A systematic review of concepts related to women’s empowerment in the perinatal period and their associations with perinatal depressive symptoms and premature birth

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Abstract

Background: The perinatal period, which we here define as pregnancy and the first year postpartum, is a time in women’s lives that involves significant physiological and psychosocial change and adjustment, including changes in their social status and decision-making power. Supporting women’s empowerment at this particular time in their lives may be an attractive opportunity to create benefits for maternal and infant health outcomes such as reductions in perinatal depressive symptoms and premature birth rates. Thus, we here systematically review and critically discuss the literature that investigates the effects of empowerment, empowerment-related concepts and empowerment interventions on reductions in perinatal depressive symptoms, preterm birth (PTB), and low birthweight (LBW).

Methods: For this systematic review, we conducted a literature search in PsychInfo, PubMed, and CINAHL without setting limits for date of publication, language, study design, or maternal age. The search resulted in 27 articles reporting on 25 independent studies including a total of 17,795 women.

Results: The majority of studies found that, for the most part, measures of empowerment and interventions supporting empowerment are associated with reduced perinatal depressive symptoms and PTB/LBW rates. However, findings are equivocal and a small portion of studies found no significant association between empowerment-related concepts and perinatal depressive symptoms and PTB or LBW.

Conclusion: This small body of work suggests, for the most part, that empowerment-related concepts may be protective for perinatal depressive symptoms and PTB/LBW. We recommend that future theory-driven and integrative work should include an assessment of different facets of empowerment, obtain direct measures of empowerment, and address the relevance of important confounders, including for example, ethnicity and socioeconomic status.

Keywords: Empowerment, Perinatal depression, Preterm birth, Low birthweight, Prematurity
Background

Women’s empowerment can lead to significant positive changes in many domains. In terms of health, studies have found an association between increased empowerment and reduced mortality and morbidity [1, 2]. For example, empowerment interventions have been associated with decreases in blood glucose and cholesterol levels among women with pre-diabetes and high cardiovascular disease risk [3]. In terms of reproductive health, empowerment has been associated with reduced rates of unintended pregnancies [4] and sexually transmitted diseases, such as chlamydia and gonorrhea, in high-risk populations [5]. Other studies have shown benefits of empowerment for health-related behaviors such as obtaining nutritional supplements and participating in health education sessions [6].

The benefits of empowerment are not necessarily limited to women themselves, but have the potential to extend to those around her, including her own children. Stressors experienced during pregnancy not only result in physiological alterations in the pregnant woman, but these biological signals can be communicated to the unborn child via placental transmission, and have been associated with outcomes including preterm birth (PTB) and postpartum depression [7, 8].

The perinatal period, here defined as pregnancy and the first year postpartum, is also a time in women’s lives that involves significant physiological and psychosocial change and adjustment, including changes in women’s social status and decision-making power. Supporting women’s empowerment at this particular time may be an opportunity to create long-lasting benefits, not only for the new mother, but also for her newborn. One of the earliest measures of infant health are measures of prematurity including PTB and low birthweight (LBW), and there is convincing evidence that being born prematurely poses a risk factor for poorer health outcomes throughout the life span (e.g., [9]). In terms of maternal health, an early birth outcome is the presence and degree of postpartum depressive symptoms, which in the broader peripartum depression literature have been assessed to occur anywhere between 1 day and 1 year postpartum [10]. It has been argued that the behavioral pathways leading to PTB and postpartum depression and its symptoms may overlap [11], which led us to include both health outcomes in this review.

Herein, we systematically review the literature testing the link between perinatal maternal empowerment and perinatal depressive symptoms as well as PTB and LBW. Because the number of studies testing these associations is very small, we chose to define empowerment in its broadest sense as a person’s autonomy, decision-making power, and self-determination. We also decided to include studies on empowerment-related concepts that merely relate to or impact on empowerment if the authors’ discussion of the methods used fell within the framework of empowerment. Conceptualizations of empowerment and its related concepts among studies in this review include, for example, relationship power, equity, self-efficacy reflected in women’s financial independence, reductions in intimate partner violence, and increases in domestic decision-making power.

The present review includes observational studies assessing the degree of empowerment and empowerment-related concepts through questionnaires, as well as studies supporting women’s empowerment by implementing programs intended to increase women’s empowerment, which we here refer to as empowerment interventions. Of note, among the intervention studies, only one actually measured changes in an empowerment-related concept [12]. Moreover, the interventions in the studies reported here were not always designed to improve a health outcome by changes in empowerment alone. Table 1 shows which measure or intervention was used for each study, and how empowerment was conceptualized.

Methods

Search strategy

We conducted a literature search in PsychINFO, PubMed, and CINAHIL, according to guidelines in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement [13]. The terms ‘agency’, ‘autonomy’, ‘choice’, ‘control’, ‘domestic decision-making power’, ‘economy’, ‘empower’, ‘empowerment’, ‘fertility intervention’, ‘leadership’, ‘power’, ‘pregnancy’, ‘resources’, ‘transformation’, ‘voice’, and ‘women’s health’ were combined with the search terms ‘birth’, ‘birthweight’, ‘preterm’, ‘depression in pregnancy’, ‘perinatal depression’, ‘postpartum depression’, and ‘premature birth’. The search terms ‘CenteringPregnancy’, ‘child marriage’, and ‘sexual activity’ also emerged as relevant due to their presence in the initial search results, and the three terms were thus added to the final search.

Inclusion and exclusion criteria

To be included in this review, studies had to be peer-reviewed and include (1) a sample of women who were either pregnant or within the first year postpartum; (2) a measure of empowerment or lack thereof or an intervention aimed at supporting women’s empowerment; and (3) a measure of perinatal depressive symptoms or of prematurity (PTB, LBW). Of note, whereas PTB/LBW is determined at the time of birth, maternal depressive symptoms can occur in the postpartum period as well. Thus, studies of empowerment in the first year postpartum were only relevant to the literature on depressive symptoms. We identified 1 study assessing depressive symptoms during pregnancy, 11 in the postpartum period.
period, and 4 in both pregnancy and postpartum. Empowerment was measured or an intervention supporting empowerment was administered postpartum for 9 studies, in pregnancy for 3 studies, and in both for 4 studies. No limits were set for date of publication, maternal age, study design, or language of publication; nevertheless, only English language publications were identified.

**Selected studies**

The literature search identified 150 records in PubMed, 74 records in PsycINFO and 40 records in CINAHL (see Fig. 1 for PRISMA flow chart). After removing 30 duplicates, 234 articles were screened for eligibility. Five records were excluded based on title and abstract reviews because they were animal studies. Of the remaining 229 full-text articles, 202 records were excluded because they did not include a measure of empowerment or an intervention supporting empowerment (n = 74); did not measure perinatal depressive symptoms, PTB, or LBW (n = 72); or lacked a measure of empowerment as well as perinatal depressive symptoms and PTB or LBW (n = 56). The remaining 27 articles were included in this manuscript. These articles report on 25 independent studies with a total of 17,795 participants. Across studies, sample sizes ranged from 30 [14] to 6155 [15], with a mean of 693 participants (SD = 1196). Most studies were conducted in the US (70.83%), and the remaining studies in Iran, Pakistan (both 8.33%), Taiwan, Canada, and the Netherlands (all 4.17%). Of the studies conducted in the US, one did not provide ethnicity information [16]. In the remaining studies, the majority of participants were African-American (36.27%), followed by White (28.13%), Hispanic (24.42%), Asian (7.01%), Native American (<1%), and Other (4%). Average participant ages ranged from 15 [17] to 33 years old [18]. Across studies, participants were an average of 25.01 years old (SD = 3.79).

**Quality ratings**

Study quality ratings were conducted according to National Institute of Health standards for controlled...
intervention studies as well as for observational, cohort, and cross-sectional studies [19]. We considered studies with a quality score of eight to 14 of good quality, and those with scores of five to seven as fair. While the National Institute of Health standards recommend to not base quality ratings on sum scores alone, we contend that this categorization also matched our individual readings of each study. No studies were considered to be of poor quality.

Conceptualizations of empowerment

We identified six studies that assessed empowerment in cross-sectional/observational study designs and 19 studies that reported on empowerment interventions. Observational studies used mostly self-report or interview measures, such as the Decision-Making Dominance Subscale of the Sexual Relationship Power Scale [20] and critical ethnographic interviews [14]. Studies used different types of empowerment interventions (see Table 1 for details). The majority report on CenteringPregnancy (CP), a group prenatal care model. “CenteringPregnancy unifies the components of prenatal care—risk assessment, education, and support within the group—and encourages women to take responsibility for their own health” ([21], p. 46). CP was included in this review because it aims to empower women by increasing their health self-care efficacy during pregnancy. “The woman’s involvement in self-care activities, the discussion and education format, the worksheets and handouts, and the sharing among the women all lead to her enhanced sense of empowerment. This, in turn, results in a sharing of power between the provider and the consumer” ([21], p. 53). Other studies report on the Creating Opportunities for Parent Empowerment (COPE) program for parents with premature infants in Neonatal Intensive Care Units. COPE aims to inform parental decision-making and increase parental knowledge about infant developmental outcomes, consequently easing parent–infant interactions. Thus, it aims to support women’s empowerment by increasing parenting confidence, participation in care, self-confidence, and control, affecting health outcomes including reducing parenting anxiety and depressive symptoms as well as reducing their stay in the Neonatal Intensive Care Units.

The remaining studies used various other interventions. The first is the Guided Participation program. It is included in the framework of empowerment-related models because it acts on autonomy and self-determination by informing mothers of premature infants of effective premature infant care and increases parenting self-efficacy, feeding competencies, and positive infant behaviors to reduce anxiety and depressive symptoms associated with parenting a premature infant [22]. This has empowerment implications in terms of promoting self-confidence among mothers of premature infants who may feel helpless, scared, and might lack confidence in their ability to care for their premature newborn. The second is an internal health locus of control intervention that aims to promote empowerment of
women through education about self-care such as pregnancy stage monitoring, nutrition, and health [12]. One study reports on a parent-to-parent and parent-to-provider dialogue intervention related to participation, collaboration, awareness, sense of control, self-efficacy, and self-help as well as access to resources and personal action to shift the personal health decision-making power from healthcare provider to client [18]. Finally, Mom Power is a parenting and self-care skills group program for high-risk mothers and their young children that aims to empower by increasing parenting and self-care knowledge [23].

**Results**

Of the 27 manuscripts included in this review, 16 report on maternal perinatal depressive symptoms and 11 studies report on PTB or LBW. No studies that addressed both maternal and infant outcomes were identified, and we therefore report on the two types of outcomes separately.

**Maternal perinatal depressive symptoms**

Of the 16 studies reporting on perinatal depressive symptoms, 10 were intervention studies and 6 were observational studies (Table 2); 15 studies assessed depressive symptoms postpartum and 12 yielded significant findings (80%), whereas only 2 out of 5 studies (40%) yielded significance when depressive symptoms were assessed in pregnancy. Nine out of 11 studies rated as good (82%) and 4 out of 5 studies rated as fair (80%) yielded significance.

**Intervention studies**

Among the intervention studies were seven randomized controlled trials [12, 22, 24–28], two quasi-experimental studies [18, 29], and one prospective cohort study [23].

Three of the randomized controlled trials, all by the same team of authors, used the COPE program as an experimental intervention. The first of this set of studies evaluated COPE in a small sample of 42 mothers of preterm infants [26]. When depressive symptoms were assessed 4 to 8 days after admission and 1 to 4 days prior to discharge, women receiving the intervention had fewer depressive symptoms than those receiving traditional care. However, no differences were observed when scores were aggregated across all phases of the intervention. A second study of 260 families confirms that mothers in COPE report fewer post-hospital depressive symptoms than those in the control group, and further expands by suggesting that COPE may also reduce parental stress [27]. The last article reporting on a subset of 246 mothers found participation in COPE was related not only to mothers’ decreased post-hospital depressive symptoms, but also to reduced anxiety [28]. Thus, while COPE was conceptualized to improve premature infant health and developmental outcomes, the findings of these three studies suggest that COPE may also be an effective tool for reducing maternal postpartum symptoms of depression, stress, and anxiety.

Two studies reported on CP randomized controlled trials [24, 25]. Among women who initially reported high stress, those in a ‘CP+’ group, which added information about HIV prevention as well as components of psychosocial functioning such as behavioral risk assessment, goal setting, communication, and negotiation skills, had significantly fewer depressive symptoms at 1 year postpartum than those in the standard CP and control groups [24]. These findings may suggest that CP could be useful in terms of improving maternal depressive symptoms if it also addresses the specific needs of the patient population. Another CP study of 322 pregnant women in the military found no differences in prenatal or postnatal depressive symptoms between those in a CP condition and those receiving standard care [25]. Similarly, a smaller quasi-experimental study of 49 Hispanic women suggests no significant differences in perinatal depressive symptoms between those in CP and those receiving traditional care [29]. However, in addition to the small sample, the study groups differed in that those in the CP group had more primigravidas.

Of the remaining studies, three found significant associations between empowerment and perinatal depressive symptoms. The strongest support comes from a prospective cohort study of 80 mother–child pairs who participated in the Mom Power intervention. Results suggest that participation in Mom Power is not only associated with significant reduction in depressive symptoms, but also with lower symptoms indicative of post-traumatic stress disorder risk and reduced caregiving helplessness [23]. Another study empowered women by providing an internal health locus of control intervention and found significant increases in internal health locus of control as well as lower postpartum depressive symptoms among those in the intervention group [12]. Similarly, a study of 70 Taiwanese parents of preterm infants, using a parent-to-parent and parent-to-provider dialogue, found that post-intervention depression scores were significantly lower for those in the intervention than for those in the control group. Those in the intervention group also had higher childrearing self-efficacy [18]. In contrast, findings from a small study of 42 mothers with very LBW infants (≤1200 g) indicate no differences in maternal perinatal depressive symptoms between those in the Guided Participation and control groups [22]. However, those in the intervention group were better able to regulate infant negative
| Reference ID/Study authors | Study design | Sample | Measure of empowerment/intervention | Measure of depressive symptoms | Major findings | Quality rating/score* |
|---------------------------|--------------|--------|-----------------------------------|-------------------------------|----------------|----------------------|
| INTERVENTION STUDIES      |              |        |                                   |                               |                |                      |
| [18] Liu et al. (2010)    | Quasi-experimental | 70 parents of preterm newborns in Taiwan, 15 fathers, 55 mothers, M age = Intervention: 33.0 years, Control: 32.5 years | Parent-to-parent and parent-to-healthcare provider dialogue, PP: 12 sessions over 8 months | BDI-II; PP: pre- and post-intervention | Participating in dialogue w/lower post-intervention PPD symptoms, greater pre to post reduction in PPD symptoms, and greater childrearing self-efficacy | Fair (6) |
| [22] Pridham et al. (2005) | Randomized controlled trial | 42 US mother-premature infant pairs, 28 weeks post-conception, M age = GP: 25.5 years, Control: 26.17 years; predominantly European American and African American | GP – program to increase feeding competencies, PP weekly, twice weekly, or monthly in first year | CES-D; PP: 1, 4, 8, 12 months | No difference in PD symptoms; GP w/better ability to regulate infant negative affect and feeding behaviors | Good (9) |
| [12] Monthshiki et al. (2013) | Randomized controlled trial | 230 women in Iran; 28–30 weeks’ GA; M age = Intervention: 28.0 years, Control: 27.8 years | Multidimensional Health Locus of Control Locus of Control, PREG: 28–30 weeks’ GA, PP: 4 weeks | EPDS; PP: 4 weeks PP | Intervention w/increased internal health locus of control and lower PPD symptoms | Fair (7) |
| [23] Musik et al. (2015)  | Prospective cohort study | 80 US mother-child pairs, M age = 23.7 years; Ethn: Caucasian 48.4%, African-American 44.1%, Biracial/Hispanic 7.5% | MP – parenting and self-care skills group program for high-risk mothers and their children, PP: 13 weeks/sessions | PDSS; PP: pre- and post-intervention | MP w/reduction in depression, post-traumatic stress disorder, and caregiving helplessness | Good (12) |
| [24] Ickovics et al. (2011) | Randomized controlled trial | 1047 US pregnant women, ages 14–25 (M = 20.4) years, 18 weeks’ GA; Ethn: 80% African-American, 1% Other; Note: Sample identical to [34], in Table 3 | CP, CP+ group w/additional HIV prevention information in last 3 sessions PREG, 28–30 weeks’ GA, PP: 4 weeks | CES-D; PREG: 2nd and 3rd trimester PP: 6, 12 months | Initial high stress and CP+ group w/fewer PPD symptoms 1 year PP | Good (11) |
| [25] Kennedy et al. (2011) | Randomized controlled trial | 322 US pregnant women in the military, 12–16 weeks’ GA; M age = Control: 25.5 years, CP: 24.9 years; Predominantly White, African American or Latina | CP, PREG: 9 group sessions PP: one session | CES-D, PDSS (PP only); PREG: baseline, 32–36 weeks’ GA PP: 3–4 months | No differences in PD and PPD symptoms w/CP | Good (10) |
| [26] Melnyk et al. (2001) | Randomized controlled trial | 42 US mothers of premature infants, M age = COPE: 26.6 years, Control: 28.8 years; Predominantly White or African American | COPE; PP: 2–4 days after admission, 2–4 days thereafter, 1–2 days in NCU, 1–4 days before discharge, 7 days after discharge, 3 and 6 months | POMS; PP: at all phases and follow-up | COPE w/less depressive symptoms after admission and before discharge, and with higher infant cognitive development scores; No difference in mother’s overall mood state | Good (11) |
| [27] Melnyk et al. (2006) | Randomized controlled trial | 260 US families; 258 mothers (M age = 27.8 years) and 154 fathers with infant born at 26–34 weeks’ GA; Predominantly White or Black | COPE; PP: 2–4 days after admission, 2–4 days thereafter, 1–2 days in NCU, 1–4 days before discharge, 7 days thereafter | BDI-II; PP: at all times except NCU | COPE w/ lower post-hospital parental stress and depressive symptoms | Good (13) |
| [28] Melnyk et al. (2008) | Randomized controlled trial | 246 US mothers of LBW preterm infants, M age = 27.9 years, born at 26–34 (M = 31.4) | COPE; PP: 2–4 days after admission, 2–4 days thereafter, 1–2 days in | BDI-II; PP: 2–4 days after NCU admission, 2–4 days | COPE w/decreased post-hospital | Good (13) |
| Reference ID/Study authors | Study design | Sample | Measure of empowerment/intervention | Measure of depressive symptoms | Major findings | Quality rating/score |
|---------------------------|-------------|--------|-----------------------------------|------------------------------|---------------|--------------------|
| [20] Robertson et al. (2009) | Quasi-experimental | 49 Hispanic women, 24–26 weeks’ GA, M age = Control: 26.5 years, CP: 246 years | NICU, 1–4 days before discharge, 7 days thereafter | CES-D PP. not specified | No difference in PD symptoms w/CP | Fair (5) |
| [29] Robertson et al. (2009) | Quasi-experimental | 49 Hispanic women, 24–26 weeks’ GA, M age = Control: 26.5 years, CP: 246 years | NICU, 1–4 days before discharge, 7 days thereafter | CES-D PP. not specified | No difference in PD symptoms w/CP | Fair (5) |
| [14] O'Mahony et al. (2013) | Qualitative | 30 non-European immigrant and refugee women < 18 years old, living in Canada < 10 years, high risk for PPD | Relationship dominance and control, at time of interview PP: weeks not specified | CES-D PREG and PP: within past 5 years and again at time of interview | Emotional and economic relationship dominance by partner w/greater self-reported PPD vulnerability and symptoms | Fair (6) |
| [16] Richardson et al. (2012) | Cross-sectional | 126 US rural pregnant women, 18–50 years, mostly Caucasian | Levenson Scale on Locus of Control PREG: 20–28 weeks’ GA | CES-D PREG: 20–28 weeks’ GA | Higher external locus of control w/higher PD scores; Internal locus of control w/fewer PD | Fair (6) |
| [20] Gibson et al. (2015) | Cross-Sectional | 182 US pregnant and PP women, M age = 18.8 years; Ethn: 43% Hispanic, 38% African American, 15% White, 4% Other | Intimate partner violence w/CTS, Partner power w/Decision-Making Dominance Subscale of the SRPS PREG: 2nd or 3rd trimester PP: 6 months | CES-D PP: 6 months | PPD symptoms w/higher partner power and intimate partner violence | Good (9) |
| [30] Ali et al. (2009) | Longitudinal | 420 Pakistani pregnant women, M age = 26.1 years, 27.1% local, 72.9% immigrants | Unplanned pregnancy and domestic violence questionnaires PP: within 10 weeks pp | Aga Khan University Anxiety and Depression Scale, DSM IV PP: consent, 1, 2, 6, 12 months | Domestic violence and unplanned pregnancy w/higher PPD risk | Good (11) |
| [31] Rahman et al. (2012) | Longitudinal | 791 rural Pakistani women, M age = 26.8 years | Empowered to manage household finances yes/no PREG: 3rd trimester PP: 6 months | SCID, HRSD PREG: 3rd trimester PP: 6 months, 1 year | Household debt and lack of empowerment to manage household finances w/PD and PPD | Good (11) |
| [32] Chien et al. (2012) | Cross-sectional | 380 immigrant women (M age = 27.00) from China and Vietnam, and native women (M age = 31.7) in Taiwan | Domestic decision-making power scale PP: 1–12 months | CES-D PREG: 1–12 months | Low domestic decision-making power, family income, low social support and immigrant status w/higher PPD symptoms | Good (8) |

*Quality rating score is number of criteria met according to the National Institute of Health quality rating scale (range 0–14)

Studies are listed in order of their Reference Section ID Number

BDI-II Beck Depression Inventory-II, CES-D Center for Epidemiological Studies Depression Scale, COPE Creating Opportunities for Parent Empowerment, CP CenteringPregnancy, CTS Conflict Tactics Scale, EPDS Edinburg Postnatal Depression scale, Ethn Ethnicity, GA gestational age, GP guided participation, HRSD Hamilton Rating Scale for Depression, LBW low birthweight, M Mean, MP Mom Power, NICU neonatal infant care unit, PD perinatal depression, PDSS Postpartum Depression Screening Scale, POMS Profile of Mood States Scale, PP postpartum, PPD postpartum depression, PREG pregnancy, SCID Structured Clinical Interview for Depression, SRPS Sexual Relationship Power Scale, US United States, w/ with
affect and feeding behaviors than those in the control group.

Observational studies
Among the 6 observational studies, 2 were longitudinal [30, 31], 3 cross-sectional [16, 20, 32], and 1 used a qualitative study design [14]. Despite variations in definitions of empowerment, all quantitative studies yielded significance, and studies suggest a positive association between perinatal depressive symptoms and domestic violence [20, 30], emotional and economic relationship dominance by an intimate partner [14], and external locus of control [16] as well as negative associations with domestic decision-making power [32] and the power to manage household finances [31].

Summary
In sum, all observational and all but three of the intervention studies [22, 25, 29] suggest reduced perinatal depressive symptoms with empowerment. More specifically, studies using the COPE, Mom Power, internal health locus of control, parent-to-parent and parent-to-provider dialogue interventions were effective in reducing maternal perinatal depressive symptoms. In contrast, the CP intervention did not significantly improve maternal affect, unless adaptations specific to the study population were made. Similarly, the Guided Participation intervention did not improve maternal health outcomes, likely because it was not primarily developed to address maternal health outcomes, but to improve infant feeding competencies and affect regulation.

PTB and LBW
All 11 studies on PTB and LBW were intervention studies and all used the CP intervention (Table 3). Of these, one was a prospective cohort study [33], two were randomized controlled trials [34, 35], and eight were retrospective cohort studies [15, 17, 36–41]. The prospective cohort study [33] reports that mothers in CP had infants with higher birth weight and longer gestational age at birth than those in the control group. Moreover, among those who delivered preterm, the CP group participants maintained gestation for significantly longer. Similarly, a randomized controlled trial of 1148 women found reduced rates of PTB and LBW among women in the CP+ group [35]. A second randomized controlled trial of 1047 women reports that those in the CP group were significantly less likely to have PTB in comparison to the control group; however, effects for PTB and LBW did not reach significance. Three other CP studies found no significant association with gestational age, birthweight, PTB, or LBW. Confounds related to sample characteristics and study design may play an important role in the effectiveness of CP.

Discussion
We set out to systematically review the relatively small literature on empowerment and maternal and infant health. While all studies meeting inclusion criteria conceptualized their measures in the context of empowerment, none of the studies included a measure of empowerment. Instead, facets of empowerment or concepts related to empowerment were assessed in all
cross-sectional studies and in one intervention study. The remaining intervention studies did not assess empowerment, limiting the conclusions that can be drawn about the role of maternal empowerment interventions in maternal and infant health. However, it is remarkable that despite the differences in how maternal empowerment was conceptualized across studies, the majority of studies provide fairly consistent evidence for a link between what was conceptualized as maternal perinatal empowerment and reduced perinatal depressive symptoms and PTB/LBW rates.

In determining why, among the intervention studies, some yielded significance whereas others did not, the conceptualization of empowerment appears to play an important role. All studies of empowerment and prematurity, and the majority of studies on maternal perinatal depressive symptoms used CP as an empowerment strategy. Our review suggests that, in the majority of studies, CP was successful at improving infant outcomes. In contrast, CP was not associated with lower maternal perinatal depressive symptoms, unless the intervention was modified to include components specific to the study population (i.e., the CP+ condition; [24]). CP was developed and tested with the goals of increasing birth weight, decreasing prematurity and improving patient and healthcare provider satisfaction [42], but not to address pregnant women’s emotional needs. Thus, it is perhaps not surprising that significant findings were limited to the studies assessing infant outcomes. Nonetheless, the studies demonstrating benefits

| Reference ID/Study authors | Study design (all are interventions) | Sample | Measure of empowerment/ intervention | Measure of PTB/ LBW | Major findings | Quality rating score |
|---------------------------|--------------------------------------|--------|--------------------------------------|---------------------|----------------|---------------------|
| [15] Tanner-Smith et al. (2014) | Retrospective cohort study | 6155 US pregnant women, M age = 25.0 years; African American 49.9%, White 30.3%, Hispanic 20.7% | CP, throughout pregnancy | MR CP w/longer gestation, higher birth weight, lower odds of very LBW, but not LBW or PTB | Good (12) |
| [17] Grady et al. (2004) | Retrospective cohort study | 124 US pregnant adolescents, M age = CP: 15.8 years, 2001 comparison: 16.5 years, 1998 comparison: 16.3 years; 12–18 weeks’ GA; Predominantly African American | CP, 12–18 weeks’ GA, and every 2 weeks until 8 weeks postpartum | MR CP group w/less LBW and PTB | Good (11) |
| [33] Ickovics et al. (2003) | Prospective cohort study | 458 US pregnant women, 12–40 years (M = 21.6); ≤ 24 weeks’ GA; African American 80%, Latina 15%, and White 5% | CP, throughout pregnancy | MR CP w/higher birth weight and longer gestation, but not PTB or LBW | Good (11) |
| [34] Ickovics et al. (2007) | Randomized controlled trial | 1047 US pregnant women, 14–25 years (M = 20.4); 18 weeks’ GA; Predominantly African American and Latina | CP, throughout pregnancy | MR CP group w/lower likelihood of PTB, but not LBW | Good (11) |
| [35] Ickovics et al. (2016) | Randomized controlled trial | 1148 US pregnant women, 14–21 years; ≤ 24 weeks’ GA; Predominantly Latina, Black, White | CP+, throughout pregnancy | MR Greater number of CP visits w/less odds of small for GA neonate, PTB, and LBW | Good (11) |
| [36] Barr et al. (2011) | Retrospective cohort study | 379 US pregnant women, M age CP: 27.1 years, Control: 27.4 years; Predominantly Hispanic, Black, White | CP, in pregnancy; GA not specified | MR CP w/less odds of PTB and a trend toward less LBW compared to standard care | Good (9) |
| [37] Klima et al. (2009) | Retrospective cohort study | 268 US pregnant women, ages 14–38 (21.8) years, ≤ 18 weeks’ GA; 100% African American | CP, throughout pregnancy | MR No difference in PTB and LBW w/CP | Good (10) |
| [38] Picklesimer et al. (2012) | Retrospective cohort study | 4083 US pregnant women, M age = 23.1 years, ≤ 16 weeks’ GA; Predominantly White, Black or Hispanic | CP, throughout pregnancy | MR CP w/less PTB, but not LBW | Good (11) |
| [39] Tandon et al. (2012) | Retrospective cohort study | 216 US pregnant women, M age = CP: 27.4 years, Control: 27.5 years; ≤ 20 weeks’ GA; 100% Hispanic/Mayan | CP, throughout pregnancy | MR CP w/lower PTB, but not LBW | Good (10) |
| [40] Trudnack et al. (2013) | Retrospective cohort study | 487 US pregnant women, M age = 25.6 years; 100% Latinas | CP, throughout pregnancy | MR No difference in LBW or PTB w/CP | Good (9) |
| [41] Walton et al. (2015) | Retrospective cohort study | 404 US pregnant women in the military, M age = CP: 24.8 years, Control: 26.3 years; Predominantly Caucasian, Asian, African American | CP, throughout pregnancy | MR No significant difference in LBW and PTB w/CP | Good (9) |

*Quality rating score is number of criteria met according to the National Institute of Health quality rating scale (range 0–14)
Studies are listed in order of their Reference Section ID Number
CP CenteringPregnancy, GA gestational age, LBW low birthweight, M [median]mean, MR medical records, PTB preterm birth, US United States, w/ with
to maternal wellbeing with modified versions of the CP interventions suggest that CP could be further developed to also provide benefits for maternal perinatal wellbeing.

Although CP was not associated with maternal depressive symptoms, other empowerment interventions seemed to be associated with lower depressive symptoms postpartum. It appears that the successful interventions were those that aimed to provide women with the coping skills for the stressors ahead. For example, the successful COPE intervention was conceptualized to empower parents, through guided education, to cope with the needs of premature infants, reduce parenting anxiety, and increase child care efficacy. Other interventions successful at improving maternal depressive symptoms were the Mom Power program, aimed at emphasizing an internal health locus of control, and the intervention improving parent-to-parent and parent-to-provider dialogue. Similar to COPE, these interventions were developed to improve parental wellbeing. Providing some additional support for a link between women’s empowerment in the perinatal period and improved maternal mental health comes from the six observational studies, all of which yielded at least some evidence of a link between empowerment and maternal mood. In contrast, CP and the Guided Participation Intervention focused on improving infant outcomes instead of maternal emotional needs, which may explain the null findings reported for maternal depressive symptoms.

While the CP intervention seems to be effective in improving infant birth outcomes in most studies, not all studies yielded significance. One possibility is that relevant confounding variables that were not statistically controlled for contributed to these null findings. For example, studies with null findings tended to have significantly more primiparous [41] and younger [37] women in the CP groups. They were also more likely to have rather homogenous samples, such as women in the military, with less ethnic diversity, or samples with a high proportion of disadvantaged or low-income women [37, 40]. Others include only parents of severely LBW infants (≥1250 g), have inconsistent intervention lengths, and report dose–response effects [22, 34], which may have also contributed to the null findings. Variations in social and material disadvantage [43], as well as in perceptions of disadvantage in education, employment, and economic status [44], may explain variations in efficacy of empowerment interventions.

It should be noted that this review did not aim to comprehensively review all possible maternal and infant health benefits that may be associated with women’s empowerment. Instead, it focused on one specialized aspect of this association, specifically, perinatal depressive symptoms and PTB/LBW. This is not to say that empowerment does not affect women’s and children’s lives in many other important ways, but rather that these are some of the earliest health benefits that can be assessed.

There is ample evidence that maternal perinatal depressive symptoms continue to have negative consequences for the health and wellbeing of the mother and child. For example, associations have been shown with infant negative affectivity [45], poor mother–infant bonding [46], elevated parenting stress [47], as well as physical and mental illness [48]. Similarly, PTB and LBW have enduring adverse consequences for child health and developmental outcomes such as increased risk for neurodevelopmental disabilities [49], attention difficulties [50], and cardiovascular disease later in life [51]. Given these associations, it appears likely that perinatal empowerment is associated with other health benefits to mother and infant, some of which may also be longer lasting. While important, these studies were considered to be beyond the scope of this review.

Empowerment was not directly measured in any of the intervention studies, with the exception of a single study measuring changes in internal health locus of control, a concept related to empowerment [12]. All interventions included at least an element of empowerment (Table 1), and it seems likely that supporting women’s empowerment was a contributor to the health benefits observed. Nonetheless, it cannot be concluded with confidence that women’s perceptions of empowerment changed in response to the intervention or, if they did, whether an increase in empowerment led to the observed health benefits. There is a need for studies that test whether empowerment is indeed a pathway through which these interventions contribute to improving maternal and infant health outcomes. We recommend that future studies, but in particular intervention studies, administer a direct measure of empowerment before and after the intervention.

Recommendations for future work
It is encouraging that the overall pattern observed in this small literature review is suggestive of significant associations between maternal empowerment-related concepts, perinatal depressive symptoms, and prematurity. To move this literature forward, both theoretically and in terms of the development of successful interventions, we propose several future directions that seem particularly promising, in our view.

First, while most studies provide evidence for an association between empowerment-related concepts and perinatal depressive symptoms or prematurity, we also identified some studies that report null findings. These inconsistencies could be the result of different definitions of empowerment and of differences in how empowerment was measured or supported through interventions. It is also possible that the divergent findings are the result of
differences in sample composition, including, for example, age, ethnicity, and socioeconomic status. Moreover, a portion of the studies reviewed here included relatively small sample sizes and some were underpowered because they were originally designed to investigate outcomes other than PTB/LBW and perinatal depressive symptoms [22, 29]. We recommend that future, adequately powered studies carefully test the role of possible moderators in the link between women’s empowerment, perinatal depressive symptoms and prematurity, and that more detailed attention will be given to methods of measuring or supporting empowerment.

Moreover, we note that existing studies have focused on empowerment as it specifically relates to women’s parental role. While the parental role is perhaps most salient in the context of empowerment of pregnant women and new mothers, other significant life changes occur with the birth of a child, in particular the birth of a first child. Across many cultures, new mothers often scale back on or halt their involvement in non-parental societal roles such as work outside the home, leading to decreases in financial independence as well as changes in social relationships and social status. We could not identify any studies that tested whether the empowerment of pregnant or postpartum women in domains other than the parental one is associated with perinatal depressive symptoms or prematurity. It would be an important contribution to the literature to study the relative impact of different facets of empowerment during the perinatal period on maternal and infant birth outcomes, because this knowledge would provide the groundwork for targeted interventions.

Related to the above, we further observe that studies sometimes use a vague conceptualization of empowerment that may be confounded with other interpersonal processes in group intervention studies. For example, the use of group prenatal care models gives rise to companionship and social support as confounding variables because these group processes are distinct from empowerment, but also may be associated with risk of perinatal depressive symptoms [52, 53]. Moreover, many interventions aimed to empower through provision of information, knowledge, and health literacy, but they did not include a measure of empowerment. Including a measure of empowerment in the intervention studies would allow for the identification of particular components of empowerment, such as increases in self-competence that may be particularly beneficial for reducing perinatal depressive symptoms and PTB or LBW. In observational studies, the operationalization of empowerment is somewhat clearer and includes increases in domestic decision-making power, financial autonomy, and internal locus of control.

Finally, we note that the literature on women’s empowerment and PTB/LBW is distinct from that on empowerment and perinatal depressive symptoms. This may be because interventions either focused on improving infant outcomes or on reducing postpartum depressive symptoms in mothers of infants that were already born premature. However, there is evidence that maternal perinatal depression and prematurity are correlated and may, in fact, share pathophysiological pathways [11, 54, 55]. The role of perinatal empowerment as a factor associated with physiological pathways related to both perinatal depressive symptoms and prematurity risk therefore merits further investigation.

Conclusion

In conclusion, the empirical evidence is promising and suggests that women’s empowerment and interventions supporting empowerment are associated with reduced perinatal depressive symptoms and PTB or LBW under certain conditions. However, more research is necessary before concrete recommendations can be made. In particular, it is important to improve our understanding of aspects of empowerment that are (1) protective for specific maternal and infant health outcomes, and (2) beneficial across a variety of populations versus specific subgroups of women. Studies testing the effectiveness of specific facets of empowerment on health outcomes and studies further investigating the role of confounding variables, including but not limited to ethnicity and socioeconomic status, would be useful first steps to achieve this goal. A better understanding of the subtleties of the link between empowerment and health will contribute to enhancing the content specificity and efficacy of empowerment interventions. Studies should also be adequately sized to provide sufficient statistical power to accommodate more complex statistical analyses, such as those testing mediational models of how empowerment is substantiated biologically. Doing so would provide the opportunity to uncover biobehavioral mechanisms that may lead to improvement in perinatal depressive symptoms as well as PTB and LBW rates. Given the potential for empowerment in the perinatal period to provide benefits for both maternal and infant health, this topic merits further investigation.

Additional file

Additional file 1: Open peer review. (PDF 271 kb)

Abbreviations

LBW: low birthweight; PTB: preterm birth; CP: CenteringPregnancy; COPE: Creating Opportunities for Parent Empowerment; PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

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