

SYSTEMATIC REVIEW

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# The role of emotion regulation in perinatal depression and anxiety: a systematic review

Pauline Verhelst<sup>1\*</sup>, Laura Sels<sup>1</sup>, Gilbert Lemmens<sup>2</sup> and Lesley Verhofstadt<sup>1</sup>

## Abstract

**Background** Major depressive disorder and anxiety disorders are highly prevalent and comorbid during the perinatal period. Although research and clinicians agree that emotion regulation (ER) is an important transdiagnostic factor underlying both disorders in the general population, ER during the perinatal period has received less research attention. The aim of this systematic review was to assess the literature regarding the role of ten commonly studied ER strategies in the onset and maintenance of perinatal depression and anxiety in pregnant women and young mothers, using the Process Model of Gross (1998) as a theoretical framework.

**Methods** We searched four electronic databases with variations of the following key words: *women; emotion regulation* (i.e., behavioral approach, behavioral avoidance, problem solving, support seeking, distraction, rumination, reappraisal, acceptance, expressive suppression, and expressive engagement); *perinatal period*; and *psychopathology*. The aim was to identify peer-reviewed, and quantitative studies published between January 1999 and January 2023. Six articles were selected for analysis.

**Results** Similar ER strategies emerged as risk and protective factors in perinatal depression and anxiety. Overall, behavioral avoidance, distraction, rumination, and expressive engagement appeared as risk factors, while problem solving, emotional and instrumental support seeking, cognitive reappraisal, and acceptance, emerged as protective factors in the onset and maintenance of perinatal depression and anxiety. These findings align with previous research in perinatal community samples, as well as in non-perinatal clinical samples.

**Conclusions** Our results support the role of ER as a transdiagnostic factor underlying both perinatal depression and anxiety. Clinicians are encouraged to implement ER strategies into the screening, prevention, and treatment of perinatal depression and anxiety. Further research is needed to strengthen these findings and to examine the role of emotion regulation during antenatal depression and anxiety more closely.

**Keywords** Emotion regulation, Systematic review, Perinatal depression, Perinatal anxiety, Women

The transition to motherhood represents a vulnerable time in which women are prone to develop psychopathology [1, 2]. One in five women experience a mental health disorder during the perinatal period, with depression and

anxiety being most prevalent [3]. Perinatal depression refers to an episode of major depressive disorder (MDD) with onset during pregnancy (antenatal) or within four weeks following childbirth (postpartum; [4]). However, most experts in the field define postpartum depression as occurring anytime within the first year following childbirth [5, 6]. Perinatal depression exhibits several distinct characteristics compared to MDD, such as having aggressive obsessional thoughts, impaired concentration, feelings of inadequacy, a diminished interest in the pregnancy or the infant and heightened anxiety symptoms [2, 7, 8].

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Indeed, depression and anxiety are highly comorbid during the perinatal period (for a review, see [9]). Perinatal anxiety refers to a range of anxiety disorders that can occur during the perinatal period, such as generalized anxiety disorder (GAD), panic disorder, and specific phobias [10].

If left untreated, both disorders can have detrimental consequences for the women experiencing them, their partner, and infant(s) [11–15]. As such, there have been increased efforts to identify risk factors associated with perinatal depression and anxiety to set up screening and treatment interventions (for overviews: [16–18]). Recently, due to the high comorbidity and symptom overlap between perinatal depression and anxiety, there has been a call for research into mechanisms underlying *both* disorders [9, 19]. A prominent transdiagnostic factor assumed to underly many psychopathologies in the general population, including depression and anxiety, is emotion regulation [20–22].

Emotion regulation refers to the strategies we use to alter our own emotional state, typically to reach a desired outcome [23, 24]. A widely known taxonomy of emotion regulation strategies is Gross' Process Model [23], identifying different cognitive and behavioral emotion regulation strategies such as behavioral approaching, behavioral avoidance, problem solving, support seeking, distraction, rumination, cognitive reappraisal, acceptance, expressive engagement and expressive suppression ([25]; see Figure S1 in Supplementary Material for a detailed description).

Although researchers and clinicians agree that emotion regulation is an important transdiagnostic factor underlying both depression and anxiety in the general population, emotion regulation during the perinatal period received less research attention thus far [26, 27]. This is surprising as the perinatal period is fraught with challenges that call upon the mother's emotion regulation abilities, such as experiencing sleep deprivation, high levels of stress, mood instability, physical complaints, and parenting [28–31]. These challenges render the perinatal period an emotionally demanding phase in women's lives. Additionally, as described above, the clinical presentation of perinatal depression and anxiety may have characteristics inherent to the perinatal period [8]. Therefore, an overview of how pregnant women and young mothers suffering from depression and anxiety regulate their emotions is warranted.

Previous reviews have investigated related topics, such as how coping strategies of women in community samples are related to perinatal psychological outcomes [32, 33]. However, it is likely that clinical samples differ from non-clinical samples regarding their habitual use of emotion regulation strategies [34, 35]. Moreover, by focusing on emotion regulation, we broaden our scope as coping

pertains to regulatory processes specifically activated in response to stressors or adverse circumstances, whereas emotion regulation occurs in response to both adverse and positive circumstances [34].

The aim of this systematic review is to assess the literature regarding the role of ten commonly studied emotion regulation strategies in the onset and maintenance of perinatal depression or anxiety in women, using the Process Model as a theoretical framework [34, 36]. The value of this taxonomy lies in its potential to explain the onset and maintenance of depressive or anxiety by linking their symptoms to specific emotion regulation strategies [34, 36–38]. The results can guide perinatal screening practices to identify pregnant women or young mothers at risk of developing or currently suffering from depression or anxiety, as well as to guide treatment programs. As such, our findings will be directly relevant for clinicians working with women during the perinatal period.

## Methods

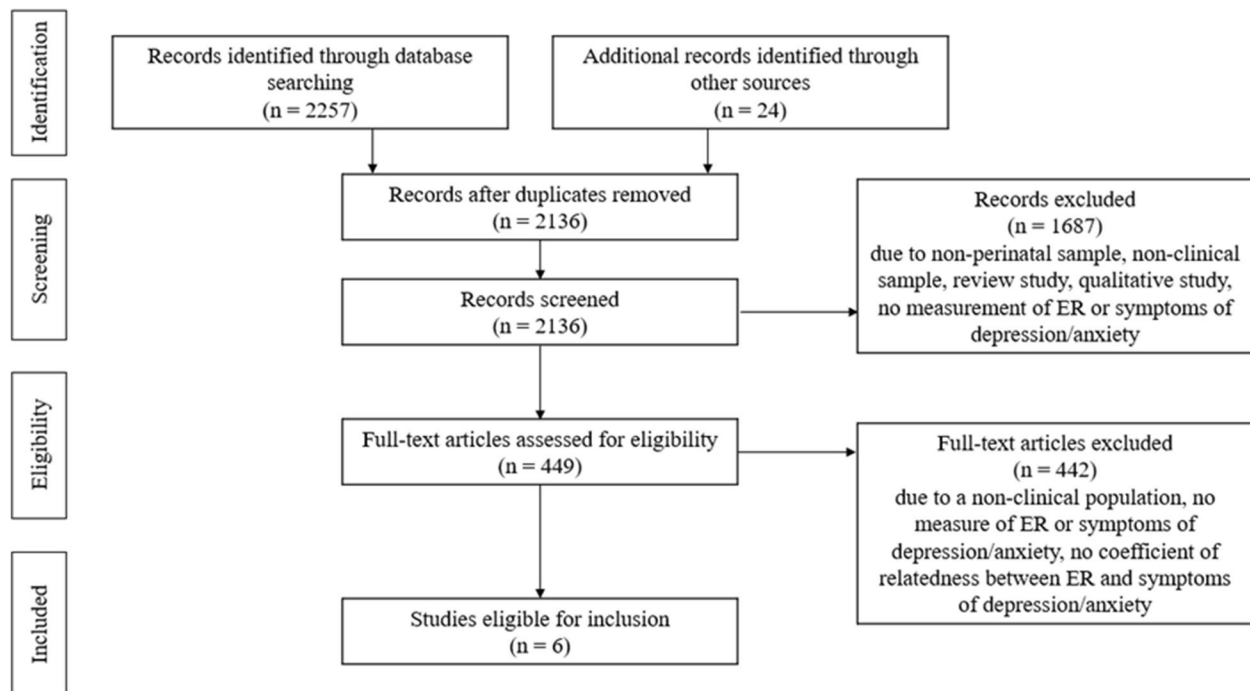
The current review was conducted in line with the PRISMA guidelines [39]. As the number of included studies was too small to allow for a valid statistical aggregation, a meta-analysis was deemed unfeasible and a narrative synthesis approach was applied [40].

## Search strategy

We searched the databases PubMed, Web of Science, PsychArticles, and Scopus with variations of the following key words: *women*; *emotion regulation* (i.e., behavioral approach, behavioral avoidance, problem solving, support seeking, distraction, rumination, reappraisal, acceptance, expressive suppression, and expressive engagement); *perinatal period* (i.e., pregnancy, postpartum); and *psychopathology* (i.e., depression and anxiety; Table S1, S2, S3 and S4 in Supplementary Material for search terms). We exported the search results to Endnote X9; reference lists of the eligible studies were reviewed. Finally, we supplemented our search in Google Scholar using the same terms and constraints as our initial search (as in [34]). We included only the first six pages of the search because studies became less relevant to the review topic beyond the sixth page. Our literature searches resulted in a total of 2281 studies for evaluation.

## Eligibility criteria

To be included, articles had to report (a) a coefficient of relatedness between at least one emotion regulation strategy and symptoms of depression or anxiety in (b) adult women (c) who were diagnosed with MDD or anxiety disorder (incl. GAD, panic disorder, social anxiety disorder, specific phobias, and obsessive compulsive and related disorders) (d) by means of a standardized



**Fig. 1** PRISMA flow diagram

diagnostic interview (e) during the perinatal period (e.g., pregnancy up to one year postpartum). More in- and exclusion criteria can be found in [Supplementary Material](#).

#### Data extraction

In January 2022, we identified 2281 studies for evaluation. In Fig. 1, the PRISMA flow diagram can be found. After deduplicating, the first author and a trained research assistant independently screened the remaining 2136 articles by their title and abstract (inter-rater agreement of 86%). We discussed disagreements until we reached consensus. If an abstract fulfilled all inclusion criteria, the full-text article was extracted. Most articles were excluded as the participants were diagnosed on a clinical cutoff in a self-report screening tool, or due to a lack of correlation coefficients between emotion regulation strategies and symptoms of depression or anxiety.

We did an updated search in January 2023, identifying no additional eligible articles. Six articles met the inclusion criteria, being included in the final analysis. First, the emotion regulation strategies were categorized according to the Process Model<sup>1</sup> [23] (Table S5 in Supplementary

Material). Second, we extracted and summarized the study characteristics and the results.

#### Quality assessment

The first author and a trained research assistant independently evaluated the scientific quality of the studies using nine criteria from [41] (Figure S2 in Supplementary Material). Each criterion was rated on a three-point scale ranging from 1 = “low quality” to 3 = “high quality”.

## Results

#### Study characteristics

The characteristics and findings of the six studies are summarized in Table 1. The studies were published between 2012 and 2021. Sample sizes varied from 36 to 161 participants, with a mean age of 31.5 years. Samples were largely comprised of Western heterosexual Caucasian women who lived with the father of their child; only one study recruited from an underrepresented group of women [42]. All studies measured emotion regulation during the postpartum period, except for one study that did so during pregnancy [42]. Two of the six studies used the same sample [43, 44].

To diagnose mood and anxiety disorders, all studies adopted structured clinical interviews for DSM-IV or DSM-V. Three studies included women diagnosed with a MDD [42–44], whereas two other studies included women diagnosed with an anxiety disorder [45, 46]. One

<sup>1</sup> Consistent with other meta-analyses (e.g., [34]), we included studies measuring coping strategies classifiable under one of the ten emotion regulation strategies since there is conceptual overlap between emotion regulation and coping strategies.

**Table 1** Study characteristics

Author(s), Year, Country (quality assessment)	Study Design	Recruitment Method	Sample Size (n) and Mean Age (a)	Pathology Assessed	Timing of Assessment	Emotion Regulation Strategies Assessed	Symptoms of Depression or Anxiety assessed	Results
Tietz et al., 2014 [46] Germany (2.7)	Cross-sectional	Recruited during a postpartum stay at a Mother-Infant Unit in a university hospital	n = 78 (30 with clinical diagnosis) a = 33.3	Diagnosis of anxiety disorder (Panic disorder, GAD, social phobia, OCD, PTSD) via SCID-I	One assessment between three and eight months postpartum	Behavioral avoidance via the MI	Depressive symptoms via the EPDS Anxiety symptoms via the BSQ	Behavioral avoidance is positively correlated with the number of anxiety disorders ( $r = 0.50^{***}$ ) Behavioral avoidance is positively correlated with symptoms of depression ( $r = 0.43^{***}$ ) and anxiety ( $r = 0.55^{***}$ ) Women diagnosed with MDD at 32 weeks postpartum scored significantly higher (***) on distraction and behavioral avoidance compared to women without MDD Women diagnosed with MDD at 32 weeks postpartum reported lower levels of social support compared to women without MD The use of distraction, behavioral avoidance and emotional expression right after birth were positively associated with depressive symptoms eight ( $r = 0.58^*$ ) and 32 weeks ( $r = 0.49^*$ ) postpartum in women diagnosed with MDD. The other strategies were not significantly associated with depressive symptoms
Gutiérrez-Zotes et al., 2015 [44] Spain (2.7)	Prospective	Recruited in the obstetric departments in seven hospitals	n = 1626 (161 with clinical diagnosis) a = 31.8	Diagnosis of MDD via the DIGS	Three assessments: at two days (COPE-B, EPDS), eight weeks (EPDS, DIGS), and 32 weeks (EPDS, DIGS) postpartum	Problem solving, distraction, acceptance, cognitive reappraisal, behavioral avoidance, support seeking, and emotional expression via the COPE-B	Depressive and anxiety symptoms via the EPDS	

**Table 1** (continued)

Author(s), Year, Country (quality assessment)	Study Design	Recruitment Method	Sample Size (n) and Mean Age (a)	Pathology Assessed	Timing of Assessment	Emotion Regulation Strategies Assessed	Symptoms of Depression or Anxiety assessed	Results
Gutiérrez-Zotes et al., 2016 [43] Spain (2,7)	Prospective	Recruited in the obstetric departments in seven hospitals	n = 1626 (161 with clinical diagnosis) a = 31.8	Diagnosis of MDD via the DIGS	Three assessments: at two days (COPE-B, EPDS), eight weeks (EPDS, DIGS), and 32 weeks (EPDS, DIGS) postpartum	Problem solving, distraction, reappraisal, cognitive reappraisal, behavioral avoidance, support seeking, and emotional expression via the COPE-B	Depressive and anxiety symptoms via the EPDS	Women diagnosed with MDD scored higher on behavioral avoidance (*), and distraction (***) and lower on cognitive reappraisal (*) compared to non-depressed women The use of distraction right after birth appeared to be a predictor for a diagnosis of MDD at 32 weeks postpartum (OR 1.18, 95% CI 1.04–1.33) For women diagnosed with MDD, the use of distraction, emotional expression, and behavioral avoidance right after birth are positively related to depressive and anxiety symptoms at eight weeks postpartum, whereas the use of problem-solving, cognitive reappraisal, and acceptance are negatively related to depressive and anxiety symptoms at eight weeks postpartum For women diagnosed with MDD, the use of distraction, behavioral avoidance, and emotional expression right after birth are positively related to depressive and anxiety symptoms at 32 weeks postpartum, whereas the use of cognitive reappraisal is negatively related to depressive and anxiety symptoms at 32 weeks postpartum

**Table 1** (continued)

Author(s), Year, Country (quality assessment)	Study Design	Recruitment Method	Sample Size (n) and Mean Age (a)	Pathology Assessed	Timing of Assessment	Emotion Regulation Strategies Assessed	Symptoms of Depression or Anxiety assessed	Results
Aydoğan et al., 2020 [45] Turkey (2,6)	Prospective	Recruited in an obstetric inpatient clinic of a university hospital	n = 38 a = 30,5	Diagnosis of panic disorder via the SCID-NP	Two assessments: at the first day (SCID-NP, COPE, PAS, HADS) and between six and eight weeks (PAS) postpartum	Problem solving, behavioral avoidance, acceptance, cognitive reappraisal, emotional expression, instrumental and emotional support seeking via the COPE	Severity of panic symptoms via the PAS Depressive and anxiety symptoms via the HADS	Problem solving, but no other strategies, was significantly higher (*) in the decreased group compared to the non-decreased group The predictive value of problem solving in the decrease of at least 50% in panic symptoms from baseline to 6–8 weeks postnatally was not found to be statistically significant (Wald $\chi^2 = 3.28$ , $df = 1$ , $Exp(\beta)$ [95% CI] = 1.44 [0.97–2.15], $p = 0.07$ ). The use of problem solving right after birth did not predict changes in symptom severity in women diagnosed with panic disorder during the next 6–8 weeks postpartum

**Table 1** (continued)

Author(s), Year, Country (quality assessment)	Study Design	Recruitment Method	Sample Size (n) and Mean Age (a)	Pathology Assessed	Timing of Assessment	Emotion Regulation Strategies Assessed	Symptoms of Depression or Anxiety assessed	Results
Stein et al., 2012 [47] UK (2.8)	Experimental	Recruited in postnatal wards at health centers	n = 253 (147 with a clinical diagnosis) a = 32.7	Diagnosis of MDD (n = 57), GAD (n = 90) via the SCID-I	One assessment at ten months postpartum	Worry and rumination were primed	Positive and negative affect via the PANAS-SF	Positive affect was lower in the worry and rumination prime condition compared to the neutral prime condition within women diagnosed with GAD (*) and MDD (*) but not within the healthy controls. Significant main effect for priming condition, with the worry and rumination condition having higher odds of high negative affect ratings than the neutral condition, across all three groups. Significant main effect of group, with both GAD and MDD having increased odds of higher post-prime negative-affect ratings overall than the healthy controls.
Olhaverly et al., 2014 [42] Chili (2.6)	Cross-sectional	Recruited in public health centers for pregnancy care	n = 96 (77 with a clinical diagnosis) a = 26.7	Diagnosis of MDD via MINI	One assessment between three and seven months pregnancy	Problem solving orientation via the SPSS-R	Depressive symptoms via the BDI	Women with a negative orientation towards problem solving showed greater levels of depressive symptoms (r = .447***). Women with a positive orientation towards problem solving showed lower levels of depressive symptoms (r = -.251*). Positive orientation towards problems and rational problem solving were more than one standard deviation below the average obtained in the non-clinical Latin American population.

BDI/Beck Depression Inventory (Beck & Steer, 1987); BDI/Beck Depression Inventory (Beck et al., 1961); BSO Body Sensations Questionnaire (Reiss, Peterson, Gursky, & McNally, 1986); COPE Coping Orientation to Problems Experienced (Carver, Scheier, & Weintraub, 1989); COPE-B The Brief Coping Orientation to Problems Experienced (Carver, 1997); DIGS Diagnostic Interview for Genetic Studies for DSM-IV (NurMBERger et al., 1994); EPDS Edinburgh Postnatal Depression Scale (Cox et al., 1987); HADS Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983, 1992, 1994); MDD Major Depressive Disorder; MI Mobility Inventory (Ehlers et al., 2001); MINI The Mini International Neuropsychiatric Interview (Sheehan et al., 1997); PANAS-SF Positive and negative affect scale – short form (Kercher, 1992); PAS Panic and Agoraphobia Scale (Bandelow, 1995); SCID-NP Structured Clinical Interview for DSM-IV Disorders-Non-Patient Version (First, Spitzer, Gibbon, & Williams, 1997); SCID-I Structured Clinical Interview for DSM-IV Axis I Disorders (First et al., 1995); SPSS-R Abbreviated Social Problem-Solving Inventory (DZurilla, Nezu, & Maydeu-Olivares, 1998)

\* p < .05; \*\* p < .01; \*\*\* p < .001

remaining study included women diagnosed with MDD or anxiety [47]. To measure the severity of depressive and anxiety symptoms in women, half of the studies used the Edinburgh Postnatal Depression Scale [48]. All studies employed distinct instruments to assess emotion regulation strategies, except for two studies that included the same sample [43, 44].

### Quality assessment

The scientific merit ratings of the studies ranged from two to three on the 3-point scale used, with a mean of 2.6 (Table S6 in Supplementary Material). All studies were included in the final synthesis.

### Narrative summary

#### *Behavioral approaching*

None of the studies assessed behavioral approaching.

#### *Behavioral avoidance*

Three prospective [43–45] and one correlational study [46] examined the use of behavioral avoidance in women diagnosed with postpartum depression or anxiety. The studies focusing on women diagnosed with postpartum depression indicated that behavioral avoidance emerges as a risk factor [43, 44, 46]. For example, in two studies, clinically depressed women who avoided emotion-eliciting situations right after birth were more likely to report depressive and anxiety symptoms up to seven months postpartum [43, 44]. The same studies indicated that women diagnosed with postpartum depression disorder engaged more in behavioral avoidance compared to non-depressed women. However, engaging in behavioral avoidance right after birth did not predict changes in the anxiety symptoms of women diagnosed with panic disorder [45].

#### *Problem solving*

Three prospective [43–45] and one correlational study [42] examined the use of problem solving in women diagnosed with antenatal and postpartum depression or anxiety. All studies indicated that the use of problem solving emerges as a protective factor in women diagnosed with a perinatal depression or anxiety [42–44]. For example, clinically depressed women with a positive orientation towards problem solving showed lower levels of depressive symptoms during pregnancy [42]. Additionally, women diagnosed with panic disorder whose symptoms diminished up to eight months, used significantly more problem solving right after pregnancy compared to those whose symptoms remained unchanged [45].

### *Support seeking*

Three prospective studies examined support seeking in women diagnosed with postpartum depression or anxiety [43–45]. The studies focusing on women diagnosed with postpartum depression indicated that seeking support from others emerges as a protective factor. Specifically, clinically depressed women who engaged in seeking instrumental and emotional support right after birth reported less depressive and anxiety symptoms up to seven months postpartum [43, 44]. However, seeking support right after birth did not predict changes in the anxiety symptoms of women diagnosed with panic disorder [45].

### *Distraction*

Two prospective studies investigated the use of distraction in women diagnosed with postpartum depression, indicating that the use of distraction emerges as a risk factor [43, 44]. Specifically, clinically depressed women who engaged in distraction right after birth were more prone to report depressive and anxiety symptoms up to seven months postpartum [43, 44]. The same studies indicated that women diagnosed with postpartum depression disorder engaged more in distraction compared to non-depressed women. Furthermore, this emotion regulation strategy was identified as the only predictor for a diagnosis of depression during the first seven months postpartum [43, 44].

### *Rumination*

One experimental study investigated the use of rumination in women diagnosed with postpartum depression or generalized anxiety disorder [47], and indicated that the use of rumination emerges as a risk factor. The findings revealed that the engagement in rumination was associated with an increase in negative affect and worrying in clinically depressed or anxious women.

*Cognitive reappraisal* Three prospective studies examined the use of cognitive reappraisal in women diagnosed with postpartum depression or anxiety [43–45]. The studies focusing on women diagnosed with postpartum depression indicated that cognitive reappraisal emerges as a protective factor. Specifically, clinically depressed women who engaged in cognitive reappraisal right after birth were less likely to report depressive and anxiety symptoms up to seven months postpartum [43, 44]. The same studies indicated that healthy postpartum women were more likely to use this strategy compared to clinically depressed women [43, 44]. However, engaging in cognitive reappraisal right after birth did not pre-



dict changes in the anxiety symptoms of women diagnosed with panic disorder [45].

#### **Acceptance**

Three prospective studies examined the use of acceptance in women diagnosed with postpartum depression or anxiety [43–45]. The studies focusing on women diagnosed with postpartum depression indicated that acceptance emerges as a protective factor. Specifically, clinically depressed women who engaged in acceptance right after birth were less likely to report depressive and anxiety symptoms up to seven months postpartum [43, 44]. The same studies indicated that healthy postpartum women were more likely to use this strategy compared to clinically depressed women [43, 44]. However, engaging in acceptance right after birth did not predict changes in the anxiety symptoms of women diagnosed with panic disorder [45].

#### **Expressive engagement**

Three prospective studies examined the use of expressive engagement in women diagnosed with postpartum depression or anxiety [43–45]. The studies focusing on women diagnosed with postpartum depression indicated that the use of expressive engagement emerges as a risk factor. Specifically, clinically depressed women who engaged in talking about their feelings right after birth were more likely to report depressive and anxiety symptoms up to seven months postpartum [43, 44]. However, engaging in expressive engagement right after birth did not predict changes in the anxiety symptoms of women diagnosed with panic disorder [45].

#### **Expressive suppression**

None of the studies assessed expressive suppression.

### **Discussion**

The current review covered six studies on the role of emotion regulation in the onset and maintenance of perinatal depression and anxiety. The first conclusion stemming from our findings is that similar emotion regulation strategies emerge as risk and protective factors in perinatal depression and anxiety in women, supporting the role of emotion regulation as a transdiagnostic factor underlying both psychopathologies. Specifically, behavioral avoidance, distraction, rumination, and expressive engagement appeared as *risk factors* in the onset and maintenance of perinatal depression and anxiety. In other words, women engaging in these strategies postpartum are more likely to develop or continue to experience depressive or anxiety symptoms. These findings are generally in line with previous research in perinatal *community* samples [32, 33, 49, 50], as well as in non-perinatal

*clinical* samples [34, 37, 51]. This implies that similar emotion regulation strategies emerge as risk factors for depression and anxiety disorders both during and outside the perinatal period.

There are a few possible explanations that help to understand why women who engage in behavioral avoidance, distraction, rumination or expressive engagement are more likely to develop or continue suffering from depressive or anxiety symptoms. First, these strategies provide an initial symptom relief, but are likely to be less effective in reducing negative emotions in the *long term* [52–54]. For instance, engaging in distracting activities temporarily ameliorates depressed mood and breaks the ruminative cycle, although chronic use of distraction increases negative mood and might develop into behavioral avoidance [55]. Similarly, the tendency to dwell on the causes and implications of emotions (rumination) initially results in a false sense of control but leads to persistent negative mood in depressed individuals [56, 57]. One could also hypothesize that engaging in behavioral avoidance, distraction, rumination or expressive engagement might limit the use of other, more helpful, strategies [56, 58, 59]. For instance, avoiding social contexts (behavioral avoidance) might limit a woman's opportunities to seek and find social support. Similarly, desperately trying to get rid of one's negative mood by engaging in distracting activities (distraction) can keep women from feeling and accepting their negative emotions about mothering [55]. Or persistently thinking (rumination) or talking (expressive engagement) about the cause of distress may hinder one's proactive engagement in problem-solving endeavors [56]. Finally, it is possible that engaging in these strategies might have adverse interpersonal consequences, provoking or further perpetuating the woman's depressive or anxiety symptoms. For instance, a mother can encounter unwanted negative responses from her partner when letting out her negative emotions (expressive engagement) persistently, which can be damaging to their relationship and her own affective state [60]. Subsequent research could examine how clinical couples regulate their own and each other's emotions during the perinatal period, and how this affects their individual and relational well-being [61].

On the other hand, the usage of problem solving, emotional and instrumental support seeking, cognitive reappraisal, and acceptance, emerged as *protective factors* in the onset and maintenance of perinatal depression and anxiety. In other words, women engaging in these strategies during or after pregnancy are less likely to develop or continue to experience depressive or anxiety symptoms. Again, these findings generally align with a large body of literature in perinatal *community* samples [32, 33, 50, 62, 63], as well as in non-perinatal *clinical* samples [34, 37].

This implies that similar emotion regulation strategies emerge as protective factors for depression and anxiety disorders both during and outside the perinatal period.

In the literature, these strategies are considered protective as they are frequently associated with an increase in positive emotions, a decrease in negative emotions, and a reduction of psychopathological symptoms [34, 36]. In addition, these strategies are speculated to limit the likelihood of using other strategies that are less effective in reducing negative emotions in the long term [37, 64]. For instance, when a mother experiencing depression can accept her negative thoughts and emotions, this may keep her from suppressing them.

Our final conclusion concerns the finding that women diagnosed with postpartum depression or anxiety differed from healthy postpartum women in their usage of emotion regulation strategies. Specifically, depressed mothers tend to use more behavioral avoidance and distraction and less cognitive reappraisal and acceptance to regulate their emotions compared to healthy mothers. Additionally, mothers diagnosed with a panic disorder whose symptoms endured used less problem solving as compared to mothers whose symptoms reduced. In other words, women facing postpartum depression or anxiety use less strategies considered effective in downregulating negative emotions but use more strategies that might exacerbate or prolong their negative emotions. These findings are consistent with previous research in (non) perinatal samples [33, 35, 37, 56, 65–67]. It is possible that women facing postpartum depression or anxiety use less acceptance, cognitive reappraisal, or problem solving because these strategies require more effort. For example, cognitive reappraisal requires a change of perspective that can be experienced as too difficult for depressed mothers due to a biased cognition towards negative or stressful stimuli or due to deficits in cognitive control [56, 64, 68]. Being “stuck” in attending to negative or stressful aspects may make it more difficult for depressed mothers to shift their attention to more positive or neutral aspects of the situation. The challenges of the perinatal period (e.g., caregiving, fatigue) can add to the mother’s mental burden [54]. As such, she might opt for the short-term effectiveness of strategies requiring less cognitive load (e.g., behavioral avoidance, distraction) over long-term effective strategies requiring a higher cognitive load [54, 56, 69]. In addition to comparing mothers with and without postpartum depression and anxiety, future studies could examine emotion regulation strategies in women with depression and anxiety both *during* and *beyond* the perinatal period. This could inform clinicians about the unique stressors inherent to the perinatal period that may influence the role of emotion regulation in the onset and maintenance of perinatal depression and anxiety.

### Limitations

First, as this review focused on a diagnostically homogenous group (i.e., women diagnosed perinatal depression or anxiety), a smaller number of studies were included compared to related reviews (e.g., [32, 33]). Second, only one article covered the antenatal period. Further studies are needed to better understand the role of emotion regulation during pregnancy. Third, only two to three studies were included per emotion regulation strategy, with no studies included for the strategies ‘behavioral approaching’ and ‘expressive suppression,’ meaning our results should be interpreted with caution. Fourth, the exclusion of non-English studies may have led to an overreliance on WEIRD (Western, Educated, Industrialized, Rich, and Democratic) samples, potentially limiting the generalizability of our findings.

Additionally, three considerations stemmed from the quality assessment. First, none of the studies reported using a theoretical framework to guide the research questions, selected variables, or interpretation of the results. Second, half of the studies reported potential limitations in sample representation, citing small sample sizes or limited diversity in sample characteristics [42, 45, 46]. Consequently, our findings may not extend to underrepresented groups of women, including unmarried, low-income, single, and non-heterosexual mothers. Finally, some of the studies measured depressive and anxiety symptoms with questionnaires designed for use in the general population, such as the HADS and the BDI [42, 45]. As these measurements include somatic symptoms commonly experienced by perinatal women, this could lead to inflated depression scores and false-positive rates.

### Clinical implications

The results of this review highlight the need to implement emotion regulation strategies in psychosocial screening procedures to identify women at risk for and currently suffering from perinatal depression and anxiety. Psychosocial assessments can be conducted during the standard hospital visit at 16 weeks pregnancy and repeated during the standard postnatal gynecological visit at six weeks by the midwives [70]. Midwives are ideally placed for openly discussing a woman’s typical response to emotional events, as they are often women’s confidants during hospital visits. Additionally, emotion regulation should have a central role in the prevention and treatment of perinatal depression and anxiety. Therapeutic *interventions* could include, for example, evaluating the perceived short- and long-term effectiveness of their emotion regulation strategies, behavioral experiments (e.g., refraining from behavioral avoidance), role plays (e.g., train how to seek support), and psychoeducation. Moreover, clinicians could help women to normalize the diversity of their

emotional experiences. The ability to accept that negative emotions are also part of the motherhood experience may help women deal in a more adaptive way with the challenges posed by motherhood, as they are not focused on trying to avoid or control negative emotions [71].

## Conclusion

Our findings indicate that similar emotion regulation strategies emerge as risk and protective factors in perinatal depression and anxiety, supporting the role of emotion regulation as a transdiagnostic factor. Specifically, behavioral avoidance, distraction, rumination, and expressive engagement appeared as *risk factors*, while problem solving, emotional and instrumental support seeking, cognitive reappraisal, and acceptance, emerged as *protective factors* in the onset and maintenance of perinatal depression or anxiety. Therefore, clinicians are encouraged to implement emotion regulation strategies into the screening, prevention, and treatment of perinatal depression and anxiety. Further research is needed to strengthen these findings and to examine the role of emotion regulation during antenatal depression and anxiety more closely.

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## Supplementary Information

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Supplementary Material 1.

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## Authors' contributions

All authors contributed to the research design and agreed on the protocol. P.V., L.S., G.L., and L.V. designed the search strategy. P.V. was responsible for the literature search and quality assessment, with input from all other authors. P.V. wrote the first draft of the manuscript and L.S., G.L., and L.V. contributed to and have reviewed and approved the final manuscript.

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## Availability of data and materials

Not applicable. This manuscript does not report data analysis.

## Data availability

No datasets were generated or analysed during the current study.

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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