REVIEW ARTICLE

The impact of childhood trauma on psychological interventions for depression during pregnancy and postpartum: a systematic review

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Abstract

Women who have experienced childhood trauma (CT) are at increased risk for depression during pregnancy and postpartum, pregnancy complications, and adverse child outcomes. There are effective psychotherapeutic interventions to treat depression during pregnancy and postpartum, yet there is a paucity of literature on the impact of CT on treatment outcomes. This review aims to determine whether and how maternal CT history affects the outcomes of psychological interventions for depression during pregnancy and postpartum. PubMed, PsycINFO, and Cochrane Library searches were conducted to identify papers on psychological interventions designed to treat depression during pregnancy and postpartum in women with CT. Seven manuscripts, describing six studies, met the inclusion criteria ($N = 1234$). Three studies utilized core principles of interpersonal psychotherapy (IPT). Two studies investigated interventions based on cognitive behavioral therapy (CBT). One study was based on a psychoeducation component. Results suggest that IPT-based interventions are beneficial for women with CT. The evidence regarding CBT-based interventions is less conclusive. This review is written in light of the paucity of research addressing the question systematically. The Childhood Trauma Questionnaire (CTQ) was the main measure used to assess CT. Trauma related to accidents, illness, and political violence was not included. The results are only applicable to interventions based on either IPT or CBT and cannot be generalized to other forms of psychotherapy. Psychotherapeutic interventions are beneficial for depressed women with history of CT during pregnancy and postpartum; however, further systematic research is needed.

Keywords Systematic review · Depression · Pregnancy · Postpartum · Childhood trauma · Psychological interventions

Introduction

Depression during pregnancy and postpartum represents a major public health problem affecting 15–20% of women, with significantly higher rates in women who have a history of childhood trauma (CT; Meltzer-Brody et al. 2018; Olsen 2018; Wajid et al. 2019). Childhood traumatic experiences, such as physical and emotional abuse, neglect, and/or sexual abuse, are highly prevalent, with over 60% of adults in the USA reporting being exposed to at least one traumatic event in their childhood (Merrick et al. 2018). Maternal CT affects child neurodevelopment (Bush et al. 2018; Gustafsson et al. 2017; Keenan et al. 2018) and is associated with a higher risk for lifetime psychopathology of offspring (Plant et al. 2018; Roberts et al. 2015). The co-occurrence of postpartum depression (PPD) and maternal CT puts children at greater risk for childhood maltreatment, with subsequent effects on internalizing and externalizing symptomatology (Choi et al. 2019; Oh et al. 2016; Plant et al. 2013). Among mothers with CT, PPD and post-traumatic stress disorder (PTSD), but not maltreatment history alone, are associated with greater bonding impairment over the first 6 months postpartum (Muzik et al. 2013). In mothers with CT, PPD was the most prominent risk factor associated with parenting impairment during infancy (Muzik et al. 2017). Providing effective interventions for

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depressed pregnant and postpartum women with CT offers a unique opportunity to improve maternal mental health and interrupt the pattern of intergenerational transmission of trauma and psychiatric vulnerability.

There are effective psychotherapies for women with depression during pregnancy and postpartum, including interpersonal psychotherapy (IPT) and cognitive behavioral therapy (CBT; Nillni et al. 2018). Remission of the mother's depressive symptoms reduces adverse effects in children up to 1 year following remission (Wickramaratne et al. 2011). Yet, studies show that only 6.3–8.6% of women with perinatal depression receive adequate treatment and less than 5% achieve remission (Cox et al. 2016). History of CT has been associated with poorer treatment outcomes in major depressive disorder (MDD; Nanni et al. 2012; Nemeroff 2016). Attachment insecurity was related to lower response to psychotherapy, possibly through weaker therapeutic alliances (Diener and Monroe 2011; Reiner et al. 2016). Nevertheless, the impact of CT on treatment outcomes for perinatal depression remains largely unclear.

To the best of our knowledge, this is the first systematic review examining the associations between CT and outcomes of psychological interventions for depression during pregnancy and postpartum. We focused on psychotherapeutic interventions, as pharmacotherapy has much less compelling evidence in addressing the behavioral and cognitive sequelae of trauma (Bryant 2019; Lee et al. 2016). The aims of this review are to (1) determine whether evidence-based psychological treatments for depression during pregnancy and postpartum are effective for women with a history of trauma and (2) examine if maternal trauma history alters treatment effectiveness for depression in pregnant or postpartum women.

Methods

This review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al. 2009). The protocol was preregistered on PROSPERO (CRD42018095328). Searches were conducted up to May 2020 in PubMed, PsycInfo, and the Cochrane Library databases. The search strategy (Appendix 1) included keywords related to psychotherapeutic interventions, pregnancy, postpartum, depression, and trauma. To ensure literature saturation, we also scanned the references of included studies and relevant reviews identified through our search. The search was not limited to CT, but rather included trauma history at large, to ensure the inclusion of all relevant literature. Two reviewers (IR and EW) independently screened candidate papers and determined whether they met inclusion criteria. Disagreements were resolved through discussion and consensus. See Appendix 1 for inclusion/exclusion criteria and the comprehensive search strategy.

Results

Searches yielded 1523 unique articles. Fifty-one were potentially eligible for inclusion based on title and abstract. After full-text review, seven articles, describing six different studies, met the inclusion criteria. The PRISMA flow chart summarizes the study selection process (see Fig. 1).

Study characteristics

All the studies were conducted in the USA and published after 2012. A total of 1234 women participated in the studies. Mean age was 27 years old. See Table 1 for a summary of the studies' characteristics. Most studies were high quality with low risk of bias (Appendix 2, Table 3); however, the analyses of trauma effects were conducted as secondary analyses, not as primary aims.

The most common instrument used to evaluate trauma history was the Childhood Trauma Questionnaire (CTQ). This is a 28-item retrospective self-report questionnaire that uses a 5-point Likert scale to assess five types of CT: sexual abuse (SA), physical abuse (PA), physical neglect (PN), emotional abuse (EA), and emotional neglect (EN; Bernstein and Fink 1998). The CTQ has good construct validity and internal consistency (Bernstein et al. 2003), as well as high test-retest reliability (Paivio and Cramer 2004). The CTQ can be used as a categorical variable, classifying trauma severity into groups, or as a continuous variable with higher scores indicating more exposure to CT. Among the manuscripts reviewed, only one (Stevens et al. 2019) added a questionnaire to assess other traumatic experiences, such as crime or natural disaster. For a detailed description of the psychometric measures used in included studies, see Table 2. Below is a qualitative summary of the studies' results grouped together by the core component of the interventions provided.

IPT-based interventions

Interpersonal psychotherapy is a structured time-limited therapy for depression focused on interpersonal functioning and relationships (Weissman et al. 2000). It has been shown to be effective for perinatal depression, shortening time to recovery, and prolonging remission (Miniati et al. 2014). Three of the studies included in our review are based on IPT, with a particular focus on interpersonal interactions, role transitions, and meaningful relationships. The first paper describes a secondary analysis of a randomized control trial (RCT) of brief-IPT (IPT-B) among a group of socioeconomically disadvantaged depressed pregnant women (Grote et al. 2012). The IPT-B intervention is a multicomponent model of care consisting of a pretreatment engagement session, eight acute sessions, and maintenance continuing up to 6 months postpartum (Grote et al. 2008).The study examined whether CT moderates or
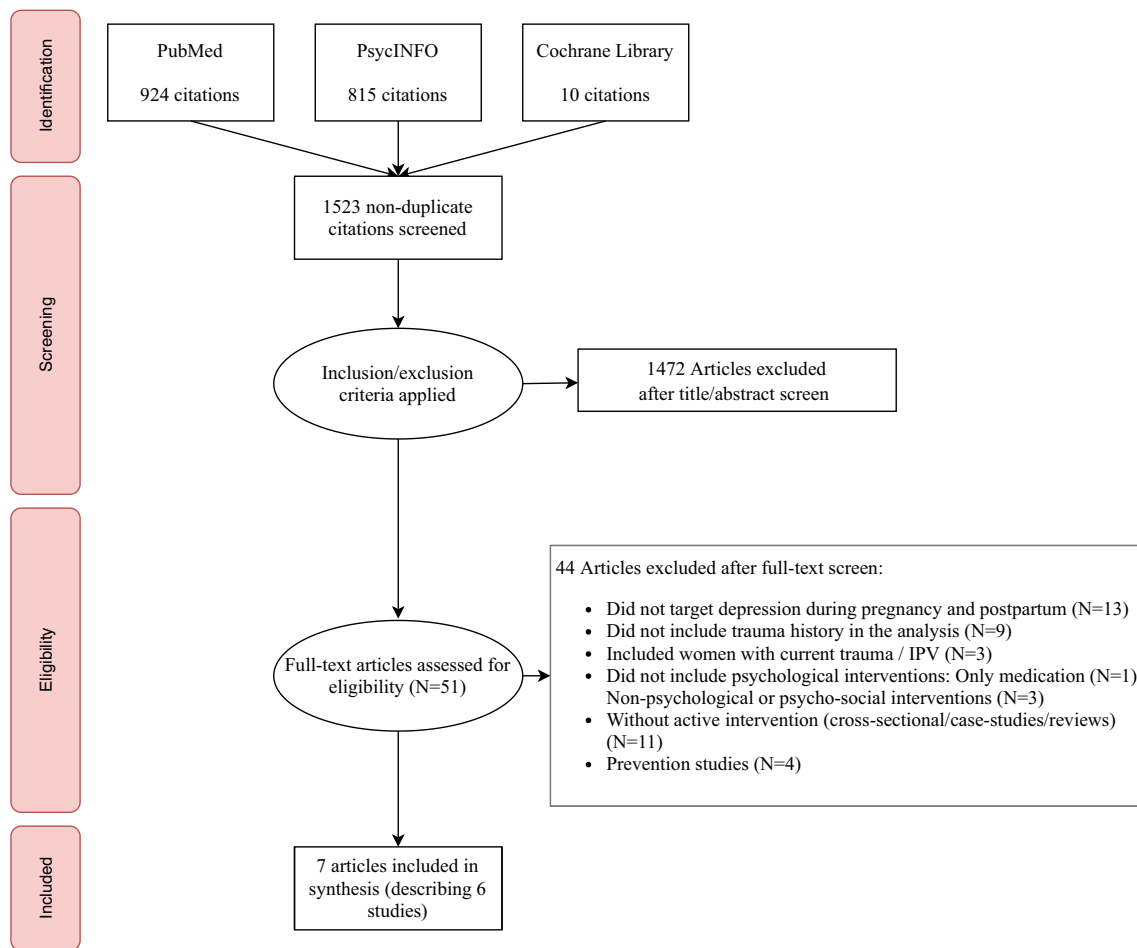
IPV - Intimate partner violence.

Fig. 1 PRISMA flow diagram

predicts treatment outcomes. Fifty-three women (IPT-B = 25, usual care—UC = 28) with Edinburgh Postnatal Depression Scale (EPDS) scores ≥ 12 were recruited at 10 to 32 weeks gestation (Grote et al. 2008). Participants were assessed at baseline, 3 months post-baseline (the end of acute treatment), and 6 months postpartum. Ninety-two percent of women reported having experienced CT according to the CTQ, and 94% of them reported being exposed to more than one type of trauma. A median split of the CTQ score revealed that women with more CT showed increased depression severity at baseline according to the Beck Depression Inventory (BDI). Overall, those in the intervention group showed significant symptom relief with large effect sizes, both at 3 months post-baseline (95% of women in IPT-B reached remission compared with 58% in UC, $\chi^2 = 9.06$, df = 1, $p < .003$; Cohen's $h = 0.96$) and at 6 months postpartum (100% of women in IPT-B reached remission compared with 70% in UC, $\chi^2 = 7.92$, df = 1, $p < .005$; Cohen's $h = 1.22$; Grote et al. 2009). However, there was no significant three-way interaction between time, treatment

group, and trauma exposure. An analysis within each group yielded significant results only for the IPT-B group, demonstrating that trauma exposure significantly predicted change in BDI scores from baseline to 3 months post-baseline, with a significant interaction term ($t = 2.52$, $p < .05$) in a significant equation ($F (3, 18) = 3.51$, $p < .05$). At 3 months post-baseline, women in the IPT-B group with more versus less CT had significantly higher BDI scores ($M = 16.6$, SD = 11.5 compared with $M = 7.7$, SD = 4.9, $F = 5.5$, $p < .05$) and Beck Anxiety Inventory (BAI) scores ($M = 12.4$, SD = 4.6 compared with $M = 5$, SD = 3.9, $F = 9.6$, $p < .01$). At 6 months postpartum, the remaining difference between CT groups receiving IPT-B was statistically different for the EPDS ($M = 5.8$, SD = 2.8 compared with $M = 3$, SD = 3.1, $F = 4.6$, $p < .05$), though neither group was at clinically significant levels. Although women with more CT entered the study more depressed and experienced significantly less reduction in depression from baseline to 3 months post-baseline, at 6 months postpartum, all the women in the IPT-B group achieved remission regardless of the degree

Table 1 Characteristics of studies included in review

Author (year)	Study characteristics Design (N)/intervention/comparison	Target population Inclusion criteria/eligibility	Study population/demographics	Intervention characteristics Place of delivery	Providers	Time to follow-up/attrition rate	Limitations as stated by authors	Review aims Aim answered by the study
Grote et al. (2012)	RCT (N = 52) culturally relevant brief interpersonal psychotherapy (IPT-B)/usual care	• ≥18 years old • EPDS > 12 • English speaking • Access to phone Exclusion criteria included current receipt of another form of depression treatment	• 26.9% White • 63.5% African-American • 3.8% Latina • 5.8% biracial • 84.6% low income • 38.5% have partner • 44.2% have high school education or less	OBGYN office where women receive care	Doctoral-level and masters level clinicians	3 months post-baseline and 6 months postpartum/13%	• Small sample size • Self-report for childhood trauma • Moderate severity of childhood maltreatment in the sample	Aim 1 and aim 2
Grote et al. (2016)	RCT (N = 168)/MOMCare*/public health Maternity Support Services (MSS Plus)	• ≥ 18 years old • Diagnosis of probable MDD or dysthymia • 12–32 weeks gestation • English speaking • Access to a phone	• 41.7% White • 23.3% African-American • 22.6% Latina • 7.1% Asian/Pacific Islander • 5.4% Native American/Alaskan • 42.1% low income • 75.6% have partner • 24.4% single • 42.1% have high school education or less	Public health centers, by phone, in community settings, and infrequently at home	Depression care specialists with a master in social Services	3, 6, 12, and 18 months post-baseline/5%	• Self-report on antidepressants use • Limited generalizability to non-English speaking populations or other US populations on Medicaid	Aim 1 and aim 2
Blalock et al. (2013)	RCT (N = 248)/cognitive behavioral analysis system of psychotherapy (CBASP)/health and wellness control	• ≥ 16 years old • Less than 32 weeks gestation • Smoked a puff or more in the past 7 days • Access to a phone • Willing to quit smoking	• 33.5% White, non-Hispanic • 54% African-American • 9.3% Hispanic • 37% low income • 40.7% have partner • 67.7% have high school education or less	Public health centers	Therapists were postdoctoral fellows in clinical psychology with 0–2 years of post-degree experience	3 and 6 months post-treatment/attrition not specified but average number of therapy sessions attended was 8.2/10	• Study is a secondary subgroup analysis • Does not measure adult trauma • Very low SES group limits generalizability • Participants were paid $40 for attending each therapy session	Aim 1 and aim 2
Ammerman et al. (2012, 2016)	RCT (N = 93)/IH-CBT/standard home visiting	• New mother • ≥16 years old • Diagnosis of MDD	• 62.3% White • 32.2% African-American	At home	Licensed, master's level social workers. Supervision provided by two	3 months post-treatment/13 mother dropped out of the stud between assessment points.	• Relatively small sample size • No long-term follow-up	Aim 2

Table 1 (continued)

Author (year)	Study characteristics	Target population		Intervention characteristics		Time to follow-up/attrition rate	Limitations	Review aims
	Design (N)/intervention/comparison	Inclusion criteria/eligibility	Study population/demographics	Place of delivery	Providers		Limitations as stated by authors	Aim answered by the study
		• 2 to 10 months postpartum • Had been receiving home-visiting services Eligibility required at least one of the following - Unmarried - Low income - ≤ 18 years of age-inadequate prenatal care Exclusion criteria include current use of psychotropic medication	• 76.3% low income • 12.9% have partner • 87.1% single • 11.4 median years of education		doctoral level clinicians		• Child trauma was determined using retrospective measures • Determination of asymptomatic at post-treatment does not represent recovery or remission	
Stevens et al. (2017)	Feasibility study (N = 45)/trauma-sensitive obstetrics care to promote control, anxiety-reduction and empowerment (TO-CARE)/no control group	• <30 weeks pregnant • History of physical or sexual abuse • Reported at least 3 PTS symptoms • English speaking	• 4.4% White • 53.3% African-American • 42.2% Hispanic/Latina 48.9% low income • 55/5% have partner • 46.7% have high school education or less	OBGYN appointments	Therapists were post-doctoral fellows supervised by Dr. Stevens	6 weeks postpartum/24% of participants dropped out after the baseline assessment, 20% dropped out after attending 1–2 sessions ("partial completers")	• Open trial • No control group • Participants received only part of their prenatal care from trained residents • Small sample size.	Aim 1
Wisner et al. (2017)	RCT (N = 628)/telephone-delivered depression care management (DCM)*/enhanced usual care	• ≥ 18 years old • ≥ History of physical or sexual abuse • Reported at least 3 PTS symptoms • English speaking	73.2% White 21.2% Black 5.6% other 1.5% Hispanic 55.6% have partner 27% have high school education or less	Administered over phone, final session at home.	Experienced master's level clinicians	3, 6, and 12 months postpartum/approximately one-third of the women did not provide data for the primary outcomes.	• Incomplete follow-up of depressed women across the first year after birth (about two-thirds of the original sample)	Aim 2

*These studies allowed the use of current medication for depression

Table 2 Summary of questionnaires used in the studies

	Questionnaires	Grote et al. (2012)	Grote et al. (2016)	Blalock et al. (2013)*	Ammerman et al. (2012, 2016)	Stevens et al. (2017)	Wisner et al. (2017)**
Psychiatric screening	SCID/MINI	√	√	√	√		√
	DIS	√					
	LIFE						√
	IPDS				√		
Depression and anxiety symptoms	EPDS	Δ			√		√
	BDI-II	Δ			Δ		
	BAI	Δ					
	PHQ-9		√			Δ	
	SIGH-ADS						Δ
	CES-D			Δ			
	SCL-20		Δ				
Trauma history	CTQ	√	√	√	√	√	
	THQ					√	
Post-traumatic stress symptoms	PCL-C		Δ			Δ	
Social support	ISEL				Δ		
	SNI				Δ		
Social functioning	SAS	Δ					
	WSAS		Δ				
Function status	GAF						Δ
	SF-12						Δ
Relationship and interpersonal problems	RQ	√	√				
	IIP	Δ					
Parenting/mother-infant relationship	PSI-SF				Δ		
	GRAT						Δ
	HOME				Δ		
Child outcomes	BITSEA						Δ
Perinatal health	PES						Δ

√ background measures, Δ outcome measures

*Smoking-related questionnaires are not included

**Questionnaire to evaluate the likelihood that a patient would use a specific intervention was not included

Psychiatric Screening: SCID: Structured Clinical Interview for DSM; MINI: Mini International Neuropsychiatric Interview; DIS: Diagnostic Interview Schedule for DSM-IV; LIFE: Longitudinal Interval Follow-Up Evaluation; IPDS: Iowa Personality Disorder Screen; Depression and Anxiety Symptoms: EPDS: Edinburgh Postnatal Depression Scale; BDI-II: Beck Depression Inventory-II; BAI: Beck Anxiety Interview; PHQ-9: Personal Health Questionnaire-9; SIGH-ADS: Structured Interview Guide for Hamilton Depression Rating Scale with Atypical Depression Supplement; CES-D: Center for Epidemiologic Studies Depression Scale; SCL-20: Hopkins Symptom Checklist-20; Trauma History: CTQ: Childhood Trauma Questionnaire; THQ: Trauma History Questionnaire; Post-Traumatic Stress Symptoms: PCL-C: Posttraumatic Stress Disorder Checklist-Civilian Version; Social Support: ISEL: Interpersonal Support Evaluation List; SNI: Social Network Index; Social Functioning: SAS: Social Adjustment Scale; WSAS: Work and Social Adjustments Scale; Functional Status: GAF: Global Assessment of Functioning; SF-12: Short-Form Health Survey; Relationship and Interpersonal Problems: RQ: Relationship Quality Questionnaire; IIP: Inventory of Interpersonal Problems; Parenting / Mother-Infant Relationship: PSI-SF: Parenting Stress Index-Short Form; GRAT: Gratification in the Maternal Role; HOME: Home Observation for Measurement of the Environment Inventory; Child Outcomes: BITSEA: Brief Infant-Toddler Social and Emotional Assessment; Perinatal Health: PES: Peripartum Events Scale

of trauma exposure. This suggests that although IPT-B is effective for women with varying degrees of CT, women exposed to more CT may need a longer time to respond and reach remission.

The MOMCare intervention is a collaborative care model designed to address barriers to treatment related to poverty and race/ethnicity among socioeconomically disadvantaged pregnant women (Grote et al. 2014). MOMCare includes the

following: (1) a pretherapy engagement session to help resolve barriers to accessing care, (2) patient's choice of IPT-B and/or pharmacotherapy for acute treatment, (3) a telephone session in addition to in-person visits, and (4) maintenance sessions up to 1 year postpartum. This RCT recruited 168 pregnant women (MOMCare = 83, Intensive Maternity Support Services—MSS-plus = 85) between 12 and 32 weeks gestation, who were given a "probable" diagnosis of depression determined by a Patient Health Questionnaire-9 (PHQ-9) score ≥ 10 (Grote et al. 2015). Blinded outcome measures were collected at 3, 6, 12, and 18 months postpartum. The primary outcome was depression severity on the Hopkins Symptom Checklist-20 (SCL-20; Derogatis 1992). Fifty-three percent of the women reported exposure to at least one type of CT, and 65% met diagnosis for probable PTSD. Women with depression and PTSD reported significantly more CT, especially EA, EN, and PN. Among the MOMCare participants, 81% started IPT-B alone, 15.2% selected IPT-B and medication, and only 3.8% preferred medication alone. Nearly 40% of women who began IPT-B alone augmented with medication during the course of the intervention. While both the intervention and control groups showed reductions in depressive symptoms over time, MOMCare was significantly more effective, with higher rates of remission (Wald's $\chi^2 = 3.67$, df = 1, $p = .05$), lower levels of depression (Wald's $\chi^2 = 6.09$, df = 1, $p = .01$), and decreased PTSD severity (Wald's $\chi^2 = 4.61$, df = 1, $p = .04$) (Grote et al. 2015). A preplanned secondary analysis was conducted to examine the impact of comorbid PTSD on the pattern of change in depressive symptoms between the groups (Grote et al. 2016). For women with comorbid PTSD, MOMCare was more effective than MSS-plus in reducing depression over the study period (Wald's $\chi^2 = 8.51$, $p < .004$). In contrast, the reduction in depressive symptoms for women without comorbid PTSD was similar for both groups (Wald's $\chi^2 = 0.01$, $p = .9$). The MOMCare effect size for reduction in depression severity, as measured by SCL-20, was about 4 times larger (0.39) for women with PTSD relative to the effect size for women without PTSD. The subgroup with PTSD diagnosis in MOMCare had a significantly higher proportion of women taking medication compared with the PTSD subgroup in the MSS-Plus group (35–48% and 12–29%, respectively). However, there was no mediating effect of increased antidepressant use and adequate duration of use on depression outcomes. This study, although not limited to psychotherapy, indicates that depressed pregnant women with comorbid PTSD respond well to an IPT-based collaborative care intervention. Compared with the prior study (Grote et al. 2012), there was no delay in the response to treatment among the PTSD subgroup, which may be attributed to the collaborative care approach of the intervention.

Cognitive behavioral analysis system of psychotherapy (CBASP; McCullough Jr. 2003) is an integrative model of

psychotherapy that focuses on reducing interpersonal stress and increasing the quality of one's relationships with significant others. By definition, CBASP is neither IPT nor CBT; however, the use of situational analysis of stressful interpersonal situations, as well as the addressing of interpersonal issues in the therapeutic relationship, makes this approach more comparable to IPT-based interventions. This RCT aimed to investigate the associations between CT, depression, and smoking cessation in pregnant women (Blalock et al. 2013). The intervention included 15 minutes of standard behavioral and motivational smoking cessation counseling plus 45 minutes of either CBASP or the health and wellness (HW) control condition. The HW control condition was mainly instructional, discussing standardized handouts on selected topics, including stress, pregnancy symptoms, and relaxation training. Assessments were conducted by telephone at 2, 4, and 6 weeks post-treatment, and at 2 weeks postpartum, with final in-person assessments at 3 and 6 months postpartum. A total of 266 pregnant women recruited before 32 weeks gestation were randomized to either CBASP or HW. Levels of depression were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D). Among women with higher baseline depressive symptoms, those receiving CBASP experienced a significantly greater reduction in depression compared with those in the HW group ($F (1, 2620) = 10.49$, $p = .001$); in contrast, women with low baseline depression scores benefitted more from HW. Among the total cohort, 248 women completed the CTQ with 76% reporting at least one traumatic event in their past. A variable assessing cumulative trauma was created by summing the total number of trauma categories that women endorsed at a moderate or greater level of severity. This variable was used to determine the effect of cumulative trauma on depression outcomes. A mixed models regression approach produced a significant group by time by trauma interaction ($F (1, 2544) = 8.41$, $p = .0038$), indicating that women who endorsed more trauma categories on the CTQ experienced a greater reduction in depressive symptoms from CBASP compared with HW over the study period. These findings, along with those of the previous study, suggest that IPT-based interventions are effective for CT-exposed women, particularly for women with cumulative experiences of CT and a diagnosis of PTSD.

CBT-based interventions

Cognitive behavioral therapy attributes the development and maintenance of mental disorders and psychological distress to maladaptive cognitions, which manifest in different situations as automatic distorted thinking patterns followed by maladaptive behaviors. Changing maladaptive cognitions leads to reductions in emotional distress and symptom relief (Beck 1970). This is the most studied form of psychotherapy in perinatal psychiatry (Nillni et al. 2018), showing significant

benefits for depressed pregnant and postpartum women. This review includes three papers, describing two studies, utilizing CBT-based psychotherapies. Ammerman et al. (Ammerman et al. 2012; Ammerman et al. 2016) adapted in-home cognitive behavioral therapy (IH-CBT) for mothers enrolled in home visitation programs prenatally or during the first months postpartum. Building on the principles of CBT to reduce maternal depression, IH-CBT focuses on issues relevant to young, low-income mothers, including the following: transition to adult roles, stress management, parenting challenges, and mother-child relationship. The intervention consists of 15 weekly sessions plus a booster session 1 month post-treatment. Mothers enrolled in home visitation programs prior to 20 or 28 weeks gestation were referred to the study if their EPDS score was ≥ 11 at 3 months postpartum. After confirming a diagnosis of depression, they were randomized to either IH-CBT ($N = 47$) or a standard home-visiting (SHV) ($N = 46$) control condition. Assessments were conducted at pretreatment, post-treatment, and 3-month follow-up. Overall, IH-CBT had significant benefits for depressed mothers, with significant improvement over time in depression scores on the BDI, EPDS, and Hamilton Depression Rating Scale (HDRS; Ammerman et al. 2013). Other variables assessed were the Social Network Index (SNI), which measures the size of the mother's social network, and the Home Observation for Measurement of Environment Inventory (HOME), an instrument that assesses nurturing, stimulating, and safe environment in the home. A secondary analysis was conducted to determine predictors of depression post-treatment among the 60 mothers who underwent IH-CBT, including 47 mothers originally assigned to IH-CBT and 13 mothers assigned to SHV who switched to IH-CBT (Ammerman et al. 2012). A comparison of symptomatic and asymptomatic groups (BDI ≤ 8) found that total CTQ scores did not predict differential levels of post-treatment depressive symptoms.

The second paper examined the moderating effects of CT on the outcomes in the IH-CBT group compared with SHV (Ammerman et al. 2016). In this analysis, the CTQ was used as a categorical variable (none, mild, moderate or severe for each type of trauma). Mothers reported high rates of severe levels of CT in both the IH-CBT (range 14.9–48.9%) and SHV (range 22.2–44.4%) groups. The most common was EA, with 80.4% of women reporting at least a mild exposure. The effect of each CT category was calculated at the three timepoints. The results showed that EA was associated with higher levels of depression, regardless of time or treatment condition. Depression outcomes were not differentiated by CT in either groups, except a trend ($p < .10$) for a three-way interaction between PN, assessment time, and treatment condition ($b = -0.63$, $t = -1.77$). There were two significant three-way interactions ($p < .05$) between CT and other variables, including PA and treatment condition. Mothers who experienced PA had significantly less improvement in HOME scores over time in IH-CBT relative to SHV. Also, a significant interaction was found between EA and SNI, showing that mothers with a history of EA significantly improved in social network size in IH-CBT compared with SHV across each assessment period. Treatment outcomes were not moderated or predicted by CT; however, CT did influence social support and parenting characteristics.

Trauma history is related to a myriad of pregnancy complications (Shaw et al. 2017; Smith et al. 2016), and obstetric care is increasingly recognized as a trigger for abuse survivors. To address these concerns, Stevens et al. developed the Trauma-Sensitive Obstetrics to Promote Control, Anxiety Reduction, and Empowerment (TO-CARE) intervention (Stevens et al. 2019). This intervention is composed of six weekly sessions of CBT coping skills, includingpsychoeducation, relaxation and self-care skills, assertive communication skills, and coping with perinatal triggers. Trauma-sensitive obstetric care is provided at the prenatal sessions, which includes coaching the obstetric provider to respond to distress signs and reinforce patient coping skills acquired at CBT sessions. In an open feasibility study (Stevens et al. 2017), 45 pregnant women under 30 weeks gestation were recruited. Self-report measures were collected at baseline, at each session, immediately post-CBT, and at 6 weeks postpartum. All the participants had a history of abuse assessed using the CTQ and Trauma History Questionnaire (THQ) and reported at least three post-traumatic stress (PTS) symptoms according to the PTSD Symptoms Checklist for Civilians (PCL-C). Twenty-one (46%) women participated in at least three CBT sessions and were considered "completers." Overall, 95% of the completers stated they believed TO-CARE was useful. In addition, the study examined whether TO-CARE decreased symptoms of PTS and depression (evaluated using PHQ-9). Reliable Change Index calculated the change in symptoms, which showed that two participants demonstrated reliable improvement in depression symptoms post-CBT and at the postpartum follow-up. None of the participants experienced worsening of symptoms. This study offers a potential intervention combining psychotherapy with trauma-informed obstetric care; however, given the open trial design, the clinical significance of this treatment is yet to be determined.

Psychoeducation-based interventions

Efforts to increase rates of treatment for women who screen positive for PPD are ongoing. Telephone-delivered depression care management (DCM) is an intervention for postpartum women based largely on psychoeducation, aimed at encouraging the patient's self-management by providing tools, education, and supporting shared decision-making between the patient and provider(s) (Wisner et al. 2017). The DCM model enables monitoring of symptoms and functioning and helps to

facilitate access to mental health services, community resources, and primary care providers. This study recruited women with an EPDS score ≥ 10 on a phone screen conducted at 4–6 weeks postpartum. The DCM group received a home visit psychiatric assessment by a clinician, who was later assigned as their care manager. Follow-up continued up to 6 months postpartum, at which point the woman could decide to discontinue calls if satisfied with her recovery. The control group received enhanced usual care (EUC), consisting of a home-visiting session in which psychoeducation about depression was provided and women were encouraged to contact their provider and facilitate treatment. The study enrolled 628 women (DCM—$N = 312$; EUC—$N = 316$). The impact of DCM on depression levels was measured by HDRS with atypical depression supplement (SIGH-AD) at 3, 6, and 12 months postpartum. Treatment preferences for women in the study were mainly psychotherapy or, to a lesser extent, antidepressants (43.5% were "very likely" to accept medication at baseline), with no significant differences between groups. At all time points, differences in depression slightly favored the EUC group, compared with DCM ($p = .0453$). However, at 12 months, the mean differences between the groups were no longer significant. In the moderation analysis, women with a history of SA (about 20% of the sample) responded more favorably to DCM with greater reduction in HDRS scores compared with EUC ($p = .0077$, effect size = − 0.20). The authors suggest that DCM clinicians who had prior experience treating sexually abused women may have provided non-specified treatment components, such as validation and respect for autonomy. It is also possible that for women with abuse history, DCM's added support and encouragement facilitated a greater therapeutic response.

Discussion

This review includes seven papers, describing six studies, investigating the effects of maternal CT on treatment outcomes for depression during pregnancy and postpartum. First, we aimed to determine whether evidence-based treatments for perinatal depression are effective for CT-exposed women. Although the number of studies is small, results indicate that IPT-based psychotherapies (IPT-B, MOMCare, and CBASP) are effective for women with CT. The evidence regarding treatments based on CBT (IH-CBT, TO-CARE) is less conclusive, as there is only one high-quality study, suggesting that CT does not affect depressive outcomes. The DCM, an intervention designed to support women's access to mental health care, is beneficial only for women with a history of SA (Wisner et al. 2017). The second aim was to examine whether maternal trauma history alters treatment effectiveness. One study showed that time to recovery in women with CT may be longer (Grote et al. 2012), suggesting a need for more

intensive treatment strategies. Across the studies, we found inconsistent results regarding CT as a predictor or moderator of treatment outcomes.

Evidence of greater response among women with CT was found largely in IPT-based interventions, suggesting that IPT is an approach uniquely positioned to address perinatal depression in the context of maternal trauma history. The efficacy of IPT-based interventions may be attributed to the general positive effects on PPD (Nillni et al. 2018; Sockol et al. 2011) and/or more specific effects of the core principles of IPT (Krupnick et al. 2008). The theoretical basis of IPT is grounded in attachment theory, which emphasizes the formative influence of early relationships on adult interpersonal patterns (Weissman et al. 2000). Individuals exposed to CT tend to view themselves, and the quality of their parenting, through the lens of their traumatic experiences (Siverns and Morgan 2019). Mothers exposed to CT may change views of themselves, others, and the world in relation to their maltreatment experiences, with the majority reporting a mix of positive and negative changes (Fava et al. 2016). Therefore, IPT may be especially helpful when the challenges of motherhood, the forming of a new relationship with the baby, and the changing relationships with her family and social network (Stuart 2012) are intensified in light of CT history.

Our findings show inconsistent results regarding CT as a predictor or moderator of treatment outcomes. A meta-analysis assessing whether childhood maltreatment predicted illness course and treatment outcomes in MDD concluded that patients with CT are twice as likely as those without CT to develop recurrent and persistent depressive episodes, even after treatment (Nanni et al. 2012). Among patients receiving psychotherapy for MDD and anxiety disorders, non-responders in terms of depressive symptoms had higher levels of PA, SA, and more CT in general (Fischer et al. 2018). In this review, some interventions showed a more favorable response for women with CT compared with women without CT. This may be attributed to the unique circumstances of depression during pregnancy and postpartum (Di Florio and Meltzer-Brody 2015). Interventions addressing the mother's own vulnerabilities and attachment style challenging her ability to form close emotional bonds to her baby (Siverns and Morgan 2019) may have an added benefit for women with CT.

Regardless of our specific findings, it is important to highlight research that indicates that psychotherapy is essential when treating women with perinatal depression with a history of CT. Women with CT treated for chronic MDD benefitted significantly more from psychotherapy alone, in this case CBASP, compared with antidepressant monotherapy. The combination of CBASP and pharmacotherapy was only marginally superior to psychotherapy alone (Nemeroff et al. 2003). This is supported by a study on depressed individuals with CT demonstrating that patients benefitted significantly more from IPT and pharmacotherapy than from pharmacotherapy alone (Zobel et al. 2011). Further research on

trauma-informed psychotherapy interventions for perinatal depression is needed to adequately address the mental health needs of women with CT exposure.

This review is written in light of the paucity of research on psychological treatments for CT-exposed women with perinatal depression. The studies included are effectiveness studies, which were conducted in community settings. As such, they examine an intervention's capacity to produce results within real-life circumstances. However, unlike efficacy research, these studies have increased variance/interfering variables, which can limit the ability to determine an intervention's effects (Rosqvist and Truax 2011). Moreover, the combined use of psychological treatments and medication in some studies limits our ability to isolate the effects of the tested interventions. There are also methodological weaknesses in the current literature. Although the studies are of good quality (Appendix 2, Table 3), the analysis of trauma was done as a secondary analysis and is therefore subject to biases and may lack statistical power to show the effects of CT on treatment outcomes. Furthermore, all but one study (Stevens et al. 2019) used the CTQ to measure CT (Table 2), neglecting to assess other adversities known to affect treatment outcomes in MDD, such as early parental loss or separation (Niciu et al. 2015). Finally, our results may be applicable only to IPT and CBT-based interventions. Other effective interventions for perinatal depression, such as mindfulness and behavioral activation (Genovez et al. 2018), have not yet been studied in-depth with perinatal populations.

In conclusion, addressing women's needs, based on their current state and past experiences, will ensure that they are provided with optimally effective care. The IPT-based interventions show good outcomes for pregnant and postpartum women with CT, though more systematic research is warranted.

Compliance with ethical standards

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

Appendix 1. Search terms and strategy

Inclusion/exclusion criteria

Articles were considered for inclusion based on the following inclusion criteria defined using the PICO template (Richardson et al. 1995):

1 Participants: Women 16 years of age or older diagnosed with depression during pregnancy or postpartum (defined as ≤ 12 months after childbirth).
2 Interventions: Any study including psychological interventions addressing depression during pregnancy or postpartum, or PTSD in women during pregnancy and postpartum. Studies were included if the follow-up extended to at least 1 month postpartum, regardless of when they started.
3 Comparisons: With respect to our first aim, there were no comparators. With respect to our second aim, we included studies comparing women with depression during pregnancy and postpartum with or without maternal trauma history or post-traumatic stress (PTS) symptoms. To determine whether trauma exposure may be a moderator of treatment response, we included studies with depressed women during pregnancy and postpartum with varying degrees of past trauma, including no exposure at all.
4 Outcomes: Depressive symptoms measured by diagnostic interview or validated questionnaires. Studies were included only if they reported at least one validated self-report or clinician-administered measure of depressive symptoms at pretreatment (baseline) and post-treatment to determine treatment effects. Moreover, as depression scores are merely a narrow view of maternal wellbeing during pregnancy and postpartum, other validated outcome measures relating to maternal anxiety symptoms, maternal functioning, birth experience and child outcomes, were considered if the study also reported depressive symptom outcomes.

Exclusion criteria include studies: (1) involving women who experienced medical trauma during childbirth, loss of a child, or studies looking at ongoing intimate partner violence (IPV) rather than past trauma; (2) that included participants with comorbidities such as alcohol/substance abuse or dependence, bipolar disorder or psychosis, intellectual disability or suicidality; (3) looking exclusively at pharmacological interventions or studies with non-psychological or non-psychosocial interventions (e.g., alternative medicine).

All studies were published in English in peer-reviewed journals.

Search terms

PubMed

(("Mothers/psychology"[MeSH] OR antenatal[tiab] OR antepartum[tiab] OR perinatal[tiab] OR prenatal[tiab] OR postnatal[tiab] OR peripartum[tiab] OR postpartum[tiab] OR pregnan*[tiab] OR maternal[tiab] OR mother[tiab]) AND ("Vulnerable Populations"[MeSH] OR "Stress Disorders, Post-Traumatic"[MeSH] OR "childhood trauma"[tiab] OR maltreatment[tiab] OR abuse[tiab] OR neglect[tiab] OR "childhood adversity"[tiab] OR "posttraumatic stress"[tiab] OR PTSD[tiab]) AND ("Depression, Postpartum"[MeSH] OR depressi*[tiab] OR anxiety[tiab]) AND ("psychotherapy"[MeSH] OR intervention[tiab] OR care[tiab] OR psychotherapy[tiab] OR CBT[tiab] OR "cognitive therapy"[tiab] OR "behavior* therapy"[tiab] OR "interpersonal* psychotherapy"[tiab] OR IPT[tiab] OR psychodynamic[tiab])))

PsycINFO

(DE "Expectant Mothers" OR TI (perinatal or prenatal or pregnancy or postpartum or mother) OR AB (perinatal or prenatal or pregnancy or postpartum or mother)) AND (DE ("At Risk Population" OR "Disadvantaged" or "Posttraumatic Stress Disorder") OR TI (trauma or maltreatment or abuse or neglect or economically disadvantaged or violence or childhood*adversity or "posttraumatic stress" or PTSD) OR AB (trauma or maltreatment or abuse or neglect or economically disadvantaged or violence or childhood*adversity or "posttraumatic stress" or PTSD)) AND (DE (Pospartum Depression) OR TI (depression or depressive*disorder or anxiety or anxiety*disorder) OR AB (depression or depressive*disorder or anxiety or anxiety*disorder)) AND (DE ("Response to Intervention" OR "Intervention") OR AB (care or psychotherapy or CBT or cognitive*t7herapy or "interpersonal*psychotherapy" or IPT or psychodynamic*therapy) OR TI (care or psychotherapy or CBT or cognitive*therapy or "interpersonal*psychotherapy" or IPT or psychodynamic*therapy))

Cochrane Library

#1MeSH descriptor: [Mothers] explode all trees
#2"antenatal":ti,ab,kw
#3"antepartum":ti,ab,kw
#4"perinatal":ti,ab,kw
#5prenatal:ti,ab,kw
#6"postnatal":ti,ab,kw
#7"peripartum":ti,ab,kw
#8"postpartum":ti,ab,kw
#9pregnan*:ti,ab,kw
#10maternal:ti,ab,kw
#11"mother":ti,ab,kw
#12#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11
#13MeSH descriptor: [Vulnerable Populations] explode all trees
#14MeSH descriptor: [Stress Disorders, Post-Traumatic] explode all trees
#15"childhood trauma":ti,ab,kw
#16"maltreatment":ti,ab,kw
#17"abuse":ti,ab,kw
#18"neglect":ti,ab,kw
#19"childhood adversity":ti,ab,kw
#20"posttraumatic stress":ti,ab,kw
#21"PTSD":ti,ab,kw
#22#13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21
#23MeSH descriptor: [Depression, Postpartum] explode all trees
#24depression:ti,ab,kw
#25"anxiety":ti,ab,kw
#26#23 or #24 or #25
#27"intervention":ti,ab,kw
#28"care":ti,ab,kw
#29"psychotherapy":ti,ab,kw
#30"CBT":ti,ab,kw
#31"cognitive therapy":ti,ab,kw
#32"behavior therapy":ti,ab,kw
#33"interpersonal psychotherapy":ti,ab,kw
#34"IPT":ti,ab,kw
#35"psychodynamic":ti,ab,kw
#36#27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35
#37#12 and #22 and #26 and #36 in Cochrane Reviews

Appendix 2. Quality assessment across studies included in the review using the Cochrane Collaboration tool for assessing the risk of bias.

Table 3 The studies included in the review were assessed for risk of bias independently by two reviewers (IR and ML) according to the Disagreements were resolved through discussion and consensus

Cochrane Collaboration tool for assessing the risk of bias (Table 8.5.a in the Cochrane Handbook for Systematic Reviews of Interventions).

Author, Year	Selection bias		Performance bias	Detection bias		Attrition bias		Reporting bias
	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment (patient-reported outcomes)	Blinding of outcome assessment (all-cause mortlity)	Incomplete outcome data addressed (Short-term outcomes: 2-6 weeks)	Incomplete outcome data addressed (Longer-term outcomes>6 weeks)	Selective reporting
Grote et al., 2012	Low Risk of Bias	Low Risk of Bias	Unclear Risk of Bias*	Low Risk of Bias	NA	NA	Low Risk of Bias	Low Risk of Bias
Grote et al., 2016	Low Risk of Bias	Low Risk of Bias	Unclear Risk of Bias*	Low Risk of Bias	NA	NA	Low Risk of Bias	Low Risk of Bias
Blalock et al., 2013	Low Risk of Bias	Low Risk of Bias	Unclear Risk of Bias*	Unclear Risk of Bias	NA	Low Risk of Bias	Low Risk of Bias	Unclear Risk of Bias
Ammerman et al.,2012, 2016	Low Risk of Bias	Low Risk of Bias	Unclear Risk of Bias*	Low Risk of Bias	NA	NA	Low Risk of Bias	Low Risk of Bias
Stevens et al., 2017	High Risk of Bias	High Risk of Bias	High Risk of Bias	High Risk of Bias	NA	High Risk of Bias	High Risk of Bias	Unclear Risk of Bias
Wisner et al., 2017	Low Risk of Bias	Low Risk of Bias	Unclear Risk of Bias*	Low Risk of Bias	NA	NA	Unclear Risk of Bias	Low Risk of Bias

* All studies included psychotherapeutic interventions, therefore clinicians and participants cannot be fully blinded

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