12)

*Mean Difference (95% CI)
†Median (range)

Abbreviations: BG = Between group; BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; FU = Followup; GAD = Generalized anxiety disorder; IG = Intervention group; NR = Not reported; NSD = No significant difference; P = Weeks postpartum; PABS = Positive Affect Balance Scale; PSS = Perceived Stress Scale; RCT = Randomized controlled trial; SD = Standard deviation

Appendix I Table 1. Study and Population Characteristics for Infant Sleep RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Hiscock, 2002[63]	Fair	AUS	156	Women with infants 6-12 months of age reporting infant sleep problems, not receiving treatment for postnatal depression	Unselected	(none)	Postpartum	37	34 (NR)
Hiscock, 2014[64] Baby Business	Fair	AUS	770	Primary caregiver of newborn infants 7-10 days postpartum	Unselected	(none)	Postpartum	4	33 (NR)
Werner, 2016[65] Practical Resources for Effective Postpartum Parenting (PREPP)	Fair	USA	54	Pregnant adult women, aged 18 to 45 years, 28-38 weeks' gestation, Predictive Index of Postnatal Depression score > 24	Depression Symptoms or History	Cooper predictive index >24	Pregnant	36	30 (18 to 45)

Abbreviations: AUS = Australia; BL = Baseline; PP = Postpartum; Rand = Randomized; RCT = Randomized controlled trial; USA = United States; Wks = weeks

Appendix I Table 2. Detailed Population Characteristics for Infant Sleep RCTs

Author, year	Race/Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Hiscock, 2002[63]	NR	<HS: NR HS Grad: NR College Grad: 67 Post College Degree: NR	30	98	1	NR	NR	NR	NR	NR
Hiscock, 2014[64] Baby Business	NR	Tertiary degree or higher: 71%	NR	97	NR	NR	NR	SEIFA of postcode: 1st quintile: 11% 2nd quintile: 10% 3rd quintile: 62% 4th quintile: 6% 5th quintile: 12.1%	NR	NR
Werner, 2016[65] Practical Resources for Effective Postpartum Parenting (PREPP)	White: 11 Black/AfrAm: 19 Hispanic/Latino: 59 Asian: 8 NA/AI: NR Other: 60	NR	54	34	17	NR	NR	Maternal education, mean years: 15 Employed = part time and full time combined Living together, not living together, and divorced not captured in % above Paternal age: 33	BL Cooper predictive index >24: 100 [per inclusion criteria] Depr hx: NR	NR

Abbreviations: AI = American Indian; HS = High school; Hx = History; MH = Mental health; NA = Native American; NR = Not reported; SEIFA = Socio-Economic Indexes for Areas; SES = Socioeconomic status

Appendix I Table 3. Intervention Characteristics for Infant Sleep RCTs, by Author

Author, year	IG	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depr focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Hiscock, 2002[63]	IG1	Three private consultation sessions to promote infant sleep	Postpartum	Home Primary Care	Individual	In-person	Physician	No	12	3 session (individual) (length NR) x 12 weeks	Usual care
Hiscock, 2014[64]	IG1	One mailed information packet focused on infant crying and sleeping, and parent self-care; One telephone call (minutes NR); One 1.5 hour group session	Postpartum	Home NR	Group Family	In-person Print Phone Video	Nurse Psychologist Other MH	No	12	1 (individual), 1 session (group) (length NR) x 12 weeks	Usual care
Werner, 2016[65]	IG1	Three in-person sessions plus 1 phone session teaching skills to manage infant crying and promote sleep, plus psychological support	Both	Home	Individual	In-person Phone	Psychologist	No	20	4 session (individual) (length NR) x 20 weeks	Minimal

Abbreviations: CG = Control group; Depr = Depression; IG = Intervention group; MH = Mental health; NR = Not reported; RCT = Randomized controlled trial; Wks = weeks

Appendix I Table 4. Detailed Intervention Characteristics for Infant Sleep RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
Hiscock, 2002[63]	IG1	Participants attended 3 private consultations held every two weeks with a provider with one year's sleep management experience. Sleep management plans were tailored towards individual families. In addition to discussing normal sleep cycles, parents were taught that settling after night waking is a learned behavior that can be modified, infants need to be taught to fall asleep independently, factors reinforcing the sleep problem can be eliminated with appropriate behavior interventions, an infant's cry may be for more than one reason, and a bedtime routine and consistent daytime naps are desirable. The main intervention was controlled crying, whereby parents responded to their infant's cry a increasing time intervals, allowing the infant to fall asleep by itself. A few parents chose "camping out" where they sat with their infants until the infant fell asleep and gradually removed their presence over a period of 3 weeks. Overnight feeding that contributed to night waking was managed by reducing over 7-10 days the volume of milk given or time taken to feed. When a pacifier was causing problems parents removed it or attached it to the infant's clothing overnight. Mothers also received a sleep management plan, information about the development and management of sleep problems, and information about normal sleep patterns. They were asked to maintain daily sleep diaries until the first followup questionnaire.	NR	Mothers in the intervention group were overwhelmingly more satisfied with the sleep strategies than control mothers were with the written information (median 8.2 vs. 2.1 out of a possible 9, p<0.001). Compared with CG, IG mothers rated the strategies as more useful in both treating their infant's sleep problem (median 8.4 vs. 1.3, p<0.001) and coping with it (median 8.2 vs 2.0, p<0.001)	Participants were mailed a single sheet describing normal sleep patterns in infants aged 6 to 12 months based on normative data. The sheet did not include advice on how to manage infant sleep problems.
Hiscock, 2014[64]	IG1	Families were mailed a 27-page booklet and a 23-minute DVD. The booklet contained information about normal infant sleep cycles, crying patterns, strategies to promote independent settling, and self-care for parents. The DVD contained similar information and included parents discussing settling techniques and infant tired signs, as well as settle technique demonstrations. Intervention families were also offered an individuals telephone consultation at infant age 6 to 8 weeks (peak infant crying time) expanding on the content of the booklet and DVD. A facilitator helped the parent apply the information the information in a way that is suitable for their family. A 1.5 hour parent group session was held at approximately infant 12 weeks. The group aim was to troubleshoot any problems parents are having with sleep and crying.	All families received the booklet/DVD, 92.5% received telephone consultation, 50.9% attended group meeting.	All families reported reading the booklet and 98% watching DVD. The majority found the booklet to be useful (78%) as well as the DVD (76%). Telephone consultation and parent group were at least a "a little useful" to 94% of participants. 95% would recommend the program to their friends.	Usual care through the maternal and child health service.
Werner, 2016[65]	IG1	Participants received 3 consecutive in-person "coaching" sessions with a psychologist. The psychologist also contacted participants by telephone at 2 weeks postpartum and, using motivational interviewing techniques, encouraged the use of PREPP skills and answered participant questions. The intervention protocol encompassed 5 specific infant behavioral techniques aimed at	All participants received the entire treatment (they all attended and completed the prenatal,	NR	Participants met with a psychologist on 2 occasions: at 34-38 weeks' gestation and 6 weeks postpartum. During these visits the

Appendix I Table 4. Detailed Intervention Characteristics for Infant Sleep RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		reducing infant fuss/cry behavior and promoting sleep. These included: 1) feeding the infant between 10 pm and midnight even if they must be awakened; 2) accentuating differences between day and night by providing higher levels of stimulation during the day; 3) lengthening the latency to feeding time in the middle of the night by engaging in other attentive activities such as walking with the baby and diapering, thereby extinguishing the association between night time waking and feeding; 4) carrying infants for a minimum of 3 hours a day, throughout the day, in addition to the carrying that occurs in response to crying and feeding; and 5) learning to swaddle the baby. Women were also provided with, 1) supportive psychological interviewing that encouraged reflection on their own childhood and how it will inform the development of their parental identity, 2) psychoeducation about the postpartum period (e.g., hormone levels, baby blues, etc); 3) various mindfulness techniques aimed at helping them to cope better when their babies are distressed and/or unsoothable and aiding them to return to sleep after tending to babies during the nighttime. In the first visit participants were given a carrier and a swaddling blanket to use with their babies.	newborn, and 6-week postpartum treatment sessions along with the phone session).		psychologist discussed PPD symptoms with participants and offered referrals for mental health care. They also provided suitable referrals and clinical followup for all participants who reported symptoms of depression or anxiety or if the participant expressed interest in such a referral. Participants also were provided with printed educational materials about the symptoms of PPD and supportive services in the community.

Abbreviations: CG = Control group; IG = Intervention group; NR = Not reported; PPD = Postpartum Depression; PREPP = Practical Resources for Effective Postpartum Parenting; RCT = Randomized controlled trial

Appendix I Table 5. Depression Incidence Outcomes for Infant Sleep RCTs, by Author

Author, year	Outcome description	IG allocation	Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Hiscock, 2014[64]	EPDS >9	IG1	All Participants	p17	67/NR (22.9)	54/NR (18.5)	Study reported OR 1.48 (0.97 to 2.27); p-value 0.07
				p26	31/NR (7.9)	51/NR (12.9)	Study reported OR 0.57 (0.34 to 0.94); p-value 0.03

Abbreviations: CG = Control group; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; NR = Not reported; OR = Odds ratio; P = Weeks postpartum; RCT = Randomized controlled trial

Appendix I Table 6. Depression Symptom Score Outcomes for Infant Sleep RCTs, by Author

Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG Mean score at BL (SD)	CG Mean score at FU (SD)	IG mean chg (SD)	CG mean chng (SD)	Mean Diff in chg (95% CI)
Hiscock, 2002[63]	EPDS	All Participants	p34	76	9.0 (0.4)	NR (NR)	76	8.8 (0.5)	NR (NR)	-3.70 (16.46)	-2.50 (3.78)	-1.20 (-5.00 to 2.60)
			p42	75	9.0 (0.4)	NR (NR)	71	8.8 (0.5)	NR (NR)	-3.60 (4.64)	-3.00 (4.08)	-0.60 (-2.02 to 0.82)
Hiscock, 2014[64]	EPDS	All Participants	p17	NR	NR (NR)	6.3 (4.4)	NR	NR (NR)	6.0 (4.2)	NR (NR)	NR (NR)	0.42 (-0.13 to 0.96)*
			p26	NR	NR (NR)	5.1 (4.0)	NR	NR (NR)	5.8 (4.3)	NR (NR)	NR (NR)	-0.60 (-1.30 to 0.11)*
Werner, 2016[65]	HDRS	All Participants	p06	26	18.5 (12.8)	12.1 (7.3)	27	13.8 (10.6)	17.2 (9.8)	-6.39 (11.14)	3.34 (10.25)	-9.73 (-15.49 to -3.97)
			p10	26	18.5 (12.8)	11.5 (8.4)	27	13.8 (10.6)	13.4 (10.5)	-7.00 (11.29)	-0.39 (10.56)	-6.61 (-12.49 to -0.73)
			p16	26	18.5 (12.8)	10.5 (10.3)	27	13.8 (10.6)	11.1 (9.4)	-8.00 (11.77)	-2.71 (10.09)	-5.29 (-11.18 to 0.60)
	PHQ-9	All Participants	p06	26	6.4 (3.6)	7.2 (4.4)	27	7.8 (4.3)	10.1 (5.0)	0.71 (4.04)	2.29 (4.71)	-1.58 (-3.95 to 0.79)
			p10	26	6.4 (3.6)	7.1 (5.0)	27	7.8 (4.3)	8.3 (4.1)	0.61 (4.49)	0.50 (4.19)	0.11 (-2.23 to 2.45)
			p16	26	6.4 (3.6)	4.0 (3.3)	27	7.8 (4.3)	7.2 (4.1)	-2.45 (3.44)	-0.57 (4.22)	-1.88 (-3.96 to 0.20)

*Mean Difference (95% CI)

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; HDRS = Hamilton Depression Rating Scale; IG = Intervention group; NR = Not reported; P = Weeks postpartum; PHQ = Patient Health Questionnaire; RCT = Randomized controlled trial; SD = Standard deviation

Appendix I Table 7. Other Continuous Outcomes for Infant Sleep RCTs, by Outcome

Outcome type	Author, year	Outcome description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG Mean score at BL (SD)	CG Mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in chg (95% CI)
Anxiety Score	Werner, 2016[65]	HAM-A	All Participants	p06	26	19.4 (13.8)	11.7 (8.2)	27	13.7 (10.1)	14.2 (8.5)	-7.62 (12.01)	0.50 (9.41)	-8.12 (-13.92 to -2.32)
				p10	26	19.4 (13.8)	11.1 (8.2)	27	13.7 (10.1)	12.0 (9.0)	-8.28 (12.02)	-1.67 (9.59)	-6.61 (-12.45 to -0.77)
				p16	26	19.4 (13.8)	9.3 (9.8)	27	13.7 (10.1)	11.5 (9.1)	-10.02 (12.28)	-2.14 (9.64)	-7.88 (-13.81 to -1.95)

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; FU = Followup; HAM-A = Hamilton Anxiety Rating Scale; IG = Intervention group; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation

Appendix J Table 1. Study and Population Characteristics for Debriefing RCTs, by Author

Author, year	Quality	Country	N Randomized	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Priest, 2003[66]	Fair	AUS	1745	Postnatal women, 1 to 3 days post-delivery	Unselected	(none)	Postpartum	0	NR (NR)
Small, 2000[67]	Fair	AUS	1041	Operative delivery, at least 1 day postpartum	Unselected	(none)	Postpartum	0	NR (NR)

Abbreviations: BL = Baseline; Gest = Gestation; NR = Not reported; PP = Postpartum; RCT = Randomized controlled trial; SD = Standard deviation; Wks = weeks

Appendix J Table 2. Detailed Population Characteristics for Debriefing RCTs

Author, year	Race/ Ethnicity, %	Education, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Priest, 2003[66]	NR	NR	NR	NR	NR	NR	65	NR	NR	Personal history of psychological treatment: 16.9%
Small, 2000[67]	NR	<HS: 33 HS Grad: 67 College Grad: 51 Post College Degree: NR	NR	77	4	59	63	Family Income (AUS): <=$20,000: 15% $20,001-30,000: 15% $30,001-40,000: 16% >$40,000: 55%	NR	NR

Abbreviations: AUS = Australia; HS = High school; Hx = History; MH = Mental health; NR = Not reported; SES = Socioeconomic status

Appendix J Table 3. Intervention Characteristics for Debriefing RCTs, by Author

Author, year	IG	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depr focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Priest, 2003[66]	IG1	One 15 to 60-min standardized debriefing session in hospital	Postpartum	In-hospital post delivery	Individual	In-person	Midwife	No	0.14	1 session (individual) (length 40) x 0.14wks	Usual care
Small, 2000[67]	IG1	One debriefing session, up to 60 min, with midwife	Postpartum	In-hospital post delivery	Individual	In-person	Midwife	No	0.14	1 session (1(length 60) x 0.14wks	Usual care

Abbreviations: CG = Control group; Depr = Depression; IG = Intervention group; P = Weeks postpartum; PHQ = Patient Health Questionnaire; RCT = Randomized controlled trial; Wks = weeks

Appendix J Table 4. Detailed Intervention Characteristics for Debriefing RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG descr
Priest, 2003[66]	IG1	Women received a single, standardized debriefing session in their hospital rooms immediately after randomization or the next day. Debriefing used the seven key stages from the critical incident stress debriefing model of Mitchell adapted for use in individual sessions with women in the postpartum period. Phases of the critical incident stress debriefing procedure: 1. Engagement: midwife described the debriefing process 2. Facts: relating the birth experience. 3. Thoughts: describe your thoughts at the time 4. Feelings and reactions: describing feelings during events that were perceived as stressful 5. Normalization: midwife emphasized the normality of the woman's response to a stressful situation 6. Education (brief): coping with early parenting; identifying sources of assistance if emotional problems continue 7. Disengagement	NR	Two-thirds of women rated the debriefing session as moderately or greatly helpful, 23% as minimally helpful, and 10% as not at all helpful.	The control group received standard postnatal care.
Small, 2000[67]	IG1	The debriefing intervention provided women with an opportunity to discuss their labor, birth, and post-delivery events and experiences. Debriefing took place before the women were discharged from hospital. Both midwives are experienced in talking with women about birth, able to listen with empathy to women's accounts, and aware of the common concerns and issues arising for women after an operative birth. Content of the discussion was determined by each woman's experiences and concerns, and up to one hour was made available for the session. Each debriefing session was documented by the research midwife at the end of the session using a standard reporting sheet. The information recorded included duration of debriefing session, main issues and concerns raised by the woman, themes discussed, and support provided.	NR (but single session in hospital so presume 100%)	26/463 (6%) rating the debriefing session as "unhelpful"; 200 (43%) rated it as "very helpful" and 237 (51%) as "helpful."	Women allocated to standard care received a brief visit from the midwife to give them a pamphlet on sources of assistance for mothers on discharge from hospital. Women allocated to debriefing also received the pamphlet.

Abbreviations: CG = Control group; IG = Intervention group; NR = Not reported; RCT = Randomized controlled trial

Appendix J Table 5. Depression Incidence Outcomes for Debriefing RCTs, by Author

Author, year	Outcome description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Priest, 2003[66]	Major or minor depression diagnosis per SADS	IG1	All Participants	p52	156/875 (17.8)	158/870 (18.2)	0.99 (0.87 to 1.11)
Small, 2000[67]	EPDS ≥13	IG1	All Participants	p26	81/467 (17.3)	65/450 (14.4)	1.20 (0.89 to 1.62)

Abbreviations: CG = Control group; CI = Confidence Interval; EPDS = Edinburgh Postnatal Depression Scale; IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative Risk; SADS = Schedule for Affective Disorders and Schizophrenia

Appendix J Table 6. Depression Symptom Score Outcomes for Debriefing RCTs, by Author

Author, year	Outcome desc	Group	Timepoint	IG n analyzed	IG Mean Score at BL (SD)	IG Mean score at FU (SD)	CG n analyzed	CG Mean Score at BL (SD)	CG Mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in chg (95% CI)
Small, 2000[67]	EPDS	All Participants	p26	467	NR (NR)	7.2 (5.7)	450	NR (NR)	6.7 (5.5)	NR (NR)	NR (NR)	NR (p=0.24)

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation

Appendix J Table 7. Other Continuous Outcomes for Debriefing RCTs, by Outcome

Outcome	Author, year	Outcome Desc	Group	Timepoint	IG n analyzed	IG Mean Score at BL (SD)	IG Mean score at FU (SD)	CG n analyzed	CG Mean Score at BL (SD)	CG Mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in chg (95% CI)
QOL	Small, 2000[67]	SF-36 Role functioning (physical)	All Participants	p26	467	NR (NR)	73.9 (35.1)	450	NR (NR)	76.2 (35.3)	NR (NR)	NR (NR)	-1.02 (-6.98 to 2.22)*
		SF-36 Mental health	All Participants	p26	467	NR (NR)	69.7 (18.8)	450	NR (NR)	71.2 (18.1)	NR (NR)	NR (NR)	-1.23 (-3.91 to 0.89)*
		SF-36 Role functioning (emotional)	All Participants	p26	467	NR (NR)	73.3 (38.1)	450	NR (NR)	80.0 (35.7)	NR (NR)	NR (NR)	-2.31 (-10.48 to -0.84)*
		SF-36 Physical functioning	All Participants	p26	467	NR (NR)	86.1 (17.4)	450	NR (NR)	85.7 (18.4)	NR (NR)	NR (NR)	0.32 (-1.96 to 2.73)*
		SF-36 Social functioning	All Participants	p26	467	NR (NR)	78.8 (24.3)	450	NR (NR)	73.2 (5.7)	NR (NR)	NR (NR)	-1.07 (-4.80 to 1.42)*

*Student's *t* test (95% CI)

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Desc = Description; Diff = Difference; FU = Followup; IG = Intervention group; NR = Not reported; P = Weeks postpartum; QOL= Quality of Life; RCT = Randomized controlled trial; SD = Standard deviation

Appendix J Table 8. Other Dichotomous Outcomes for Debriefing RCTs, by Outcome

Outcome type	Author, year	Outcome description	IG Allocation	Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
PTSD	Priest, 2003[66]	PTSD Diagnosis per SADS	IG1	All Participants	p52	NR/NR (0.6)	NR/NR (0.8)	0.71 (0.23 to 2.23)

Abbreviations: CG = Control group; CI = Confidence Interval; IG = Intervention group; NR = Not reported; P = Weeks postpartum; PTSD = Post traumatic stress disorder; RCT = Randomized controlled trial; RR = Relative Risk; SADS = Schedule for Affective Disorders and Schizophrenia

Appendix K Table 1. Study and Population Characteristics for Complementary RCTs, by Intervention

Intervention type	Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Parenting/ mother-infant attachment	Cooijmans, 2022[68]	Fair	NLD	127	Women age ≥ 18, who gave birth to healthy singleton infant at ≥37 weeks	Unselected	(none)	Pregnant	35	32 (≥18)
	Little, 2023[69]	Fair	USA	100	Pregnant women aged 18 and older living in a primarily Latinx, income-constrained urban community	Other char	Low SES	Pregnant	NR	27 (≥18)
Yoga	Davis, 2015[70]	Fair	USA	46	Women with elevated anxiety symptoms, up to 28 weeks' gestation; EPDS ≥ 9	Depr Sx or Hx	EPDS ≥ 9	Pregnant	20.8	30 (18 to 45)
Breathing/ relaxation	Ertekin Pinar, 2018[71]	Fair	TUR	220	Pregnant women, 8-30 weeks' gestation	Unselected	(none)	Pregnant	13	28 (18 to 38)
Mindfulness	Hassdenteufel, 2023[72]	Fair	DEU	280	Women age ≥ 18 with an increased level of emotional distress (EPDS score > 9)	Depr Sx or Hx	EPDS >9	Pregnant	21	33 (≥18)
	Pan, 2019[73]	Good	TWN	104	Age 20 or older, 13-28 weeks' gestation	Unselected	(none)	Pregnant	21	33 (≥20)
	Zhang, 2023[74]	Fair	HKG	183	Pregnant women in Hong Kong	Unselected	(none)	Pregnant	NR	33 (NR)

Abbreviations: BL = Baseline; HKG = Hong Kong; NLD = Netherlands; PP = Postpartum; Rand = Randomized; RCT = Randomized controlled trial; TUR = Türkiye; TWN = Taiwan; USA = United States; Wks = weeks

Appendix K Table 2. Detailed Population Characteristics for Complementary RCTs, by Intervention

Intervention type	Author, year	Race/ Ethnicity, %	Education, %	Em-ployed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Prim-iparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Parenting/ mother-infant attachment	Cooijmans, 2022[68]	NR	Maternal education level, mean: 6.84	NR	NR	NR	6	47	NR	NR	NR
	Little, 2023[69]	White: NR Black/AfrAm: NR Hispanic/Latino: 95 Asian: NR NA/AI: NR Other: NR	<HS: NR HS Grad: 67 College Grad: NR Post College Degree: NR	13	68	NR	NR	76	Per inclusion criteria, all participants recruited from low-income community	NR	NR
Yoga	Davis, 2015[70]	White: 78 Black/AfrAm: NR Hispanic/Latino: NR Asian: NR NA/AI: NR Other: NR	<HS: NR HS Grad: NR College Grad: 80 Post College Degree: NR	96	83	NR	NR	59	NR	BL EPDS ≥ 9: 100 [per inclusion criteria Llifetime depr disorder: 46	30 (lifetime anxiety disorder)
Breathing/relaxation	Ertekin Pinar, 2018[71]	NR	<HS: 42 HS Grad: 38 College Grad: 21 Post College Degree: NR	92	100	NR	NR	29	Self-rated SES, %: - Medium, 42 - Good, 58	NR	NR
Mindfulness	Hassdenteufel, 2023[72]	NR [Country of origin (frequencies), %: Germany: 85 Other: 15]	Maternal education, %: University entrance qualification: 51 University of applied sciences entrance	47	66	2	35	45	Household net income (frequencies), %: < 1500 €: 25 1500 - 2999 €: 45 3000 - 4999 €: 22 5000 - 8000 €: 7	BL depr sx, %: 100 Depr hx, %: NR	NR

Appendix K Table 2. Detailed Population Characteristics for Complementary RCTs, by Intervention

Intervention type	Author, year	Race/ Ethnicity, %	Education, %	Em-ployed, %	Married or cohabitat-ing, %	Single or living alone, %	C-section, %	Prim-iparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
			qualification: 17 Low secondary qualification: 5								
	Pan, 2019[73]	NR	Education level, ≤Junior college, 12%: 12 Education level, ≥University, 88%O: 84	20	96	NR	NR	91	NR	NR	NR
	Zhang, 2023[74]	NR (Hong Kong residents)	F7 (HS grad) or below: 31 College or above: 69	86	98	2	NR	NR	Personal income, %: $10,000 below: 18 $10,000 to $19,999: 34 $20,000 to $29,999: 24 $30,000 or above: 25	Current depr: 0% (based on inclusion criteria) Depr hx: 0% (based on inclusion criteria)	No. of psychiatric disorders, %: 0: 97 1: 3

Abbreviations: BL = baseline; AfrAm = African American; AI = American Indian; **depr = depression;** HS = High school; Hx = History; MH = Mental health; NA = Native American; NR = Not reported; SES = Socioeconomic status

Appendix K Table 3. Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention Type	Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depr focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
Parenting/ mother-infant attachment	Cooijmans, 2022[68]	Skin-to-skin contact with 2 home visits	Both	Home	Individual	Email or Text In-person Phone	Research Staff	No	5	NR min home visit, regular contact via text/email	Usual care
	Little, 2023[69]	Received an ergonomic infant carrier and instructions on proper use during one home visit	Both	Home	Individual	In-person	Community health worker	No	1	1 x NR min in-person home visiting session	Waitlist
Yoga	Davis, 2015[70]	Eight 75-minute group yoga sessions and video for home practice	Pregnant	Community, Home(independent)	Group, Individual (independent)	In-person Video	Fitness/exercise instructor	No	8	8 session (group) (length 75) x 8wks	Usual care
Breathing/relaxation	Ertekin Pinar, 2018[71]	Three 30-40 min home visits with breathing and muscle relaxation exercises	Pregnant	Home	Individual	In-person	Research Staff	No	8	3 x 30 min in-person home visits = 90 min over 8 wks	Usual care
Mindfulness	Hassdenteufel, 2023[72]	Electronic mindfulness-based intervention which included 8 weekly, 45min sessions	Pregnant	Virtual (self-directed)	Individual	Web	NA (self-directed)	No	8	8 x 45 min self-guided electronic sessions	Usual care
	Pan, 2019[73]	Eight 180-minute weekly plus 7-hr 1-day mindfulness training sessions plus audio recordings	Pregnant	Other, Home (independent)	Group, Individual (self-directed)	In-person	Research Staff	No	8	8 x 180 min group sessions. 1 x 420 group session	Usual care

Appendix K Table 3. Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention Type	Author, year	Brief IG description	IG span	Setting	Format(s)	Delivery	Provider(s)	IG content was depr focused	IG duration, wks	# of sessions, length of sessions (min), and duration	CG
	Zhang, 2023[74]	Nine, mindfulness-based childbirth and parenting group sessions, half-day retreat, and audio mindfulness practices	Pregnant	Other (NR), Home (independent)	Group, Individual (self-directed)	In-person & self-directed	Research staff	No	9	9 x 165 min sessions plus a half day retreat and individual, self-directed mindfulness practices	Attention control

Abbreviations: CG = Control group; Depr = Depression; HR = hour; IG = Intervention group; RCT = Randomized controlled trial; Wks = weeks

Appendix K Table 4. Detailed Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention type	Author, year	Detailed IG descr	IG Adherence	IG Acceptability	CG descr
Parenting/ mother-infant attachment	Cooijmans, 2022[68]	Pregnant women were told that the study was about infant sleep and feeding, mother-infant contact, mother-infant (mental) health, and that some women would be asked to implement a five-week daily mother-infant contact period. Interested, eligible women received detailed study information at a home visit between weeks 34–36 of gestation. During the instruction phase of the pregnancy home visit, all mothers in the intervention group were provided with detailed written and oral instructions on SSC. IG mothers were encouraged to engage in at least one uninterrupted daily hour of skin-to-skin contact (SSC) for the first five postnatal weeks (Dutch mothers are entitled to 10 to 12 weeks of paid leave after birth), starting immediately after birth. Other caregivers are allowed to provide supplementary hours of SSC to the infant. The requested uninterrupted hour requires to undress and dress the infant only once. During SSC, the naked infant, wearing only a diaper, will be placed in a stable and upright position between the breasts of the mother to facilitate and maximize SSC. The head of the infant is positioned in a slightly upright position to keep the airway open. After, the infant and mother will be covered by a blanket or cardigan. will explicitly be asked to feed their child before SSC. However, we will not discourage breastfeeding during SSC. During the oral and written instructions, we will explain safety precautions during SSC. We will emphasize the importance of being awake and alert during SSC, and of avoiding drinking hot beverages during SSC to protect the infant. During the second home visit (week 5 after birth), we will ask mothers whether they experienced problems with the safety precautions. Besides SSC, both conditions underwent the same procedures. Mother in both groups will fill out the same daily contact logbook. In the daily logbook, all mothers will be asked to register for every 15 min with simple lines the following three categories: 1) holding, 2) SSC, and 3) no contact. In this logbook, mothers are also able to discriminate between holding and SSC by the mother or other caregivers, for example the father or grandparents.	NR	NR	Care as usual. Mothers in the control condition were not requested and encouraged to provide SSC to their infant. Mothers in both groups filled out the same daily contact logbook.
	Little, 2023[69]	Participants assigned to the intervention group were provided with an ErgoBaby Omni 360 (ergonomic infant carrier) during a prenatal home visit to facilitate increased mother-infant physical contact from birth onward. The first author, who is an infant carrying educator, trained the home visiting team in carrier use to be able to support the study	79.5 % of participants in the intervention condition reported using an infant carrier in the first 6-weeks postpartum, whereas	NR	In the waitlist control group, mothers received the same infant carrier and educational

Appendix K Table 4. Detailed Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention type	Author, year	Detailed IG descr	IG Adherence	IG Acceptability	CG descr
		participants, plus participants were provided with ongoing virtual access to an instructional video to ensure proper, safe, and comfortable use of the carrier.	only 1 participant in the control condition reported using an infant carrier within the first 6-weeks postpartum. Participants in the intervention condition reported using their carriers for an average of 1.95 h per day (SD = 1.59).		training at 6-months postpartum
Yoga	Davis, 2015[70]	Participants participated in 8 consecutive 75 min weekly group yoga classes. Classes were offered one day per week and make up sessions were not available. Yoga instruction was based on the traditional Ashtanga Vinyasa system of yoga modified for pregnancy. Each class included a series of postures designed for pregnancy and included 5 minutes of introductory breathing practice, 10 min of synchronizing breath, gaze and movement, 20 min of synchronized seated postures, and 20 min of cool down and sitting. Participants received an antenatal yoga instructional video to use for home practice and were asked to record frequency and duration of yoga practice outside of classes provided in the study.	Participants attended an average of 6 out of 8 classes (SD 1.89). They reported practicing yoga for an average of 93.22 min/week (SD 38.59; range = 53.3-130.7).	The mean credibility score of the yoga intervention as a treatment for depression and anxiety was 40.95 (SD 6.42; range: 27-49) and mean satisfaction was 28.15 (SD = 3.48; range: 21-32). Both scores are indicative of high levels of credibility and satisfaction	Participants were told that there were no restrictions on seeking care for depression or anxiety outside of the study and were asked to provide information about any non-study treatment received.
Breathing/ relaxation	Ertekin Pinar, 2018[71]	At three 30-40 min home visits, participants received stress management training that consisted of information about stress, factors causing stress in pregnancy, methods of coping with stress and breathing and muscle relaxation exercises. The stress management techniques and breathing and muscle relaxation exercises were taught using demonstration and role-play techniques. Further guided practice of breathing and muscle relaxation exercises were conducted at the two followup visits.	NR	NR	Received standard care
Mindfulness	Hassdenteufel, 2023[72]	All participants randomized to the IG were granted access to a supervised eMBI, which was specifically developed for this study, available through Apple iTunes and the Google Play Store. Data submitted was carefully viewed by the study staff with the possibility to interact with the patient if necessary. The intervention consisted of 8 weekly sessions lasting 45 min involving psychoeducational and obstetrical content, mindfulness exercises, and cognitive behavioral approaches.	NR	NR	Treatment as usual (TAU) without any restrictions or regulations within the study period

Appendix K Table 4. Detailed Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention type	Author, year	Detailed IG descr	IG Adherence	IG Acceptability	CG descr
		Exemplarily, the first session addressed “Fears and worries about birth and parenting”. The psychoeducational content encompassed the occurrence of pregnancy-related stress, emergence of mental vicious circles, and individual sources of strength. Mediated skills comprised how to exit from the vicious circle of fear and the use of mindful breathing and mindful body scans. Content was delivered in the form of audio files, videos, written content, a personal skills box, and interactive worksheets. The content of the app will consist of 40 mindfulness podcasts, tailored to different stages in the pre- (second trimester) and post-partum period (6 months after birth). The podcasts will also be available for women to listen to on the Mater Mothers website.			
	Pan, 2019[73]	Adaptation of the Mindfulness-Based Childbirth and Parenting Program (MBCP) used the transformative experience of pregnancy, childbirth, and postpartum-related adjustments in self-awareness training. The program provided a series of 8 3-hour classes held once per week for 8 weeks and one 7-hour day of silent-meditation practice. Additionally, the participants were required to listen to program-related audio recordings at home six times a week for 30 minutes each. Summary of the program were as follows: Week (1) The history of MBCP, eating meditation, breathing meditation; Week (2) Body scan, attitudinal foundations of mindfulness, community building; Week (3) Breathing meditation, physiology of childbirth from a mind-body perspective; Weeks (4–6) Mindful movement/yoga, sitting meditation, pain meditations using ice, practicing various positions for labor with a partner or support person, 3-min breathing space meditation; (Retreat day) Body scan, yoga, sitting meditation, mindful eating, walking meditation, mindful speaking and listening around fear and happiness; Week (7) Loving-kindness meditation and psychoeducation: biological, emotional and social needs of the newborn and the needs of the postpartum family; and Week (8) Physiology of breastfeeding, mindfulness as a skill for coping with breastfeeding challenges and the postpartum period, closing graduation ceremony.	NR	NR	Participants were given conventional childbirth education: two courses on pregnancy-related physiological and psychological information and self-care skills during pregnancy and after childbirth.
	Zhang, 2023[74]	The intervention involved training in mindfulness through various meditation practices including mindful awareness of the breath, body, feelings, thoughts, and emotions; body scan meditation; a mindful movement sequence; and loving-kindness meditation. In addition, the MBCP intervention included specific exercises for coping with stress, pain, and fear	Course attendance was higher in the CG than in MBCP (87.6% vs. 68.1% attended 4 or more sessions, p=0.002), but no	The program evaluation results showed that more than half the expectant mothers thought the programs	The 9-week Antenatal Childbirth Education and Support (ACES) course was

Appendix K Table 4. Detailed Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention type	Author, year	Detailed IG descr	IG Adherence	IG Acceptability	CG descr
		associated with pregnancy, childbirth, and early parenting. A focus was on shifting participants' relationships with negative thoughts and emotions. The intervention consisted of 9 weekly sessions of 2¾ h, a half-day retreat delivered prenatally, and a postnatal reunion session. Participants were invited to practice mindfulness meditation at home for 30 to 45 min each day using audio recordings of 5 to 30 min for formal mindfulness practices or to practice mindful movement or informal daily mindfulness practices without audio recordings. Two trained MBCP instructors were responsible for co-leading a total of seven MBCP groups, involving up to 18 pairs (i.e., pregnant women and their partners) per group.	statistically significant differences at baseline were found between those who attended at least 4 sessions and those who did not in both groups. The mean number of lessons attended by the participants of MBCP and the CG was 6.0 (standard deviation (SD)=3.8) and 7.8 (SD=3.1), respectively.	to be interesting (64.9% in CG vs. 55.9% in MBCP), helpful (87.8% vs. 74.6%), and well organized (82.4% vs. 74.6%). The majority of them would recommend the program to others (88.9% vs. 82.8%).	designed as a psychosocial placebo comparable to MBCP in terms of program structure, instructor contact hours, content regarding pregnancy and childbirth, class activities, and homework assignments of similar nature and duration. Participants were invited to do 30 to 45 min of homework assignments. The homework assignments included a pregnancy diary, a dietary record for 3 days and sharing with the support person, walking, pelvic foor exercises, birthing position exercise, breastfeeding beneft review, planning/shopping for birth, and breastfeeding-related materials. ACES aimed to enhance the well-being of pregnant women by means other than the

Appendix K Table 4. Detailed Intervention Characteristics for Complementary RCTs, by Intervention Type

Intervention type	Author, year	Detailed IG descr	IG Adherence	IG Acceptability	CG descr
					mindfulness components. Three health professionals with pregnancy-related clinical experience and experience facilitating educational group sessions delivered seven ACES groups of up to 18 pairs of participants.

Abbreviations: CG = Control group; Descr = Description; IG = Intervention group; NR = Not reported; RCT = Randomized controlled trial; SD = Standard deviation; SSC = Skin-to-skin contact

Appendix K Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Complementary RCTs, by Author

Intervention type	Author, year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Parent-infant attachment	Little, 2023[69]	EPDS >9	IG1	All participants	p06	3/41 (7.3)	5/37 (13.5)	0.54 (0.14 to 2.11)
Mindfulness	Pan, 2019[73]	EPDS ≥13	IG1	All Participants	g36	15/51 (29.4)	11/45 (24.4)	1.20 (0.62 to 2.34)

Abbreviations: CG = Control group; CI = Confidence Interval; Dep Prev = Depression Prevention; EPDS = Edinburgh Postnatal Depression Scale; g = Gestation week; IG = Intervention group; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative Risk;

Appendix K Table 6. Depression Symptom Score Outcomes for Complementary RCTs, by Author

Intervention type	Author, year	Outcome Desc	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG Mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean diff in chg (95% CI)
Parent-infant attachment	Cooijmans, 2022[68]	EPDS	All Participants	p05	56	4.9 (3.8)	4.4 (3.7)	60	4.7 (3.9)	4.3 (3.7)	-0.47 (3.72)	-0.3 (3.79)	-0.14 (-1.51 to 1.23)
				p12	56	4.9 (3.8)	4.7 (4.0)	60	4.7 (3.9)	5.5 (4.8)	-0.14 (3.86)	-0.78 (4.42)	-0.92 (-2.44 to 0.60)
				p52	56	4.9 (3.8)	4.1 (3.9)	60	4.7 (3.9)	4.9 (3.9)	-0.79 (3.86)	-0.26 (3.90)	-1.05 (-2.46 to 0.36)
	Little, 2023[69]	EPDS	All participant	p06	41	NR	2.0 (3.5)	37	NR	3.7 (4.8)	NR	NR	Study reported Beta: -0.54 (95% CI: -1.05 to -0.02)
Yoga	Davis, 2015[70]	EPDS	All Participants	g25	19	10.1 (4.5)	8.5 (4.9)	18	10.6 (5.1)	8.8 (6.0)	-1.66 (4.67)	-1.7 (5.62)	0.13 (-3.19 to 3.45)
				g29	20	10.1 (4.5)	6.3 (4.0)	19	10.6 (5.1)	7.3 (5.1)	-3.78 (4.24)	-3.2 (5.10)	-0.53 (-3.47 to 2.41)
Breathing /relaxation	Ertekin Pinar, 2018[71]	BDI	All Participants	g22	103	8.1 (6.8)	6.4 (5.7)	99	9.0 (6.3)	7.9 (6.1)	-1.69 (6.30)	-1.0 (6.24)	-0.62 (-2.35 to 1.11)
Mindfulness	Hassdenteufel, 2023[72]	EPDS	All participant	p22	142	11.8 (NR)	7.8 (NR)	174	11.7 (NR)	9.8 (NR)	-4.00 (NR)	-1.80 (NR)	Study reported pvalue: 0.086
	Pan, 2019[73]	EPDS	All Participants	g29	51	9.8 (0.6)*	NR (NR)	45	9.0 (0.7)*	NR (NR)	NR (NR)	NR (NR)	-2.56 (-3.98 to -1.15)
				g36	51	9.8 (0.6)*	NR (NR)	45	9.0 (0.7)*	NR (NR)	NR (NR)	NR (NR)	-2.53 (-4.37 to -0.70)
	Zhang, 2023[74]	EPDS	All Participants	p26	55	6.9 (3.9)	5.8 (4.4)	66	6.9 (3.9)	7.2 (4.1)	-1.00 (4.20)	0.20 (4.00)	-1.30 (95% CI: -2.80 to 0.20)†
		CESD	All Participants	p08	57	9.4 (6.8)	10.1 (8.3)	73	10.2 (6.8)	13.1 (7.7)	0.80 (7.60)	3.00 (7.20)	-3.00 (95% CI: -5.80 to -0.20)†
				p26	55	9.4 (6.8)	9.4 (7.4)	66	10.2 (6.8)	12.5 (7.3)	0.00 (7.20)	2.40 (7.00)	-3.10 (95% CI: -5.70 to -0.50)†

*Mean (SE)
†Mean Difference

Abbreviations: BDI = Beck Depression Inventory BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; g = Gestation week IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation; SE = Standard Error

Appendix K Table 7. Other Continuous Outcomes for Complementary RCTs, by Outcome

Outcome category	Intervention type	Author, year	Outcome Descr	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG Mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean diff in chg (95% CI)
Anxiety Score	Parent-infant attachment	Cooijmans, 2022[68]	STAI	p05	56	30.5 (7.2)	28.9 (7.5)	60	29.3 (6.1)	29.8 (8.1)	-1.58 (7.34)	-0.53 (7.30)	-2.11 (-4.77 to 0.55)
				p12	56	30.5 (7.2)	29.2 (9.0)	60	29.3 (6.1)	30.3 (7.7)	-1.31 (8.26)	-1.08 (7.03)	-2.39 (-5.17 to 0.39)
				p52	56	30.5 (7.2)	29.4 (8.8)	60	29.3 (6.1)	30.3 (8.3)	-1.07 (8.14)	-1.06 (7.42)	-2.13 (-4.96 to 0.70)
	Yoga	Davis, 2015[70]	STAI-S	g25	19	36.9 (12.2)	41.8 (15.2)	18	41.7 (10.8)	39.0 (11.4)	4.92 (13.93)	-2.7 (11.07)	7.62 (-0.52 to 15.76)
				g29	20	36.9 (12.2)	34.8 (10.7)	19	41.7 (10.8)	38.8 (13.7)	-2.07 (11.51)	-2.9 (12.49)	0.84 (-6.69 to 8.37)
			STAI-T	g25	20	45.0 (12.1)	43.4 (13.5)	18	45.4 (10.2)	42.4 (13.5)	-1.52 (12.87)	-2.9 (12.20)	1.43 (-6.57 to 9.43)
				g29	19	45.0 (12.1)	38.3 (9.9)	19	45.4 (10.2)	40.4 (10.9)	-6.61 (11.15)	-5.0 (10.56)	-1.59 (-8.50 to 5.32)
	Mindfulness	Hassdenteufel, 2023[72]	STAI	p22	142	NR	NR	174	NR	NR	NR	NR	Study reported pvalue: <0.001
		Zhang, 2023[74]	STAI	p08	57	34.5 (9.4)	35.5 (8.3)	73	35.1 (8.3)	39.8 (8.5)	1.00 (9.00)	4.80 (8.40)	-4.30 (95% CI: -7.10 to -1.40)*
				p26	55	34.5 (9.4)	34.4 (8.2)	66	35.1 (8.3)	38.9 (8.1)	0.00 (8.80)	3.80 (8.20)	-4.50 (95% CI: -7.40 to -1.70)*
Stress	Parent-infant attachment	Cooijmans, 2022[68]	The Everyday Problems List (EPL)	p05	56	15.2 (8.3)	11.4 (8.6)	60	14.3 (7.8)	10.3 (8.3)	-3.86 (8.44)	-4.0 (8.05)	0.14 (-2.86 to 3.14)
				p12	56	15.2 (8.3)	11.9 (9.9)	60	14.3 (7.8)	11.9 (9.2)	-3.28 (9.20)	-2.4 (8.59)	-0.80 (-4.04 to 2.44)
				p52	56	15.2 (8.3)	14.3 (10.5)	60	14.3 (7.8)	14.8 (11.2)	-0.98 (9.59)	-0.41 (9.92)	-1.39 (-4.94 to 2.16)
	Breathing/relaxation	Ertekin Pinar, 2018[71]	PSS	g22	103	23.8 (6.0)	23.2 (5.7)	99	25.2 (5.7)	25.1 (5.0)	-0.58 (5.85)	-0.1 (5.39)	0.41 (-1.96 to 1.14)
	Mindfulness	Pan, 2019[73]	PSS	g29	51	15.6 (6.2)	NR (NR)	45	13.7 (5.8)	NR (NR)	NR (NR)	NR (NR)	-2.82 (-4.82 to -0.77)
				g36	51	15.6 (6.2)	NR (NR)	45	13.7 (5.8)	NR (NR)	NR (NR)	NR (NR)	-2.79 (-4.94 to -0.69)

Appendix K Table 7. Other Continuous Outcomes for Complementary RCTs, by Outcome

Outcome category	Intervention type	Author, year	Outcome Descr	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG Mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean diff in chg (95% CI)
		Zhang, 2023[74]	PSS	p08	57	20.6 (6.7)	21.1 (6.0)	73	20.9 (6.4)	22.5 (6.0)	0.60 (6.40)	1.60 (6.20)	-1.40 (95% CI: -3.50 to 0.60)*
				p26	55	20.6 (6.7)	19.7 (5.9)	66	20.9 (6.4)	20.5 (6.5)	-0.80 (6.40)	-0.40 (6.40)	-0.70 (95% CI: -2.90 to 1.50)*
QoL	Mindfulness	Zhang, 2023[74]	SF-12, MCS	p08	57	49.3 (8.9)	47.3 (9.1)	73	49.6 (8.8)	44.6 (9.4)	-2.00 (9.00)	-5.00 (9.20)	2.70 (95% CI: -0.60 to 5.90)*
				p26	55	49.3 (8.9)	49.7 (8.9)	66	49.6 (8.8)	46.5 (8.9)	0.40 (8.80)	-3.00 (8.80)	3.20 (95% CI: 0.10 to 6.30)*

*Mean Difference

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Desc = Description; Diff = Difference; FU = Followup; g = Gestion week; IG = Intervention group; NR = Not reported; P = Weeks postpartum; PSS = Perceived Stress Scale; QoL = quality of life; RCT = Randomized controlled trial; SD = Standard deviation; SF-12 MCS = Mental health–related quality Of life as measured by the Mental Component Score' STAI = State-Trait Anxiety Inventory; STAI-S = State-Trait Anxiety Inventory-State; STAI-T = State-Trait Anxiety Inventory-Trait

Appendix K Table 8. Harms Outcomes for Complementary RCTs, by Author

Intervention type	Author, year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Mindfulness	Hassdenteufel, 2023[72]	Serious adverse events	IG1	All Participants	p22	0/142 (0.0)	0/174 (0.0)	1.22 (0.02 to 61.29)
	Zhang, 2023[74]	Serious adverse events	IG1	All Participants	p26	0/55 (0.0)	0/66 (0.0)	1.20 (0.02 to 59.33)

Abbreviations: CG = Control group; CI = Confidence Interval; Dep Prev = Depression Prevention; EPDS = Edinburgh Postnatal Depression Scale; g = Gestation week; IG = Intervention group; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative Risk;

Appendix L Table 1. Study and Population Characteristics for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Author, year	Quality	Country	N Rand	Brief population description	Selected for increased risk?	Depression Risk Criteria	Pregnant or postpartum at BL	Avg Wks PP or Gest at BL	Mean age (range)
Monks, 2022[75]	Fair	USA	25	Adults aged 18 to 45 years and scheduled for cesarean delivery under neuraxial anesthesia.	Unselected	(none)	Pregnant	38	32 (18 to 45)
Wisner, 2001[76]	Fair	USA	58	Pregnant women, 35 weeks' gestation or less; history of postpartum-onset MDD in the previous 5 years but no current treatment for depression	Depr Sx or Hx	History of postpartum-onset MDD	Postpartum	0	NR (21 to 45)
Wisner, 2004[77]	Fair	USA	22	Pregnant women, 35 weeks' gestation or less; history of postpartum-onset MDD in the previous 5 years but no current treatment for depression	Depr Sx or Hx	History of postpartum-onset MDD	Postpartum	0	32 (25 to 37)

Abbreviations: Avg = Average; BL = Baseline; Gest = Gestation; Hx = History; MSS = Major Depressive Disorder; PP = Postpartum; Rand = Randomized; RCT = Randomized controlled trial; Sx = Symptoms; USA = United States; Wks = weeks

Appendix L Table 2. Detailed Population Characteristics for Prophylactic Psychotropic Pharmacotherapy RCTs

Author, year	Race/Ethnicity, %	Edu, %	Employed, %	Married or cohabitating, %	Single or living alone, %	C-section, %	Primiparous, %	SES other	BL depr sx, % & Depr hx, %	Other MH
Monks, 2022[75]	White: 70 Black/AfrAm: 26 Hispanic/Latino: 4 Asian: 0 NA/AI: 0 Other: 0	NR	NR	NR	NR	100	NR	Uninsured, %: 33	BL depr sx: NR Hx of MDD: 17 Hx of PPD: 17	Any psychiatric history, %: 44
Wisner, 2001[76]	NR	NR	NR	NR	NR	NR	NR		Inclusion criteria required to have at least 1 episode of PP-onset major depression: 100	NR
Wisner, 2004[77]	White: 100 Black/AfrAm: 0 Hispanic/Latino: 0 Asian: 0 NA/AI: 0 Other: 0	NR	NR	100	NR	NR	NR	All women were of middle to high SES	Inclusion criteria At least 1 episode fitting the DSM-IV criteria for postpartum onset major depression: 100	NR

Abbreviations: AfrAm = African American; AI = American Indian; Edu = Education; Hx = History; MDD = Major depressive disorder; MH = Mental health; NA = Native American; NR = Not reported; PP = Postpartum; PPD = Postpartum depression; SES = Socioeconomic status

Appendix L Table 3. Intervention Characteristics for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Author, year	IG Allocation	IG type	Brief IG description	Setting	IG span	Provider(s)	PC team involved	Daily Dose	Drug Duration	CG
Monks, 2022[75]	IG1	ketamine	One time subcutaneous injection 0.5 mg/kg ketamine and 40 min IV saline	In-hospital post delivery	Pregnant	Anesthesiologist	No	0.5 mg/kg	0.14	Placebo
	IG2	ketamine	One time, 40 min IV ketamine (40 ml) and subcutaneous injection 0.5 mg/kg saline	In-hospital post delivery	Pregnant	Anesthesiologist	No	40ml	0.14	Placebo
Wisner, 2001[76]	IG1	nortriptyline	Oral nortriptyline 20-75mg/day for 20 wks	In-hospital post delivery OB-GYN	Postpartum	Nurse Psychiatrist Research Staff	No	20-75mg/day	20	Placebo
Wisner, 2004[77]	IG1	sertraline	Oral sertraline (25 to 75 mg/day) for 20 wks	In-hospital post delivery	Postpartum	Physician Psychiatrist	No	25-75mg/day	20	Placebo

Abbreviations: CG = Control group; IG = Intervention group; PC = Primary care; RCT = Randomized controlled trial

Appendix L Table 4. Detailed Intervention Characteristics for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
Monks, 2022[75]	IG1	All participants received spinal anesthesia with 1.6 – 1.8 ml of 0.75% hyperbaric bupivacaine, 15 mcg of fentanyl and 100 mcg of preservative free morphine. Participants in each arm of the study received a subcutaneous (SC) injection (approximately 0.5–1.0 ml) and a 40-min intravenous (IV) infusion (40 ml) of study injectates shortly after delivery of their baby. The injectates consisted of either 0.9% sodium chloride (saline) or 0.5 mg/kg of ketamine depending on their group allocation. One group received SC ketamine and IV saline (SC group); one group received SC saline and IV ketamine (IV group); and one group received SC saline and IV saline (Placebo group).	100%	We found no evidence of intolerability of ketamine.	All participants received spinal anesthesia with 1.6 – 1.8 ml of 0.75% hyperbaric bupivacaine, 15 mcg of fentanyl and 100 mcg of preservative free morphine. Received subcutaneous injection saline and IV saline
	IG2	All participants received spinal anesthesia with 1.6 – 1.8 ml of 0.75% hyperbaric bupivacaine, 15 mcg of fentanyl and 100 mcg of preservative free morphine. Participants in each arm of the study received a subcutaneous (SC) injection (approximately 0.5–1.0 ml) and a 40-min intravenous (IV) infusion (40 ml) of study injectates shortly after delivery of their baby. The injectates consisted of either 0.9% sodium chloride (saline) or 0.5 mg/kg of ketamine depending on their group allocation. One group received SC ketamine and IV saline (SC group); one group received SC saline and IV ketamine (IV group); and one group received SC saline and IV saline (Placebo group).	100%	We found no evidence of intolerability of ketamine.	All participants received spinal anesthesia with 1.6 – 1.8 ml of 0.75% hyperbaric bupivacaine, 15 mcg of fentanyl and 100 mcg of preservative free morphine. Received subcutaneous injection saline and IV saline
Wisner, 2001[76]	IG1	Women were given Nortriptyline in the maternity hospital in order to achieve dosing as soon as possible after birth. The initial dose was 20 mg/day and was increased daily as follows: 30, 40, 50, 50, 60, and 70 mg/day, and continued at 75 mg/day through day 21. The serum drug levels from day 14 was used to determine the dose from day 22 forward. A nonblinded medical monitor used the serum drug levels and side effects data to adjust the dosage so that Nortriptyline level was 50-150 ng/mL, with the optimal dose defined as 80-120 ng/mL. At week 17, the dose was tapered at a rate of 33% per week across 3 weeks and treatment was discontinued at week 20.	5 subjects were defined as noncompliant (serum level <50 ng/mL)	NR	Placebo
Wisner, 2004[77]	IG1	Women were given Sertraline in the maternity hospital in order to achieve dosing as soon as possible after birth. The initial dose was 50 mg/day, however that was reduced to 25 mg/day for 4 days due to reported side effects. Thereafter, the dose was increased to 50 mg/day through week 4, then to 75	The women were compliant as evidenced by the ranges of maternal serum levels	NR	Placebo

Appendix L Table 4. Detailed Intervention Characteristics for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Author, year	IG	Detailed IG description	IG Adherence	IG Acceptability	CG description
		mg/day during weeks 5-17. At week 17, the dose was tapered across 3 weeks and treatment was discontinued at week 20.	measured at 8 weeks of collection.		

Abbreviations: CG = Control group; IG = Intervention group; NR = Not reported; RCT = Randomized controlled trial; SD = Standard deviation; SC = Subcutaneous

Appendix L Table 5. Depression Incidence, Prevalence, or Cut-Off Outcomes for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Author, year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Wisner, 2001[76]	Depression recurrence (instrument NOS)	IG1	All Participants	p17	6/26 (23.1)	6/25 (24.0)	0.96 (0.36 to 2.59)
Wisner, 2004[77]	Depression recurrence (instrument NOS)	IG1	All Participants	p17	1/14 (7.1)	4/8 (50.0)	0.14 (0.02 to 1.07)
	Depression recurrence (instrument NOS)	IG1	All Participants	p20	3/14 (21.4)	4/8 (50.0)	0.43 (0.13 to 1.45)

Abbreviations: CG = Control group; CI = Confidence Interval; IG = Intervention group; NOS = Not otherwise specified; P = Weeks postpartum; RCT = Randomized controlled trial; RR = Relative Risk

Appendix L Table 6. Depression Symptom Score Outcomes for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Author, year	Outcome Desc	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in chg (95% CI)
Monks, 2022[75]	EPDS	All Participants (IG1)	p06	8	6.3 (6.3)	5.4 (6.3)	7	8.3 (4.7)	8.6 (5.4)	-0.84 (6.28)	0.29 (5.10)	-1.13 (-6.98 to 4.72)
	EPDS	All Participants (IG2)	p06	8	5.0 (4.8)	4.8 (3.2)	7	8.3 (4.7)	8.6 (5.4)	-0.22 (4.22)	0.29 (5.10)	-0.51 (-5.22 to 4.20)

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Depr = Depression; Desc = Description; Diff = Difference; EPDS = Edinburgh Postnatal Depression Scale; FU = Followup; IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation; Sx = Symptoms

Appendix L Table 7. Other Continuous Outcomes for Prophylactic Psychotropic Pharmacotherapy RCTs, by Outcome

Outcome	Author, year	Outcome Description	Group	Timepoint	IG n analyzed	IG mean score at BL (SD)	IG mean score at FU (SD)	CG n analyzed	CG mean score at BL (SD)	CG mean score at FU (SD)	IG mean chg (SD)	CG mean chg (SD)	Mean Diff in chg (95% CI)
Anxiety score	Monks, 2022[75]	GAD-7	All Participants (IG1)	p06	8	6.1 (8.2)	5.2 (7.6)	7	7.3 (2.9)	6.0 (3.2)	-0.92 (7.93)	-1.33 (3.06)	0.41 (-5.86 to 6.68)
			All Participants (IG2)	p06	8	6.3 (5.6)	3.9 (2.9)	7	7.3 (2.9)	6.0 (3.2)	-2.31 (4.81)	-1.33 (3.06)	-0.98 (-5.13 to 3.17)

Abbreviations: BL = Baseline; CG = Control group; Chg = Change; CI = Confidence Interval; Diff = Difference; FU = Followup; GAD-7 = Generalized Anxiety Disorder 7-item; IG = Intervention group; P = Weeks postpartum; RCT = Randomized controlled trial; SD = Standard deviation

Appendix L Table 8. Harms Outcomes for Prophylactic Psychotropic Pharmacotherapy RCTs, by Author

Outcome	Author, year	Outcome Description	IG Allocation	Participant Group	Timepoint	IG n/N (%)	CG n/N (%)	RR (95% CI)
Adverse event	Monks, 2022[75]	Self-reported AE*	IG1	All Participants	p06	6/8 (75)	7/7 (100)	0.77 (0.49 to 1.20)
			IG2	All Participants	p06	6/8 (75)	7/7 (100)	0.77 (0.49 to 1.20)
Serious AE	Monks, 2022[75]	Severe adverse effects (instrument NR)	IG1	All Participants	p06	0/8 (0.0)	0/7 (0.0)	0.89 (0.02 to 39.83)
			IG2	All Participants	p06	0/8 (0.0)	0/7 (0.0)	0.89 (0.02 to 39.83)
Withdrawals due to AE	Wisner, 2001[76]	Withdrawal due to adverse effects (instrument NR)	IG1	All Participants	p20	1/28 (3.6)	1/28 (3.6)	1.00 (0.07 to 15.21)
	Wisner, 2004[77]	Withdrawal due to adverse effects (instrument NR)	IG1	All Participants	p20	3/14 (21.4)	0/8 (0.0)	4.20 (0.24 to 72.29)
Conversion to mania	Wisner, 2001[76]	Conversion to mania (instrument NR)	IG1	All Participants	p20	1/28 (3.6)	0/28 (0.0)	3.00 (0.13 to 70.64)
	Wisner, 2004[77]	Conversion to mania per SADS	IG1	All Participants	p20	1/14 (7.1)	0/8 (0.0)	1.80 (0.08 to 39.64)
Other Harms outcomes	Wisner, 2001[76]	Constipation per AsbergSE	IG1	All Participants	p20	20/26 (78.0)	5/25 (22.0)	3.85 (1.71 to 8.66)
	Wisner, 2004[77]	Dizziness per AsbergSE	IG1	All Participants	p20	8/14 (57.1)	1/8 (12.5)	4.57 (0.69 to 30.22)
		Drowsiness per AsbergSE	IG1	All Participants	p20	14/14 (100.0)	4/8 (50.0)	1.93 (1.00 to 3.74)

*Includes nausea, vomiting, shivering, sedation, blurred vision, diplopia, dizziness, anxiety, pruritis, and euphoria, amnesia, hallucinations, or nystagmus

Abbreviations: AE = Adverse effects; CG = Control group; CI = Confidence Interval; IG = Intervention group; NR = Not reported; P = Weeks postpartum; RCT = Randomized controlled trial

Appendix M Table 1. Interventions to Prevent Perinatal Depression: Implementation Table

Intervention type	**Counseling**
Primary Population	Perinatal women (pregnant and up to one year postpartum) at increased risk for PND including those with subclinical depressive symptoms not meeting criteria for clinical depression, history of depression, or low SES)
Primary Outcomes Measured	Depression status and depression symptoms
Study Findings	Reduction in postpartum depression status and symptoms Depression status: RR 0.83 (95% CI, 0.72 to 0.95] Depression score change: SMD -0.35 (95% CI -0.57 to -0.12)
Behavior change goals and techniques	CBT, IPT
Duration of interventions	4 weeks to 70 weeks
Settings of trials	13 IGs sessions delivered in the OB-GYN office or other medical setting, six interventions delivered at home, 2 solely virtual, 2 at least one session in hospital
To whom is the intervention targeted	Perinatal women (pregnant and up to one year postpartum) at increased risk for PND
Mode and intensity of delivery	Most interventions with benefit were group-based interventions. Group and individual CBT, IPT sessions spanning pregnancy only or pregnancy and postpartum periods with 4 to 20 contact episodes occurring in group, individual sessions, or both
Example interventions	Mother and Babies Program, REACH Program, Rose Program
Materials provided for practice	Mother and Babies Program: https://www.mothersandbabiesprogram.org/ ROSE program: https://www.womenandinfants.org/rose-program-postpartum-depression
Evidence of effect modification	More effective in trials of increased risk women
Comparison group	Usual care including access to routine prenatal care and prenatal education classes
Interventionist and training requirement	psychologists, psychiatrists, licensed social workers, or other mental health providers
Reported adherence	Variably defined: Generally, the average number of sessions attended were at least half of what was planned by the interventions (50%-80% range out of total number of contacts 4-20 contacts)

Abbreviations: CBT = cognitive behavior therapy; CI = confidence interval; IG = intervention group; IPT = interpersonal Therapy; OB-GYN = Obstetrics and gynaecology; PND = perinatal depression; RR = relative risk; SES = socioeconomic status; SMD = standardized mean difference

Appendix N Table 1. Studies That Have Investigated the Ability of Screening Tools Used During Prenatal or Early Postpartum Period to Predict Subsequent Development of Postpartum Depression

Author, year	N	Predictor (cut-off score)	Type	Baseline Timepoint	Outcome (cut-off score) or interview	Outcome Time Points	Summary of Results
Padilla 2020[78]	N=1783 US Academic center (FL)	Healthy Start Screen (HSS) (scale 1-10) >6	Self-administered	Pregnancy, anytime	EPDS>=12	Postpartum visit, timing not specified (typically 4-6 weeks)	• Women who answered specific HSS questions affirmatively (feeling down, depressed or hopeless, feeling alone when facing problems, to having ever received mental health services, or to having any trouble paying bills) were more likely to have an EPDS score greater than or equal to 12. • Of all HSS items, only one item ("felt down, depressed, or hopeless") had a c-statistic with a lower bound 95% CI above 0.6, • An overall HSS score >6 had a PPV of 19% and a weak c-statistic (0.59).
Khanlari 2019[79]	N=53,032 population based Australian cohort (2 health districts	EPDS 10-12 or >=13	Self-administered	Pregnancy, 'first visit' with midwife, timing not specified	EPDS >=13	postpartum, within first 6 weeks after delivery	• Women with antenatal EPDS >10 to 12 more likely to experience probable PPD compared with women scoring 9 or less. (aOR 4.5 95% CI 3.4–5.9, P < 0.001) • Women with antenatal EPDS ≥13 more likely to have PPD (aOR 13.0 (10.3 to 16.5).
Alves 2018[80]	N=140 Portuguese cohort	PDPR-R, prenatal version, 4.5	Self-administered	Pregnancy, second trimester	SCID	Postpartum, 6-9 months postpartum	For PDPI-R prenatal version cut off 4.5: • AUC 0.803 (95 % CI, 0.597 to 1.000). • Predictive value compared to the SCID gold standard for PPD was sensitivity 83.3%, specificity 85.8%, PPV 20.8 and NPV 99.1%
Marin-Morales 2018[81]	N=209 Spanish cohort	BDI-II, continuous	Self-administered	Postpartum 24 hours after delivery	BDI-II, continuous	Postpartum, 4 months after delivery	Pearson correlation coefficient was 0.54 between BDI-II at 24 hours post partum and 4 months postpartum
Suri 2017[82]	N=343 US Academic Centers Pregnant women with hx of MDD	HDRS	Clinician administered	Pregnancy, third trimester	SCID	Postpartum at 4, 8, 12 and 24 weeks after delivery	• For pregnant, euthymic women, third trimester total HDRS scores significantly predicted postpartum depression (p<0.001). • Scores on 3 HDRS items alone (work activities, early insomnia and suicidality) significantly predicted postpartum depression. o In multiple logistic regression model, none of the other HDRS items significantly improved prediction.

Appendix N Table 1. Studies That Have Investigated the Ability of Screening Tools Used During Prenatal or Early Postpartum Period to Predict Subsequent Development of Postpartum Depression

Author, year	N	Predictor (cut-off score)	Type	Baseline Timepoint	Outcome (cut-off score) or interview	Outcome Time Points	Summary of Results
Miller 2017[83]	N=526 US Midwestern Academic center cohort	Daily Experiences Questionnaire (DEQ)	Self-report	Postpartum, 3 days after delivery	DEQ	Postpartum, 2 weeks and 12 weeks after delivery	• Both positive and negative affect predicted postpartum depressive symptoms at two and twelve weeks, over and above previous traumatic experiences and history of depression. • At 12 weeks postpartum, lower levels of positive affect after birth (t=−2.58, β=−.16, p<.05), higher levels of negative affect after birth (t=5.10, β=.32, p<.001), and higher levels of past trauma (t=2.02, β=.12, p<.05) were significant predictors of depressive symptoms (R2=.22). • Recent history of depression was not a significant predictor of depressive symptoms (p>.05).

Appendix N Table 2. Summary of Systematic Reviews of Individual Risk Factors for PND/PPD

Author year	Search dates	K	N	Design	Outcome	Authors conclusions
Biaggi 2015[84]	2003-2015	97	NR	Qualitative SR	Antenatal depression or anxiety	Risk factors associated with antenatal depression or anxiety were lack of partner or of social support; history of abuse or of domestic violence; personal history of mental illness; unplanned or unwanted pregnancy; adverse events in life and high perceived stress; present/past pregnancy complications; and pregnancy loss.
Hutchens 2020[85]	1996-2016	21	NR	Umbrella SR review	PPD Not defined	25 statistically significant risk factors. The 2 strongest risk factors for PPD were prenatal depression and current abuse. The most common risk factors identified were high life stress, lack of social support, current or past abuse, prenatal depression, and marital or partner dissatisfaction.
Liu 2020[86]	1968-2020	27	133,313	MA	PPD based on EPDS thresholds	The risk factors associated with postpartum depression: gestational diabetes mellitus (OR = 2.71, 95%CI 1.78–4.14, I2 = 0.0%), depression during pregnancy (OR = 2.40, 95%CI 1.96–2.93, I2 = 96.7%), pregnant women give birth to boys (OR = 1.62; 95%CI 1.28–2.05; I2 = 0.0%), history of depression during pregnancy (OR = 4.82, 95%CI 1.32–17.54, I2 = 74.9%), history of depression (OR = 3.09, 95%CI 1.62–5.93, I2 = 86.5%) and epidural anesthesia during delivery (OR = .81, 95%CI .13–4.87, I2 = 90.1%
Yang 2022[87]	2009-2021	31	79,043	MA	PND	Risk factors correlated with PND were educational level (P=0.0001, odds ratio [OR]: 1.40, 95% CI: [1.18,1.67]), economic status of families (P=0.0001, OR: 1.69, 95%CI: [1.29,2.22]), history of mental illness (P<0.00001, OR: 0.29, 95% CI: [0.18, 0.47]), domestic violence (P<0.00001, OR: 0.24, 95% CI: [0.17,0.34]), perinatal smoking or drinking (P=0.005, OR: 0.63; 95% CI [0.45, 0.87]; P=0.008, OR: 0.43, 95% CI, [0.23 to 0.80]; respectively), and multiparity (P=0.0003, OR: 0.74, 95% CI: [0.63, 0.87]).
Zhao 2020[88]	1968-2019	48	NR	SR of cohorts, MAs, SRs	PPD	Based on SR of others' MAs, risk factors identified were: violence experiences (k=32, OR 2.04), IPV (k=7, RR 1.43), DV (k=16, OR 3.1) , violence (k=6, OR 3.47) immigration status (k=22, OR 2.10), gestational diabetes (k=18, RR 1.59), cesarean section(k=32, RR 1.22), vitamin D deficiency (k=9, OR 3.67), obese and overweight (k=23, OR 1.09), post-partum anemia (k=10 RR 1.89) and other risk factors without pooled estimates: depression history (k=21, no OR pooled), lack of social support (k=27), life stress (k=16), marital relationship (k=14), SES (k=8), self-esteem (k=6), unplanned pregnancy (k=6), prenatal anxiety (k=4), marital status (k=3), childcare stress (k=7), infant temperament (k=10).

Appendix N Table 3. Five Studies of Externally Validated Risk Tools Developed Through Machine Learning

Author year	Design	Country	N	Validation	Outcome	Variables	AUROC	Sens	Spec	PPV	NPV	Comments
Amit 2021[89]	Retrospective cohort	UK	266,544 Primip first live birth 2000-2017 EHR data	Temporal and geographic validation	Diagnosis depression, new treatment w AD, non-pharm treatment for depression at **1 year postpartum** Prevalence of depression was 13.4% in this cohort	Full EHR model with 69 variables. Some of these variables included: AD prescriptions before and during pregnancy, age, smoking, abdominal pain, previous depression and anxiety, race, number of tests, number of diagnoses, ethnicity, BMI, poverty/ deprivation index, number drug prescriptions.	EHR alone 0.72 0.844(EHR +EPDS)	0.764	0.80	--	--	On a subgroup of patients (N = 223,681) without recorded history of mental illness (including depression, psychoses, personality disorders or antidepressant prescriptions), the EHR-based prediction achieved AUC of 0.67.
Zhang 2021[90]	Retrospective cohort	USA	Two NYC EHR datasets: 15, 197 (2015-2018) for development set and 53, 972 for validation set (2004-2017) All pregnant women with live birth	Geographic validation	Med codes, AD within 1 year **postpartum**	32 variables in the model: Anxiety history, other disorder history, antidepressants, mood disorder history, depression in pregnancy, anxiety in pregnancy, mental disorder in pregnancy, palpitations, diarrhea, vomiting in pregnancy, hypertensive disorder, acute pharyngitis, hemorrhage in early pregnancy antepartum, white, threatened	0.886	0.80	0.84	.26	.98	Best model uses elements of mental health history, medical comorbidity, obstetric complications, medication prescription orders, and patient demographic characteristics. The best model AUCs were 0.937 (95% CI 0.912 - 0.962) and 0.886 (95% CI 0.879-0.893) in the development and validation datasets, respectively. The model performs

Appendix N Table 3. Five Studies of Externally Validated Risk Tools Developed Through Machine Learning

Author year	Design	Country	N	Validation	Outcome	Variables	AUROC	Sens	Spec	PPV	NPV	Comments
						miscarriage, abdominal pain, migraine, beta blocking agents, antihistamines for systemic use, hypothyroidism, placental infarct, single (vs. married), deliveries by cesarean, direct acting antivirals, primigravida, pre-eclampsia, other antibacterials, emergency department visits, abnormality of organs and/or soft tissues of pelvis affecting pregnancy, diastolic blood pressure in third trimester, false labor a labor at or after 37 weeks (reduced risk), Asian race (reduced risk)						consistently when data used from multiple time periods during pregnancy and at delivery.
Hochman 2020[91]	Retrospective cohort	Israel	Total N=214,359 (2008-2015) Nationwide cohort of Israel's largest HMO Singleton live birth	Temporal validation	ICD 10 codes, new rx for AD at **1 year post partum** In birth cohort, 1.9% had new onset PPD	The distribution of the top 20 impactful PPD predictor features: maternal age at childbirth, ethnicity, socioeconomic status, pregestational CCI score, pregestational BMI, smoking,	0.712	0.349	0.905	0.014	0.985	Authors conjecture that since PPD typically underdiagnosed, ICD 10 likely captures moderate to severe cases of PPD however use of AD prescriptions lessens the outcome specificity

Appendix N Table 3. Five Studies of Externally Validated Risk Tools Developed Through Machine Learning

Author year	Design	Country	N	Validation	Outcome	Variables	AUROC	Sens	Spec	PPV	NPV	Comments
			Training set (2008-2014) n=185,029 Validation set (1/2015 to 12/2015) N=29,330			pregestational psychiatric disorder, pre-gestational depressive disorders, albumin, hematocrit, gestational related number of previous live births, adjusted clinical group score at 3rd trimester, hemoglobin, hemoglobin (number of gestational tests), hematocrit (week of 1st gestational test), creatinine, white blood cells (at 3rd trimester), ferritin, gestational age at birth, birthweight						as ADs are used for other conditions.
Park 2021[92]		USA	Total N=573, 634 Medicaid database 2014-2018 Split model 2014-2017 (5: 3: 2 ratio for train, validate, test)		ICD 9/10 or AD prescription **60 days postpartum**	Demographic Clinical Obstetric Health care utilization	0.722	0.615	--	--	--	Cohort included racial diversity with 314 903 White and 217 899 Black pregnant women.
Payne 2020[93]		USA	Four Prospectively collected US academic center cohorts N=285		EPDS>=13 at **4-6 weeks postpartum**	Psychosocial Biological epigenetic biomarkers in the TTC9B and HP1BP3 genes	0.84	--	--	--	--	

Appendix O Table 1. Ongoing Studies

Trial Identifier	Study Name	Country	N	Aim	Relevant Outcome(s)	Status 2023
NCT04069091	Implementation of Prevention and Intervention of Maternal Perinatal Depression to Strengthen Maternal and Child Health (IMPRINT)	Finland	1000	To test an existing evidence-based, low-intensity pregnancy intervention targeting maternal perinatal depression (online CBT-based therapy) in a cluster-randomized trial. To evaluate the short- and long-term efficacy of the intervention in women who report clinically relevant, subthreshold or more severe symptoms in an early pregnancy depression screen; to study biological, psychological and social determinants of depressive symptom severity, comorbidities and response to interventions.	Depressive symptoms (EPDS); child developmental milestones	Study completion December 2027
NCT06049433	Prevention of Perinatal Depression Among At-risk Individuals Through Integration of a Multimedia, Web-based Intervention Within the Healthcare System	US	120	The team will evaluate the implementation feasibility and acceptability of a remote-access and on-demand MBCT PND prevention intervention among diverse populations that is integrated within maternal clinical care settings using an existing patient portal.	Depressive symptoms (EPDS)	Study completion September 2025
NCT05345834	The DC Mother-Infant Behavioral Wellness Program	US	700	To examine the effectiveness of patient navigation with culturally adapted cognitive-behavioral interventions and peer support groups for low-income Black/of African Descent pregnant women who are experiencing stress, anxiety, and/or depression.	Change in stress (PSS); depression symptoms (EPDS); anxiety symptoms (GAD-7)	Study completion August 2024
NCT04846504	Accelerating Implementation of Mindful Mood Balance for Moms (MMB4Moms)	US	423	The Mindful Mood Balance for Moms (MMBFM) study examines whether using an internet program called Mindful Mood Balance for Moms to deliver Mindfulness Based Cognitive Therapy (MBCT) over an 8-week time period, is effective for reducing depression symptoms among pregnant women with a history of prior depression, and studies the effects of	Depressive symptoms (PHQ-9); anxiety symptoms (GAD-7); change in perceived stress (PSS); physical and	Study completion September 2023

Appendix O Table 1. Ongoing Studies

Trial Identifier	Study Name	Country	N	Aim	Relevant Outcome(s)	Status 2023
				implementation strategies on the reach of the MMB4M program.	mental functioning (SF-12)	
NCT04914299	Positive Intelligence - Prospective Study Evaluating a Novel Mobile App Based Preventive Behavioral Intervention for Perinatal Mood Disorders	US	400	To investigate whether a novel mobile App-based behavioral intervention in pregnant women can: (1) prevent and/or decrease the incidence of perinatal mood disorders (2) decrease the severity and/or duration of perinatal mood disorders in affected participants (3) increase access of pregnant women to behavioral intervention and support tools (4) increase the satisfaction of pregnant women with their prenatal care.	Depression symptoms (EPDS, PHQ); anxiety symptoms (GAD);	Study completion July 2022
NCT05832424	Feasibility and Acceptability of a Telehealth Intervention Among Women With Perinatal Depression/Anxiety and Substance Use Risk	US	30	To evaluate the effectiveness of a telehealth approach to increase access to services and reduce depression/anxiety symptoms and risk of substance use in a population of women with perinatal depression/anxiety and elevated substance use risk	Depression symptoms (EPDS); anxiety symptoms (GAD-7)	Study completion January 2025
NCT04838210	Elevating Voices, Addressing Depression, Toxic Stress and Equity in Group Prenatal Care (EleVATE GC)	US	390	This study will provide high-quality, representative data on the capacity of Elevating Voices, Addressing Depression, Toxic Stress and Equity in Group Prenatal Care (EleVATE GC) to reduce perinatal depression, preterm birth, and low birthweight in African-American women.	Major depression (based on EPDS score); perceived stress (PSS); anxiety symptoms (PROMIS); PTSD; social support	Study completion June 2025

Appendix O Table 1. Ongoing Studies

Trial Identifier	Study Name	Country	N	Aim	Relevant Outcome(s)	Status 2023
NCT06117397	A Text Messaging Intervention to Reduce Perinatal Depression Risk (Perinatal TMI)	US	40	To conduct preliminary testing of a text messaging intervention that will reduce the risk of a major depressive episode and worsening depressive symptoms in perinatal individuals.	Depression symptoms (EPDS); diagnosis of a major depressive episode (CAT-MH);	Study completion April 2025
NCT03970057	MoodUP in Improving Psychological Outcomes Among Perinatal Women	Singapore	364	To determine if an internet-based CBT (MoodUP) significantly lower scores for stress, anxiety, and depressive symptoms among perinatal individuals.	Perceived stress (DASS-21); anxiety symptoms (DASS-21); depression symptoms (DASS-21)	Study completion December 2023
NCT05595486	Baby2Home (B2H) Mobile Health Application	US	640	Baby2Home is a digital health intervention designed to bridge the resultant gaps in obstetrics and pediatrics healthcare services for new families over the first year of life. This randomized controlled trial will evaluate whether, compared to usual care, Baby2Home 1) improves maternal, paternal, and infant health service utilization outcomes over the first year postpartum, 2) improves maternal and paternal patient reported outcomes, and 3) reduces racial/ethnic and income-based disparities in preventive health services utilization and parental patient reported outcomes.	Depressive symptoms (PHQ-9); healthcare utilization; perceived stress (PSS); anxiety symptoms (GAD); QOL (PROMIS Global Health Scale)	Study completion March 2025
NCT05700760	The ROSE Scale-up Study: Informing a Decision About ROSE as Universal Postpartum Depression Prevention	US	2320	To determine the effectiveness of ROSE among general populations of women, including women screening negative for PPD risk. This project will assess ROSE effectiveness across PPD risk levels and across prevention approaches in a sample of 2,320 women from a large regional health system (based in Detroit, MI).	Major depressive episode (SCID); functioning (SF-12);	Study completion December 2027

Appendix O Table 1. Ongoing Studies

Trial Identifier	Study Name	Country	N	Aim	Relevant Outcome(s)	Status 2023
NCT05552053	Resources, Inspiration, Support and Empowerment (RISE) for Black Pregnant Women (RISE)	US	150	To determine whether a culturally relevant mobile Health (mHealth) intervention is effective in improving outcomes among Black pregnant women randomized to the intervention compared to a control group.	Depression symptoms (EPDS); anxiety symptoms (OASIS); PTSD symptoms;	Study completion June 2025

Abbreviations: CAT-MH = Computer adaptive tests – mental health; CBT = Cognitive Behavioral Therapy; DASS = Depression Anxiety Scales; DSM = Diagnostic and statistical manual of mental disorders; GAD-7 = Generalized Anxiety Disorder 7-item; EPDS = Edinburgh Postnatal Depression Scale; MBCT = Mindfulness based cognitive therapy; PHQ = Patient Health Questionnaire; PND = Perinatal depression; PPD = Postpartum depression; PSS = Perceived Stress Scale; PTSD = Post traumatic stress disorder; SCID = Structured Clinical Interview

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