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Preventing and Treating Women’s Postpartum Depression: A Qualitative Systematic Review on Partner-Inclusive Interventions

Stephanie Alves, Alexandra Martins, Ana Fonseca, Maria Cristina Canavarro, and Marco Pereira

**Abstract**

Partner-related factors associated with the occurrence of Postpartum Depression (PPD) may justify the partner's inclusion in preventive and treatment approaches. The aim of this qualitative systematic review was to synthesize the literature on partner-inclusive interventions designed to prevent or treat postpartum depression (PPD) in women. In accordance with the PRISMA guidelines, the systematic search of studies published between 1967 and May 2015 in PsycINFO and PubMed identified 26 studies that met the inclusion criteria, which reported on 24 interventions. The following partner parameters were analyzed: participation type, session content, mental health assessment, attendance assessment, and the effects of partner's participation on the women's response to the interventions. Total participation by the partner was mostly reported in the prevention studies, whereas partial participation was reported in the treatment studies. The session content was mostly based on psychoeducation about PPD and parenthood, coping strategies to facilitate the transition to parenthood such as the partner's emotional and instrumental support, and problem-solving and communication skills. Some benefits perceived by the couples underscore the relevance of the partner's inclusion in PPD interventions. However, the scarce information about the partner's attendance and the associated effects on the women's intervention outcomes, along with methodological limitations of the studies, made it difficult to determine if the partner's participation was associated with the intervention's efficacy. Conclusions about the clinical value of including partners in PPD interventions are still limited. More research is warranted to better inform health policy strategies.

*Keywords:* postpartum depression, prevention, treatment, partner, systematic review.

## Introduction

The relevance of postpartum depression (PPD) to public health is consensual (Henshaw, Sabourin, & Warning, 2013; O'Hara & McCabe, 2013), with a prevalence rate that may reach 19.2% for minor and 7.1% for major PPD in the first three months postpartum (Gavin et al., 2005). This condition may have serious consequences on relational (e.g., poor partner well-being and relationship difficulties), parenting (e.g., disturbed mother-child interactions) and infant outcomes (e.g., impairments in cognitive and psychosocial development) (O'Hara & McCabe, 2013; Westall & Liamputtong, 2011).

According to previous reviews, interventions targeting PPD are important because they have been found to be effective to either prevent (e.g., Clatworthy, 2012; Pilkington, Whelan, & Milne, 2015) or treat PPD in women (e.g., Dennis & Hodnett, 2007; Goodman & Santangelo, 2011). Although these existing reviews suggested that there are potential benefits of partner-inclusive interventions (i.e., interventions including both the woman and her partner) and the need for additional research in this area, to the best of our knowledge, this topic has not been systematically reviewed.

The inclusion of partners when implementing PPD interventions may be justified for several reasons in terms of both its prevention and treatment. On the one hand, there is evidence that couple-related factors may be protective against the development of perinatal depressive and anxiety symptoms (e.g., communication, relationship satisfaction, emotional and instrumental support; Pilkington, Milne, Cairns, Lewis, & Whelan, 2015), which makes them important targets for preventive intervention efforts (Pilkington, Milne, Cairns, & Whelan, 2016). Involving both partners in preventive interventions may facilitate the training of important couple skills, and lead to positive benefits for both the women's and their partner's mental health (Shapiro & Gottman, 2005). Moreover, the importance of increasing awareness in both members of the couple about perinatal distress and the important role of the women's partners in this context have been stressed (Fonseca & Canavarro, 2017; Henshaw et al., 2013). Both women and their partners highlighted the need to be proactively educated about depression and other concerns (e.g., the changes in the couple's relationship, parenting), ideally before the development of depressive symptoms (Feeley, Bell, Hayton, Zelkowitz, & Carrier, 2016; Letourneau et al., 2012). Women also endorsed a higher involvement of their partners in PPD preventive interventions when these interventions address PPD education (Wheatley, Brugha, & Shapiro, 2003). By receiving and discussing information about risk factors and signs of PPD, partners may be able to recognize if the woman is at-risk for PPD (Garfield & Isacco, 2009; Letourneau et al., 2012), which may allow them to adjust the support provided to

1 women's needs, or to encourage them in the process of seeking professional help, if needed (Fonseca &  
2 Canavarro, 2017).

3         On the other hand, in the presence of a clinical diagnosis of PPD, potential benefits may emerge by  
4 involving the male partners in the women's recovery process. Because of their capacity to provide support and  
5 promote women's sense of security when they are faced with PPD (Montgomery, Bailey, Purdon, Snelling, &  
6 Kauppi, 2009), it is reasonable to assume that the presence of the women's partners during the therapeutic  
7 process may also contribute to the women's recovery process (Misri, Kostaras, Fox, & Kostaras, 2000). First,  
8 because the women's partners often have difficulties in understanding their spouse's emotional experiences  
9 (Everingham, Heading, & Connor, 2006; Letourneau et al., 2007), they may benefit of being included in  
10 treatment plans to learn about the symptoms of PPD and how to provide adequate support and assist women in  
11 their recovery (Westall & Liamputtong, 2011). This may help partners feeling less helpless to cope with  
12 women's PPD and women may feel more supported (Westall & Liamputtong, 2011). In this context, partner-  
13 assisted interventions could be a promising approach, by providing partners with the skills to encourage  
14 behavior changes rather than to reinforce maladaptive behaviors (Baucom, Whisman, & Paprocki, 2012). In  
15 addition, the presence of the partner in the treatment sessions may be a facilitating factor in improving impaired  
16 couple's skills that may contribute to maintain women's symptoms (Carter, Grigoriadis, Ravitz, & Ross, 2010).

17         Moreover, men themselves often experience depression during pregnancy and the postpartum period,  
18 with estimated prevalence rates of, respectively, 8.4% (Cameron, Sedov, & Tomfohr-Madsen, 2016) and 10.4%  
19 (Paulson & Bazemore, 2010). The incidence estimates of male depression are particularly high when women  
20 were experiencing PPD, ranging from 24 to 50% (Goodman, 2004). In fact, there is sound evidence of the  
21 positive association between maternal and paternal depressive symptoms during pregnancy and the postpartum  
22 period (Cameron et al., 2016; Paulson & Bazemore, 2010). Couple's comorbidity may maintain or even  
23 intensify the women's difficulties: if men experience emotional distress themselves, they may have difficulties  
24 in providing adequate support (Roberts, Bushnell, Collings, & Purdie, 2006), which may compromise their role  
25 as the women's primary source of support. Therefore, partner-inclusive interventions may be particularly  
26 helpful to increase attention on their own postpartum depressive symptoms (Carter et al., 2010; Westall &  
27 Liamputtong, 2011), which may have benefits for both members of the couple and the whole family (Roberts et  
28 al., 2006).

29         Although recommendations have been made about the inclusion of partners in the care and education  
30 provided to women in the perinatal period (e.g., Burgess, 2011), there is a dearth of information about the

1 empirical relevance of including both members of the couple in those interventions. No previous reviews of  
2 interventions for PPD have specifically addressed this important question, although some prior reviews  
3 provided some important insights about the importance of better examining this topic. Goodman and Santangelo  
4 (2011) reviewed group treatment interventions for PPD and along with the main review parameters, they also  
5 discriminated the number of sessions inclusive of partners, and if they attended alone or with women. In the  
6 discussion of their results, and although this was not the focus of the review, the authors highlighted that there is  
7 an important gap in the literature concerning the effect of partner's participation on women's outcomes.

8         A recent review from Pilkington, Whelan, et al. (2015) analyzed preventive interventions for perinatal  
9 depressive and anxiety symptoms that included some content addressing partner's support or the couple  
10 relationship, regardless of the partner's inclusion in the intervention sessions. Although this previous work  
11 provided us some details about the inclusion of the partners in this type of interventions (i.e., whether they were  
12 included or not in the intervention sessions, the specific session's content, and whether their mental health was  
13 assessed), a wide number of partner-inclusive interventions (i.e., interventions that did not target couple  
14 relationship-related factors but have included partners in the intervention sessions) were not analyzed, beyond  
15 the fact that no data about partner's attendance or the influence of partner's involvement on women's symptoms  
16 changes were reported.

17         Finally, two systematic reviews found no added value in women's outcomes by including the partner in  
18 the PPD interventions. One systematic review and meta-analysis that assessed the potential moderators (e.g.,  
19 subtypes of cognitive-behavioral therapy [CBT], context of delivery, and partner's inclusion) of the efficacy of  
20 CBT to prevent and treat perinatal depression showed that the partner's inclusion did not influence the efficacy  
21 of those interventions (Sockol, 2015). In another meta-analysis, both relational interventions (i.e., couple or  
22 family psychotherapy with the involvement of both the woman with depression and her partner) and individual  
23 interpersonal psychotherapy (IPT) were effective at reducing perinatal depression among treatment-control  
24 study designs, although individual IPT demonstrated larger average effect sizes among pre-post study designs  
25 (Claridge, 2014). However, some interventions in this review, which were classified as "individual  
26 interventions", included a separate component for partners (e.g., Reay, Fisher, Robertson, Adams, & Owen,  
27 2006).

28         Despite the relevance of all these reviews, none specified details about the partner's real attendance,  
29 and the partner's type of participation in the intervention session(s) was scarcely described. These data are  
30 essential to draw conclusions about the effects of their participation on women's responses to the intervention



1 partner or marital or dyadic or father or husband or spous\*) [all fields]”. The search was conducted without  
2 language restriction, but only articles written in English were retrieved and considered for inclusion. The  
3 reference lists of existing reviews and retrieved articles were examined to identify other relevant studies. Studies  
4 were included in the review if they met the following inclusion criteria:

- 5 (1) Non-biological interventions delivered during pregnancy or during the first 12 months postpartum  
6 with the primary aim to prevent or treat postpartum depression (PPD) or symptoms thereof up to 12  
7 months after birth;
- 8 (2) The interventions targeted women (or both members of the couple) and included both partners in  
9 the intervention session(s), regardless of the population (e.g., a universal population of pregnant  
10 women or mothers or women at-risk in the case of prevention studies);
- 11 (3) Prospective pre-/post-intervention study or comparisons of interventions with a control group (CG);
- 12 (4) Any type of methodological design (i.e., randomized controlled trial [RCT] or quasi-experimental  
13 trial design);
- 14 (5) The primary outcome was depressive symptoms assessed using validated self-report or clinician-  
15 administered measures.

16 Articles were not eligible for inclusion if they reported a) non-original research (e.g., article reviews,  
17 meta-analyses, book chapters or discussion articles); b) unpublished studies, abstracts, communications, theses,  
18 case studies, ongoing studies, or descriptive studies; c) studies assessing the efficacy of a community-based  
19 intervention or service (e.g., with multiple functions such as screening, liaison to other services), without a clear  
20 prevention/treatment intervention for PPD; d) studies primarily addressing the couple’s adjustment, parenting  
21 adjustment, infant development, adolescent pregnancy, partner intimate violence or substance abuse, or  
22 adjustment to perinatal losses (i.e., PPD as a secondary outcome); e) interventions that targeted only the  
23 partner’s postpartum depressive symptoms; and f) studies focusing on the prevention/treatment of depression  
24 during pregnancy without a clear focus on preventing/reducing depressive symptoms in the postpartum period.

25 The articles with the primary aim to prevent/treat PPD and simultaneously inter-related outcomes (e.g.,  
26 anxiety, parenting difficulties, mother-child interactions, marital adjustment, or social support) were included. If  
27 more than one article was available on an individual intervention, we included these articles in our analysis but  
28 omitted duplicate results.

## 29 **Coding of the Studies**

1           The characteristics of the studies identified in this review were grouped into intervention  
2 characteristics, methodological quality, assessment characteristics, and intervention outcomes. Regarding the  
3 intervention characteristics (see Tables 1 and 2, for preventive and treatment studies, respectively), all studies  
4 were coded for: (1) authors and country of origin; (2) sample size, calculated for all women allocated in the  
5 study conditions (studies with CG)/or that initiated the intervention (pre-post study design); and (3) intervention  
6 approach (CBT vs. IPT vs. Counseling vs. Family Therapy vs. Education vs. Psychosocial). We classified the  
7 main approach(es) of the intervention. When the interventions included strategies/techniques based on  
8 established psychological therapeutic models (psychological interventions; e.g., CBT, IPT), we coded the  
9 therapeutic orientation. Interventions that consisted of providing education about perinatal emotional health  
10 (e.g., information about PPD symptoms and professional treatments) and/or parenting issues (e.g., information  
11 about transition to parenthood-related changes, activities to enhance parent-child interactions) were categorized  
12 as Education. Interventions designed to provide non-specific support to the participants (e.g., discussion of  
13 personal postpartum concerns in group) were classified as Psychosocial. The studies were also classified for: (4)  
14 study design (randomized controlled trial vs. controlled trial vs. quasi-experimental design vs. open trial); (5)  
15 control type (treatment as usual vs. enhanced treatment as usual vs. waiting list vs. not applicable; when the CG  
16 consisted of another type, we specified it); (6) intervention format (whether the intervention was conducted  
17 individually or in a group format: individual vs. group vs. both); (7) number of sessions; (8) type of partner  
18 participation: total (partners were invited to attend to all the sessions with women, with or without specific  
19 sessions designed for them) vs. partial (only a specific part of the intervention was designed for partners); and  
20 (9) content of the partner/couple session(s).

21           Preventive studies were also coded for the following: (1) prevention timing (postpartum vs. antenatal  
22 vs. both) and (2) prevention type (*indicated* – individuals with subclinical symptoms who do not meet  
23 diagnostic criteria; *selected* – targeted individuals with risk factors for a disorder but without symptoms of the  
24 disorder; *selected/indicated* – included individuals at-risk and presenting subclinical symptoms; and *universal* –  
25 administered to all members of a given population). For *selected* or *selected/indicated* prevention studies,  
26 information about the inclusion criteria was provided. This classification followed the Institute of Medicine  
27 criteria for preventive interventions for mental disorders (Mrazek & Haggerty, 1994).

28           The appraisal of the methodological quality of the reviewed studies was based on several indicators  
29 consistently reported for the quality assessment of quantitative research (Downs & Black, 1998; National  
30 Collaborating Centre for Methods and Tools, 2008) and included the following: (1) sociodemographic



1 characterization of the sample (yes vs. no); (2) sample size power calculations (yes vs. no); (3) intention-to-treat  
2 analysis (yes vs. no); (4) control for confounders in data analyses (yes vs. no); (5) more than one assessment  
3 time points (yes vs. no); (6) blinding of the outcome assessors (yes vs. no vs. not applicable); (7) drop-outs  
4 (specification of the allocated participants who did not receive or discontinued the intervention and the  
5 associated reasons; yes vs. no); and (8) loss to follow-up (specification of the participants who did not complete  
6 the post-intervention/follow-up measures and the associated reasons; yes vs. no). Treatment studies were also  
7 classified for (9) whether participants with PPD who were receiving antidepressant or psychological treatment at  
8 baseline were excluded from the study (yes vs. no).

9         Regarding the assessment characteristics (see Tables 4 and 5, for preventive and treatment studies,  
10 respectively), the studies were coded for: (1) method of outcome assessment (self-report vs. clinician-  
11 administered measure vs. both); (2) outcome measure and cut-off/diagnostic criteria; and (3) postpartum (for the  
12 preventive studies) and post-intervention (for the treatment studies) timing of the assessments (in weeks). For  
13 treatment studies (Table 5), when the assessments were conducted immediately post-intervention, they were  
14 coded as 0 weeks. For the studies in which the assessments occurred at a specific time point (e.g., weeks post-  
15 enrollment), we clarified this information. The studies were also classified for: (4) women's attendance  
16 (number/percentage of women attending the intervention sessions) and (5) partner/couple's attendance  
17 (number/percentage of partners/couples attending the intervention sessions). For treatment studies, the  
18 diagnostic criteria for participants being included in the study were also reported (Table 5). Overall, when these  
19 characteristics were not clearly specified in the included studies, we coded as not specified. Finally, we reported  
20 the intervention's outcomes relevant for this review: the efficacy of the intervention in preventing (Table 6) or  
21 treating (Table 7) women's depressive symptoms and relevant information about the partner (e.g., partner's  
22 depressive symptoms outcomes, benefits of their participation).

### 23 **Study Selection and Data Extraction Process**

24         The first author defined and conducted the search strategy, reviewed the titles and abstracts of the  
25 electronic searches, and assessed the studies for eligibility. The first and second authors analyzed independently  
26 each article that met the inclusion criteria, using a standard data codification form that specified the intervention  
27 and assessment characteristics, and described the intervention outcomes. A quality assessment of each study was  
28 considered in the interpretation of the results. The first author assessed the methodological quality of included  
29 studies and the second author checked the extracted data. Any doubts that have arisen during the selection of the  
30 studies to be included in the systematic review, as well as any disagreement during the data collection process

1 were discussed and resolved by consensus between the first and second authors or, if necessary, by discussion  
2 with the remaining authors, who supervised this process. None of the authors of the studies included in this  
3 review were contacted for additional information. A qualitative and descriptive synthesis using five key  
4 parameters of the reviewed studies was conducted.

## 5 **Results**

6 Figure 1 shows a flow chart illustrating the search strategy of the studies included. Through the  
7 electronic search, 3665 references were retrieved and 145 additional references were identified for possible  
8 inclusion by searching the references of relevant studies or reviews ( $N = 3810$ ). After deletion of duplicate  
9 studies, 3644 abstracts and titles were screened. Of those, the full-texts of 235 available studies were retrieved  
10 for possible inclusion in the review (eight publications were not available despite attempts to contact the  
11 respective authors) and 207 were excluded for the following reasons: (1) the intervention did not include the  
12 partner in the intervention session(s) ( $n = 162$ ) or (2) this information was unclear (i.e., the partners filled out  
13 the assessment measures but no data were reported about a possible inclusion in the delivered intervention;  $n =$   
14 2); (3) the primary outcome was not women's postpartum depressive symptoms or a clinical diagnosis of PPD  
15 (e.g., dyadic/parenting variables and depressive symptoms during pregnancy;  $n = 15$ ); (4) the population was  
16 not limited to women during the perinatal period (e.g., participants with children aged above 1 year;  $n = 6$ ); (5)  
17 the study design was a case study/report ( $n = 10$ ); (6) there was no assessment of the efficacy of the intervention  
18 (i.e., descriptive and feasibility studies without the assessment of depressive symptoms;  $n = 5$ ); and (7) the study  
19 aim was not to assess a specific intervention for PPD (e.g., community-based intervention;  $n = 7$ ).

20 [Insert\_figure\_1\_about\_here]

21 The characteristics of the 28 articles included in this systematic review are displayed in Tables 1  
22 through 7. Because of overlapping samples, two preventive (Hayes & Muller, 2004; Hayes, Muller, & Bradley,  
23 2001) and two treatment articles (Mulcahy, Reay, Wilkinson, & Owen, 2010; Reay, Owen, et al., 2012) were  
24 considered as one study. Therefore, a total of 26 studies (13 = prevention studies, Tables 1, 3, 4 and 6; 13 =  
25 treatment studies, Tables 2, 3, 5 and 7) were reviewed, which reported on 24 interventions.

## 26 **Intervention Characteristics**

27 **Type of partner participation.** The intervention characteristics of the preventive and treatment  
28 studies are presented in Tables 1 and 2, respectively. Total participation from partners was allowed in nine  
29 preventive interventions (69%), with the exception of three studies where partners were only included in one  
30 (Brugha et al., 2000; Elliott et al., 2000) or two (Thomas, Komiti, & Judd, 2014) of the sessions. In one

1 preventive study, this information was unclear. Partial participation by partners was reported in all but one  
 2 treatment study (Brandon et al., 2012). Partners were invited to participate (with or without women) in between  
 3 one and four sessions or to attend a part of the intervention specifically directed to them (Chen et al., 2011;  
 4 Danaher et al., 2013; Hou et al., 2014). In some studies, both partners and other significant persons (Brugha et  
 5 al., 2000; Buist, Westley, & Hill, 1999; Melnyk et al., 2006; Stamp, Williams, & Crowther, 1995) or family  
 6 members in general (e.g., partners, extended family; Hayes & Muller, 2004; Hayes et al., 2001; Hou et al.,  
 7 2014) could participate in the intervention.

8 [Insert\_table\_1\_about\_here]

9 [Insert\_table\_2\_about\_here]

10 **Content of partner/couple session(s).** Among the preventive interventions, the contents addressed in  
 11 the session(s) were as follows (see Table 1): education about PPD or maternal and paternal mental health during  
 12 the perinatal period ( $n = 4$ ); coping strategies to deal with depression and anxiety symptoms ( $n = 2$ ); education  
 13 about, and strategies to cope with, postpartum/parenting concerns (e.g., baby's behavior management,  
 14 expectations, normative feelings and changes, roles of grandparents and experiences within families of origin)  
 15 ( $n = 8$ ); father-child relationship issues ( $n = 2$ ); problem-solving strategies ( $n = 4$ ); and couples' relationship  
 16 concerns such as normative relationship changes ( $n = 3$ ), division of household and baby-care tasks ( $n = 2$ ) and  
 17 communication skills ( $n = 4$ ). These contents were mostly addressed antenatally (even in the interventions  
 18 conducted both antenatal and postnatally), which was the delivery timing for preventive interventions that most  
 19 often emerged. One intervention covered some of these issues at postpartum (e.g., readjustments in the couple's  
 20 relationship; parenting skills; Fisher, Wynter, & Rowe, 2010), while the remaining postpartum interventions  
 21 focused on strategies to cope with premature infants/the experience of prematurity (Bernard et al., 2011; Melnyk  
 22 et al., 2006). Group interventions offered the opportunity for couples to discuss and normalize potential  
 23 difficulties surrounding the postpartum period (e.g., couples' relationship concerns), to train skills, and to  
 24 brainstorm activities with other couples (Fisher et al., 2010; Mao, Li, Chiu, Chan, & Chen, 2012; Matthey,  
 25 Kavanagh, Howie, Barnett, & Charles, 2004; Thomas et al., 2014).

26 With respect to treatment interventions, the following contents were identified (see Table 2): education  
 27 about perinatal depression or PPD ( $n = 4$ ) and partner supportive strategies (e.g., emotional and instrumental  
 28 support and communication skills), namely related to the postpartum period or transition to parenthood issues  
 29 (e.g., helping with the baby and participating in the housework) ( $n = 6$ ) or to the father-child relationship  
 30 (Puckering, McIntosh, Hickey, & Longford, 2010). The couple's experience with perinatal depression or

1 postpartum depressive and anxiety symptoms was particularly underscored in two studies (Brandon et al., 2012;  
2 Morgan, Matthey, Barnett, & Richardson, 1997). For example, Brandon et al. explored both the women's and  
3 partner's perspectives about the experience and stressors of depressive symptoms, the dyadic expectations each  
4 holds about the roles of the "mother" and "father", and agreements/disagreements about the women's depressive  
5 symptoms at each session.

## 6 **Methodological Quality**

7 Table 3 displays the methodological quality characteristics of the included studies. Most studies  
8 provided sociodemographic information to characterize the participants at baseline. Ten studies reported  
9 conducting a power analysis to determine sample size, and an intention-to-treat analysis was mentioned in 13  
10 studies. A modified intention-to-treat analysis was conducted in one study (Mulcahy et al., 2010). The effects of  
11 potential confounders (e.g., sociodemographic characteristics, outcome at baseline, and antidepressant  
12 medications) were controlled for in the analyses in 11 studies. Half of the studies reported more than one time  
13 point assessment at the postpartum/post-intervention. Of the 12 studies that used clinician-administered  
14 measures, eight reported that outcome assessors were blinded to group allocation. Most studies indicated the  
15 number of participants who dropped-out and/or were loss to follow-up. The reasons for participant's drop-out  
16 were specified in seven studies, and the reasons regarding loss to follow-up in six articles. Of the 13 treatment  
17 studies, five excluded women who were receiving current antidepressant therapy or other treatments for their  
18 postpartum depressive symptoms at the start of the study.

19 [Insert\_table\_3\_about\_here]

## 20 **Assessment Characteristics**

21 **Assessment of the partner's mental health.** The assessment characteristics of the preventive and  
22 treatment studies are presented in Tables 4 and 5, respectively. Six studies (23%) included an assessment of the  
23 partner's mental health. Partners were assessed for postpartum depressive symptoms in three preventive studies  
24 (Matthey et al., 2004; Melnyk et al., 2006; Milgrom et al., 2011) and three treatment studies (one for perinatal  
25 depressive symptoms and two for general mental health; Brandon et al., 2012; Misri et al., 2000; Morgan et al.,  
26 1997). In Brandon et al.' study, the partners completed the EPDS-Partner to capture their point of view of the  
27 women's depressive symptoms.

28 [Insert\_table\_4\_about\_here]

29 [Insert\_table\_5\_about\_here]

1           **Assessment of the partner's attendance.** Data about the partner's attendance were reported in seven  
2 studies (27%). Regarding the preventive studies, one study found poor engagement of partners in the sessions  
3 (attendance = 4%; Stamp et al., 1995), and in two studies, the partner's session attendance rate was above 50%  
4 (Matthey et al., 2004; Thomas et al., 2014) (see Table 4). In one study, this information was unclear (Melnyk et  
5 al., 2006), and in two other studies, it was unclear if the attendance reported was for the women only or for both  
6 the women and their partners (Fisher et al., 2010; Mao et al., 2012). Regarding the treatment studies, poor  
7 engagement of the partners in the intervention was found in one study (attendance = 34%; Danaher et al., 2013),  
8 whereas in the remaining three studies, the majority of partners participated (Brandon et al., 2012; Morgan et al.,  
9 1997; Reay et al., 2006) (see Table 5).

## 10 **Intervention Outcomes**

11           **Effects of the partner's participation in the women's response to the interventions.** The  
12 intervention outcomes of the preventive and treatment studies are presented in Tables 6 and 7, respectively.  
13 Matthey et al. (2004) found that, in comparison with other two groups, a joint session with partners about  
14 psychosocial issues was particularly effective in promoting the early postpartum emotional adjustment of  
15 women with low self-esteem (see Table 6). Moreover, the authors observed a significant and positive impact of  
16 this session (empathy condition) on the male partners' understanding of the women's experience of motherhood  
17 at 6 weeks postpartum, that is, the partners of these women were significantly more aware of what their spouses  
18 are experiencing than the partners of women with low self-esteem who did not attend the selected extra session.  
19 This was observed in the lower discrepancy scores between partner's ratings of women's experience of  
20 motherhood and the women's ratings of their own experience. Therefore, the authors suggested that the better  
21 outcomes for those women with low self-esteem were related to their partners' increased awareness of what the  
22 women were experiencing. Of the two treatment studies that assessed the effects of including the partner in the  
23 women's response to the intervention (see Table 7), one study found that a more rapid recovery in the woman  
24 was related to the partner's involvement (Misri et al., 2000). Compared to women whose partners did not  
25 participate in any of the psychoeducational sessions (CG), women who attended four selected sessions with  
26 their partners (intervention group) reported significantly lower levels of postpartum depressive symptoms one  
27 month after the end of the intervention, suggesting that the partner's support plays an important role in the  
28 treatment of women's PPD. On the other hand, Morgan et al. (1997) observed overall significant reductions in  
29 PPD symptoms among participating women, but stressed that there were no significant differences between

1 women whose partners attended the couples' session and those whose partners did not attend regarding their  
2 levels of depressive symptoms, at any assessment-points.

3 [Insert\_table\_6\_about\_here]

4 [Insert\_table\_7\_about\_here]

5 **(Other) benefits of the partner's participation.** Some benefits of the partner's participation in the  
6 intervention, either as perceived by the couples or as observed by the authors, were reported in the included  
7 studies (see Tables 6 and 7). In some studies, women and/or their partners were asked to provide feedback about  
8 their participation and experience in the interventions delivered. Partners expressed some benefits associated  
9 with their attendance to the session(s), such as a higher understanding of their spouse's mental health difficulties  
10 (e.g., emotional changes, warning signs and how to access help; Morgan et al., 1997; Thomas et al., 2014), the  
11 opportunity to express their own experiences of coping with the women's depression (Brandon et al., 2012) and  
12 to normalize those experiences by sharing them with other men (Morgan et al., 1997). One couple expressed a  
13 higher appreciation of each other's efforts to help (Morgan et al., 1997). Women indicated a more effective  
14 communication of their needs (Brandon et al., 2012) and a higher support received from their partners (Morgan  
15 et al., 1997) as a result of these couple-based session(s), and more positive appraisals of the couple's  
16 relationship were observed among women who participated in the intervention with their partners (Misri et al.,  
17 2000). In addition, the authors observed that the partners recognized better the women's depressive symptoms  
18 by the end of the intervention (i.e., partner's ratings of the intensity of women's depressive symptoms  
19 demonstrated a higher agreement with women's ratings of their own depressive symptoms) (Brandon et al.,  
20 2012) and understood better the women's experience of motherhood, as indicated by a higher accuracy between  
21 partner's ratings of women's experience of motherhood and the women's ratings of their own experience  
22 (Matthey et al., 2004). Finally, the mental health of some of the partners involved has also improved as a result  
23 of their participation (Misri et al., 2000). No study reported negative outcomes or adverse events associated with  
24 partner's inclusion (that have at least been assessed).

## 25 **Discussion**

26 The aim of this systematic review was to summarize the research findings on partner-inclusive  
27 interventions designed to prevent or treat PPD. The number of interventions in this review indicates that there is  
28 considerable interest in including the partner in interventions designed to prevent or treat women's PPD.  
29 However, little information was provided about the partner's specific participatory behaviors during the  
30 interventions, except when delivered in a group format with other couples. In addition, there was little

1 information on how partners have been used (if applicable) as a resource to improve the efficacy of the  
2 intervention. Moreover, in general, missing details about the partners' attendance did not allow us to understand  
3 if the authors did not report the data because very few of them actually participated and the services are still  
4 mostly mother-centered, or if they actually participated. Providing information on the number of partners who  
5 attend the interventions is therefore critical to better understand the feasibility and acceptability of their  
6 inclusion, and to define practical strategies to increase their engagement.

7         Despite the evidenced efforts to maximize the participation of the partners (e.g., session scheduled on  
8 Saturday morning and courtesy phone-call; Fisher et al., 2010; Mulcahy et al., 2010), the effects of the partner's  
9 participation on women's intervention outcomes were rarely assessed. The minimal available data supports the  
10 partner's involvement in the prevention (Matthey et al., 2004) and recovery (Misri et al., 2000) of women's  
11 PPD, at least in the short-term. The exception was the study by Morgan et al. (1997), where the results did not  
12 seem to support the influence of the partner's participation on the women's response to the intervention.  
13 Nevertheless, some positive benefits related to their joint participation were observed in, or expressed by,  
14 women and their partners (Brandon et al., 2012; Matthey et al., 2004; Misri et al., 2000; Morgan et al., 1997;  
15 Thomas et al., 2014). In the reviewed studies, it was difficult to identify which component was the potential  
16 active mechanism underlying the efficacy of the intervention on the positive adjustment of some women, e.g.,  
17 the partner's inclusion, the content addressed, or the combination of both. Mao et al. (2012) have suggested that  
18 the outcomes of the intervention may be associated with both participation of the partner and the learning  
19 activities provided at the session. Along with the observed beneficial effect in the preventive (Fisher et al., 2010;  
20 Matthey et al., 2004) and treatment (Brandon et al., 2012; Morgan et al., 1997) couple-based sessions, the  
21 combination of these two factors deserves further attention.

22         The content of the sessions was consistent with the evidence-based recommendations for father-  
23 inclusive antenatal education programs (e.g., psychoeducation about relationship changes, the motherhood  
24 experience, and partner supportive strategies; May & Fletcher, 2013), the relevance of partner-related skills in  
25 the prevention of perinatal depression and anxiety (Pilkington et al., 2016), and specifically, the need to address  
26 men's literacy about perinatal mental health (Fonseca & Canavarro, 2017; Letourneau et al., 2012).  
27 Accordingly, a higher awareness about perinatal emotional issues and women's experience of motherhood seem  
28 to be achieved in the reviewed interventions (Brandon et al., 2012; Matthey et al., 2004; Morgan et al., 1997;  
29 Thomas et al., 2014). However, understanding how partner's inclusion potentially influences women's  
30 responses to the intervention (i.e., the potential mediating processes) remains unknown. For example, the

1 reviewed studies did not explore how the perceived benefits of the interventions could translate into mental  
2 health benefits for women (and their partners). Moreover, few studies addressed the partner's mental health and  
3 did not find a significant effect of the intervention on their outcomes, which may be because the interventions  
4 were primarily designed to address women's depressive symptoms. It is of note, however, that when the  
5 interventions were delivered specifically to the partners of women with PPD, positive effects on the men's  
6 depressive symptoms were found (e.g., Davey, Dziurawiec, & O'Brien-Malone, 2006).

### 7 **Directions for Future Research**

8         Because important gaps have been found in the reviewed studies, this systematic review suggests  
9 important directions for future research. Additional research using already developed interventions would  
10 benefit from a comparison of the outcomes of the same intervention delivered to women only vs. to women and  
11 their partners (including same-sex couples, as highlighted in others reviews; e.g., Pilkington, Whelan, et al.,  
12 2015). This would generate a complete understanding about the core intervention elements (i.e., the partner's  
13 inclusion vs. the contents addressed) underlying the effectiveness of the intervention.

14         Moreover, it would be of value to examine the effects of the partner's participation on additional  
15 dyadic, parental and infant developmental outcomes. Beyond the well-documented evidence of the role of the  
16 partner's support in preventing (Pilkington, Milne, et al., 2015) and helping women to recover from PPD (Misri  
17 et al., 2000), research also supports its important role in improving positive appraisals of the couple's  
18 relationship (Misri et al., 2000), reducing maternal parenting stress (Sampson, Villarreal, & Padilla, 2015), and  
19 contributing to less distressed child's temperament (Stapleton et al., 2012). Therefore, because most of the  
20 interventions reviewed endorsed fostering partner's supportive strategies, this suggests some benefits of partner-  
21 inclusive interventions at multiple levels. Similarly, problem-solving and communication skills were commonly  
22 addressed in the interventions reviewed. The partner's participation may facilitate the practice of these skills  
23 (Mao et al., 2012), which could help to promote the couple's relationship quality (Shapiro & Gottman, 2005) as  
24 well as positive co-parenting and parent-child relationships (Feinberg & Kan, 2008). Although some of the  
25 included studies were also interested on the effect of the intervention on relationship outcomes, the assessment  
26 of the specific contribution of the partner's inclusion on these outcomes was generally neglected. Finally,  
27 because men also may experience PPD and couple's comorbidity is common (Cameron et al., 2016; Goodman,  
28 2004), their involvement would probably be helpful for their own well-being (Misri et al., 2000), for example,  
29 by helping them to learn strategies to cope with their own depressive symptoms. Accordingly, the assessment of  
30 both partners' mental health is of unquestionable importance. Future research should consider assessing the



1 effects of partner's involvement on multiple outcomes in order to inform clinical practice about the wide  
2 potential benefits of their inclusion in the interventions directed to prevent or treat women's PPD. This would  
3 allow a clarification of the mechanisms (e.g., improvement of the partner's mental health and improvement of  
4 the couple's communication) through which the partner's inclusion in the interventions may possibly impact the  
5 women's outcomes. Additionally, analyzing potential moderators (e.g., the type of partner participation) is  
6 important to better understand under what circumstances the partner's inclusion effects might be enhanced.

7 Efficacy studies of web-based approaches to prevent PPD with a partner component, as recently  
8 described (e.g., Haga, Drozd, Brendryen, & Slinning, 2013), are also of the utmost importance because they  
9 may be a suitable context to promote the partner's inclusion with less time and work constraints. Although  
10 poorer partner attendance was reported in the web-based intervention included in this review (Danaher et al.,  
11 2013), a recent RCT conducted by Milgrom et al. (2016) indicated that most partners accessed the partner  
12 support website ( $n = 16/21$ ; 76%). Finally, the focus of our review is on the benefits of the partner's inclusion;  
13 however, the involvement of significant others might be preferable for some women (e.g., single mothers). It is  
14 of note that involving partners in some interventions may be contraindicated, e.g., in the presence of intimate  
15 violence (Brandon et al., 2012). In line with this, futures studies should also provide information about the  
16 safety of including partners in the interventions. Further attention as to the specific women and circumstances  
17 that PPD partner-inclusive interventions are most appropriate and effective is needed.

## 18 **Strengths and Limitations**

19 The strengths of the present systematic review include a thorough search strategy, which was  
20 developed in line with the PRISMA statement and provides transparency about how the articles were analyzed  
21 to allow for replication. Our review extends the existing literature by including and synthesizing information  
22 about a wide range of partner-inclusive interventions, regardless of the approach (e.g., CBT and IPT) and type  
23 (both preventive and treatment approaches). Although there are some reviews on the effectiveness of PPD  
24 prevention and treatment, to date, this question has not been systematically addressed. Finally, the studies were  
25 analyzed according to diverse parameters beyond efficacy indicators, which allowed for the recognition of the  
26 current gaps that compromise a better understanding of the partner's role in this field and therefore need to be  
27 overcome in future research.

28 The present review is not without limitations. First, the considerable heterogeneity of the reviewed  
29 studies and their mixed quality (e.g., methodological limitations such as the small sample size and absence of  
30 long-term follow-up) restricted the interpretation of the findings. Second, we conducted a qualitative analysis of

1 the studies without a quantitative synthesis. This is justified, however, because of the heterogeneity across  
2 studies (e.g., assessment measures, postpartum/post-intervention assessment time points and cut-off scores) and  
3 the missing information on the main characteristics assessed in the reviewed studies. Finally, we were unable to  
4 access the full-text of eight articles (no response to our request or no contact information for the authors).

#### 5 **Clinical Implications**

6           Psychoeducation about emotional changes during the perinatal period and open discussions about  
7 shared perinatal concerns may be particularly important to overcome a sense of helplessness often reported by  
8 couples to deal with disturbing emotional experiences. A short participation period of both members of the  
9 couple in preventive interventions (1-2 sessions) may offer the possibility of sharing knowledge and practicing  
10 coping skills between each member of the couple and with other couples. Regarding the treatment interventions,  
11 the role of the partner as an “assistant” in facilitating behavior changes in women with PPD may be of particular  
12 relevance (Brandon et al., 2012). Finally, interventions approaching couples as a unit of the intervention might  
13 be an opportunity to directly address the mental health of both partners.

#### 14 **Conclusions**

15           Despite the strong arguments of why including partners could be important in interventions for PPD,  
16 our review indicates that no conclusions can be made regarding whether a specific type of partner participation  
17 is associated with the efficacy of the intervention. This is a serious limitation in this field, and consequently,  
18 practical recommendations about the benefits of including partners in PPD interventions are still limited.  
19 However, the involvement of partners may lead to the improvement of important issues related to the onset  
20 and/or maintenance of PPD. Additional research, including well-powered trials, is warranted to clarify whether  
21 partner’s inclusion is related to the (in)efficacy of the intervention to prevent and/or treat PPD – elucidating *how*  
22 and *for whom* – as well as to better inform health policy strategies.

23

#### 24 **Compliance with Ethical Standards**

25 **Ethical approval** This article does not contain any studies with human participants or animals performed by  
26 any of the authors.

27 **Conflict of Interest** The authors declare that they have no conflict of interest.

#### 28 **Author Contributions**

29 SA defined and conducted the search strategy, reviewed the titles and abstracts of the electronic searches, and  
30 assessed the studies for eligibility. SA and AM analyzed independently each article that met the inclusion

1 criteria. SA assessed the methodological quality of included studies and AM checked the extracted data. Any  
 2 disagreement was discussed and resolved by consensus or, if necessary, by discussion with referral with AF,  
 3 MCC, and MP, who supervised this process. SA wrote the first draft of the manuscript. All authors contributed  
 4 to and approved the final manuscript.

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Table 1

*Intervention characteristics of included studies assessing preventive interventions for PPD (n = 13)*

Study (Country)	Sample size	Intervention approach	Study Design	Control type	Prevention timing	Prevention type (Inclusion criteria)	Intervention Format	No. Sessions	Partner participation	Partner/Couple Session(s) Content
Bernard et al., 2011; USA	56	CBT	RCT	TAU	POST	Selected (Prematurity)	Individual	3	Total	CBT-based skills to facilitate the adjustment to neonatal intensive care unit experience.
Brugha et al., 2000; UK	209	CBT	RCT	TAU	ANT	Selected / Indicated (≥1 of the 6 symptoms in modified GHQ-D)	Group	6 + initial meeting + postpartum reunion	Partial	Before the beginning of the intervention, there was an introductory meeting with the woman and her partner. The woman's partner or a "significant other" was encouraged to attend to session 3 with the woman, addressing the topic of postnatal depression (identification, sources of help, importance of social support).
Buist et al., 1999; AUS	44	Education	RCT	TAU	Both	Selected (≥3 risk factors on the screening questionnaire developed by authors)	Group	10	Total	The intervention group, with partners, attended 10 sessions about parenting and coping strategies (e.g., how to deal with a baby's crying). One session focused on PPD education (recognition, where to get treatment, partner's role).
Elliott et al., 2000; UK	99	Psychosocial	CT	TAU	Both	Selected (LQ <sup>a</sup> , CCEI anxiety subscale ≥10)	Group	11	Partial	Partners were invited to attend session 2 with women. Content of the session not reported.
Fisher et al., 2010; AUS	399 couples	Education	CT	TAU	POST	Universal	Group	1 half-day session*	Total	Couples attended the session with their first newborn at Saturday mornings. The two main components addressed baby's behavior management issues (e.g., sleep needs, settling strategies) and readjustment in the intimate relationship (parenthood expectations and losses/gains, equality of household and baby-care tasks, and problem-solving strategies).

<b>Hayes &amp; Muller, 2004;</b> AUS	206	Education	RCT	TAU	ANT	Universal	Individual (Information booklet)	6 sessions	Unclear	Information booklet with 6 categories of information (plus audiotape and midwife guidance) that covered education about emotional changes and ways to get help, designed for pregnant women, their partners, and extended family. Unclear if all of the 5 categories of information were also designed to partners or if only the last one: the sixth category offered information targeted specifically at partners, extended family and friends.
<i>Hayes et al., 2001;</i> AUS										
<b>Kozinsky et al., 2012;</b> HUN	1762	CBT IPT Education	RCT	TAU	ANT	Universal	Group	4*	Total	The partners were allowed to attend the sessions with women that covered education about pregnancy/postpartum issues (e.g., breastfeeding) and PPD (e.g., symptoms, risk factors, treatment issues), PPD screening and coping skills (e.g., Partner's contribution to childcare, problem-solving and communication skills), help-seeking issues, and relaxation.
<b>Mao et al., 2012;</b> CHN	240	CBT	RCT	TAU	ANT	Universal	Both	4 group +1 individual	Total	The partners were allowed to attend the sessions with women as "secondary participants". The sessions covered Chinese delivery culture issues and ways of coping, problem-solving and communication skills, cognitive restructuring and relaxation exercises, and ways to improve self-confidence. The individual counseling session allowed the discussion of more intimate concerns between partners (e.g., sexual relationship).
<b>Matthey et al., 2004;</b> AUS	268	Psychosocial	RCT	TAU TAU+ (extra session on "baby play")	ANT	Universal	Group	1*	Total	All couples (3 conditions) received six routine antenatal sessions at evening. Couples were approached to participate at one extra session occurred at week 5 in the TAU+ and empathy conditions. The session in the empathy condition focused on each partner's postpartum concerns and coping strategies to cope with these concerns. Couples also received post-session mail-outs to consolidate the information given in the extra session.
<b>Melnyk et al., 2006;</b> USA	260	Education	RCT	Information about hospital services and policies	POST	Selected (Prematurity)	Individual	4	Total	Mothers and fathers (or significant others) received information about: (1) the appearance and behavioral characteristics of preterm infants and how best to parent them; and (2) practical parenting activities specific to the situation (e.g., strategies to assist their infants when stressed).
<b>Milgrom et al., 2011;</b> AUS	143	CBT	RCT	TAU+	Both	Selected/Individual and/or RAC	Individual (Workbook+ Phone)	9 units + 8 phone sessions with	Total	All participants (intervention and control groups) received a community networking pamphlet with contacts for relevant services and an information booklet about perinatal emotional health. The intervention consisted of a single self-

									≥13)	women	help workbook with 9 units for both partners (they were encouraged to share reactions to the material together); Unit 2 was specially designed to partners and covered father–baby relationship issues and Unit 5 covered couple’s relationship concerns (e.g., normative relationship changes, communication skills). Expectations about parenting, problem-solving strategies, cognitive and behavioral strategies for coping with depression and anxiety were also covered.
<b>Stamm et al., 1995; AUS</b>	144	Psychosocial	RCT	TAU	Both	Selected (score ≥2 on a modified antenatal screening questionnaire)	Group	3*	Total		Sessions focused on practical and emotional preparation for changes resulting from baby’s birth. The postpartum session emphasized mutual support and included a videotape about PPD. A particular aspect of the program was designed to encourage partners to acquire supportive strategies. Specific content was not reported.
<b>Thomas et al., 2014<sup>e</sup>; AUS</b>	48	CBT IPT Education	QE	NA	ANT	Selected/Indicated (Current/leaving depression or anxiety symptoms or past psychiatric history)	Group	6 <sup>d</sup>	Partial		Partners attended two sessions with women that covered: (1) parenthood-related changes, education of parental mental health (e.g., mood monitoring and detection of early and late warning signs of depression and anxiety) and coping plans to manage symptoms; (2) couple (e.g., normative relationship changes, communication skills) and father–child relationship concerns.

*Note:* USA = United States; UK = United Kingdom; AUS = Australia; HUN = Hungary; CHN = China; CBT = Cognitive-Behaviour Therapy; IPT = Interpersonal Psychotherapy; RCT = randomized controlled trial; CT = controlled trial; QE = quasi-experimental design; TAU = treatment as usual; TAU+ = enhanced treatment as usual; NA = not applicable; POST = postpartum; ANT = antenatal; Both = POST + ANT/individual + group; GHQ-D = General Health Questionnaire modified; LQ = Leverton Questionnaire; CCEI = Crown Crisp Experiential Index; EPDS = Edinburgh Postnatal Depression Scale; RAC = Risk Assessment Checklist.

\* Participants attended the session(s) in addition to standard care (TAU).

<sup>a</sup> Women were classified as vulnerable if they scored two on any one of the vulnerability questions in the LQ or scored 1 on more than one question;

<sup>b</sup> Total sample included 258 mothers and 154 fathers/significant others (81 in the intervention group and 73 in the comparison group). Although 2 mothers choose not to participate, the fathers of those infants were enrolled;

<sup>c</sup> Antenatal intervention delivered to pregnant women with current depressive and anxiety symptoms or at risk of developing PPD;

<sup>d</sup> Of a total of eight groups delivered, the earlier programs comprised five sessions (including one partner session), whilst the last four had six sessions (based on the feedback from women and partners an additional partner session was integrated).

Table 2

*Intervention characteristics of included studies assessing treatment interventions for PPD (n = 13)*

Study (Country)	Sample size	Intervention approach	Study Design	Control type	Intervention Format	No. Sessions	Partner participation	Partner/Couple Session(s) Content
Brandon et al., 2012 <sup>a</sup> ; USA	11 couples	PA-IPT	OT	NA	Individual	8	Total	Couple-based intervention that covered IPT strategies, including ways of partners being emotionally and instrumentally supportive and respond to women's needs.
Chen et al., 2011 <sup>b</sup> ; SING	41	CBT IPT Counseling Education	QE	NA	Individual	NS	Partial	Intervention program considered a second part for partners, which included PPD psychoeducation (e.g., adverse consequences, treatment options), counseling to enhance support to the patient (e.g., facilitating the understanding of PPD, encouraging support), and assessment of partner's needs (brief exploration of partner's coping and counseling on resources available).
Danaher et al., 2013; AUS USA	53	CBT	QE	NA	Individual (Web + Phone)	6	Partial	Separate Partner Support Website about information on PPD, overview of MomMoodBooster Program, and ways to be supportive.
Hou et al., 2014; CHIN	249	CBT SFT	RCT	TAU	Individual	13 CBT + 6 SFT*	Partial	Family therapy content included reconstruction of the mode of interaction (enhancing family relationships and support) among family members (e.g., couples, parents of couples), but it was not clear which person participated.
Lane et al., 2002; AUS	23	CBT	QE	NA	Group	10 + 1 or 2 partner sessions	Partial	One or two partner's (only) evening sessions (content not reported).
Meager & Milgrom, 1996; AUS	20	CBT	RCT	WL	Group	10	Partial	One separate session for partners "to promote a better understanding of PPD and to facilitate change". It was not specified if the session was part of the 10 delivered and if addressed both partners and the women.
Milgrom et al., 2005; AUS	192	CBT	RCT	TAU Counseling	Group	9 + 3 couple sessions	Partial	Partners attended three sessions with women (content not reported).
Milgrom et al., 2015; AUS	45		RCT	Sertraline Sertraline + CBT				
Misri et al., 2000; CAN	29	Education	RCT	Women participati on only	Group	7	Partial	Partners attended sessions 2, 4, 6 and 7 (content not reported) with women. The researcher encouraged positive interactions between the couple by focusing on postpartum issues (e.g., involvement in baby-tasks and housework).

<b>Morgan et al., 1997; AUS</b>	34 <sup>e</sup>	CBT	QE	NA	Group	8 + couple session	Partial	One evening session conjoint with women at week 6 organized in three parts: 1) introductory meeting, where women shared their difficulties followed by partner's perceptions; 2) meeting with mothers and partners separately; 3) group discussion.
<b>Puckering et al., 2010; UK</b>	20	CBT Education	RCT	WL	Group	14 + 3 partner sessions	Partial	Three evening partner (only) sessions about information on PPD and activities to promote father-baby interactions.
<b>Reay et al., 2006; AUS</b>	18	IPT-Group	QE	NA	Both	2 individual + 8 group + partner session	Partial	Partner (only) evening psychoeducational session about PPD (e.g., symptoms, causes, consequences) and practical and communication strategies to support and respond to women. <sup>d</sup>
<b>Mulcahy et al., 2010; AUS</b>	57		RCT	TAU				
<b>Reay et al., 2012 (follow-up)</b>	(50)							

*Note.* USA = United States; SING = Singapore; AUS = Australia; CHIN = China; CAN = Canada; UK = United Kingdom; PA-IPT = Partner-Assisted Interpersonal Psychotherapy; CBT = Cognitive-Behaviour Therapy; IPT = Interpersonal Psychotherapy; SFT = Systemic Family Therapy; OT = open trial; QE = quasi-experimental design; RCT = randomized controlled trial; NA = not applicable; TAU = treatment as usual; WL = waiting list; Both = individual + group; NS = not specified.

\* Participants attended the session(s) in addition to standard care (TAU).

<sup>a</sup> Treatment delivered to pregnant and postpartum women (72.7% and 27.3%, respectively);

<sup>b</sup> Case management model for PPD, with screening and intervention components;

<sup>c</sup> One couple have a child 2-years old;

<sup>d</sup> Additional information retrieved from the descriptive study (Reay, Mulcahy, et al., 2012).

Table 3

*Methodological quality of included studies assessing preventive and treatment interventions for PPD*

Study	Sample char	Sample power	ITT	Control	Assess point	Blind assess	Drop-out / Reas	Loss to FU / Reas	Excl curr treat
<b>Preventive studies</b>									
Bernard et al., 2011	+	+	-	+	-	NA	+/+	+/+	
Brugha et al., 2000	+	+	+	+	-	+	+/-	+/-	
Buist et al., 1999	+	-	-	-	+	NA	-/-	+/-	
Elliot et al., 2000	-	-	+	-	+	+	+/-	+/-	
Fisher et al., 2010	+	+	+	+	-	+	+/+	+/-	
Hayes & Muller, 2004	+	+	-	+	+	-	-/-	+/+	
<i>Hayes et al., 2001</i>	+	+	-	+	+	-	-/-	+/-	
Kozinsky et al., 2012	+	-	+	+	-	+	-/-	+/-	
Mao et al., 2012	+	-	+	-	-	+	+/-	+/+	
Marthey et al., 2004	+	+	+	+	+	NS	+/-	+/-	
Melnyk et al., 2006	+	+	+	+	-	NA	+/-	+/-	
Milgrom et al., 2011	+	+	+	+	-	NA	+/-	+/-	
Stamp et al., 1995	+	+	+	-	+	NA	+/-	+/-	
Thomas et al., 2014	+	-	-	-	-	NA	+/+	+/-	
<b>Treatment studies</b>									
Brandon et al., 2012	+	-	-	-	+	+	+/-	+/+	+
Chen et al., 2011	+	-	-	-	-	NA	-/-	-/-	+
Danaher et al., 2013	+	-	+	-	+	-	+/-	+/-	+
Hou et al., 2014	+	-	-	-	+	NA	-/-	+/+	-
Lane et al., 2002	-	-	-	-	-	NA	+/+	+/-	NS
Meager & Milgrom, 1996	+	-	-	-	-	NA	+/+	+/-	-
Milgrom et al., 2005	+	+	+	+	+	NA	+/-	+/-	+
<i>Milgrom et al., 2015</i>	+	+	+	+	+	NA	+/-	+/-	+
Misri et al., 2000	+	-	-	-	+	NS	+/-	+/-	-
Morgan et al., 1997	+	-	-	-	+	NA	+/-	-/-	-
Puckering et al., 2010	-	-	-	-	-	NA	+/-	+/-	-
Reay et al., 2006	+	-	+	-	+	+	+/+	+/-	-
<i>Mitcchay et al., 2010</i>	+	-	+	-	+	+	+/+	+/-	-
<i>Reay et al., 2012</i>	+	-	-	+	NA	NA	NA	+/+	NA

*Note.* Sample char = describe sample's characteristics; Sample power = report power analysis; ITT = report intention-to-treat analysis; Control = report control of confounders in data analyses; Assess point = two or more assessment time points; Blind assess = interviewers were blind to group condition; Drop-out/Reas = specify the number of participants who dropped-out/specify the reasons for drop-out; Loss to FU/Reas = specify the number of participants who were loss to follow-up/specify the reasons for loss to follow-up; Excl curr treat = exclusion of women receiving current treatment (e.g., pharmacotherapy,

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psychotherapy) at baseline; + = yes; - = no; NA = not applicable; NS = not specified.



Table 4

*Assessment characteristics of included studies assessing preventive interventions for PPD (n = 13)*

<b>Study</b>	<b>Method of outcome assessment</b>	<b>Outcome measure + Cut-off/Diagnostic criteria</b>	<b>Postpartum assessment timings (weeks)</b>	<b>Women's attendance</b>	<b>Partner/Couple's attendance</b>
<b>Bernard et al., 2011</b>	Self-report	Women: BDI-II	4 weeks after infant's discharge from NICU	26/31 mothers received all 3 sessions.	NS
<b>Brugha et al., 2000</b>	Both	Women: GHQ-D $\geq 2$ EPDS $\geq 11$ SCAN ICD-10	12	42/94 (45%) of the intervention group women (who completed the 3-month assessment) attended 2 or more sessions in addition to session 3.	NS
<b>Buist et al., 1999</b>	Self-report	Women: BDI EPDS	6 24	NS	NS
<b>Elliott et al., 2000</b>	Both	Women: EPDS PSE CCEI SRQ	12 48	18/21 first-time mothers and 15/26 second-time mothers attended an average of 7 and 4 sessions, respectively.	NS
<b>Fisher et al., 2010</b>	Clinician-administrated measure	Women: CIDJ <sup>a</sup>	24	120/189 (64%) women attended the session.	Unclear
<b>Hayes &amp; Muller, 2004</b>	Clinician-administrated measure	Women: SADS-M	8-12 16-24	NS	NS
<i>Hayes et al., 2001</i>		Women: POMS			
<b>Kozlinsky et al., 2012</b>	Clinician-administrated measure	Women: LQ $\geq 12$	6-8	NS	NS
<b>Mao et al., 2012</b>	Both	Women: PHQ-9 $\geq 10^*$ EPDS $\geq 11$ SCID (DSM-IV-TR)	6	All participants completed the intervention.	Unclear

<b>Matthey et al., 2004</b>	Both	Women and partner: EPDS (various cut-offs) POMS DIS (DSM-IV) CES-D (partners only)	Women and partner: 6 24		246/268 couples (92%) <sup>b</sup>
<b>Melnik et al., 2006</b>	Self-report	Women and partner: BDI-II	Women and partner: <sup>c</sup> 8 week's corrected infant age	Unclear	Unclear
<b>Milgrom et al., 2011</b>	Self-report	Women: BDI-II ≥14 Partner: DASS	12	50.7% of women in the intervention group participated in all 8 Phone sessions.	NS
<b>Stamp et al., 1995</b>	Self-report	Women: EPDS > 9 (minor depression) and > 12 (major depression)	6 12 24	31% of women attended the three intervention groups.	3/71 (4%) partners attended at least one of the three groups
<b>Thomas et al., 2014</b>	Self-report	Women: CES-D ≥19* EPDS	8	37/48 (77%) women completed at least 80% of the 6 sessions.	28/48 (58.3%) attended at least one partner session

*Note.* Both = self-report + clinician-administered measures; BDI/BDI-II = Beck Depression Inventory; GHQ-D = General Health Questionnaire modified; EPDS = Edinburgh Postnatal Depression Scale; SCAN ICD-10 = Schedules for Clinical Assessment in Neuropsychiatry using ICD-10 criteria for depressive disorder; PSE = Present State Examination; CCEI = Crown Crisp Experiential Index; SRQ = Self Rating Questionnaire; CIDI = Composite International Diagnostic Interview; SADS-M = Schedule for Affective Disorders and Schizophrenia modified; POMS = Profile of Mood States; LQ = Leventon Questionnaire; PHQ-9 = Patient Health Questionnaire; SCID = Structured Clinical Interview for DSM-IV; DSM-IV/DSM-IV-TR = DSM-IV/DSM-IV-TR depression criteria (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition/Text Revision); DIS = Diagnostic Interview Schedule; CES-D = Center for Epidemiological Studies Depression Scale; DASS = Depression Anxiety Stress Scales short form; NICU = Neonatal Intensive Care Unit; NS = not specified.

\* Measures administered after the intervention completion but antenatally;

<sup>a</sup> Diagnosis of Depression or Anxiety or Adjustment Disorder with Depressed Mood, Anxiety, or Mixed Anxiety and Depressed Mood;

<sup>b</sup> Couples attending the extra session in the Empathy (intervention) or Baby Play (TAU+) conditions, or the Control session in which PPD was discussed.

<sup>c</sup> Follow-up data collection occurred at each of the session II through IV session interventions (2-4 days after the first session, 1-4 days before infant discharge from the NICU, and 1 week post-NICU discharge, respectively), before the interventions.

Table 5

*Assessment characteristics of included studies assessing treatment interventions for PPD (n = 13)*

Study	Treatment inclusion	Method of outcome assessment	Outcome measure + Cut-off/Diagnostic criteria	Post-intervention assessment timings (weeks)	Women's attendance	Partner/Couple's attendance
Brandon et al., 2012	DSM-IV + HAM-D ≥16	Both	Women: HAM-D > 9 EPDS > 12* Partner: HAM-D > 9 EPDS-P*	0 6-8		10/11 couples (100%) <sup>a</sup>
Chen et al., 2011	EPDS ≥13 or ≥1 yes in one of the 3 add questions (infanticide impulses, psychotic symptoms)	Self-report	Women: EPDS ≥13	24 weeks post-enrollment or at discharge.	NS	NS
Danaher et al., 2013	PHQ-9 10-19 or EPDS 12-20	Both	Women: PHQ-9 HRSID	12 and 24 weeks post-enrollment.	46/53 (87%) women completed all 6 sessions.	18/53 (34%)
Hou et al., 2014	DSM-IV-TR	Self-report	Women: EPDS	0 6, 12, 18, 24 months postpartum.	NS	NS
Lane et al., 2002	NS	Self-report	Women: EPDS	0	18/23 (78%) women completed the intervention.	NS
Meager & Milgrom, 1996	EPDS >12 + BDI > 15	Self-report	Women: EPDS BDI POMS	0	6/10 (40% attrition) women completed the 10 sessions.	NS
Milgrom et al., 2005	EPDS ≥12 + DSM-IV	Self-report	Women: BDI ≥17	0 48	107/159 (67%) women allocated to the three psychological interventions attended the respective intervention.	NS
Milgrom et al., 2015	EPDS ≥13 + DSM-IV	Self-report	Women: BDI-II ≥13	12 and 24 weeks post-enrollment.	Women completed an average of 10.6 sessions and all completed at least half of the sessions (CBT condition)	NS
Misri et al., 2000	DSM-IV + EPDS ≥12	Both	Women: EPDS	0 4	29/29 (100%) women attended all sessions.	NS

			MINI (DSM-IV) SQ Partner: GHQ			
<b>Morgan et al., 1997</b>	EPDS $\geq 13$	Self-report	Women: GHQ EPDS $\geq 13$ Partner: GHQ $\geq 7/8^b$	0 24 weeks (only for the last 4 groups) <sup>c</sup>	Only one woman dropped-out; attendance at the sessions was at a level of 90%.	21/29 <sup>d</sup> (72%)
<b>Puckering et al., 2010</b>	EPDS > 10	Self-report	Women: EPDS	0	11/12 women attended the intervention group.	NS
<b>Reay et al., 2006</b>	EPDS $\geq 13$ + DSM-IV	Both	Women: EPDS BDI HAM-D $\geq 8$	0 12	17/18 (94%) women attended the intervention.	14/18 (78%)
<b>Malcahy et al., 2010</b>	DSM-IV + HAM-D $\geq 14$	Both	Women: EPDS $\geq 13$ BDI-II HAM-D $\geq 8$	0 12	22/29 (76%) women attended the intervention.	NS
<b>Reay et al., 2012 (follow-up)</b>		Self-report	EPDS $\geq 13$ BDI-II	2-year post-intervention.		

*Note.* DSM-IV/DSM-IV-TR = DSM-IV/DSM-IV-TR depression criteria (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition/Text Revision); HAM-D/HRSD = Hamilton Rating Scale for Depression; EPDS = Edinburgh Postnatal Depression Scale; EPDS-P = Edinburgh Postnatal Depression Scale – Partner; PHQ-9 = Patient Health Questionnaire; NS = not specified; BDI/BDI-II = Beck Depression Inventory; Both = self-report + clinician-administered measures; POMS = Profile of Mood States; MINI = MINI-International Neuropsychiatric Interview; SQ = (Kellner) Symptom Questionnaire; GHQ = General Health Questionnaire; Y = efficacious; N = Not efficacious.

\* Measures administered during the intervention before each session.

<sup>a</sup> Couples attending all the sessions (one couple excluded because of the presence of partner violence; attendance 100%);

<sup>b</sup> Partners assessed “in the last three joint sessions” at week 6;

<sup>c</sup> 48 weeks (12 months) follow-up for the first group and 36 weeks (9 months) for the second group;

<sup>d</sup> Because couple’s session was run from the second group onwards (of a total of six groups), only 21 out of 29 partners attended the session.

Table 6

*Intervention outcomes of preventive interventions for PPD (n = 13)*

Study	Efficacy of the intervention on women's depressive symptoms	Relevant information about partner (for this review)
Bernard et al., 2011	Women in the intervention group tended to report marginally significant lower levels of depressive symptoms at follow-up in comparison with those in the CG ( $p = 0.06$ ).	Since few partners choose to participate in the study, only data on mothers were presented.
Brugha et al., 2000	No significant differences in the percentage of women with clinically significant depressive symptoms between intervention group and CG at 12 weeks postpartum.	No objective information was given about partner's attendance.
Buist et al., 1999	No significant differences in depressive symptoms between intervention group and CG at both assessment time points. No significant change over time within groups.	
Elliott et al., 2000	First-time mothers in the intervention group reported significantly lower levels of depressive symptoms in comparison with those in the CG at 12-weeks postpartum (effects no longer present at 48 weeks postpartum). A significantly lower percentage of first-time mothers in the intervention group experienced clinically significant depressive symptoms during the first 2 months postpartum.	
Fisher et al., 2010	Women without psychiatric history in the intervention group were significantly less likely to experience the onset of Depression or Anxiety or Adjustment Disorder in comparison with those in the CG at 24 weeks postpartum.	
Hayes & Muller, 2004	No significant differences in changes in depressive symptoms from pre- to postpartum assessment time points between intervention group and CG.	
Hayes et al., 2001	Significant improvements in depressive symptoms from pre- to postpartum assessment time points within both groups, but no significant differences in improvement were found between intervention group and CG.	
Kozinszky et al., 2012	Women in the intervention group reported significantly lower levels of depressive symptoms, and were less likely to experience PPD, in comparison with those in the CG at 6-8 weeks postpartum.	
Mao et al., 2012	Women in the intervention group reported significantly lower levels of depressive symptoms, and were less likely to experience PPD, in comparison with those in the CG at 6-weeks postpartum.	

<b>Matthey et al., 2004</b>	Women with low self-esteem in the intervention group (empathy condition) reported significantly lower levels of depressive symptoms at 6 weeks postpartum in comparison with those in the two CG (effects no longer present at 24 weeks postpartum). There were no significant differences in the percentage of low self-esteem women with clinically significant depressive symptoms between conditions at both assessment time points.	The results of these women were related to their partners' increased awareness of what the women were experiencing. These women also reported, at 6 weeks postpartum, a higher satisfaction with the sharing of baby and home-related tasks. No significant impact of the intervention on partner's depressive symptoms was found.
<b>Melnik et al., 2006</b>	Women in the intervention group reported significantly lower levels of depressive symptoms in comparison with those in the CG at 8 weeks' corrected infant age.	No significant differences in depressive symptoms between partners/significant others in the intervention group and those in the CG.
<b>Milgrom et al., 2011</b>	Women in the intervention group reported significantly lower levels of depressive symptoms in comparison with those in the CG at 12-weeks postpartum. A significantly lower percentage of women in the intervention group experienced clinically significant depressive symptoms following intervention.	Most partners (intervention: $n = 16$ , CG: $n = 8$ ) did not complete follow-up assessment and 14% women were single. Although partners in the intervention group scored lower in postpartum depressive symptoms in comparison to those in the CG, no significant differences were found between the groups.
<b>Stamp et al., 1995</b>	No significant differences in the percentage of women with clinically significant depressive symptoms between intervention group and CG at all assessment time points.	
<b>Thomas et al., 2014</b>	Significant improvements in depressive symptoms among women from pre- to post-intervention (antenatal period), and up to 2-months postpartum.	The feedback reported by 21 partners (75%) about their participation was highly positive, underscoring a better understanding of parental mental health issues and resources available to their family. 67% said they would recommend the program to other fathers. The authors intended to assess the benefits perceived by women from partner's attendance but no data were reported in the article.

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*Note.* CG = control group.

Table 7

*Intervention outcomes of treatment interventions for PPD (n = 13)*

Study	Efficacy of the intervention on women's depressive symptoms	Relevant information about partner (for this review)
<b>Brandon et al., 2012</b>	Significant improvements in depressive symptoms from pre- to post-intervention, which were maintained at 6/8-weeks follow-up. By the end of the intervention, 90% (9/10) of the women met criteria for clinical response (HAM-D = 9), and at 6/8-weeks follow-up 8 of these 9 women met criteria for symptomatic recovery.	Partner's depressive symptoms remained low from intake to the end of the intervention (except in one partner). One of the two partners that met criteria for past episodes of Major Depressive Disorder experienced symptom recurrence over the course of the acute phase. Women and their partners reported some benefits from participating in the intervention, and the authors observed a better recognition of women's depressive symptoms by their partners at the end of the intervention.
<b>Chen et al., 2011</b>	Significant improvements in depressive symptoms from pre- to post-enrollment assessment in 78% (32/41) of women (EPDS < 13).	
<b>Danaher et al., 2013</b>	Significant improvements in depressive symptoms from pre- to 12 weeks post-enrollment and to 24-weeks follow-up, 90% (26) of the 29 women who met PHQ-9 criteria for minor or major depression at baseline did not report these criteria anymore at 12 weeks post-enrollment.	
<b>Hou et al., 2014</b>	Women in the intervention group reported significantly lower levels of postpartum depressive symptoms in comparison with those in the CG following intervention. Observed improvements in depressive symptoms from pre- to different post-intervention time points in both groups, but significantly greater among women in the intervention group.	
<b>Lane et al., 2002</b>	Significant improvements in depressive symptoms from pre- to post-intervention.	The authors mentioned higher partner attendance without reporting objective information. Partners reported benefits (not specified) from participating in the intervention.
<b>Meager &amp; Milgrom, 1996</b>	Significant improvements in depressive symptoms among women in the intervention group from pre- to post-intervention, with these women reporting significantly lower levels of depressive symptoms in comparison with those in the CG following intervention.	
<b>Milgrom et al., 2005</b>	Women who received psychological interventions (CBT and counseling) reported significantly lower levels of postpartum depressive symptoms in comparison with those in the standard care group following intervention. More than 50% of these women (vs. 29% in the standard care group) reported minimal levels of depression (BDI-II < 17). Follow-up data were too scarce to adequate analyses.	
<b>Milgrom et al., 2015</b>		CBT mono-therapy and sertraline mono-therapy were found to be superior at 12 weeks post-enrollment to combination therapy in reducing depressive symptoms. Within the

CBT mono-therapy group, the percentage of women reporting minimal levels of depression (BDI-II < 13) was significantly higher at 24 weeks follow-up compared to pre-intervention.

**Misri et al., 2000** Women in the support group (partners involved) reported significantly lower levels of postpartum depressive symptoms in comparison with those in the CG (partners not involved) at 1 month post-intervention. 81% (13) of the 16 women in the support group who met MINI criteria for major depression at baseline did not report these criteria anymore at 1 month post-intervention (vs. 39% in the CG).

Higher data completion at assessment time points from partners. Partner's general mental health was higher among those involved in treatment than those who did not (CG) at both assessment time points. Women in the support group reported significantly higher levels of dyadic adjustment in comparison with those in the CG following intervention.

**Morgan et al., 1997** Significant improvements in depressive symptoms from pre- to post-intervention. Any women scored above the cut-off score on the EPDS at follow-up.

There were no significant differences in women's outcomes based on the partner's participation in the couple's session. 8/14 men scored in the GHQ distressed range, and 6 of them had a partner who scored above the EPDS cut-off score. Women and their partners reported some benefits from participating in the joint session.

**Puckering et al., 2010** Significant improvements in depressive symptoms among women in the intervention group from pre- to post-intervention, with these women reporting significantly lower levels of depressive symptoms in comparison with those in the CG following intervention.

The authors mentioned higher partner attendance without reporting objective information.

**Reay et al., 2006** Significant improvements in depressive symptoms from pre- to post-intervention, which were maintained at 12-weeks follow-up. By the end of the intervention, 50% of the women fully remitted (HAM-D < 8).

**Mulcahy et al., 2010** Significant improvements in depressive symptoms from pre- to post-intervention in both groups, but significantly greater among women in the intervention group, who reported significantly lower levels of postpartum depressive symptoms compared to those in the CG (differences between groups persisted at 12-weeks follow-up). A significantly higher percentage of women in the intervention group met criteria for recovery following intervention (EPDS < 13 and HAM-D < 8).

**Reay et al., 2012 (follow-up)** Mothers who received IPT-G were less likely to develop persistent depressive symptoms in the long-term and to require treatment during the 2-year follow-up.

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*Note.* HAM-D = Hamilton Rating Scale for Depression; EPDS = Edinburgh Postnatal Depression Scale; PHQ-9 = Patient Health Questionnaire; CG = control group; CBT = Cognitive-Behaviour Therapy; BDI-II = Beck Depression Inventory-II; MINI = MINI-International Neuropsychiatric Interview GHQ = General Health Questionnaire; IPT-G = Interpersonal Psychotherapy-group.



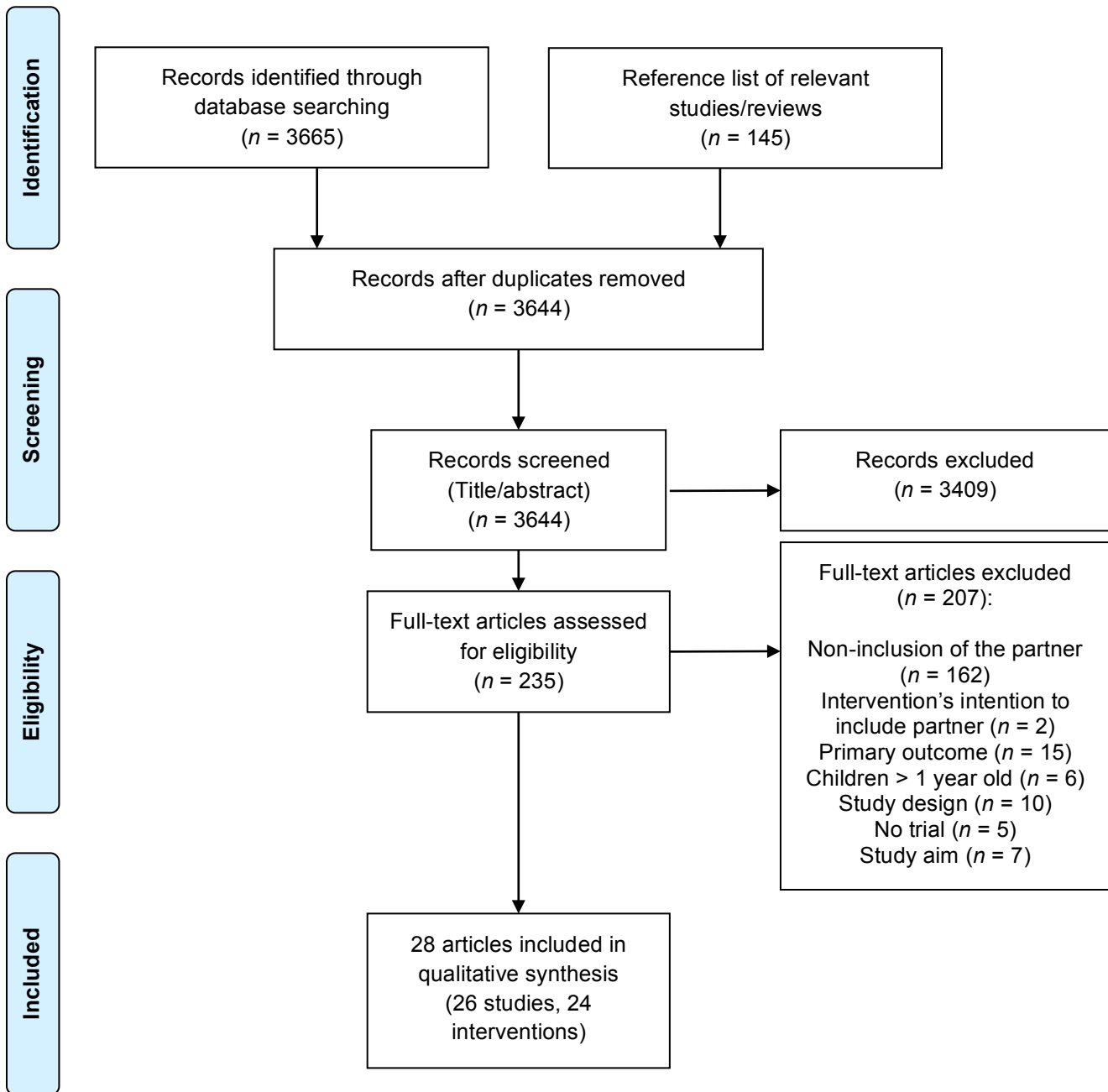


Figure 1. Flow chart illustrating identification of included studies.