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REVIEW

WILEY ADAA ANXIETY AND DEPRESSION ASSOCIATION OF AMERICA

The effect of perinatal depression treatment for mothers on parenting and child development: A systematic review

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Antenatal and postpartum depression are very common and have significant consequences for mothers and their children. This review examines which antenatal depression (AD) and postpartum depression (PPD) treatment interventions are most efficacious in improving parenting and/or child development. CINAHL, Scopus, Cochrane Systematic Reviews, Cochrane Controlled Trials, Medline (OVID), Embase (OVID), PsychINFO, PsycARTICLES, AMED, and reference lists were searched. Randomized controlled trials (RCTs) and quasi-experimental studies assessing the effect of AD, PPD, or both treatment interventions on parenting and/or child development were included. Meta-analysis was conducted using random effects when possible. Thirty-six trials (within 40 articles) met criteria for review. Interventions include interpersonal psychotherapy (IPT), cognitive behavioural therapy (CBT), peer support, maternal-child interaction guidance, and other interventions, such as massage. For AD, IPT, CBT, and massage produced large effects on parenting (e.g. adjustment and attention toward infant) and child development (e.g. behaviour). For PPD, maternal-child interaction guidance and psychotherapeutic group support produced large effects on parenting (e.g. sense of competence) and child development (e.g. cortisol). However, meta-analysis revealed nonsignificant effects of IPT on maternal-child attachment and CBT on parenting stress. Promising findings exist for IPT, CBT, maternal-child interaction guidance, massage, and psychotherapeutic group support for specific parenting and/or child development outcomes. Additional RCTs using measures already employed in the literature are required to conduct necessary meta-analysis and fully elucidate treatment effects.

1 | INTRODUCTION

Both antenatal and postpartum depression (PPD) are common problems among childbearing women. Antenatal depression (AD) affects 7–12% of women and PPD affects 10–15% of women, or more in low-income populations (Campbell & Cohn, 1997; Muñoz et al., 2007; Murray, Cooper, & Goodyear, 2003) and ethnic minority groups (Robinson, Benzies, Cairns, Fung, & Tough, 2016). Both AD and PPD have significant consequences for mothers and their children.

AD is thought to disrupt the normal maternal neurocognitive changes that occur during early and late pregnancy that prepare

Abbreviations: AD, antenatal depression; AD-SUS, Adult Service Use Schedule; AQS, Attachment Q-Set; ASQ, Ages and Stages Questionnaire; BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; BMI, Body-mass Index; BSID, Bayley Scales of Infant Development; BSQ, Behaviour Screening Questionnaire; C-TRF, Caregiver-Teacher Report Form; CBCL, Child Behavior Checklist; CBQ, Child Behaviour Questionnaire; CBT, Cognitive Behavioural Therapy; CCSC, Child-Care Stress Checklist; CES-D, Center for Epidemiological Studies Depression Scale; DASS, Depression Anxiety Stress Scales; DMC, Dyadic Mutuality Code; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition; ECBI, Eyeberg Child Behaviour Inventory; EAS, Emotional Availability Scales; EPDS, Edinburgh Postnatal Depression Scale; GAD-7, Generalized Anxiety Disorder Scale; GAS, Global Assessment Scale; HAZ, Height for age Z score; HRSD, Hamilton Rating Scale for Depression; I, intervention group; C, control group; IBQ, Infant Behaviour Questionnaire; ICD-10, International Classification of Diseases-10th edition; ICQ, Infant Characteristics Questionnaire; IDD, Inventory to Diagnose Depression; IPT, Interpersonal Psychotherapy; ITSEA, Infant Toddler-Social and Emotional Assessment; MAI, Maternal Attachment Inventory; MABI, Mother's Assessment of the Behaviour of Infant; MAMA, Maternal Adjustment and Maternal Attitudes Questionnaire; MDI, Mental Development Index; MINI 5.0.0, MINI-International Neuropsychiatric Interview; MPA, Maternal Postnatal Attachment Scale; NA, Not Available; NBAS, Neonatal Behavioural Assessment Scale; NCAST, Nursing Child Assessment Satellite Training; NPI, Neonatal Perception Inventory; NSGD, No significant group differences; PAQ, Postpartum Adjustment Questionnaire; PBCL, Preschool Behavior Checklist; PCERA, Parent-Child Early Relational Assessment; POMS, Profile of Mood States; PPAQ, Postpartum Adjustment Questionnaire; PPD, postpartum depression; PPVT-R, Peabody Picture Vocabulary Test, Dutch version; PSBQ, Preschool Social Behavior Questionnaire; PSCS, Parenting Sense of Competence Scale; PSI, Parenting Stress Index; PSI-SF, Parenting Stress Index Short Form; RCT, randomized controlled trial; SAS-SR, Social Adjustment Scale; SCAS, Spence Children's Anxiety Sclae; SDQ, Strengths and Difficulties Questionnaire; SF-12, Short Form 12 Health Survey; SPS, Social Provisions Scale; SCID, Structured Clinical Interview for DSM-IV; WASAS, Work and Social Adjustment Scale; WAZ, Weight-for-age Z score; WPPSI-R, Wechsler Preschool and Primary Scales of Intelligence-Revised

mothers to respond appropriately to infant cues. As such, AD has been linked to a reduction in mothers' attentional bias toward infant distress (Pearson, Lightman, & Evans, 2011), which may lead to reduced sensitivity toward infants' emotional facial expressions that connote distress. These conditions predict poor mother–child interaction quality, and ultimately insecure infant attachment (Pearson, Cooper, Penton-Voak, Lightman, & Evans, 2010). The developing fetus is also affected by exposure to persistently heighted maternal neuroendocrine responses (Giesbrecht et al., 2011), which may explain poor child development outcomes observed across cognitive, language, behavioural, mental, and physical health domains (Glover, 2014; 2015). Specifically, AD has been associated with various developmental problems such as a slower, gradual, or delayed cry and lower IQ in infants and an increased risk of depression and behavioral problems (Bergman, Sarkar, O'Connor, Modi, & Glover, 2007; Deave, Heron, Evans, & Emond, 2008; Hay, Pawlby, Waters, Perra, & Sharp, 2010; O'Connor, Monk, & Fitelson, 2014; Pearson et al., 2010; Warnock, Bakeman, Shearer, Misri, & Oberlander, 2009) in preschool and school-age children and adolescents.

PPD also has significant consequences for the mother–child relationship, security of infant attachment (McMahon, Barnett, Kowalenko, & Tennant, 2006; Stewart & Vigod, 2016; Trapolini, Ungerer, & McMahon, 2007) and various developmental outcomes in children, such as social, motor, intellectual, cognitive, and even immunological development (Cooper & Murray, 1997; Field, 2010; Goodman & Gotlib, 1999; Luoma et al., 2001; L Murray & Cooper, 2003; Thompson & Fox, 2010). PPD has been found to have a negative, moderate to large effect on the quality of maternal-child interactions, as an indicator of the quality of parenting (Beck, 1995; Field, 2010; Letourneau et al., 2012; Letourneau, Watson, Duffett-Leger, Hegadoren, & Tryphonopoulos, 2011). PPD reduces mothers' enjoyment in the maternal role and often leads to negative perceptions of normal infant behavior or detached caregiving (Barr, 2008; Beck, 1996). Depressed mothers often fail to respond appropriately to infant cues, alleviated infant stress, and engage in joint activities, resulting in less positive feedback and a decreased likelihood of meeting their infants' needs (Cooper & Murray, 1997; Feldman, 2007). With preschoolers, mothers with PPD were less likely to engage in play behaviours, be nurturing and positive during face-to-face interactions, talk with their child, limit television/video watching, have regular daily routines, engage in safety practices such as turning down water heaters or using seat belts and were more likely to engage in harsh punishment and (Field, 2010). These maternal behaviours are linked to insecure attachment in infants and lower self-esteem and developmental outcomes in children (Casey et al., 2004; Martins & Gaffan, 2000; Murray, Fearon, & Cooper, 2015). Even following their mothers' recovery, children are still at risk for the development of additional behavioral problems and delayed development of self-regulatory strategies leading to more negative reactions to stress, poor academic performance, and fewer social competencies (Hay et al., 2001; Hay et al., 2010; Murray & Cooper, 1999).

Although AD may have a stronger impact on unresponsiveness in mother–child interaction than PPD (Flykt, Kanninen, Sinkkonen, & Punamäki, 2010), as relationship styles appear to be formed early and persist (Thompson & Fox, 2010), PPD has been suggested to lead to poor child developmental outcomes by decreasing mother–child interaction quality (Cooper, De Pascalis, Woolgar, Romaniuk, & Murray, 2015; Field, 2010; Letourneau et al., 2012; Logsdon, Wisner, & Pinto-Foltz, 2006). However, AD predicts PPD and the two are strongly correlated, thus, it may be difficult to disentangle unique influences of either AD or PPD on parenting or child development (Verreault et al., 2014). Due to the significant consequences of AD and PPD for both parenting and child development, it is essential to evaluate the effectiveness of interventions designed to address these problems.

Given the high prevalence rates of AD and PPD and the serious consequences for the mother–child relationship and child development, efficacious treatment interventions are required that consider more than just reducing symptoms of depression (Letourneau et al., 2012). Reviews of the literature support both early detection of AD and PPD as well as comprehensive interventions that include a focus on the mother–child relationship and child development in addition to the mother's depression (Field, 2010; Tsivos, Calam, Sanders, & Wittkowski, 2014). However, despite the frequently reported associations among maternal depression, parenting, and childhood developmental problems, few systematic reviews to date have attempted to assess what treatments intervene successfully with both AD and PPD, focused on parenting and child outcomes. Many reviews have focused on investigating both biological and nonbiological interventions aimed at treating solely depression (Cuijpers, Brännmark, & van Straten, 2008; Dennis, 2005; Dennis & Stewart, 2004; Dennis & Creedy, 2004; Leis, Mendelson, Tandon, & Perry, 2009). The purpose of this systematic review is, thus, to examine which treatment interventions of various types for AD, PPD, or both are most efficacious in improving both parenting and child development, regardless of impact on symptoms of AD or PPD. This review is written on the basis of the work of Tsivos et al. (2014) and Field (2010). Specifically, this review includes more recent trials; a focus on AD, PPD, or both (perinatal); includes effect sizes and meta-analysis where possible as well as multiple categories of interventions (both biological and nonbiological); and multiple child development and parenting outcomes, thus providing a more complete and comprehensive review of perinatal depression treatment interventions that focus on parenting and child development outcomes.

2 | METHODS

This review follows the methodology recommended by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009) and the Cochrane Collaboration (Higgins & Green, 2011) to define the question and develop the search strategy, inclusion/exclusion criteria, data collection method, risk of bias assessment, and the analysis, synthesis, presentation, and interpretation of data.

2.1 | Search strategy

First, we searched the literature for recent systematic reviews of randomized controlled trials or quasi-experimental studies on the effect

of treating AD and PPD on parenting and child outcomes. If the inclusion criteria were in agreement with, or were broader than, the inclusion criteria defined for the specific objectives of the current literature review, we reviewed each of the original references and compared them against the inclusion criteria for the current review.

We developed a search strategy to examine electronic databases for randomized controlled trial (RCT) and quasi-experimental studies evaluating the efficacy of AD, PPD, or both (perinatal) treatment interventions. Generic subject headings and keywords were used with procedures for Medline and PsychINFO as gold standard. Search terms from previous reviews were adopted and revised (Poobalan et al., 2007; Tsivos et al., 2014). We searched the following databases: CINAHL, Scopus, Cochrane Systematic Reviews, Cochrane Controlled Trials, Medline (OVID); Embase (OVID), PsychINFO, PsycARTICLES, and AMED. No language, publication date, or publication status limits were applied to the searches.

2.2 | Study selection

When trial terms, depression terms, and parenting terms were combined, there were 5,543 abstracts that were identified, retrieved, and reviewed. Two reviewers independently screened the output of the search to identify potentially eligible studies based on the inclusion criteria. See Figure 1 for PRISMA (Moher et al., 2009) Flow Diagram.

2.3 | Eligibility criteria

Study eligibility criteria were designed according to the PICOS (participants, interventions, comparisons, outcomes, and study design) criteria as suggested by PRISMA (Moher et al., 2009) checklist. For inclusion, trials needed to satisfy the following criteria.

P: Participants include women defined as depressed in the antenatal or postpartum period (i.e., within the first year). Depression must be measured by a valid assessment tool (e.g. Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky, 1987)) or been diagnosed by a physician and could range from mild to severe symptoms.

I: All types of treatment interventions for women diagnosed with AD or PPD (e.g. interpersonal psychotherapy, cognitive behavioral therapy, peer support, or maternal-child interaction guidance).

C: Studies must include a comparator treatment, whether another intervention group, treatment as usual, or a control group.

O: Inclusion of parenting and/or child development and health outcomes (e.g. cognitive, language, behavioral, mental, and physical health domains).

S: Studies must be primary randomized controlled trials or quasi-experimental studies. Only studies in English and French were accepted. Studies were excluded if they reported nonrandomized interventions, interventions only for maternity blues or maternal psychosis, preventive interventions for participants identified to be "at risk" during the antenatal or postpartum period, or measured outcomes in children older than 5 years.

2.4 | Data extraction and types of outcomes/data items

Two reviewers used a standard data form to independently extract relevant characteristics of the participants, interventions, and outcomes of each study. A third reviewer checked the data and disagreements were resolved through consensus. In the case of duplicate publications and companion papers of a primary study, we maximized the yield of information by simultaneously evaluating and including all available data. See Table 1 for specific outcomes targeted.

2.5 | Risk of bias and quality assessment

The quality of each paper was assessed independently by two reviewers using the Cochrane collaboration's risk of bias tool for randomized control trials (Higgins & Green, 2011). Any disagreements about risk of bias were resolved by a third reviewer through discussion. See Table 2 and 3 for risks assessed. The risks were assessed as low risk of bias (score of 0), high risk of bias (score of 2), or unclear risk of bias (score of 1). For each assessed risk, the reviewers provided a statement, description, or direct quotation to support their judgment. A summary assessment of risk was made across all the risks, which informed the interpretation of plausible bias then the summary risk of bias. Scores were tallied to provide a summative score for each paper. For the purposes of this review and comparing bias scores, a score less than 6 was considered low risk of bias, a score of 6 was considered moderate risk of bias, and a score greater than 6 was considered high risk of bias.

2.6 | Data synthesis

For most of the outcomes, combination of results using meta-analysis was inappropriate owing to the heterogeneity of interventions and outcome measurements. However, comparisons across studies were made, direction of effect size were discussed and meta-analysis using a random effects modelling of standardized mean differences (SMD) occurred where possible (Table 5). The results are summarized according to the AD or PPD treatment strategy evaluated.

3 | RESULTS

In total, 36 trials, described within 40 studies (i.e., some trials had follow-up studies by different authors, while others had two different authors report on the same trial), evaluated the effect of treatment for AD and/or PPD on parenting and/or child development. Study characteristics are described below and in Table 4. Findings are organized according to treatment modality.

3.1 | Study characteristics

The studies examined included over 5,000 women combined from Australia, United States, Canada, United Kingdom, and the Netherlands. All of the studies utilized a convenience sample, in which the samples were recruited from referrals from health professionals, via media

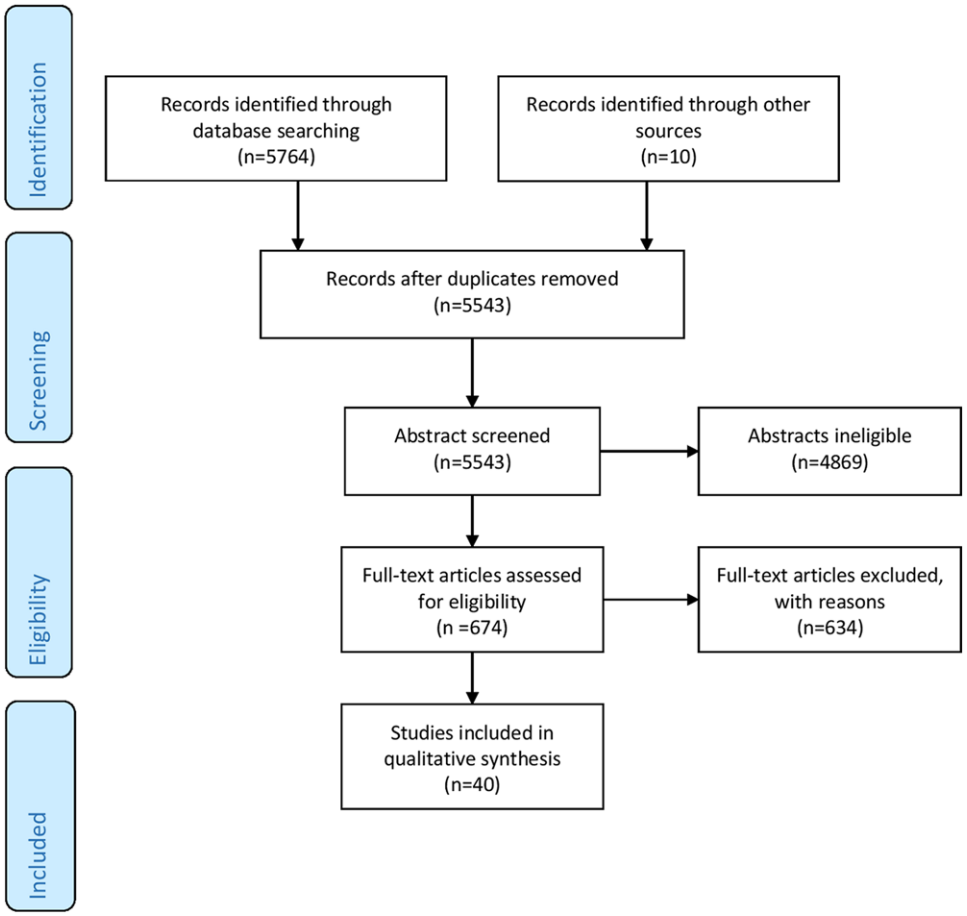

FIGURE 1 PRISMA 2009 Flow Diagram From: Moher D, Liberati A, Tetzlaff J, Altman DG, the PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. Plos Med 6(6):e1000097

TABLE 1 Relevant data extraction information

Outcomes of Interest	Specific Data to be Collected
Parenting	Mother–child interaction or relationship (including responsiveness, sensitivity, and warmth), maternal attachment style, mother–child attachment, maternal attitudes and adjustment, maternal perceptions of infant behavior, maternal self-esteem, maternal loneliness, maternal responsiveness and/or sensitivity, maternal intrusiveness, parenting confidence and competence, and parenting stress including biological stress assessment
Child Development	Infant and child behavior (including emotionality and socio-emotional functioning), infant and child development (cognitive, motor, intellectual, attachment security, socio-emotional functioning, self-esteem, ego-resilience, and prosocial behavior) and child health (cortisol)

TABLE 2 Risks of Bias assessed

Type of Risk of Bias	Definition
Selection	Random sequence generation and allocation concealment
Performance	Blinding of participants and personnel
Detection	Blinding of outcome assessors
Attrition	Incomplete outcome data
Reporting	Selective reporting of the outcome, subgroups or analysis
Other	Any important concerns about other possible sources of bias such as funding source, adequacy of statistical methods used, type of analysis, baseline between group imbalance in important prognostic factors

TABLE 3 Risk of Bias (PPD) (Low = 0, Unclear = 1, High = 2)

Author (Year)	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Risk of Bias Score
Period Treatment Provided: Postpartum							
Bilszta et al. (2012)	Low	High	High	Low	Low	Low	4
Cicchetti et al. (2000)	Low	High	High	High	Low	Low	6
Clark et al. (2003)	High	High	High	Low	Low	Low	6
Dennis (2003)	Low	Low	Low	Low	Low	Low	0
Hart et al. (1998)	Low	High	High	Low	Low	Low	4
Horowitz et al. (2001)	Low	High	High	Low	Low	Low	4
Horowitz et al. (2013)	Low	High	Unclear	Low	Low	Low	3
Kersten-Alvarez et al. (2010)	Low	Low	High	Low	Low	Low	2
Letourneau, Stewart et al. (2011)	Low	Low	Low	Low	Low	Low	0
Tryphonopoulos (in review)	Low	Low	Low	High	Low	Low	2
Meager and Milgrom (1996)	Low	High	High	High	Low	Low	6
Misri et al. (2006)	Low	Low	High	High	Low	Low	4
Morrell et al. (2009)	Low	High	High	High	Low	Low	6
Mulcahy et al. (2010)	Low	High	High	Low	Low	Low	4
Murray et al. (2003)	Low	High	High	High	Low	Low	6
O'Hara et al. (2000)	Low	Unclear	High	High	Low	Low	5
Onozawa et al. (2001)	Low	High	High	Low	Low	Low	4
Reay et al. (2012)	Low	High	High	High	Low	Low	6
Sharp et al. (2010)	Low	High	High	High	Low	Low	6
Toth et al. (2006)	Low	High	High	High	Low	Low	6
Tsivos et al. (2014)	Low	Low	Low	Low	Low	Low	0
Van Doesum et al. (2008)	Low	Low	High	Low	Low	Low	2
Verduyn et al. (2003)	Low	Low	Low	Low	Low	Low	0
Wan et al. (2011)	Low	High	High	Unclear	Low	Low	5
Milgrom et al. (2015)	Low	High	Low	High	Low	Low	4
Ammerman et al. (2015)	Low	Low	Low	High	Low	Low	2
Puckering et al. (2010)	Low	High	High	High	Low	Low	6
O'Mahen et al. (2014)	Low	Low	High	High	Low	Low	4
Period Treatment Provided: Antenatal							
Spinelli et al. (2013)	Low	High	High	Low	Low	Low	4
Spinelli and Endicott (2003)	Low	High	High	High	Low	Low	6
Pearson et al. (2013)	Low	High	High	High	Low	Low	6
Field et al. (2009)	Low	High	High	High	Low	Low	6
Milgrom et al. (2015)	Low	Low	Low	Low	Low	Low	0
Milgrom et al. (2011)	Low	High	High	High	Low	Low	6
Netsi et al. (2015)	Low	High	High	High	High	High	10
Period Treatment Provided: Perinatal							
Perry et al. (2011)	Low	High	High	High	High	Low	8
Forman et al. (2007)	Low	High	Low	High	Low	Low	4
Goodman et al. (2015)	Low	High	High	High	Low	Low	6
Maselko et al. (2015)	Low	Low	Low	Low	High	Low	2

TABLE 4 Characteristics of Studies on Effects of Treating Postpartum Depression on Parenting and Child Development

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Interpersonal Psychotherapy								
Period Treatment Provided: Postnatal								
O'Hara et al. (2000)	RCT - Group allocation based on random numbers table - Stratification by history of MDD - Intent-to-treat	120 US women Multi-stage community screening identified using the IDD, SCID, and HRSD I = 60 mothers2 C = 60 mothers	Twelve 60-minute individual IPT sessions by trained therapists during 12-week period in standard fashion according to manual guidelines	PPD:HRSD by interview and BDI self-report; Mother-child Relationship: SAS-SR and PPAQ	4, 8, and 12 weeks	+,+	Significant group differences found favoring IPT group for relationship with children older than 2 years ($p<0.05$) and children other than the baby ($p = 0.005$) but no significant group difference in relationship with new baby ($p = 0.13$).	Homogenous sample; Clinical interviewers were not blinded to group allocation
Clark et al. (2003)	Quasi-experimental	39 US women with major depression, screened by phone, identified using DSM-IV criteria I = 13 mothers I2 = 15 mothers C = 11 mothers	Two treatment groups: (1) mother-child group therapy; (2) IPT. Twelve weekly sessions, 1.5-hour for the mother-child therapy group and 1-hour for IPT, by trained therapists over a 12-week period.	PPD: BDI and CES-D; Mother-child Interaction: PCERA; Parenting Stress: PSI; Infant development: Bayley MDI	Pre- and posttreatment	+, +, – Only CESD was sig.	Significant group differences found favoring two intervention groups on child adaptability ($p = 0.036$), reinforces parent ($p<0.001$), and maternal positive affective involvement and verbalization ($p = 0.005$). Significant group differences favored control condition for factor 2 of PCERA, maternal negative affect and behavior ($p = 0.006$). No significant group differences found for infant development.	Small sample size; Non-random group allocation; Lack of intent-to-treat; Significant difference in baseline characteristics related to maternal age and severity of depressive symptoms
Mulcahy et al. (2010)	RCT - Computer randomization	57 Australian women with MDD assessed using DSM-IV criteria and HRSD score ≥14 and whose infant was <52 weeks old I = 29 mothers C = 28 mothers	Eight week sessions of manualized IPT modified for group setting held at a community centre including 2 individual sessions, 8 group sessions, and 1 2-hour evening session for partners	PPD: HRSD, EPDS, and BDI-II; Mother-child Relationship: MAI	1, 4, and 8 weeks (end of treatment) and 3 months follow-up	+, +	Women who received IPT-G ($M = 97.2$, $SD = 5.4$) had higher MAI scores than women in control group ($M = 92.3$, $SD = 10.1$; $p = 0.024$). Mean EPDS score for the IPT-G group at 3-months posttreatment was 7.7 ($SD = 4.4$) compared with 12.7 ($SD = 6.2$) for the control group ($p = 0.002$); a similar group difference was observed in mean BDI-II scores ($p = 0.000$). No significant difference in MAI scores was found between the groups at the 3-month follow-up.	Small sample size; Inexplicit randomization process; Lack of intent-to-treat

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Reay et al. (2012)	RCT (follow-up)	57 Australian women with MDD assessed using DSM-IV criteria or HRSD score ≥14 and whose infant was <52 weeks old I = 23 mothers C = 21 mothers	Eight week sessions of manualized IPT modified for group setting held at a community centre including 2 individual sessions, 8 group sessions, and 1 2-hour evening session for partners	PPD: EPDS and BDI-II; Mother-child Relationship: MAI	2 years posttreatment	+,+	No significant group difference related to the mother-child relationship was found. Mean MAI score for the IPT-G group at 2 years posttreatment was 94.2 (SD = 11.0) in comparison to 93.1 (SD = 9.8) for the control group	Small sample size; High attrition rate with the control group; 43.5% of women in the intervention group and 67% in the control group received antidepressant medication; Lack of intent-to-treat
Cicchetti et al. (2000)	RCT - Stratification by family characteristics	158 US women criteria for MDD since their child's birth and infants aged 20 months I = 43 mothers C1 = 54 mothers (depressed) C2 = 61 mothers (non-depressed)	Depressed Intervention mothers underwent toddler–parent psychotherapy sessions provided over average of 57.7 weeks, ranged from 42–79 weeks. The mean number of sessions was 45.6 (SD = 11.4)	Mother-child attachment: AQS by maternal report and Ainsworth Strange Situation Procedure; Infant development: Bayley MDI; Child development: WPPSI-R, verbal and performance subscales	Pre- and post treatment (age 20 and 36 months)		Significant group differences were found favouring the intervention group on WPPSI-R full scale IQ ($p = 0.008$) and verbal IQ ($p = 0.024$) scores, but no significant group difference in performance IQ scores ($p = 0.10$). Child cognitive functioning Child verbal IQ	Homogeneous sample; Inexplicit randomization procedures; Lack of intent-to-treat; High attrition in treatment group; Significant difference in baseline characteristics; Different measures used to assess cognitive development in children
Toth et al. (2006)	RCT (follow up)	130 Mothers with DSM-III-R criteria for MDD since their child's birth I = 66 C1 = 64 mothers (depressed) C2 = 68 mothers (non-depressed)	Depressed Intervention mothers underwent toddler–parent psychotherapy sessions provided over average of 58.19 weeks, ranged from 42–79 weeks. Mean number of intervention sessions conducted was 45.24, with range of 30–75.	Mother-child attachment: SSP	Pre- and post treatment (age 20 and 36 months)		Improved attachment relationship (secure) in infants with depressed mothers in TPP Mother-child attachment	Attrition rate; Only one intervention

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Period Treatment Provided: Perinatal								
Goodman et al. (2015)	RCT Pilot	42 mother-child dyads included. Mothers scored >9 and <20 on EPDS on two consecutive screens 1 week apart.	Perinatal Dyadic Psychotherapy (8, 1-hr home sessions over 3 months) or usual care	PPD: EPDS; DSM-IV, SCID-I, DSM-IV-TR, STAI, MSRI Parenting: PSI-SF Mother-child interaction: CIB	Pre-intervention; postintervention; 3 month follow-up	+,+	No significant differences found between groups at postintervention or follow-up on PSI-SF total scores and SIB sub-scales.	No formal power calculations; power to detect significant differences between groups on outcomes was limited, small sample size, lower than expected effect sizes.
Forman et al. (2007)	RCT	120 women with evidence of a major depressive episode during the postpartum period (assessed using IDD; SCID for DSM-IV; HDRS). Treatment began with infants approximately 6 months (M = 6.1 mo; SD = 0.7).	Twelve weeks of IPT was randomly assigned to 50% of participants, and other 50% were assigned to a waitlist control group.	PPD: BDI and HRDS Home visit mother-child interaction videos coded. Parenting: maternal responsiveness (global ratings based on Ainsworth's system) and a microscopic coding system; PSI. Infant emotionality measures:naturalisitic mother-child interactions, standard interactions, atypical reactions, maternal report (IBQ; CBQ); Attachment security: AQS; CBCL)	6 months and 9 months of age	+,– (only in relation to parenting stress)	No effect of treatment on maternal responsiveness, but parenting stress improved 3 months posttreatment for intervention group. No significant group differences for any infant emotionality measures 18 month child outcomes: Significant group differences for children of mothers enrolled in intervention showed significantly lower attachment security ($p<0.001$) and higher negative affect ($p<0.001$).	Attrition at the 18 month assessment led to loss of power. No untreated control group at follow-up. Inability to compute change scores from infancy to follow-up. Data from maternal report is both subjective/objective. Fathers were not included in design.
Period Treatment Provided: Antenatal								
Spinelli et al. (2013)	Antenatal/RCT - Stratification by site, ethnicity, and trimester of pregnancy	142 women (Hispanic, African, American, White) who met DSM-IV criteria for MDD and a min 12/17 on HDRS-17 I = 72 C = 70	Interpersonal psychotherapy for 12 weeks	PPD: HDRS-17, EPDS, and CGI; Maternal-Fetal Attachment: MFAS	0, 4, 8 and 12 weeks following group assignment	+,+ NSGD	The aggregate HDRS-17 score was significantly negatively correlated with MFAS for both treatment groups, demonstrating less depression as measured by HDRS-17 is associated with higher levels of maternal-fetal attachment (interpersonal psychotherapy p = 0.03, parenting education program p = 0.007)	Subjects and therapists are not blind to control condition Using few social workers vs MD

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Spinelli and Endicott (2003)	Antenatal/RCT Random assignment by table of random numbers	38 women (Hispanic, African, American, White) who met DSM-IV criteria for MDD and a min 12/17 on HDRS-17 I = 21 C = 17	Interpersonal psychotherapy for 16 weeks	PPD: EPDS, BDI, and HDRS-17; Recovery: CGI, HDS; Maudsley Mother-child interaction Scale (modified)	Weekly prior to treatment	+, +	Significant negative correlation between the modified score on the mother-child interaction scale and the Hamilton depression scale. ($p<0.05$)	small group size large attrition rate
Cognitive Behavioural Therapy								
Period Treatment Provided: Postnatal								
Ammerman et al. (2015)	RCT	93 depressed mothers with MDD (based on DSM-IV/SCID) I = 47 C = 46	In-Home Cognitive Behavioral Therapy (IH-CBT) or IH-CBT plus home visiting or standard home visiting (SHV)	PPD:EPDS; DSM-IV (SCID); HDRS Parenting stress: PSI-SF Nurturing/Parenting: HOME inventory Child adjustment: ASQ:SE	Pre-treatment, posttreatment and 3 months follow-up		No differences between IH-CBT and controls on parenting and child adjustment. Low levels of depression associated with decreased parenting stress and increased nurturing parenting. Improvement in depression related to changes in parenting in low-income mothers in intervention group. IH-CBT was not independently associated with these improvements.	Small sample size, no long-term follow-up, child functioning was measured by maternal report and findings may not be generalizable to mothers with higher levels of social resources
Meager and Milgrom (1996)	Pilot RCT	20 Australian women with severe and long-standing PPD which developed within 6 months were recruited by local hospitals and maternal health centres EPDS and BDI I = 10 mothers C = 10 mothers	Ten weekly 1.5 hour group sessions based on CBT conducted by a clinical psychologist. Women exchanged telephone numbers and met outside the program	PPD: EPDS, BDI, and POMS; Parenting Stress: PSI	Pre- and posttreatment	+,–	Parenting stress scores did not change over the 10 weeks for either the treatment or control group. The child domain subscale showed marginal deterioration in control group ($p = 0.05$)	Small sample size; Inexplicit randomization process; 40% of women were on antidepressant medication; High attrition rate; Possible co-intervention through provision of peer support outside group setting

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Verduyn et al. (2003)	RCT - Computer randomization - Stratification by gender of child - Intent-to-treat	119 UK mothers with major depression and child problems Screened using the BDI and BSQ Identified with DSM-IV criteria I1 = 47 mothers I2 = 44 mothers C = 28 mothers	Two treatment groups: (1) group sessions of CBT with modifications to include parent skills training conducted by 2 psychologists and 2 nurses, or (2) mother and toddler support groups led by a health visitor and psychologist. Sessions were held weekly and ran for 90 minutes over a 16-week period	PPD: BDI and HRSD; Child behavior: CBCL, ECBI, and Maternal Report and PBCL Teacher Report; Child development: Assessment of vocab., digit recall, number skills, Overall IQ	Pre- and post treatment and 6 and 12 months follow-up	+,+,+ NSGD	At all time periods, there was a significant improvement in CBCL total scores for the CBT group but not for the support or control groups. Significant improvement in ECBI problem scores for the CBT group from pre-test to 6-month and 12-month follow-up was also found.	Homogenous sample; Insufficient power to detect group differences; Uneven group sizes; High attrition rate; Child outcomes were assessed only by maternal and teacher report
Misri et al. (2006)	RCT - Computer randomization	35 Canadian women who met DSM-IV criteria Identified using the HRSD and EPDS I1 = 19 mothers I2 = 16 mothers	Two treatment groups: (1) antidepressant medication (paroxetine) plus 12 weekly, 1-hour CBT sessions delivered by a psychologist using a treatment manual, or (2) antidepressant medication	Parenting Stress: PSI, child and parent domains	Pre- and posttreatment		Statistically significant decreases in levels of parenting stress in both groups. PSI total ($p<0.05$) and parent domain ($p<0.05$) scores were lower for the 17 (73.9%) women who had not achieved remission (HRSD <7) than for the 6 (26.1%) women who had not achieved remission by the end of the trial.	Small sample size; Inexplicit randomization process; Lack of placebo control group; Lack of intent-to-treat

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Murray et al. (2003)	RCT (follow-up)	193 UK women Screened with a mailed EPDS Identified using DSM-III-R criteria I1 = 43 mothers I2 = 50 mothers I3 = 48 mothers C = 52 mothers	Three treatment groups: (1) CBT, (2) psychodynamic therapy, or (3) non-directive counselling. The interventions were provided in women's own homes on a weekly basis and conducted between the infants' ages of 8 to 18 weeks	Mother-child Interaction: Videotape, Play Responsiveness, and Sensitivity; Mother-child Attachment: SSP; Infant Behaviour: Maternal Management Checklist and BSQ;Infant development: Bayley MDI; Child Behaviour: Rutters A2 Scale, Maternal Report and PBCL Teacher Report; Child development: McCarthy Scales of Children's Abilities	4.5, 9, and 18 months and 5 years follow-up		Significant improvements were in all treatment groups for mother-child relationship problems at end of treatment and for early infant emotional/behavioral problems management, but not in control (+,+,+,-) At 18 months, women in counselling ($p = 0.001$) and psychodynamic ($p = 0.03$) groups had lower BSQ scores in comparison to the control group; a non-significant difference was found between the CBT and control groups ($p = 0.06$). No significant improvement found for infant attachment or cognitive development at 18 months or any of the child outcomes at 5 years	Homogeneous sample; Insufficient power to detect group differences between active treatments
Morrell et al. (2009)	Cluster RCT - Computer randomization - Stratification by number of expected births per year - Intent-to-treat	595 UK women identified with EPDS scores ≥12 at 6 weeks postpartum I = 404 mothers C = 191 mothers	Two treatment groups: (1) cognitive behavioural therapy, or (2) person-centered therapy (non-directive) provided weekly at home for 8 weeks by trained health visitors	PPD: EPDS and SF-12 mental component; Parenting Stress: PSI-SF, measure of adjustment to parenthood	6, 12, and 18 months	+,–	Significant group difference in mean PSI-SF scores between intervention and control groups of women with a score ≥12 at six weeks.	High attrition at 12 and 18 months

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Period Treatment Provided: Antenatal								
Netsi et al. (2015)	Pilot RCT - Randomization through central randomization service (internet/computer generated code)	36 women identified with CIS-Revised version depression criteria and were randomized to TAU or CBT plus TAU.	CBT: 12 home sessions. Control: care as usual	PPD: CIS-Revised version; EPDS Infant development: ICQ; BISQ	Baseline (16 weeks gestation), end of treatment (15 weeks post randomization), 2 months postnatal (33 weeks post randomization). ICQ: 2 months postpartum BISQ: 2 months postpartum - nocturnal sleep (7pm-7am); daytime sleep (7am-7pm); 24 hr sleep duration	+,–	Positive, but non-significant relationship between temperament and nocturnal sleep duration (95%CI). Nocturnal sleep duration and change in depression was significant (95%CI). No differences in infant outcome and maternal SSRI use or breastfeeding (p = 0.459;p = .297). Improvement in depressive symptoms in treatment group was associated with easier temperament and shorter sleep duration	Attrition in both arms of the trial. Small sample size.
Pearson et al. (2013)	RCT pilot	24 Depressed pregnant women between first and last trimester of pregnancy. Must meet depression criteria on a 3 question depression screen and criteria for ICD-10 depression using CIS-R or EPDS positive. I = 12 C = 12 51 women were in a non-depressed comparison group	CBT or usual care	PPD: CIS-R; EPDS Attentional bias for infant distress: Attentional bias reaction time paradigm	Before (on average 13 weeks gestational age) and after intervention (on average 32 weeks gestational age)	+,+	Greater reduction in depression post intervention correlated with an increase in attentional bias indices toward infant distress (p = 0.034). Negative correlation only seen in complete trial sample, not apparent in CBT group along (p = 0.800).	Small sample size, Large attrition rate between pre- and post intervention sessions

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Milgrom et al. (2015)	RCT Feasibility study and parallel two-group RCT. Variable-length permuted block randomization schedule was generated by independent individual prior to trial.	29 Australian women, aged 18 plus, less than 30 weeks gestational age and with scores ≥13 on EPDS were recruited.	"Beating the Blues Before Birth": 12 session group postnatal intervention adapted for antenatal. 8 treatment sessions, 1 hour, once per week. Partner involved in one session.	PPD: EPDS, BDI-II, BAI, Social support: SPS Infant development: ASQ-3; ASQ-SE; IBQ-R	Baseline, immediately posttreatment (for RCT: 9 weeks postrandomization, for feasibility trial: 9 weeks postrandomization) and at follow-up (RCT: 9 months, feasibility: 6 months) Infant data measured at 9 months	+,+ (greater effect in intervention group, and maintained improvement at 9 month follow-up)	23 of 25 IBQ-R subscales showed between group differences favouring the intervention group.	Small sample size, high attrition
Period Treatment Provided: Perinatal								
Perry et al. (2011)	RCT	217 Latina women who met a score of ≥16 on the CES-D and/or have a history of depression	8 weeks of group sessions led by a bilingual masters-level facilitator and three individual booster sessions during the first year postpartum	PPD: BDI-II; Mother-child attachment: MPA	6–8 weeks postpartum	+,+	Slightly higher total attachment scores following intervention than control ($p = 0.06$). Significant negative correlation between maternal depressive symptoms and attachment scores.	Maternal self-report may be subject to bias (social desirability, recall); MPA has not been validated against Strange Situation reduced generalizability given demographics
Maselko et al. (2015)	RCT follow-up	289 antenatally depressed intervention women, 295 antenatally depressed control group, 300 antenatally non-depressed. Women considered depressed met DSM-IV-TR criteria for major depression episode. Pakistani women. I – 289 C – 295 C2- 300	Thinking Healthy Programme Intervention or treatment as usual	PPD: DSM-IV, HRDS Child cognitive development: WPPSI-IV Socio-emotional development: SDQ, SCAS Child physical development: HAZ WAZ BMI for age Z score	Unclear	N/A	No differences in cognitive, socioemotional or physical outcomes across all three groups. Children born to mothers in intervention group had slightly higher SCAS score.	Methodological limitations include geographical diffusion of components of the thinking healthy programme intervention could have happened over time between community health workers, once the trial ended. (therefore, some women in the control group may have been exposed to some components of the perinatal depression intervention); reporting bias

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Peer Support								
Period Treatment Provided: Postnatal								
Dennis (2003)	Pilot RCT - Random allocation using sealed envelopes - Intent-to-treat	42 Canadian women screened by public health nurses during immunization clinic Identified using EPDS I = 20 mothers C = 22 mothers	Telephone-based support from a mother recruited from the community who previously experienced PPD and received a 4-hour training session Support individualized and based on maternal need	PPD: EPDS; Parenting Stress: CCSC	4 and 8 weeks postrandomization	+,+	No significant group difference in mean CCSC scores but a positive trend favouring the peer support group was found at 8 weeks (M = 4.95, SD = 2.68 vs. M = 6.48, SD = 3.63).	Small sample size; Insufficient power to detect group differences for child-care stress
Letourneau et al. (2011)	RCT - Random allocation using sealed envelopes	60 Canadian women with EPDS >12 and healthy infant <9 months I = 27 mothers C = 33 mothers	Home visits and telephone calls for 12 weeks by peers to provide support, including information about optimal mother-child interactions. Peers were mothers who recovered from PPD for >2 years	PPD: EPDS; Mother-child Interaction: NCAST, feeding and teaching scales: Infant development: Bayley MDI; Infant behavior: ICQ maternal report	6 and 12 weeks postrandomization	−,+	At 12 weeks, a significant difference was found in mother-child teaching interactions (p = 0.05) favouring the control group. No significant treatment effects were found for infant IQ scores. Mothers in both groups perceived their infants as less difficult over time (p<0.001). Intervention failed to improve mother-child interactions	Small sample size; Insufficient power to detect group differences related to child outcomes; Significant difference in baseline characteristics related to antidepressant use

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Period Treatment Provided: Antenatal								
Milgrom et al. (2011)	RCT Coded, double blinded variable length permuted block randomized treatment allocation schedule. (feasibility study and RCT)	143 Australian women 20–32 weeks gestational age and with scores ≥13 on EPDS and were recruited. Additional 100 women with EPDS <100 participated.	"Towards parenting" Intervention" and community networking and a self-help workbook comprising nine units. Telephone based support from women's health professionals/other community supports (telephone councilors such as psychologists, social workers, midwives or trainees) and non-clinical community supports (play groups, mother's groups, etc). Also included self-help workbooks, separate for women and their partners.	PPD: EPDS, RAC, BDI-II, DASS Parenting: PSI	Baseline (20-32 weeks gestation, pre-randomization): EPDS, RAC, Demographics; posttreatment (12 weeks postpartum): BDI-II, DASS, PSI	+,–	Significant improvement in DASS scores for anxiety and stress in treatment group ($p<0.01$ and $p<0.01$; lower levels of depression (DBI-II) posttreatment compared to control ($p<0.01$). Intervention participants scored significantly lower on PSI scores than control on the parenting domain ($p = 0.05$) and overall ($p<0.05$)	Workbook content was always delivered in conjunction with telephone support (not able to test these components effects on outcomes individually). Poor engagement of men in first version.
Maternal-Child Interaction Guidance								
Period Treatment Provided: Postnatal								
Horowitz et al. (2001)	RCT - Random allocation using sealed envelopes	117 US women Identified using the EPDS I = 60 mothers C = 57 mothers	Three home visits by a nurse and 15-minute mother-child interaction coaching sessions delivered by an advanced nurse and research assistant	PPD: BDI-II; Mother-child Responsiveness: Dyadic Mutuality Code	4-8, 10–14, and 14–18 weeks postpartum	+,+ NSGD	Significant group differences in responsiveness favouring the interaction coaching group at 10–14 weeks ($M = 9.7$ vs. $M = 8.8$; $p = 0.002$) and 14–18 weeks ($M = 9.6$ vs. $M = 8.8$; $p = 0.029$).	Homogeneous sample; Inexplicit randomization; Follow-up assessment completed by an unblinded research nurse' EPDS scores not provided at inception; Depression measures differed pre and post intervention

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Bilszta et al. (2012)	RCT - Computer randomization	74 Australian women who met DSM-IV criteria and were receiving inpatient treatment for PPD in 2 hospitals I1 = 25 mothers I2 = 26 mothers C = 23 mothers	Two treatment groups: (1) video feedback or (2) verbal-only feedback of mother-child play. Weekly 30-minute sessions were held with a trained therapist for the period the mother was admitted. Both groups received information on attachment and mother-child interaction	PPD: EPDS; Maternal attachment style: Adult Attachment Style; Parenting confidence: PSCS; Infant behavior: NPI	Pre- and posttreatment	+,+,+ NSGD	Significant improvements in parenting sense of competence were seen in the verbal ($p = 0.005$) and standard care ($p = 0.034$) groups but not the video intervention group ($p = 0.10$).	Small sample size; Inexplicit randomization; Lack of intent-to-treat; High attrition; Co-intervention as "most" were on antidepressants and received psychotherapy and mother-craft assistance' Statistical results related to attachment style not reported; Infant behaviour was assessed only by maternal report
Van Doesum et al. (2008)	RCT - Computer randomization	71 Dutch women with major depressive disorder and infant between 1–12 months Identified using DSM-IV criteria and the BDI I = 35mothers C = 36mothers	Home visits and video feedback for 3–4 months by child prevention specialist. All women received concurrent outpatient treatment for their depression by a qualified local therapist or psychiatrist. Support individualized and based on maternal need	PPD: Clinical interview and BDI; Mother-child Interaction: EAS, Early Infancy to Childhood Version for children up to 4 years, adapted version for children 0–6 months; Mother-child Attachment: AQS version 3 for children 12–48 months; Infant socioemotional functioning: ITSEA parent report	Pre- and posttreatment and 6 months follow-up	+,+ NSGD	Treatment significantly improved quality of the mother-child relationship with the greatest degree of improvement occurring for maternal sensitivity ($p<0.01$) (+,–) Children in the treatment group had significantly higher scores for attachment security ($p<0.05$) and emotional competence ($p<0.01$) than children in the control group at the 6-month follow-up.	Small sample size; Lack of intent-to-treat;Significant difference in education level between those who completed the trial and those who discontinued

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TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Kersten-Alvarez et al. (2010)	RCT (follow-up)	58 Dutch women with major depressive disorder Identified using the DSM-IV criteria and the BDI I = 29 mothers C = 29 mothers	Home visits and video feedback for 3–4 months by child prevention specialist. All women received concurrent outpatient treatment for their depression by a qualified local therapist or psychiatrist. Support individualized and based on maternal need	Quality of maternal interactive behavior: 5 scales used to create composite score for quality of interactive behavior; Maternal-child attachment Attachment Story Completion Task, adapted version for 5 year olds; Self-esteem: Puppet Interview, adapted for 5 to 7 year olds; Ego-resiliency: California Child Q-Set, Dutch version teacher ratings; Child development: PPVT-R; Child behavior: PSBQ teacher report, CBCL and C-TRF teacher report; School adjustment: Stress Response Scale teacher report	5 years postpartum		No significant group differences found. The mean score for quality of maternal interactive behaviour was -0.24 (SD = 0.26) for the intervention group and 0.24 (SD = 0.26) for the control group. The mean score for child attachment security was 13.3 (SD = 0.72) for the intervention group and 13.0 (SD = 0.72) for the control group. There were long-term effects of the intervention on child externalizing behaviour in families reporting stressful life events.	Small sample size; Significant difference between participating and non-participating women
Horowitz et al. (2013)	RCT 3 Phases	134 US mother infant dyads With EPDS score ≥10 and diagnostic interview to confirm depression status	A relationship-focused behavioral nursing intervention (CARE), to promote responsive interaction between depressed mothers and infants. One hour visits by a nurse empathic listening, focused attention and self-reflection during data collection, directions for video-recorded interaction	MIT, MIT-Brief and MIT Update; Depression: EPDS, PDSS, and SCID; Mother/Infant Interaction: NCATS	6 weeks, 3, 6, and 9 months postpartum Treatment group additional visits at 2 and 4 months postpartum.	+,+ NSGD	Significant increases in mother-child interaction in treatment and control groups and decreases in depression severity.	NCATS as sole outcome of maternal/infant interaction; Sample did not match national population of postpartum mothers; Same nurses conducted control and treatment visits

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Tsivos et al. (2014)	Pilot RCT	27 UK women with major depression. Identified using EPDS and SCID. Recruited via convenience sampling. I = 12 mothers C = 10 mothers	Participants were randomly allocated to receive either eight Baby Triple P sessions in addition to TAU or TAU only. The intervention consists of 8 individual sessions led by a trained Triple P practitioner focused on positive parenting, responding to your baby, survival skills, partner support, implementing parenting routines and maintenance and closure.	PPD: BDI-II; Mother-child Relationship: OHI, CARE Index, PBQ; Parenting Competence: WPL, BPBS-b; Intervention arm specific measures: CSQ	Pre- and posttreatment and 3-month follow up	+,+ NSGD	Women allocated to Baby Triple P showed more favorable improvements in maternal sensitivity, self-regulation, and subjective bonding the between-group differences were not significant. Maternal unresponsiveness, parenting attitudes Infant behavior (passivity, compulsivity, improved in both groups, but no significant group differences present	Small sample size; Response bias
Tryphonopoulos in review	RCT Pilot - computerized randomization	12 Mothers w/PPD diagnosis and active psychiatric treatment; and an Edinburgh PPD Scale (EPDS) cut-off score of 12	Intervention mothers received 3 video-feedback sessions during home visits, provided at 3-week intervals. Control participants received 3 home visits on the same schedule	Depression: EPDS; Mother-child Interaction Quality: NCAST, CARE-Index	Post-test data were collected 10 weeks post randomization	+,+	Overall improvement in mother-child interaction quality +,+ I group led to significantly greater improvement than C group	Outcome data not collected by 'blind' assessors; Small sample size
Other Interventions								
Period Treatment Provided: Postnatal								
Onozawa et al. (2001)	RCT	25 UK women who met EPDS score ≥ 13 at 4 weeks postpartum I = 12 mothers C = 13 mothers	Five weekly 1-hour infant massage classes and a 30-minute informal support group	PPD: EPDS; Mother-child interaction: Assessed by video recording and rated according to global rating for mother-child interactions	At last session	+,+	Significant improvement in overall mother-child interaction ($p = 0.0004$) in the massage group but not the control group	Small sample size; Inexplicit randomization process; High attrition rate with the massage group; Lack of intent-to-treat

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
O'Mahen et al. (2014)	RCT - Computer randomization	59 UK women competed study to the 6 month follow-up point. Women met DSM-IC criteria for MDD and >12 on EPDS. Women who met ICD-10 criteria for MDD were eligible. Children were 1 year or younger at study enrollment.	NetmumsHWD (12 session treatment course: core BA module, 5 sessions, and a relapse prevention session. Women also chose two optional modules from a list of possible six) or TAU	PPD: EPDS, GAD-7; WASAS; SPS; AD-SUS Postnatal bonding: PBQ	Baseline, 17 weeks posttreatment and 6 months posttreatment	+,– (EPDS, GAD-7, WASAS scores improved for intervention group)	No between group differences in postnatal self-reported bonding.	Study doesn't necessarily examine cost-effectiveness and efficacy. Also mother-child interaction was not measured as an observational assessment.
Roberts & Glover (2008)	RCT - Prospective block-controlled randomized design	Mothers scoring >12 on the Edinburgh PPD Scale (EPDS) at 4 weeks postpartum I = 31 C = 31 C2 = 34 The baseline appointment took place when the infants were 9–12 weeks old (median, 10) before the first session of the intervention	1) massage and support groups, n = 31 2) massage and non-depressed, n = 34 3) support group and non-depressed, n = 31 (6 sessions each) 34 are non-depressed control group Mothers in all groups were filmed interacting with their infant again at infant age 19 weeks (median 19)	PPD: EPDS, SSAI Child development: ICQ Mother-child interaction: Global Ratings for Mother–Infant Interactions	4 weeks postpartum, baseline (9-12 weeks, median:9), outcome (undefined time), 1 year	+,–	At one year follow-up intervention mothers showed higher levels of sensitivity than mothers in the control group.	No control group of depressed mothers with no intervention

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Milgrom et al. (2015)	RCT - Psychometric measures collected weekly for 12 weeks, with a follow-up at 24 weeks.	45 postpartum women with a DSM-IV diagnosis of depression were randomized to receive either CBT, Sertraline or both.	1)cognitive behavioural therapy (CBT) group treatment with 9 sessions for mothers alone, and three additional "couple" sessions; 2) sertraline (as prescribed by psychiatrists), or 3) a combination of both treatment modalities	PPD: EPDS; BAI; Parenting: PSI	Psychometric measures collected weekly for 12 weeks, with a follow-up at 24 weeks. The PSI was administered at Baseline, Time 1 and Time 2	+,+,+	For parenting stress, no significant results were observed. However, participants receiving CBT mono-therapy exhibited any change in the desired direction.	– sample of women may not reflect the actual population of postnatal women because those eligible included women who were willing to be randomized to any group, rather than those who had a preference. – high attrition rate in sertraline group – small sample size
Hart et al. (1998)	RCT	27 US women Identified using the CES-D I = 14 mothers C = 13 mothers	Mothers were trained on how to examine their infants at home using the Mother's Assessment of the Behaviour of Infant (MABI). Mothers were present when the Neonatal Behavioural Assessment Scale (NBAS) was administered and given information about significance of various infant behaviours	PPD: CES-D; Infant behavior: NBAS	4 weeks postpartum	,– NSGD	There were significant improvements in social interaction behaviours ($p<0.05$) and state organization ($p<0.05$) for infants of mothers who administered the MABI at home compared with the control group Both C and I showed improvements, but I group led to significantly greater improvement	Small sample size; Inexplicit randomization process; Instrument to measure outcome was same as intervention

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Sharp et al. (2010)Wan et al. (2011) (follow-up)	RCT - Computer randomization - Intent-to-treat	254 UK women who met ICD-10 criteria for major depression in the first 6 months postpartum I1 = 129 mothers I2 = 125 mothers	Two treatment groups: (1) antidepressants, or (2) non-directive counselling (listening visits) by trained health visitors, which commenced after 4 weeks for 14 weeks	PPD: EPDS, CIS-R; Maternal attitudes and adjustment: MAMA, postpartum version	4, 18, and 44 weeks after randomization	+,+ NSGD at 18 weeks	No treatment or combination of treatments was more effective for improving adjustment to parenthood. Maternal attitudes improved in all groups over time ($p<0.001$). However, the earlier start of antidepressant treatment provided a short-term advantage for improving attitudes ($p = 0.04$) and reducing stress ($p = 0.02$).	No true control group after 4 weeks; Change in study protocol before completion; High number of women in both groups received both interventions; High treatment non-compliance; Significant difference in baseline characteristics
Puckering et al. (2010)	Randomized waiting list controlled trial - Coin toss	Mothers scoring >10 on EPDS are offered non-directive counselling listening visits by health visitors Rescreened at 12–16 weeks. Mothers scoring above clinical threshold at 12–16 weeks were offered to enroll in the Mellow Babies programme. Infants all less than one year old. I = 11 C = 6	(1) Immediate intervention (Mellow Babies), group session, once a week from 10am to 3pm for 14 weeks.- mothers reflect on lives/past/present feelings and relations, consider ways of managing depression using broad cognitive behavioral approaches/assessing videos of feeding baby; (2) waiting list control	PPD: EPDS Mother-Child Interaction: Mellow Parenting observation coding scheme (1. Anticipation of the child's need; 2. Responsiveness; 3. Autonomy; 4. Cooperation; 5. Distress; 6. Control and conflict)	During baby's mealtime, and again at a time that suited participants	+,–	Greater positive interaction and less negative interaction was observed between mothers and infants who had attended the Mellow Babies group.	Small sample size and retention within the waiting list group.

(Continues)

TABLE 4 (Continued)

Study	Design of Study	Participants	Intervention	Outcome Measures	Timing of Measure	Effect on PPD	Effect on Parenting & Child Development	Limitations
Period Treatment Provided: Antenatal								
Field et al. (2009)	RCT	200 women between 16–20 weeks gestation from two ultrasound clinics (Hispanic, African-American and non-Hispanic) who met depression criteria via SCID for MDD. I – 88 C - 61	(1) Massage therapy twice per week for 12 weeks (2) Standard Treatment	Maternal Questionnaires: Sociodemographic Questionnaire, SCID, CES-D, STAI, STAXI, the Daily Hassles Scale, Sleep Disturbances Scale; saliva cortisol Newborn measures: two days following delivery: gestational age, birth weight, saliva cortisol levels and BNBAS.	16–20 weeks gestational age (GA), 32 weeks GA, 2 days post delivery	+,–	Mothers' infants from intervention group were less likely to be born prematurely, have low birthweight, had lower cortisol levels and performed better on BNBA habituation, orientation and motor scales.	30% attrition

+,+ indicates Both C and I improved PPD, but I group led to significantly greater improvement unless stated otherwise.

and community outreach programs or within the university hospitals or from outpatient clinics.

Most of the studies (28/40) reported that the majority of their sample (>50%) were Caucasian. Four studies reported a majority of their sample was Hispanic, one study reported only Pakistani women as their sample, while another study reported a more diverse ethnicity of their sample with equal numbers of Caucasian, Hispanic, and African American. Finally, six studies did not report on the ethnicity of their sample (Dennis, 2003; Letourneau, Stewart et al., 2011; Murray & Cooper, 2003; Pearson et al., 2013; Puckering, McIntosh, Hickey, & Longford, 2010; Verduyn, Barrowclough, Roberts, Tarrier, & Harrington, 2003). Mother's primary language was English in 29/40 studies. Four studies reported a bilingual or Spanish speaking sample, two studies reported a Dutch speaking sample and one study reported that their sample from Pakistan spoke Urdu. Four studies did not report the mother's primary language in their sample.

Five studies targeted low socio-economic samples and four studies included a more middle-upper class sample. The remaining 31 studies did not specifically target the socioeconomic status (SES) of their sample. In terms of marital status, 31 (out of 40) of the studies reported that a majority of the women in their sample were married or cohabitating. One study reported that a majority (87%) was not married, three studies reported that half of the women in the sample were married and half were not married and five studies failed to report the marital status of their sample.

The mean mother's age in the majority of the studies samples (26/40) was between ages 30 and 32. Some studies (8/40) reported the mean maternal age as less than 30 (between a mean age of 22 and 29 years old), while the remaining 2 studies reported a mean maternal age above 32 years old (mean age between 33 and 35 years old). Four studies did not report the mean maternal age.

Finally, 24 studies (out of 40) reported sample sizes <100, while 16 reported sample sizes >100.

3.2 | Treatment type, session length, and duration

Treatment strategies included interpersonal psychotherapy, cognitive behavioural therapy, peer support, maternal-child interaction guidance, and other diverse interventions such as infant massage, toddler parent psychotherapy, teaching mothers to recognize and respond to their infant's behaviour, and antidepressant medication combined with non-directive counselling. The session length and duration of intervention varied. The most common duration of programs was between 8–12 weeks/8–12 sessions (23/40). Some interventions occurred in less than 8 weeks, while others lasted more than 12 weeks. In addition, each session typically lasted from 60 to 90 min.

3.3 | Allocation

Most studies reported that the study samples were divided between intervention groups through a process of randomization. Thirty nine out of 40 studies used an RCT design, while one study employed a quasi-experimental design (Clark, Tluczek, & Wenzel, 2003).

3.4 | Assessments

All of the studies used standardized assessments to measure outcomes. All of the studies of women focused on parental and child outcomes such as child development, parental behaviors, and maternal-child interaction/ attachment. See Table 1 for outcomes of interest.

3.5 | Methodologic quality

A summary of the scores across all studies assessed is presented in Table 4. Majority of the studies (38/40) had a low to moderate risk of bias score of 6 or less.

3.6 | Analysis

All studies conducted appropriate analyses given their design and sample sizes. Thirteen studies reportedly employed an intention-to-treat analysis (ITT; including all participants as randomized), while 27 studies did not report ITT or conducted implicit per protocol (analyzing participants in the groups whose protocol they most closely matched) analysis.

3.7 | Treatment effects

Below are the findings, by treatment type, of the effects of treating AD and PPD on parenting and child development. See Table 4 for study details of design and limitations. See Table 5 for effect size calculations. Only large effect sizes are described below.

3.7.1 | Interpersonal psychotherapy (IPT)

Addressing AD, two trials evaluated the effect of IPT on parenting, measured by mother–child attachment or interaction quality (Spinelli & Endicott, 2003; Spinelli et al., 2013). Although there were some positive findings, group differences were not identified in either study. Addressing PPD, Four trials (plus two follow-ups) evaluated the effect of IPT on parenting and child development (Cicchetti, Rogosch, & Toth, 2000; Clark et al., 2003; Mulcahy, Reay, Wilkinson, & Owen, 2010; O'Hara, Stuart, Gorman, & Wenzel, 2000; Reay et al., 2012; Toth, Rogosch, Manly, & Cicchetti, 2006). In one trial, the efficacy of toddler–parent psychotherapy as a preventive intervention for fostering secure attachment relationships and cognitive development in the offspring of depressed mothers was evaluated (Cicchetti et al., 2000). The study focused on child development outcomes, whereas the follow-up study (Toth et al., 2006) focused on mother–child attachment relationship outcomes. In the original study (Cicchetti et al., 2000), significant group differences favoring the treatment group were observed for intelligence and verbal IQ. In the follow-up (Toth et al., 2006), significant group differences were observed favoring the intervention group in secure attachment relationships. One RCT found significant group differences and a large effect size on each of the relevant subscales of the Social Adjustment Scale-Self-Report (SAS-SR) favoring the IPT group including relationship quality with children older than 2 years and relationship with children other than the baby, while no significant group difference for relationship with a new baby was found (O'Hara et al.,

TABLE 5 Means, Standard deviations, Cohen's d and effect sizes on measures of child development and parenting in PPD interventions (all values reported as postintervention)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
Interpersonal Psychotherapy															
Period Treatment Provided: Postnatal															
O'Hara et al. (2000)	I = 60 C = 60	NA	NA	NA	NA	NA	N/A	N/A	SAS-SR	.93	2.35	0.34	0.45	1.05	0.46
									PPAQ	2.33	2.57	0.29	0.38	0.71	0.33
Clark et al. (2003)	I = 15 C = 11	BSID	NA	NA	NA	NA	NA	NA	PCERA—Parental Positive Affective Involvement and Verbalization	4.2	3.1	0.6	0.6	1.83	0.25
									PCERA—Parent Negative Affect and Behaviour	4.9	5.0	0.3	0.1	0.45	0.22
									PCERA—Parental Intrusiveness, Insensitivity and Inconsistency	4.3	3.8	0.6	0.5	0.91	0.41
									PCERA—Infant Positive Affect, Social and Communicative Competence	3.5	3.3	0.8	0.5	0.30	0.15
									PCERA—Infant Quality of Play, Interest and Attentional Skills	4.3	4.2	0.5	0.5	0.20	0.10
									PCERA—Infant Dysregulation and Irritability	4.8	4.7	0.3	0.3	0.33	0.16
									PCERA—Dyadic Mutual Enjoyment and Reciprocity	3.5	3.0	0.9	0.5	0.69	0.32
									PCERA—Dyadic Tension	4.0	3.7	0.4	0.4	0.75	0.35
									PSI-Total Child Score	100.5	114.6	16.5	15.6	0.88	0.40
									PSI—Adaptability	24.9	29.6	3.9	3.6	1.24	0.52
									PSI—Acceptability	13.1	13.2	4.6	2.9	0.03	0.01
									PSI—Demandingness	19.8	21.6	4.2	5.1	0.39	0.19
									PSI—Mood	9.5	12.4	3.0	2.8	0.99	0.44

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
									PSI—Distractibility/ Hyperactivity	23.7	18.5	5.0	9.3	0.73	0.34
									PSI—Reinforces Parent	9.5	18.5	2.6	9.3	1.42	0.58
Mulcahy et al. (2010)	I = 23 C = 27	NA	NA	NA	NA	NA	NA	NA	MAI	97.18	92.28	5.35	10.14	0.59	0.28
Reay et al. (2012)	I = 23 C = 21	NA	NA	NA	NA	NA	NA	NA	MAI	94.22	93.10	10.99	9.84	0.11	0.05
Cicchetti et al. (2000)	I = 43 C = 54	WPPSI-R - Full scale IQ	107.09	100.78	13.43	12.54	0.49	0.24	NA	NA	NA	NA	NA	NA	NA
		WPPSI-R - Performance IQ	108.67	103.75	14.49	15.67	0.33	0.16							
		WPPSI-R - Verbal IQ	104.21	97.50	14.85	12.37	0.50	0.24							
		Bayley MDI	111.12	109.48	16.68	18.73	0.09	0.05							
Toth et al. (2006)	I = 66 C = 64	NA	NA	NA	NA	NA	NA	NA	Strange Situation Attachment Classification	NA	NA	NA	NA	NA	NA
Period Treatment Provided: Perinatal															
Goodman et al. (2015)	I = 21 C = 21	NA	NA	NA	NA	NA	NA	NA	PSI-SF	73.67	64.30	18.61	15.35	0.55	0.27
									CIB—maternal sensitivity	3.69	3.95	0.59	0.55	0.09	0.05
									CIB—Infant involvement	3.20	3.34	0.69	0.78	0.06	0.03
									CIB—dyadic reciprocity	3.46	3.60	0.68	0.83	0.05	0.03
Forman et al. (2007)	I = 60 C = 60	NA	NA	NA	NA	NA	NA	NA	AQS	0.44	0.48	0.17	0.14	0.26	0.13
									Behavior: Internalizing	46.14	49.09	7.32	7.49	0.09	0.20
									Behavior: Externalizing	47.34	46.50	9.05	10.10	0.19	0.04
									CBQ: Extrav/Surgency	0.06	-0.08	0.81	0.69	0.06	0.09
									CBQ: Neg. affectivity	0.19	0.15	0.79	0.61	0.13	0.02

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
Period Treatment Provided: Antenatal															
Spinelli et al. (2013)	I = 21 C = 17	NA	NA	NA	NA	NA	NA	NA	MFAS	NA	NA	NA	NA	NA	NA
Spinelli and Endicott (2003)	I = 72 C = 70	NA	NA	NA	NA	NA	NA	NA	Maudsley Mother-child interaction Scale	NA	NA	NA	NA	NA	NA
Cognitive Behavioural Therapy															
Period Treatment Provided: Postnatal															
Ammerman et al. (2015)	I = 47 C = 46	Child Adjustment: ASQ SE	-0.08	-0.01	0.56	0.53	0.13	0.0.06	PSI-SF	73.34	79.56	23.65	18.47	0.29	0.15
									HOME inventory	34.58	31.88	5.73	6.61	0.44	0.21
Meager and Milgrom (1996)	I = 10 C = 10	NA	NA	NA	NA	NA	NA	NA	PSI—Parent domain	295.40	341.40	NA	NA	NA	NA
									PSI—Child domain	127.40	146.00	NA	NA	NA	NA
Verduyn et al. (2003)	I = 47 C = 28	Behavior screening questionnaire	10.64	10.89	2.25	2.27	0.11	0.05	NA	NA	NA	NA	NA	NA	NA
		British Ability Scales: Normal vocabulary	45.25	47.58	7.58	7.44	0.31	0.15							
		Verbal comprehension	46.85	49.70	7.56	5.71	0.41	0.20							
		Visual recognition	50.71	51.42	9.01	7.31	0.08	0.04							
		Recall of digits	51.43	56.06	9.79	7.42	0.52	0.24							
		CBCL	56.80	59.50	9.70	9.10	0.29	0.14							
		ECBI	10.80	9.80	8.00	6.80	0.14	0.07							
Misri et al. (2006)	I = 19 C = 16	NA	NA	NA	NA	NA	NA	NA	PSI–Parent domain	175.00	164.00	NA	NA	NA	NA
									PSI–Child domain	107.00	111.00	NA	NA	NA	NA
									PSI–Total stress	282.00	274.00	NA	NA	NA	NA
Murray et al. (2003)	I = 43 C = 31	BSQ	NA	NA	NA	NA	NA	NA	Maternal Sensitivity	NA	NA	NA	NA	NA	NA
		Bayley Scale	NA	NA	NA	NA	NA	NA							
		Rutter A2 Scale-	NA	NA	NA	NA	NA	NA							

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
		PBCL	NA	NA	NA	NA	NA	NA							
		McCarthy Scale	NA	NA	NA	NA	NA	NA							
Morrell et al. (2009)	I = 1310 C = 698	NA	NA	NA	NA	NA	NA	NA	PSI-SF	157.9	155.9	15.3	16.9	0.13	0.06
Period Treatment Provided: Antenatal															
Netsi et al. (2015)	I = 14 C = 11	ICQ: Difficult temperament	31.64	32.36	9.84	6.65	0.09	0.04	NA	NA	NA	NA	NA	NA	NA
		BISQ: Sleep duration overnight	6.73	7.33	2.93	1.74	0.25	0.12							
		Sleep duration during the day	4.70	7.09	2.63	3.70	0.75	0.35							
		Sleep duration over 24h period	11.43	14.42	4.19	3.39	0.79	0.36							
Pearson et al. (2013)	I = 12 C = 12	NA	NA	NA	NA	NA	NA	NA	Attentional bias task	37.80	−43.10	92.00	84.00	0.91	0.42
Milgrom et al. (2015)	I = 27 C = 27	ASQ-3							NA	NA	NA	NA	NA	NA	NA
		Communication	25.00	16.67	18.53	10.30	0.56	0.27							
		Problem solving	41.25	26.67	14.2	17.62	0.91	0.42							
		Interpersonal	28.44	26.67	16.80	9.13	0.13	0.07							
		ASQ-SE													
		Self-regulation	5.35	11.92	8.23	7.51	0.83	0.39							
		Compliance	0.62	1.15	1.71	2.19	0.27	0.13							
		Communication	0.62	2.69	1.70	3.30	0.79	0.37							
		Adaptive	5.62	6.15	6.02	6.81	0.08	0.04							
		Interactions	5.31	7.69	3.40	5.99	0.49	0.24							
		IBQ-R													
		Activity	4.28	4.04	0.74	1.09	0.26	0.13							
		Distress	3.73	4.50	1.05	1.23	0.67	0.33							
		Fear	3.24	3.47	1.22	1.44	0.17	0.09							
		Orienting	4.18	4.28	1.12	1.16	0.09	0.04							

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
		Smiling/laughing	5.31	4.78	0.88	1.31	0.48	0.23							
		High-intensity pleasure	6.52	6.09	0.35	0.67	0.80	0.37							
		Low-intensity pleasure	5.55	5.04	0.90	0.87	0.578	0.28							
		Soothability	5.63	5.25	0.71	1.00	0.44	0.21							
		Reactivity	5.33	4.13	1.06	1.18	1.07	0.47							
		Cuddliness	5.36	5.78	0.91	0.85	0.48	0.23							
		Sensitivity	4.72	3.99	1.54	1.72	0.45	0.22							
		Sadness	3.26	3.86	0.94	1.1	0.59	0.28							
		Approach	5.92	5.65	0.72	0.85	0.34	0.17							
		Vocal reactivity	5.68	5.09	0.85	1.08	0.61	0.29							
		Surgency/extraversion	5.40	4.94	0.53	0.84	0.66	0.31							
		Negative affectivity	3.22	3.93	0.73	0.95	0.84	0.39							
		Orienting/regulation	5.18	5.09	0.52	0.65	0.17	0.08							
Period Treatment Provided: Perinatal															
Perry et al. (2011)	I = NA C = NA	NA	NA	NA	NA	NA	NA	NA	MPA	67.70	65.90	5.90	6.60	NA	NA
Maselko et al. (2015)	I = 289 C = 295	WPPSI FSIQ	82.53	82.13	11.30	11.40	0.04	0.02	NA	NA	NA	NA	NA	NA	NA
		SDQ—total difficulties	11.55	11.12	5.3	5.2	0.08	0.04							
		SCAS—anxiety	22.31	20.37	14.1	13.4	0.14	0.07							
		HAZ	−0.88	−0.80	1.0	1.1	0.08	0.04							
		WAZ	−1.18	−1.12	1.2	1.1	0.05	0.03							
Peer Support															
Period Treatment Provided: Postnatal															
Dennis (2003)	I = 20 C = 22	NA	NA	NA	NA	NA	NA	NA	Child-care stress	4.95	6.48	2.68	3.63	0.48	0.23
									Maternal loneliness	20.37	23.91	5.23	6.07	0.62	0.30

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	
Letourneau, Stewart et al. (2011)	I = 27 C = 33	Infant Cortisol	2.72	2.33	1.68	1.10	0.29	0.14	NCAST Feeding Scale	57.5	59.0	8.26	7.90	0.19	0.09	
									NCAST Teaching Scale	50.4	53.6	8.13	5.76	0.46	0.22	
									Bayley MDI	97.4	100.2	12.2	13.6	0.22	0.11	
									ICQ	72.0	65.6	20.6	18.2	0.33	0.16	
									Maternal Cortisol	2.73	2.31	1.97	1.56	0.24	0.12	
Period Treatment Provided: Antenatal																
Milgrom et al. (2011)	I = 71 C = 72	NA	NA	NA	NA	NA	NA	NA	RAC	NA	NA	NA	NA	NA	NA	
									PSI	NA	NA	NA	NA	NA	NA	
Maternal-Child Interaction Guidance																
Period Treatment Provided: Postnatal																
Horowitz et al. (2001)	I = 60 C = 57	NA	NA	NA	NA	NA	NA	NA	DMC	9.55	8.80	.77	1.86	0.413	0.202	
Van Doesum et al. (2008)	I = 35 C = 36	Child responsiveness	4.26	3.18	1.48	1.74	0.67	0.32	Maternal Sensitivity		4.82	3.79	1.78	1.86	0.57	0.27
		Child Involvement							Maternal Structuring		3.12	2.71	1.09	1.06	0.38	0.19
		AQS security	3.74	2.79	1.83	1.91	0.51	0.25	Maternal Non-Intrusiveness		3.56	3.24	1.56	1.15	0.23	0.12
		Socioemotional functioning:	0.41	0.26	0.30	0.35	0.46	0.22	Maternal Non-Hostility		4.89	4.84	0.41	0.56	0.10	0.05
		Externalizing	0.60	0.57	0.39	0.30	0.09	0.04								
		Internalizing	0.45	0.39	0.23	0.16	0.30	0.15								
		Dysregulation	0.46	0.48	0.26	0.26	0.08	0.04								
		Competence	1.40	1.22	0.28	0.30	0.62	0.04								
Bilszta et al. (2012)	I = 25 C = 23	NA	NA	NA	NA	NA	NA	NA	NPI (video)	3.2	1.9	0.9	1.3	1.20	0.51	
									PSCS (video)	61.5	62.3	2.5	3.1	0.29	0.14	
									NPI (verbal)	2.4	1.9	1.1	1.3	0.42	0.20	
									PSCS (verbal)	67.3	62.3	3.1	3.1	1.61	0.63	

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
Horowitz et al. (2013)	I = 62 C = 64	NA	NA	NA	NA	NA	NA	NA	NCATS	53.16	53.71	8.3	7.0	0.07	0.04
									Responsiveness Subscale	7.44	7.03	3.1	3.1	0.13	0.07
Kersten-Alvarez et al. (2010)	I = 29 C = 29	Attachment security to mother	13.29	12.98	0.72	0.72	0.43	0.21	Quality of interactive behavior	-0.24	0.24	0.26	0.26	1.85	0.68
		Self-esteem	4.18	3.75	0.29	0.29	1.48	0.60							
		Ego-resiliency	0.43	0.34	0.06	0.06	1.50	0.60							
		Verbal intelligence	104.68	103.52	3.54	3.54	0.33	0.16							
		Prosocial behaviour	20.99	21.67	1.20	1.18	0.57	0.28							
		School adjustment	76.74	75.91	2.17	2.13	0.39	0.19							
		Mother-rated internalizing problem	53.40	49.67	2.06	2.06	1.81	0.67							
		Mother-rated externalizing problem	50.51	50.80	2.06	2.06	0.14	0.07							
Tsivos et al. (2014)	I = 12 C = 10	NA	NA	NA	NA	NA	NA	NA	CARE Index	NA	NA	NA	NA	NA	NA
									PBQ	9.50	9.75	NA	NA	NA	NA
									WPL	171.3	175	NA	NA	NA	NA
									PBS-b	65.09	61.88	NA	NA	NA	NA
Tryphonopoulos (in review)	I = 6 C = 6	NA	NA	NA	NA	NA	NA	NA	NCATS Total	61.00	53.50	4.52	4.04	1.75	0.66
									CARE Index	5.33	5.17	0.52	1.60	0.13	0.07
Other Interventions															
Period Treatment Provided: Postnatal															
Hart et al. (1998)	I = 14 C = 13	NBAS-Social	3.3	2.6	0.5	0.5	1.40	0.57	NA	NA	NA	NA	NA	NA	NA
		NBAS-Motor	3.1	2.9	0.6	0.5	0.36	0.18							
		NBAS-State organization	2.8	2.3	0.5	0.3	1.20	0.52							

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
		NBAS-State regulation	2.9	2.6	0.3	0.4	0.85	0.39							
		MABI-Social	2.9	3.0	0.4	0.5	0.22	0.11							
		MABI-Motor	3.0	2.7	0.5	0.4	0.66	0.31							
		MABI-State organization	2.2	2.5	0.4	0.6	0.59	0.28							
		MABI-State regulation	3.0	3.1	0.5	0.5	0.20	0.10							
Onozawa et al. (2001)	I = 12 C = 13	Infant Interaction: Attentive to non-attentive Lively to inert Happy to distressed	NA	NA	NA	NA	NA	NA	Maternal Interaction: Warm to cold Non-intrusive to intrusive	NA	NA	NA	NA	NA	NA
O'Mahen et al. (2014)	I = 41 C = 42	NA	NA	NA	NA	NA	NA	NA	PBQ	22.57	17.57	12.99	11.17	0.41	0.20
Roberts & Glover (2008)	I = 31 C = 31	ICQ – fussy/difficult scale	27.83	26.46	6.48	8.54	0.18	0.09	Maternal sensitivity	4.00	4.28	.57	.44	0.55	0.27
									Infant performance	2.63	2.65	.93	1.08	0.02	0.01
									Overall interaction	3.27	3.26	.7	.91	0.01	0.01
Sharp et al. (2010)	I = 129 C = 125	NA	NA	NA	NA	NA	NA	NA	MAMA	35.3	33.5	6.1	5.3	0.32	0.16
Puckering et al. (2010)	I = 11 C = 6	NA	NA	NA	NA	NA	NA	NA	Positive anticipation	22.1	8.8	19.8	5.7	0.91	0.40
									Positive autonomy	41.4	17.8	19.5	5.5	1.65	0.62
									Positive responsiveness	93.7	30.4	36.0	20.4	2.16	0.72
									Positive cooperation	5.8	2.2	10.5	3.4	0.46	0.22
									Positive distress	5.8	1.2	10.8	1.3	0.60	0.28
									Positive control	0.1	0.4	0.3	0.9	0.45	0.21
									Negative anticipation	0.6	0	1.2	0	0.71	0.32
									Negative autonomy	2.1	7.8	3.0	6.5	1.13	0.47

(Continues)

TABLE 5 (Continued)

Author	Sample Size (n)I, C	Child Development	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r	Parenting measures	Mean Tx	Mean TAU	SD Tx	SD TAU	Cohen's d	Effect size r
									Negative responsiveness	2.2	3.6	4.8	7.0	0.23	0.11
									Negative cooperation	0.2	1.8	0.6	2.5	0.88	0.39
									Negative distress	0.09	1.6	0.3	3.1	0.69	0.31
									Negative control	0	1.6	0	2.6	0.87	0.38
Wan et al. (2011)	I = 129 C = 125	NA	NA	NA	NA	NA	NA	NA	MAMA	37.47	NA	5.13	NA	NA	NA
Period Treatment Provided: Antenatal															
Field et al. (2009)	I = 88 C = 61	Cortisol levels	261.3	502.5	214.9	251.2	1.03	0.45	NA	NA	NA	NA	NA	NA	NA
		Brazelton Scales	5.7	4.6	1.4	2.3	0.58	0.27							
		Habituation	5.6	5.0	1.2	1.5	0.44	0.21							
		Orientation	5.3	4.6	.6	1.2	0.74	0.34							
		Motor	3.8	3.7	.8	1.1	0.10	0.05							
		State organization	5.4	5.9	1.2	2.8	0.23	0.11							
		State regulation	6.0	5.5	1.2	1.4	0.38	0.19							
		Autonomic stability	2.3	3.2	2.0	3.3	0.33	0.16							
		Reflexes	2.1	2.8	1.4	2.0	0.41	0.20							

Results shown at posttreatment time point, not follow-up

2000). In another trial (Clark et al., 2003), 39 women who met DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) criteria for major depression were assigned to either a waiting-list control group, a mother–child psychotherapy group, or an IPT group. Both interventions were superior to the waiting-list control condition in improving scores on the child adaptability and reinforces parent subscales of the parenting stress index (PSI), and increasing scores on the parent–child early relational assessment (PCERA) for maternal positive affective involvement and verbalization; there were no significant differences between the mother–child therapy and IPT groups. A large effect size was determined for three subscales of the PCERA as well as the total child score for the PSI and three subscales of the PSI (see Table 5). No significant differences were found for infant development among the groups. Lastly, in a different trial, group-based IPT significantly improved mothers' perceptions of the mother–child relationship based on the maternal attachment inventory (MAI) compared with women in the treatment as usual (TAU) group. Followup assessments at 3 months posttreatment revealed that there was no significant group difference related to the mother–child relationship at follow-up, however there were positive trends favoring the experimental group (Mulcahy et al., 2010). At 2 years posttreatment, no significant group differences were found related to the mother–child relationship (Reay et al., 2012). When MAI effect sizes were meta-analyzed (Mulcahy et al., 2010; Reay et al., 2012) using fixed effects analysis for standardized mean differences, the overall effect favoured the intervention, however, the 95% confidence interval for the difference crossed zero (SMD = 0.36, –0.05–0.77, $p = 0.085$).

Two studies examined the effects of interpersonal psychotherapy on parenting and child outcomes perinatally (Goodman, Prager, Goldstein, & Freeman, 2015; Forman et al., 2007). One study that investigated an intervention consisting of eight nurse-delivered mother–child sessions (Goodman et al., 2015) found no significant differences between groups on parenting stress or mother–child interaction following the intervention and follow-up. Another study (Forman et al., 2007) reported no effect of the intervention on maternal responsiveness, mothers' reports of their children's temperament or behavior problems, or of the quality of their relationship, but did show significant group differences for parenting stress. Based on the studies presented above, there is mixed evidence on the affect that IPT has on parenting stress, the mother–child relationship, and infant outcomes.

3.7.2 | Cognitive behavioral therapy

Three trials reported on CBT in the antenatal period (Milgrom, Holt et al., 2015; Netsi, Evans, Wulff, O'Mahen, & Ramchandani, 2015; Pearson et al., 2013), six trials reported on CBT interventions in the postpartum period (Ammerman et al., 2015; Meager & Milgrom, 1996; Misri, Reebye, Milis, & Shah, 2006; Morrell et al., 2009; Murray & Cooper, 2003; Verduyn et al., 2003), and two in both time periods (perinatal) (Maselko et al., 2015; Perry, Ettinger, Mendelson, & Le, 2011). Addressing AD, one study reported no significant group differences in infant outcomes (temperament and sleep duration) or maternal SSRI use with CBT, although there were some positive associations noted (Netsi et al., 2015). In another study (Pearson et al., 2013), postintervention, attentional biases of women in the treatment group increased to become comparable to that of nondepressed women and a large effect size is noted. In another antenatal intervention (Milgrom, Holt et al., 2015), at nine months, infant outcomes, such as self-regulation, and problem solving showed a large effect size favoring the treatment group. In addition, 15/17 subscales of the IBQ-R (Revised Infant Behaviour Questionnaire Short Form) were showed between group differences in support of the intervention, with three of the subscales (high intensity pleasure, reactivity, and negative affectivity) showing large effect sizes.

The six trials that evaluated the effect of cognitive behavioural therapy (CBT) for mothers with PPD on parenting and child development identified mixed findings. In an Australian pilot trial (Meager & Milgrom, 1996), parenting stress based on PSI total scores did not change significantly over time for either group. In another trial of group CBT in comparison to mother–toddler support group or control (Verduyn et al., 2003), no significant group differences in child behavior problem scores were found at any time, however there was a significant improvement in child behavior problem scores in the CBT group. In a different trial (Misri et al., 2006), at posttreatment, there were no significant differences in PSI total, parent, or child domain subscale scores between groups. However, there were statistically and clinically significant decreases from pre- to posttreatment in PSI total and parent and child domain subscale scores for both treatment groups. In addition, both treatment groups positively impacted maternal parenting stress levels (Misri et al., 2006). Meta-analysis was possible for the PSI-SF (parenting stress index short form; using data from Ammerman et al., 2015 & Morrell et al., 2009) (Ammerman et al., 2015; Morrell et al., 2009), revealing no significant overall effect (SMD = 0.154, –0.005–0.313, $p = 0.057$).

Another trial (Murray & Cooper, 2003) indicated limited positive benefits for the mother–child relationship and child outcomes. Women in all groups demonstrated more sensitivity in interactions with their infants following treatment. The treatments had no significant impact at 5 years post intervention on maternal or child outcomes. A larger cluster trial evaluated the effect of two psychologically informed interventions (sessions based on cognitive-behavioral or person-centered counselling) by health visitors compared to control (Morrell et al., 2009). Significant group differences were found in parenting stress scores with lower stress scores in the intervention group. Lastly, an in-home CBT intervention study revealed no differences between treatment and control groups on parenting and child adjustment (Ammerman et al., 2015).

Two perinatal CBT studies were reviewed. In one study of low-income Latina mothers (Perry et al., 2011), small group differences were found in maternal self-report scores of feelings of attachment to their infant at 6–8 weeks postpartum using the maternal postnatal attachment (MPA) scale, with women in the intervention group having slightly higher attachment scores than women in the control group. In another study, the effects of an early perinatal depression intervention on long-term child development outcomes (child was 7 years old) were assessed (Maselko et al., 2015). Overall, child development outcomes did not differ for children in the intervention or control group.

The study found that at age 7 years, the initial improvements with the intervention did not last.

Based on the CBT trials described above, the therapy shows promise when focused on antenatal depression, however for postpartum depression CBT does not appear to stand out among alternative therapy approaches examined. However, there were some promising findings for CBT reducing parenting stress. When investigating parenting and child measures over time, no long-term effects were sustained.

3.7.3 | Peer support

Three trials evaluated the effect of peer support on PPD and AD and the impact on parenting and child development (Dennis, 2003; Letourneau, Stewart et al., 2011; Milgrom, Schembri, Ericksen, Ross, & Gemmill, 2011). One antenatal intervention addressed depression, anxiety, and parenting difficulties (Milgrom et al., 2011). Mothers in the intervention group scored significantly lower on PSI scores than the control group on the parenting domain and the PSI total score, however, there were no significant differences found between groups on the child domain of the PSI. Two trials investigated peer support intervention in the postpartum period (Dennis, 2003; Letourneau, Stewart et al., 2011). In one pilot trial that evaluated the effect of telephone-based peer support on depressive symptomatology among mothers identified as high-risk for PPD, although no significant group differences were found in relation to maternal self-esteem, loneliness and child-care stress, a positive trend favoring the intervention group was found (Dennis, 2003). In another trial, peer support was further evaluated in a home-based format that included mother–child interaction teaching (Letourneau, Stewart et al., 2011). The results favored the control group in which a significant group difference was observed for one of the two measures of mother–child interactions. No significant treatment effects were observed in infant IQ scores or diurnal salivary cortisol levels. Mothers in both groups perceived their infants as less difficult over time.

Based on the results of the peer support trials examined, it appears that more research, specifically additional randomized controlled trials with larger samples, are required to make judgments on the effectiveness of peer support interventions on parenting and child development. The findings reveal preliminary evidence that antenatal interventions may have positive effects on parenting stress, however, the postpartum trials examined in this review did not reveal significant results or results favoring the peer support intervention group.

3.7.4 | Maternal–child interaction guidance

Six trials (one with a follow-up study) have evaluated the effect of maternal-child interaction guidance on PPD, parenting, and child development (Bilszta, Buist, Wang, & Zulkefli, 2012; Horowitz et al., 2001; Horowitz et al., 2013; Kersten-Alvarez, Hosman, Riksen-Walraven, Van Doesum, & Hoefnagels, 2010; Tryphonopoulos; Tsivos, Calam, Sanders, & Wittkowski, 2014; Van Doesum, Riksen-Walraven, Hosman, & Hoefnagels, 2008). One trial evaluated the effect of an interactive coaching intervention intended to promote responsiveness between mothers experiencing PPD and their infants (Horowitz et al., 2001). There was a significant improvement in mother–child responsiveness in the interaction coaching group after the intervention as compared to the control group. In an RCT examining the effect of video feedback to improve maternal parenting behavior, participants were randomized to either a video intervention group, a verbal intervention group, or a control group (Bilszta et al., 2012). There was a significant improvement in parenting sense of competence scores within the verbal feedback (large effect size) and the standard care group, but not the video intervention group. Neither intervention had an advantage, compared to standard care, in improving parenting confidence or perceptions of infants. Another trial evaluated the effect of a mother–baby intervention on the quality of mother–child interaction, infant–mother attachment security, and infant socio-emotional functioning (Van Doesum et al., 2008). Participants in the intervention group had higher scores for attachment security and competence (one aspect of socio-emotional functioning). In a follow-up study (Kersten-Alvarez et al., 2010) the intervention's long-term effects when the children reached school age were examined and no lasting treatment benefits were found. However, in those families that reported a higher number of stressful life events, children in the intervention group had fewer externalizing behavior problems than children in the control group. In addition, a large effect size was seen for the maternal quality of interactive behavior as well as three child outcomes at age five, specifically self-esteem, ego-resiliency and mother-rated internalizing problems.

In another RCT, a relationship-focused behavioral intervention was evaluated (Horowitz et al., 2013). The intervention was designed to coach depressed mothers (nurse led) to interpret infants' behavioral cues and to respond appropriately to those cues; however, no significant group differences were found. Another RCT was conducted to evaluate and determine the feasibility of a newly developed parenting program compared to treatment as usual (Tsivos et al., 2014). The intervention involved practicing skills between the mother and infant to enhance parental knowledge and resourcefulness, promoting nurturing and low conflict environments, and promoting children's social, emotional, and intellectual abilities through positive parenting practices. Group differences were not significant. Finally, a recent RCT pilot study examined a video-feedback intervention guidance intervention on improving mother–child interaction quality and maternal and infant diurnal salivary cortisol levels (Tryphonopoulos). The results overall favored the intervention group which showed a more significant improvement as well as a large effect size, in mother–child interaction quality.

The six trials that evaluated the effect of maternal-child interaction guidance on parenting and child development reported varying findings, all with multiple study limitations. Three of the six trials evaluated identified some promise for utilizing a maternal-child interaction guidance approach to positively affect the maternal-child relationship.

3.7.5 | Other interventions

Eight studies (and one follow-up) have been classified as "other" interventions and are described below: Cicchetti et al., 2000; Field, Diego, Hernandez-Reif, Deeds, & Figueiredo, 2009; Hart, Field, & Nearing, 1998; Milgrom, Gemill et al., 2015; O'Mahen et al., 2014; Onozawa,

Glover, Adams, Modi, & Kumar, 2001; Puckering et al., 2010; Roberts & Glover, 2008; Sharp et al., 2010; Toth et al., 2006; and Wan, Sharp, Howard, & Abel, 2011. In one trial, an infant massage intervention was examined for its effect on PPD and mother–child interaction (Onozawa et al., 2001). The intervention group (having had five weekly infant massage classes) showed significant improvements in mother–child interaction scores. Another trial investigated PPD and mother and infant outcomes following an infant massage intervention, compared to the support group (Roberts & Glover, 2008). At one year, massage group mothers had nondepressed levels of sensitivity of interaction with their babies, whereas the support group did not. There were no other differences in either mother or child between the two intervention groups. Another trial evaluated antenatal massage for their effects on infant prematurity, low birth weight, cortisol levels, and PPD (Field et al., 2009). The massage group mother's infants tended to be greater gestational age. The massage group also experienced lower rates of prematurity and lower incidences of low birth weight and the intervention had a large effect size on cortisol levels. Antenatal and infant massage therapies show promise for improving maternal and child outcomes.

In a different trial (Hart et al., 1998), the neonatal behavioral assessment scale (NBAS) was administered in addition to mothers in the intervention group being taught to administer the mother's assessment of the behavior of her infant (MABI) independently and infant behavior was assessed. Infants of depressed mothers in the intervention group had significant improvements (with large effect sizes) in their NBAS social interaction behaviors, state regulation, and state organization compared with infants of depressed mothers in the control group. An internet intervention was evaluated for its effects on PPD and postnatal maternal bonding with infant, among other variables (O'Mahen et al., 2014). There were no between group differences were observed in postnatal maternal bonding with infants. In a randomized waiting list controlled trial, a psychotherapeutic group intervention was evaluated for its effects on maternal mood and mother–child interaction (Puckering et al., 2010). The main purpose of the group was for them to discuss and share ideas with each other, while the facilitator largely assisted in drawing attention to mothers' successes and skills. Mother–child interaction improved significantly overall for the intervention group with greater positive interaction and a less negative interaction scores as compared to the waiting list control group. A large effect size is noted for positive anticipation, positive autonomy, positive responsiveness, negative autonomy, negative cooperation, and negative control.

In a UK trial, 254 women were randomized to receive either an antidepressant, usually a selective serotonin reuptake inhibitor (SSRI) prescribed by their general practitioner, or nondirective counseling (listening visits) (Sharp et al., 2010; Wan et al., 2011). No particular treatment modality (antidepressants or listening visits) was more effective for improving maternal adjustment to parenthood. However, it was noted that the earlier start of antidepressant treatment provided a short-term advantage for improving maternal attitudes toward their infant, pregnancy, and toward parenthood and reducing stress. A different trial evaluated both CBT and antidepressant treatment in postpartum women (Milgrom, Gemill et al., 2015). There was no advantage in combining CBT with antidepressants. CBT on its own was most effective for the treatment of depression. For parenting stress, no significant results were observed. Antidepressant treatment interventions have not shown great promise for improving maternal and child outcomes related to PPD.

4 | DISCUSSION

The objective of this systematic review was to determine the effects of treating AD, PPD, or both on parenting and child development. In total, 36 trials (within 40 articles) were examined. The trials reviewed all focused on various treatment types, with some showing more promise than others in addressing depressive symptoms, antenatally, postnatally, and perinatally, as well as diverse maternal and infant outcomes.

For IPT interventions, a large effect size was observed for maternal social adjustment, in a relatively well designed study with a low risk of bias (score = 5; O'Hara et al., 2000). In a slightly less well-designed study of IPT (Clark et al., 2003), a large effect was observed on the quality of the mother–child relationship (specifically the PCERA subscales of parental intrusiveness, insensitivity, and inconsistency) as well as stressors in the parent–child relationship related to the child domain (adaptability, mood, and reinforced parent; moderate risk of bias = 6). For CBT interventions, a very well designed study (Milgrom, Holt et al., 2015) focused on AD showed multiple large effect sizes favoring the treatment group for infant outcomes including: developmental progress (specifically problem solving); child self-regulation; and infant temperament and behavior variables such as high intensity pleasure, reactivity, and negative affectivity (low risk of bias = 0). Another CBT study revealed a large effect size for attentional bias of women (an indicator of a woman's ability to maintain attention toward infant distress) favoring the treatment group (Pearson et al., 2013; moderate risk of bias = 6). In terms of maternal-child interaction guidance interventions, four studies (Bilszta et al., 2012; Hart et al., 1998; Kersten-Alvarez et al., 2010; Tryphonopoulos) demonstrated results with large effect sizes, all with low risk of bias scores that should be highlighted. Variables with large effect sizes include NPI-video (Bilszta et al., 2012), quality of interactive behavior, self-esteem, ego-resiliency, mother-rated internalizing problem (Kersten-Alvarez et al., 2010), mother-child interaction quality (Tryphonopoulos), and infant social, state organization, and state regulation (Hart et al., 1998). Finally, two interventions described as "other" found favorable findings, however both studies had a moderate risk of bias score of six (Field et al., 2009; Puckering et al., 2010). In the psychotherapeutic group intervention a large effect size was noted for positive anticipation, positive autonomy, positive responsiveness, negative autonomy, negative cooperation, and negative control (Puckering et al., 2010). The antenatal massage intervention resulted in a large effect size on newborn cortisol levels (Field et al., 2009). These interventions that have demonstrated statistically significant results and/or large effect sizes show promise and should be explored further.

Unfortunately, while promising findings exist for IPT, CBT, maternal-child interaction guidance, and other interventions including massage

and psychotherapeutic group support, it is difficult to draw any definitive conclusions regarding any one treatment that shows the most potential to influence maternal and infant outcomes. The interventions reviewed varied in their effects on the various outcomes, with some showing promise for child development, and others showing promise only for maternal outcomes. Currently, there is insufficient evidence available to make policy or practice recommendations. Further research in this area is recommended.

To enhance the evidence base, larger trials are required on all therapy approaches used to treat women with AD and PPD to ascertain effects of all the outcomes of interest and to recommend effective therapy approaches or interventions. Future trials that include larger sample sizes and measure both mother–child interaction quality and infant outcomes are necessary, given their correlation. Furthermore, trials that include a longer term follow-up would be beneficial to assess if there are lasting effects with any of the various treatment and intervention options. Despite this, various interventions for women suffering from AD and PPD that have shown promise in benefiting both mother–child relationships and infant outcomes have been described here.

4.1 | Strengths and limitations

This review is written on the basis of the 2007 systematic review on PPD and mother–child interaction and child development by Poobalan et al. (2007), and the systematic review by Tsivos et al. (2014). These two reviews of PPD interventions also assessed mother–child or infant development outcomes and revealed a lack of child-related outcomes assessed as well as inconsistencies in the mother-child outcomes (Poobalan et al., 2007; Tsivos et al., 2014). Many reviews of PPD interventions only focus on depression as an outcome (Boath & Henshaw, 2001; Cuijpers et al., 2008; Dennis, 2005; Fitelson, Kim, Baker, & Leight, 2011), limiting the ability to make treatment recommendations with the potential to impact parenting and child development outcomes for mothers affected by PPD. This review builds on the previous reviews by addressing effect sizes, including a focus on AD in addition to PPD, including both mother–child relationship and infant outcomes, as well as conducting meta-analysis where possible and including more recent trials.

There is considerable heterogeneity, which could be considered as both, a strength and a limitation. The trials examined in this review have many limitations affecting both the individual study results and the ability of this review to summarize and make generalizations about the findings. Some study limitations noted across the trials examined include lack of blinding of assessors to group allocation; homogenous samples; small sample sizes; insufficient power to detect group differences; high attrition rates; mothers in the treatment group already taking antidepressant medication; lack of intention-to-treat data analysis; and group differences in baseline characteristics. Due to such limitations and the heterogeneity of the studies reviewed (i.e., different sample characteristics, different outcomes assessed, and different intervention components), it is difficult to make judgments about which therapies may be most effective for women with AD and PPD and their infants.

CONFLICTS OF INTEREST

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