The Relationship Between Infant-Feeding Outcomes and Postpartum Depression: A Qualitative Systematic Review
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Pediatrics 2009;123:e736-e751
DOI: 10.1542/peds.2008-1629

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REVIEW ARTICLE

The Relationship Between Infant-Feeding Outcomes and Postpartum Depression: A Qualitative Systematic Review

Cindy-Lee Dennis, PhD, Karen McQueen, RN, MA

PERINATAL COMMUNITY HEALTH, LAWRENCE S. BLOOMBERG FACULTY OF NURSING, UNIVERSITY OF TORONTO, TORONTO, ONTARIO, CANADA; DEPARTMENT OF NURSING, LAKEHEAD UNIVERSITY, THUNDER BAY, ONTARIO, CANADA

The authors have indicated they have no financial relationships relevant to this article to disclose.

ABSTRACT

CONTEXT. The negative health consequences of postpartum depression are well documented, as are the benefits of breastfeeding. Despite the detailed research related to these maternal and infant health outcomes, the relationship between maternal mood and breastfeeding remains equivocal.

OBJECTIVE. A qualitative systematic review was conducted to examine the relationship between postpartum depressive symptomatology and infant-feeding outcomes.

METHODS. We performed electronic searchers in Medline (1966–2007), the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1982–2007), and Embase (1980–2007) by using specific key words. A hand search of selected specialist journals and reference lists of articles obtained was then conducted. Seventy-five articles were reviewed, of which 49 specifically provided data to be extracted related to postpartum depressive symptomatology and infant-feeding outcomes. Both authors independently extracted data including study design, participants (number and characteristics), and results.

RESULTS. The results from this review suggest that women with depressive symptomatology in the early postpartum period may be at increased risk for negative infant-feeding outcomes including decreased breastfeeding duration, increased breastfeeding difficulties, and decreased levels of breastfeeding self-efficacy. There is also beginning evidence to suggest that depressed women may be less likely to initiate breastfeeding and do so exclusively.

CONCLUSIONS. Depressive symptomatology in the postpartum period negatively influences infant-feeding outcomes. These findings have important clinical implications and support the need for early identification and treatment of women with depressive symptomatology. However, strategies to address help-seeking barriers are needed if women are to receive appropriate and timely treatment. Research to determine effective interventions to support depressed breastfeeding women is warranted. Pediatrics 2009;123:e736–e751

POSTPARTUM DEPRESSION (PPD) is an important and common health problem for many women from diverse cultures. Approximately 13% of women will experience this condition within the first 12 weeks postpartum, and a period prevalence has been assessed at 19.2% within first postpartum year. PPD is of concern because of its well-documented health consequences for the mother and infant. Although women who have suffered from PPD are twice as likely to experience future episodes of depression over a 5-year period, infants are particularly vulnerable because of impaired maternal-infant interactions and negative perceptions of infant behavior. Researchers have found that depressed mothers are more likely to express behaviors that have a negative impact on their children such as being intrusive or withdrawn, disengaged, and noninteracting. Depressed mothers are also less sensitively attuned to their infant’s needs. Infants may have adverse cognitive, behavioral, and emotional outcomes, as well as long-term developmental disturbances. Furthermore, evidence from developing countries has suggested that poor maternal mental health is associated with infant malnutrition and reduced physical health.

Although 2 large meta-analyses incorporating >85 studies have identified important risk factors, a question that remains equivocal is whether PPD influences infant-feeding outcomes or vice versa. This relationship continues to be unknown because of methodologic limitations such as varying research designs, inconsistent definitions, differing assessment periods, and small sample sizes. No systematic review of this literature has been completed. As such, a qualitative systematic review was conducted to examine the relationship between maternal mood and infant-feeding outcomes. This review method was selected to provide a comprehensive overview of the current literature while also
allowing the inclusion of diverse methodologies, measures of depressive symptomatology, and timing of outcome assessments. The review will assist pediatricians and other diverse clinicians interacting with women across the perinatal period who are or may be at risk of experiencing PPD.

**METHODS**

**Data Sources**

The search strategy involved systematically reviewing published peer-reviewed articles from 1966 to 2008. Databases searched included Medline (1966–2007), Embase (1980–2007), and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1982–2007). Key words used in various combinations included “postpartum depression,” “postnatal depression,” “maternal depression,” “Edinburgh Postnatal Depression Scale,” “breastfeeding,” “infant feeding,” and “bottle feeding.” To measure the capture rate of relevant references, tables of contents for key journals were hand searched for the past 2 years, and reference lists of included studies and relevant reviews were examined.

**Study Selection**

Studies were eligible if they provided specific information related to infant-feeding outcomes and focused on PPD and/or postpartum depressive symptomatology; other perinatal mood disorders (ie, pregnancy or postpartum anxiety, maternity blues, puerperal psychosis) were not examined. For the purpose of this review, PPD was defined as any self-reported depressive symptomatology or clinical diagnosis of depression occurring within the first postpartum year. This generous time interval was allowed to account for differing methodologies in the literature. It is important to note that self-report measures are not diagnostic and suggest that further clinical examination is required to confirm a diagnosis of PPD. Studies that incorporated measures of antenatal depression were included if PPD was also an outcome. In this review, breastfeeding was defined as any current or previous breastfeeding activities at any level (eg, exclusive, partial). Only primary studies were included; review articles were excluded from the results.

**Data Extraction**

Data were independently extracted by both authors and included study design, participants (number and characteristics), and results. Categorization results were compared, and differences were discussed until agreement was obtained.

**RESULTS**

The search identified 75 studies, of which 49 specifically provided information related to PPD and infant-feeding outcomes (Table 1). The majority of studies used self-report instruments to measure PPD. All studies were published between 1981 and 2007, with samples from 15 countries including Australia, Barbados, Canada, China, Denmark, Finland, France, Hong Kong, Iceland, Ireland, Pakistan, Sweden, United Arab Emirates, United States, and the United Kingdom. No studies were identified in other languages that would require translation or exclusion from the systematic review. Sample sizes ranged from 22 to 14,609, with a mean of 864 participants. On the basis of these studies, infant-feeding outcomes were subcategorized as (1) infant-feeding method, (2) breastfeeding initiation, duration, and exclusivity, (3) breastfeeding difficulties, and (4) breastfeeding self-efficacy.

**Infant-Feeding Method and Depressive Symptomatology**

*Breastfeeding and Increased Depressive Symptomatology*

Two studies conducted by the same UK-based research team revealed an association between breastfeeding and maternal mood postnatally. In a retrospective study of 89 UK women who were asked about their feeding patterns 18 months after delivery, those who “totally” breastfed their infant for at least 12 weeks had a significantly higher incidence of PPD than those who “partially” breastfed. In another UK study, 91 women were assessed early in pregnancy and again 12 and 24 weeks after delivery. Breastfeeding mothers were slightly more depressed 12 weeks after delivery but not at 24 weeks. Although the results of these 2 older studies suggest that breastfeeding mothers may be more likely to develop PPD, more recent research has indicated that bottle feeding may be associated with depressive symptomatology.

*Bottle Feeding and Increased Depressive Symptomatology*

In a UK study of 217 women, bottle feeding was significantly associated with depressive symptomatology 5 days after delivery, and this effect was maintained to 6 weeks, where 31% (n = 8) of bottle-feeding women had an Edinburgh Postnatal Depression Scale (EPDS) score of >12 compared with only 13% (n = 25) of breastfeeding women (P = .04). In a larger UK study of 2375 mothers, bottle feeding at 6 to 8 weeks after delivery was identified through stepwise logistic regression analysis as 1 of 4 variables associated with an EPDS score of >12 (odds ratio [OR]: 1.52 [95% CI: 1.12–2.06]). Similarly, in a US study that involved 755 mothers, those who had a positive screen on the Postpartum Depression Screening Scale 6 weeks after delivery were more likely to be bottle feeding. Furthermore, bottle feeding was identified as 1 of 2 statistically significant variables predicting depressive symptomatology (risk ratio [RR]: 4.8 [95% CI: 4.4–5.2]). Among 125 Emirate women in Abu Dhabi, mothers who were bottle feeding at 12 weeks after delivery had significantly higher EPDS scores than those who were breastfeeding. In secondary analysis of 200 US mothers, those with depressive symptomatology (n = 25) at 4 to 6 weeks after delivery were significantly less likely to be breastfeeding (32%) than nondepressed mothers (n = 175 [55%]).

In a US population-based study in which data were analyzed by using 14,609 recent mothers from the Centers for Disease Control and Prevention’s Pregnancy Risk Assessment Monitoring System, women who were bottle feeding (n = 9145 [62.6%]) were significantly more...
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<tr>
<td>Alder and Cox (1983)</td>
<td>Retrospective postal questionnaire 1–2 y after childbirth</td>
<td>89 UK women who had taken part in a prospective study regarding PPD</td>
<td>Clinical depression at 18 mo</td>
<td>Breastfeeding: “total” (exclusive breastfeeding until 12 wk) or “partial” (introduction of formula before 12 wk)</td>
<td>Mothers who “totally” breastfed their infants for at least 12 wk had a significantly higher incidence of PPD than those who “partially” breastfed</td>
<td>Retrospective study (risk of recall bias); small sample size</td>
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<td>Alder and Bancroft (1988)</td>
<td>Descriptive study with assessments early in pregnancy and again 12 and 24 wk after delivery</td>
<td>91 UK women from 1 hospital</td>
<td>Clinical depression at 12 and 24 wk</td>
<td>Breastfeeding: number of weeks infant received nourishment from breast milk</td>
<td>Breastfeeding mothers were more depressed at 12 wk but not at 24 wk</td>
<td>Small sample size</td>
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<tr>
<td><strong>Bottle feeding and increased depressive symptomatology</strong></td>
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<td>Astbury et al (1994)</td>
<td>Longitudinal study using mailed questionnaires 32–36 wk after delivery</td>
<td>790 Australian women who had given birth in Victoria during 1 week</td>
<td>EPDS score &gt; 12 at 32–36 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Bottle-feeding mothers were significantly more likely to have depressive symptomatology</td>
<td>Imprecise definition of breastfeeding</td>
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<td>Green et al (2006)</td>
<td>Longitudinal study with in-hospital interview and follow-up questionnaires via mail and/or telephone</td>
<td>125 United Arab Emirates women from 1 hospital during a single month</td>
<td>EPDS (Arabic version) score &gt; 12 at 12 and 24 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Mothers who were bottle feeding at 12 wk had significantly higher EPDS scores that mothers who were breastfeeding</td>
<td>Imprecise definition of breastfeeding; homogeneous sample; 44% of the sample had an EPDS score of &gt;9 at 12 wk after delivery; high attrition rate (32% loss to follow-up at 12 wk and 55% at 24 wk)</td>
</tr>
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<td>Groer and Morgan (2007)</td>
<td>Secondary analysis from a larger study using data collected during 1 home visit between 4 and 6 wk after delivery</td>
<td>200 US women from 1 university hospital</td>
<td>POMS at 4–6 wk (top decile of scores were used to classify mothers as depressed)</td>
<td>Exclusively or nearly exclusively breastfeeding or formula feeding</td>
<td>Depressed mothers were more likely to bottle feed than nondepressed mothers at 4–6 wk</td>
<td>Imprecise definition of breastfeeding; weak measure of PPD</td>
</tr>
<tr>
<td>Gross et al (2002)</td>
<td>Population-based study using a mailed questionnaire 8–24 wk after delivery</td>
<td>14 609 US women from 3 states (Colorado, New York, and North Carolina)</td>
<td>Self-reported “very depressed” between 8 and 24 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Women who were bottle feeding were significantly more likely to report being “very depressed” than mothers who were breastfeeding</td>
<td>Large population-based sample; retrospective study; poor measure of PPD; imprecise definition of breastfeeding; impractical definition of breastfeeding; impractical definition of breastfeeding; EPDS was adapted to mood over the past 5 d instead of 7 d</td>
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<td>Hannah et al (1992)</td>
<td>Descriptive study using an in-person questionnaire 5 d and a mailed questionnaire 6 wk after delivery</td>
<td>217 UK women from 1 hospital between 3 and 5 d after delivery</td>
<td>EPDS score &gt; 12 at 5 d and 6 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Bottle feeding was significantly associated with depressive symptomatology</td>
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<td>Authors</td>
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<td>Mancini et al15</td>
<td>Cross-sectional study using an in-person questionnaire 6 wk after delivery</td>
<td>755 US women from a collaborative obstetrics and midwifery practice (11 obstetrician and 9 nurse-midwife practices)</td>
<td>PDSS score ≥ 80 at 6 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Women with depressive symptomatology were significantly more likely to be bottle feeding</td>
<td>Imprecise definition of breastfeeding; the number of women who declined to participate was not tracked</td>
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<tr>
<td>Warner et al14</td>
<td>Cross-sectional study using interviews 6–8 wk after delivery</td>
<td>2375 UK women from 2 maternity units</td>
<td>EPDS score ≥ 12 at 6–8 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Bottle feeding was identified as 1 of 4 variables associated with depressive symptomatology</td>
<td>Imprecise definition of breastfeeding</td>
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<tr>
<td>Abou-Saleh et al25</td>
<td>Longitudinal study using clinician administered questionnaire at 8 ± 2 wk after delivery</td>
<td>34 United Arab Emirates women from 1 hospital in Dubai</td>
<td>EPDS score ≥ 11 on day 7 and PSE at 8 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding mothers had significantly lower levels of depressive symptomatology in comparison with bottle-feeding mothers</td>
<td>Small sample size; early assessment of maternal mood; imprecise definition of breastfeeding</td>
</tr>
<tr>
<td>Groer21 (2005)</td>
<td>Cross-sectional study using home-visit interviews between 4 and 6 wk after delivery</td>
<td>183 US women from physicians' offices or the postpartum unit from 1 hospital</td>
<td>POMS at 4–6 wk</td>
<td>Exclusive breastfeeding or exclusive bottle feeding on entry into study</td>
<td>Exclusively breastfeeding mothers had significantly lower levels of depressive symptomatology in comparison with those bottle feeding mothers</td>
<td>Those in the breastfeeding group were more likely to be older and married and to have a higher income</td>
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<tr>
<td>Hatton et al22</td>
<td>Cohort study using a mailed questionnaire 6 wk after delivery and 1 during an out-patient clinic visit 12 wk after delivery</td>
<td>377 US women from a large multicenter study</td>
<td>EPDS score ≥ 14 at 6 and 12 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding mothers had lower levels of depressive symptomatology in comparison with bottle-feeding mothers at 6 wk but not at 12 wk</td>
<td>Low response to survey (48%); imprecise definition of breastfeeding</td>
</tr>
<tr>
<td>Lane et al23 (1997)</td>
<td>Longitudinal study using in-hospital interview and mailed questionnaire 6 wk after delivery</td>
<td>289 Irish women from 1 hospital</td>
<td>EPDS score ≥ 12 at 3 d and 6 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding mothers had significantly lower levels of depressive symptomatology in comparison with those bottle feeding mothers</td>
<td>Imprecise definition of breastfeeding; early assessment of maternal mood</td>
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<tr>
<td>Mezzacappa et al26</td>
<td>Within-subjects design assessing maternal mood before and after infant feeding (breast or bottle) with each mother</td>
<td>24 US mothers (infants were between 4 and 28 wk old) recruited through advertising</td>
<td>PANAS before and after feeding method</td>
<td>All mothers breastfeeding and bottle feeding</td>
<td>Breastfeeding was associated with a decrease in depressive symptomatology prefeeding to postfeeding, whereas bottle feeding was associated with an increase in depressive symptomatology</td>
<td>Small sample size; no definition of breastfeeding; voluntary participation</td>
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<td>Tammentie et al24 (2002)</td>
<td>Cross-sectional study using a mailed questionnaire 6–8 wk after delivery</td>
<td>373 Finnish women from 1 maternity hospital</td>
<td>EPDS score &gt; 12 at 8 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding women had significantly lower levels of depressive symptomatology than bottle-feeding women</td>
<td>Low response rate (39%) to survey; imprecise definition of breastfeeding; homogeneous sample of families comprising 2 adults may limit generalizability</td>
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<td>Yonkers et al20 (2001)</td>
<td>Multistage screening study using questionnaires and interview; mothers scoring above the threshold for depressive symptoms at 3 wk were given repeat questionnaires at 4 and 5 wk if they continued to score above the threshold</td>
<td>802 US women from 4 publicly funded inner-city community maternal health clinics</td>
<td>EPDS score &gt; 11 at 3 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding mothers were less likely to have depressive symptomatology at 3 wk</td>
<td>Early assessment of maternal mood; imprecise definition of breastfeeding; the sample, composed of primarily socioeconomically disadvantaged mothers, may limit generalizability</td>
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<tr>
<td>Breastfeeding initiation</td>
<td>Green and Murray27 (1994)</td>
<td>1272 UK women from 1 antenatal clinic</td>
<td>EPDS score of &gt; 14 antenatally and &gt; 12 at 6 wk</td>
<td>Breastfeeding: “not at all,” “gave up,” or “still”</td>
<td>Depressive symptomatology antenatally decreased breastfeeding initiation and duration</td>
<td>Depressive symptomatology antenatally was not associated with breastfeeding initiation; women with persistent depressive symptomatology (symptoms at 2 time points) were more likely to discontinue breastfeeding in the first week than 4 wk after delivery; depressive symptomatology at 1 time point was not associated with breastfeeding duration</td>
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<tr>
<td>Pippins et al29 (2006)</td>
<td>Longitudinal study using 4 telephone surveys (3 during pregnancy and 1 after delivery)</td>
<td>1448 US women from the Project Women and Infants Starting Health (WISH) cohort study in the San Francisco Bay area (California)</td>
<td>Short-form CES-D score &gt; 10</td>
<td>Breastfeeding initiated (yes/no) and breastfeeding at 1 mo (yes/no)</td>
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<td>Imprecise definition of breastfeeding; high rates of breastfeeding initiation and duration in this sample may limit generalizability; 63% of eligible women participated in study</td>
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<td>Seimyr et al (2004)</td>
<td>Longitudinal study using questionnaires antenatally and 8 and 52 wk after delivery</td>
<td>434 pregnant Swedish women from 6 antenatal clinics</td>
<td>EPDS score $\geq 9$ antenatally and at 8 and 52 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Depressive symptomatology negatively influenced breastfeeding initiation and duration rates</td>
<td>Raw data not reported; imprecise definition of breastfeeding</td>
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<td>Bick et al (1998)</td>
<td>Descriptive study using home-based interview</td>
<td>906 UK women returned a mail questionnaire as part of long-term postpartum health study</td>
<td>EPDS score $\geq 12$ at a mean of 45 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Depressive symptomatology in the first 12 wk predicted breastfeeding discontinuation</td>
<td>Retrospective survey, subject to recall bias; imprecise definition of breastfeeding Sample recruited from 2 different sites; imprecise definition of breastfeeding</td>
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<tr>
<td>Cooper et al (1993)</td>
<td>Descriptive study using semistructured interview with 2 cohorts of mothers (Oxford or Cambridge)</td>
<td>483 UK women; the Oxford cohort was from an antenatal clinic, and the Cambridge cohort was from a postnatal ward</td>
<td>PSE and SPI at 8 wk</td>
<td>Breastfeeding: unspecified</td>
<td>PPD preceded breastfeeding discontinuation</td>
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<tr>
<td>Dunn et al (2006)</td>
<td>Secondary analysis of a telephone survey 6 wk after delivery</td>
<td>526 Canadian women from 4 regional hospitals</td>
<td>EPDS score $\geq 11$ at 6 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Women with depressive symptomatology were more likely to discontinue breastfeeding</td>
<td>Secondary analysis of a population-based study; imprecise definition of breastfeeding Small sample size; imprecise definition of breastfeeding</td>
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<tr>
<td>Galler et al (1999)</td>
<td>Longitudinal study using interviews and questionnaires 7, 12 and 24 wk after delivery</td>
<td>93 Barbados women from 1 maternity hospital</td>
<td>SDS at 7 and 24 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Depressive symptomatology 7 wk after delivery was significantly correlated to infant-feeding practices at 7 and 24 wk</td>
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<tr>
<td>Galler et al (2006)</td>
<td>Longitudinal study using interviews and questionnaires 7, 12, and 24 wk after delivery</td>
<td>226 women from Barbados from 1 maternity hospital</td>
<td>SDS at 7 and 24 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Depressive symptomatology at 7 wk was significantly associated with infant-feeding practices at 24 wk</td>
<td>Imprecise definition of breastfeeding</td>
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<td>Henderson et al (2003)</td>
<td>Longitudinal study using in-hospital and mailed questionnaires 8, 24, and 52 wk after delivery</td>
<td>1745 Australian women from 2 large hospitals</td>
<td>EPDS score $\geq 12$ at 8, 24, and 52 wk</td>
<td>Breastfeeding: “any,” “full,” “partial,” or “no” breastfeeding</td>
<td>Early discontinuation of breastfeeding was significantly associated with depressive symptomatology; a majority of the mothers reported that their depression preceded breastfeeding cessation</td>
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<tr>
<td>Jardri et al (2006)</td>
<td>Methodologic study using questionnaires between the third and fifth days after delivery and an interview at 8 wk</td>
<td>427 French women from 1 hospital during 2 periods of 2 mo</td>
<td>Structured interview (MINI) at 8 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Discontinuing breastfeeding in the first 4 wk after delivery for nonmedical reasons was identified as 1 of 5 risk markers for PPD</td>
<td>Imprecise definition of breastfeeding; 64 participants lost to follow-up; early assessment of mood</td>
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<td>Misri et al (1997)</td>
<td>Retrospective study using mailed questionnaires</td>
<td>51 Canadian women from the reproductive psychiatry clinics of 2 hospitals</td>
<td>All women were suffering from major depression</td>
<td>All women had stopped breastfeeding</td>
<td>Depressive symptomatology preceded breastfeeding discontinuation</td>
<td>Retrospective study; small sample size; all women were suffering from depression and had stopped breastfeeding, which may limit generalizability</td>
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<td>McLearn et al (2006)</td>
<td>Secondary data analysis of families that participated in the National Evaluation of Healthy Steps for Young Children using questionnaires in-hospital and via telephone 8–24 wk after delivery</td>
<td>5565 US families from 24 pediatric practices across the country</td>
<td>Modified 14-item CES-D score &gt; 10 at 8–16 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Mothers with depressive symptomatology were less likely to continue to breastfeed to 8–16 wk</td>
<td>Imprecise definition of breastfeeding; secondary data analysis</td>
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<td>Papinczak and Turner (2000)</td>
<td>Longitudinal study using interviews in-hospital and at home at 12 and 24 wk</td>
<td>159 Australian women from 1 maternity hospital</td>
<td>Unspecified at 12 and 24 wk</td>
<td>Breastfeeding: &quot;exclusive&quot; or &quot;partial&quot;</td>
<td>Increased breastfeeding duration was significantly associated with decreased depressive symptomatology</td>
<td>Measure of depression unspecified</td>
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<td>Taj and Sikander (2003)</td>
<td>Cross-sectional study using interviews between 8 wk and 2 y after delivery</td>
<td>100 Pakistani women whose child had a checkup from the outpatient department of the children's hospital</td>
<td>HADS (Urdu version) at 8 wk to 2 y</td>
<td>Breastfeeding: unspecified</td>
<td>Depressive symptomatology preceded breastfeeding discontinuation</td>
<td>Retrospective study; imprecise definition of breastfeeding</td>
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<td>Taveras et al (2003)</td>
<td>Cohort study using in-person interview 1–2 d after delivery and via telephone at 2 and 12 wk</td>
<td>1163 US low-risk women and infants from a group model managed care organization</td>
<td>CES-D score &gt; 15 at 2 wk</td>
<td>Breastfeeding: &quot;exclusive&quot; (no supplementing with &gt;12 oz/d); low &quot;partial&quot; or &quot;token&quot; breastfeeding was classified as discontinuation</td>
<td>Depressive symptomatology at 2 wk was associated with breastfeeding discontinuation at 12 wk</td>
<td>Early assessment of mood; excluded mothers discharged later than 48 h, which would include mothers-infants with cesarean delivery and/or complications</td>
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<td>Breastfeeding exclusivity Clifford et al (2006)</td>
<td>Longitudinal study using mailed questionnaires 1 and 24 wk after delivery</td>
<td>856 Canadian women from 2 hospitals</td>
<td>EPDS score &gt; 12 at 1 and 24 wk</td>
<td>Full breastfeeding (breast milk is sole source of nutrition) and partial breastfeeding (receipt of nonhuman milk along with breast milk)</td>
<td>Depressive symptomatology at 1 week negatively associated with full breastfeeding at 1 week; a similar association was found at 24 wk; however, depressive symptomatology was not significant in multivariate analysis</td>
<td>High attrition rate (35%); homogenous sample</td>
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<td>Results Summary</td>
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<tr>
<td>McCarter-Spaulding and Horowitz (2007)</td>
<td>Descriptive study of women with depressive symptoms (EPDS score &gt; 9) at 2–4 wk, who received 3 home visits between 4–8, 10–14, and 14–18 wk after delivery</td>
<td>122 US women from 2 hospitals with an EPDS score of &gt;9 compared with a random sample of New England mothers</td>
<td>EPDS and BDI-II at 4–8, 10–14, and 14–18 wk</td>
<td>Breastfeeding: unspecified (undefined responses were breastfeeding, bottle feeding, or both)</td>
<td>Compared with the random sample, the level of exclusive breastfeeding was significantly lower among depressed mothers than the level of combination feeding</td>
<td>Imprecise definition of breastfeeding; at last assessment, &lt;10% of the sample had an EPDS score of &gt;9, resulting in a very small sample size of depressed mothers</td>
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<tr>
<td>Thome et al (2006)</td>
<td>Cross-sectional survey using questionnaires 8–12 wk after delivery</td>
<td>Population-based sample of 734 Icelandic women from the Icelandic National Register</td>
<td>EPDS at 8–12 wk</td>
<td>Exclusive breastfeeding: “exclusive” (breast milk only with the exception of vitamins or medicine)</td>
<td>Exclusively breastfeeding mothers had lower levels of depressive symptomatology in comparison with nonexclusively breastfeeding mothers</td>
<td>Cross-sectional survey of ~25% of total births during study period</td>
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<td>Chaudron et al (2001)</td>
<td>Cohort study using in-home interviews in second trimester and 4 and 16 wk after delivery</td>
<td>465 US women from the Wisconsin Maternity Leave and Health Project</td>
<td>DIS or CES-D score &gt; 15 at 4 and 16 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding did not predict PPD; however, women who worried about breastfeeding were significantly more likely to become depressed than those who did not worry about breastfeeding problems</td>
<td>Imprecise definition of breastfeeding</td>
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<td>Edhborg et al (2005)</td>
<td>Qualitative study using a grounded-theory approach</td>
<td>22 Swedish women from 1 hospital</td>
<td>EPDS score &gt; 9 at 12 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Mothers with depressive symptomatology experienced many breastfeeding problems</td>
<td>Small sample size; imprecise definition of breastfeeding</td>
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<td>Fergerson et al (2002)</td>
<td>Cohort study using the EPDS to screen for depressive symptoms vs usual care (no screening)</td>
<td>37 low-income US women from 1 inner-city hospital</td>
<td>EPDS score &gt; 9 at first postpartum visit</td>
<td>Breastfeeding: “exclusive breastfeeding,” “exclusive bottle feeding,” “mixed feeding” (breast and bottle), or attempted breastfeeding but discontinued</td>
<td>Depressive symptomatology was associated with a failed breastfeeding attempt</td>
<td>Small sample size; low participation rate; high-risk sample</td>
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<td>Forman et al (2000)</td>
<td>Descriptive study using mailed questionnaires 16 wk after delivery</td>
<td>528 Danish women from 1 hospital over a 28-mo period</td>
<td>EPDS score &gt; 12 at 16 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Mothers who never established breastfeeding were more likely to experience depressive symptomatology</td>
<td>Potential selection bias resulting from high rate of nonresponders</td>
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<tr>
<td>Tamminen (1988)</td>
<td>Pilot study using questionnaires in the early postpartum period</td>
<td>119 primiparous Finnish women</td>
<td>BDI in early postpartum period</td>
<td>Breastfeeding: unspecified</td>
<td>Mothers with depressive symptomatology experienced more breastfeeding difficulties</td>
<td>Pilot study; imprecise definition of breastfeeding</td>
</tr>
<tr>
<td>Authors</td>
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<td><strong>Breastfeeding self-efficacy</strong></td>
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<td>Dai and Dennis52 (2003)</td>
<td>Methodologic study using translated questionnaires in-hospital and by telephone 4 and 8 wk after delivery</td>
<td>186 Chinese women from 1 hospital</td>
<td>EPDS at 4 and 8 wk</td>
<td>Breastfeeding: “exclusive” “almost exclusive,” “high,” “partial,” “token,” or “bottle feeding”</td>
<td>Mothers with depressive symptomatology had lower levels of breastfeeding self-efficacy</td>
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<tr>
<td>Dennis51 (2003)</td>
<td>Longitudinal study using mailed questionnaires 1, 4, and 8 wk after delivery</td>
<td>491 Canadian women recruited antenatally from physician or midwife offices or postnatally by public health nurses after discharge from hospital</td>
<td>EPDS at 1, 4, and 8 wk</td>
<td>Breastfeeding: “exclusive” “almost exclusive,” “high,” “partial,” “token,” or “bottle feeding”</td>
<td>Mothers with depressive symptomatology had lower levels of breastfeeding self-efficacy</td>
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<td><strong>Directional effect of infant-feeding outcomes</strong></td>
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<td>Dennis and McQueen53 (2007)</td>
<td>Secondary analysis of a longitudinal study using mailed questionnaires 1, 4, and 8 wk after delivery</td>
<td>Population-based sample of 594 Canadian women recruited antenatally from physician or midwife offices or postnatally by public health nurses after discharge from hospital</td>
<td>EPDS at 1, 4, and 8 wk</td>
<td>Breastfeeding: “exclusive” “almost exclusive,” “high,” “partial,” “token,” or “bottle feeding”</td>
<td>No relationship was found between infant-feeding outcomes at 1 wk after delivery and the development of depressive symptomatology; conversely, mothers with depressive symptomatology 1 wk after delivery were significantly more likely at 4 and/or 8 wk to discontinue breastfeeding, be unsatisfied with their infant-feeding method, experience significant breastfeeding problems, and report lower levels of breastfeeding self-efficacy</td>
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<td><strong>No relationship</strong></td>
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<td>Cox et al55 (1982)</td>
<td>Longitudinal study using interviews completed twice antenatally and twice postnatally at 10 d and 12–20 wk</td>
<td>105 UK women attending 1 antenatal clinic</td>
<td>SPI during pregnancy and postnatally at 10 d and 12–20 wk</td>
<td>Breastfeeding: unspecified</td>
<td>Breastfeeding did not influence maternal mood</td>
<td>Imprecise definition of breastfeeding</td>
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<tr>
<td>Josefsson et al58 (2002)</td>
<td>Case-control study using data from standardized medical charts</td>
<td>132 Swedish women with depression and 264 controls without depression</td>
<td>EPDS score &gt; 9 at 6–8 and 24 wk</td>
<td>Breastfeeding: unspecified</td>
<td>No association was found between breastfeeding and depressive symptomatology</td>
<td>Imprecise definition of breastfeeding</td>
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likely to report being “very depressed” in the initial months after delivery than those who were breastfeeding (n = 5464 [37.4%]) (OR: 1.4 [95% CI: 1.1–1.8]). Although this study used a single question to assess for depression, the researchers hypothesized that bottle feeding was a result of the depressive symptomatology. The relationship between bottle feeding and depressive symptomatology was also demonstrated later in the perinatal period among 790 Australian women who completed a postal questionnaire mailed 8 to 9 months after delivery.19

Breastfeeding and Decreased Depressive Symptomatology

Consistently, breastfeeding across the postpartum period has been associated with a decrease in depressive symptomatology. In a US study of 802 women systematically screened during their first postpartum visit at 4 publicly funded inner-city community maternal health clinics, women who were breastfeeding 3 weeks after delivery were significantly less likely to have depressive symptomatology than those who were bottle feeding (OR: 0.60 [95% CI: 0.44–0.81]; P = .008).20

Several studies have also demonstrated that breastfeeding mothers have lower mean depression scores than bottle-feeding women. In a US study that examined the relationship between infant feeding, stress, mood, and diverse hormone levels, 84 exclusively breastfeeding and 99 bottle-feeding women completed an interview between 4 and 6 weeks after delivery.21 Exclusively breastfeeding mothers had significantly lower depression mean scores than those who were bottle feeding (t = 2.89, P = .004). In a US study in which mothers were recruited from a cohort that completed a clinical trial of calcium for the prevention of preeclampsia, breastfeeding mothers had lower mean EPDS scores 6 weeks after delivery (n = 262; mean: 7.8 [SD: 1.5]) than those who were bottle feeding (n = 124; mean: 9.8 [SD: 1.6]; P < .001).22 This relationship persisted even after controlling for previous history of depression, increased life stress, and current use of psycho-pharmaceuticals.

TABLE 1 Continued

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<td>Kendall et al46 (1981)</td>
<td>Descriptive study using visual analog scales</td>
<td>81 UK women from 1 hospital</td>
<td>Visual analog scales daily to 3 wk</td>
<td>Breastfeeding: unspecified</td>
<td>No significant difference in mood scores between mothers who were breastfeeding and those who were bottle feeding</td>
<td>Validity of visual analog scales not provided; early assessment of maternal mood; imprecise definition of breastfeeding</td>
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</table>
active medication. However, no significant differences in depressive symptomatology were found at 12 weeks. In a study of 289 Irish women, breastfeeding mothers had significantly lower mean EPDS scores 6 weeks after delivery (mean: 6.1 [SD: 4.4]) than bottle-feeding mothers (mean: 7.5 [SD: 4.8]; t = -2.25, P = .02). Similar results were found among 373 Finnish and 34 Dubai women 8 weeks after delivery.

It is noteworthy that 1 US study, which examined the immediate effect of infant-feeding method on maternal mood, found that among the 24 mothers, breastfeeding was associated with a decrease in negative mood from prefeeding to postfeeding, whereas bottle feeding was associated with an increase in negative mood. The researchers suggested that effects were attributable to the act of breastfeeding itself and not solely to individual differences.

Breastfeeding Initiation, Duration, and Exclusivity and Depressive Symptomatology

Breastfeeding Initiation

Three studies that examined the influence of both antenatal and postpartum depressive symptomatology on breastfeeding outcomes were found. In a UK study, 1272 women completed postal questionnaires antenatally during each trimester and 6 weeks after delivery. Participants who experienced depressive symptomatology antenatally were less likely to attempt breastfeeding, and those who were depressed at any time period across the perinatal period were less likely to continue breastfeeding. Similarly, in a longitudinal community-based study that involved 434 pregnant women, those with depressive symptomatology antenatally were significantly less likely to initiate breastfeeding compared with those with no depressive symptomatology (82% vs 94%; χ² = 7.69, P = .02). Mothers with depressive symptomatology antenatally and 8 weeks after delivery also perceived breastfeeding more negatively and breastfed for a shorter duration (4.6 months [SD: 2.4] vs 5.3 months [SD: 1.9]; P = .04).

In a longitudinal study of 1448 pregnant US women who were surveyed by telephone 3 times antenatally and once postnatally, depressive symptomatology during or before pregnancy was not associated with breastfeeding initiation. Having depressive symptomatology at a single point was also not a significant risk factor for discontinuing breastfeeding within the first 4 weeks after delivery. However, having persistent depressive symptomatology at 2 time points with at least 1 point occurring before delivery did increase the odds of discontinuing breastfeeding (OR: 1.77 [95% CI: 1.10–2.26]).

Breastfeeding Duration

A consistent relationship between postpartum depressive symptomatology and breastfeeding duration has been found among diverse populations. In a secondary analysis of a cross-sectional Canadian telephone survey of 526 mothers 6 weeks after delivery, women with depressive symptomatology were more likely to discontinue breastfeeding than those with no symptomatology after controlling for age and education (OR: 0.28 [95% CI: 0.11–0.71]; P = .007). Another secondary analysis from a large national US study of 5576 families from 24 pediatric practices across the United States resulted in similar findings. Mothers with depressive symptomatology 8 to 16 weeks after delivery were less likely to continue breastfeeding in comparison with women with no symptomatology (adjusted OR: 0.73 [95% CI: 0.61–0.88]).

In a US prospective cohort study of 1163 women at low risk, 1007 (87%) initiated breastfeeding, of whom 872 (75%) continued to 2 weeks after delivery and 646 (55%) continued to 12 weeks. Discontinuation of breastfeeding at 12 weeks was associated with the presence of depressive symptomatology (OR: 1.8 [95% CI: 1.01–1.37]). In a study of 159 Australian mothers of whom 91.1% initiated breastfeeding and only 49.6% continued to 24 weeks, increased duration was significantly associated with decreased levels of depressive symptomatology. In a UK study of 906 women who were interviewed at a mean of 45 weeks after delivery, factors found to be predictive of discontinuing breastfeeding included depressive symptomatology. In particular, 27% of the women who breastfed for ≤12 weeks had an EPDS score of >12 compared with 17.9% of those who breastfed for ≥12 weeks (P < .01). Similar findings were identified by using translated versions of the EPDS. In a validation study of a French version of the EPDS with 427 women in France, discontinuation of breastfeeding within 4 weeks after delivery for nonmedical reasons was identified as 1 of 5 risk markers for the development of PPD (adjusted OR: 5.4 [95% CI: 1.4–20.3]).

In a prospective study of 483 UK women who resided in either Oxford or Cambridge, of the 25 Oxford mothers diagnosed with clinical depression 56% had discontinued breastfeeding by 8 weeks after delivery in comparison with only 22.9% of the women with no depression. In Cambridge, 55.5% of the women with depression discontinued breastfeeding by 8 weeks in comparison with only 20.8% of the nondepressed women. For both cohorts, the researchers suggested that the depressive episode preceded the cessation of breastfeeding.

In a cohort study of 1745 Australian women, breastfeeding was determined at 8, 24, and 52 weeks after delivery, and of the 18% of mothers with depressive symptomatology the onset occurred before 8 weeks in 63% of the cases. Median duration of breastfeeding was 26 weeks for the women with early-onset depression, 28 weeks for the women with late-onset depression, and 39 weeks for the women without depression. After adjustment for confounding factors, early discontinuation of breastfeeding was found to be significantly associated with PPD (adjusted hazard ratio: 1.25 [95% CI: 1.03–1.52]). In this study, the onset of PPD occurred before discontinuation of breastfeeding in most cases. In a retrospective study of 51 Canadian postpartum women who were diagnosed with depression and had discontinued breastfeeding, a majority of the mothers (n = 39 [83%]) reported that their depression preceded the ces-
sation of breastfeeding, whereas only 8 (17%) women indicated that their depression developed subsequent to discontinuation. 38 Consistent findings were found in a cross-sectional study of 100 Pakistani mothers with children of breastfeeding age from 8 weeks to 2 years who were interviewed and assessed for depressive symptomatology. 39 Thirty-eight percent of the women had discontinued breastfeeding, and their mean depression score was 19.7, whereas 62% of the women were breastfeeding and their mean score was 3.3. Of the bottle-feeding mothers, 36.8% reported that their depressive symptomatology preceded their discontinuation.

In a unique study of 93 mothers in Barbados who were assessed at 7, 12, and 24 weeks after delivery, significant predictive relationships between maternal mood and infant-feeding practices were found and remained after controlling for disadvantaged environmental conditions such as less information seeking by the mother, lower family income, and poor maternal health. 40 In particular, depressive symptomatology 7 weeks after delivery was significantly related to infant-feeding practices at 7 and 24 weeks. Conversely, at 7 weeks infant-feeding practices did not predict maternal mood at any time. Building on this study, the researchers examined an additional 226 Barbadian mothers and found similar results. 41

Breastfeeding Exclusivity

Three studies have examined the relationship between breastfeeding exclusivity and PPD. In a study of 734 Icelandic mothers who completed self-administered questionnaires 8 to 12 weeks after delivery, exclusively breastfeeding mothers had lower mean EPDS scores (mean: 5.9 [SD: 4.6]) in comparison with nonexclusively breastfeeding mothers (mean: 7.1 [SD: 4.9]; P < .001). 42 In another study, 856 Canadian mothers were mailed questionnaires 1 and 24 weeks after delivery to determine factors associated with full breastfeeding. 43 Depressive symptomatology at 1 week was negatively associated with full breastfeeding at 1 week (P < .05); similar finding were found at 24 weeks (P < .05). However, depressive symptomatology was not a significant variable in Cox proportional hazards analysis of predictors of breastfeeding duration. An additional study evaluated 122 US women with an EPDS score at 2 to 4 weeks after delivery of >9; the women were part of a larger study and were compared with a random sample of US mothers. 44 A significant (P < .001) difference was found between the breastfeeding rates among mothers with depressive symptomatology and the random sample when 3 categories of breastfeeding were evaluated: exclusive breastfeeding, combination feeding, and formula feeding. These findings suggest that higher levels of depressive symptomatology reduce the likelihood of exclusive breastfeeding. It is noteworthy that in a small (n = 51) Canadian study, 38 no difference in depression severity was found between those who had been exclusively breastfeeding and those who were supplementing.

Breastfeeding Difficulties and Depressive Symptomatology

In a US study, 465 women who were not depressed 4 weeks after delivery were reassessed 12 weeks later for any depressive episode occurring between 4 and 16 weeks after delivery. 45 Of these women, 27 (5.8%) became clinically depressed. In a logistic regression analysis, breastfeeding did not predict depression. However, women who worried about breastfeeding were significantly more likely to become depressed than those who did not (relative risk: 3.0 [CI: 1.04–9.22]; P = .04). In a study of 119 primiparous Finnish women, mothers identified with depressive symptomatology experienced more breastfeeding difficulties than nondepressed mothers. 46 Similarly, breastfeeding problems were identified as an outcome in a Swedish study of 22 women who showed signs of depression. 47 A “failed” breastfeeding attempt was the only factor found to be associated with an EPDS score of >9 among a low-income inner-city sample of 37 US women during their first postpartum visit (relative risk: 3.78 [95% CI: 1.03–13.89]), whereas in a community-based Danish study of 528 mothers, those who never established breastfeeding were 2.4 times more likely to experience depressive symptomatology 16 weeks after delivery than those who were breastfeeding. 48

Breastfeeding Self-efficacy and Depressive Symptomatology

Breastfeeding self-efficacy is a mother’s perceived confidence in her ability to breastfeed 49 and has been consistently shown in diverse samples to predict breastfeeding outcomes. Two studies have demonstrated an inverse relationship between breastfeeding self-efficacy and depressive symptomatology. In a population-based study of 491 Canadian breastfeeding mothers, EPDS scores 1, 4, and 8 weeks after delivery were negatively correlated to Breastfeeding Self-efficacy Scale scores at the corresponding time periods (mean r = −0.37, P < .001). 51 In another methodologic study that translated the Breastfeeding Self-efficacy Scale into Mandarin and determined the psychometric characteristics among a sample of 186 Chinese women, EPDS scores again were negatively correlated with breastfeeding self-efficacy 4 weeks (r = −0.35, P < .001) and 8 weeks (r = −0.20, P = .04) after delivery. 52

Directional Effect of Infant-Feeding Outcomes and Depressive Symptomatology

Only 1 study was found that specifically examined the relationship between diverse infant-feeding outcomes and postpartum depressive symptomatology by using a time-sequenced analysis. 53 As part of a population-based study, 594 Canadian mothers completed questionnaires 1, 4, and 8 weeks after delivery. After controlling for depressive symptomatology 1 week after delivery, no relationship was found between diverse infant-feeding outcomes (eg, infant-feeding method, satisfaction with infant-feeding method, breastfeeding difficulties, or breastfeeding self-efficacy) 1 week after delivery and the development of depressive symptomatology at 4 or 8 weeks. Conversely, mothers with an EPDS score 1 week
after delivery of >12 were significantly more likely at 4 and/or 8 weeks to discontinue breastfeeding, be unsatisfied with their infant-feeding method, experience significant breastfeeding problems, and report lower levels of breastfeeding self-efficacy. This study clearly suggests that maternal mood influences breastfeeding outcomes, rather than the reverse.

No Relationship Between Infant-Feeding Outcomes and Depressive Symptomatology

Several studies have found no relationship between any infant-feeding outcomes and maternal mood. In an early UK study of 81 women who completed 6 visual analog scales daily for the first 3 weeks after delivery, there was no significant difference in depressive symptomatology between mothers who were breastfeeding (n = 55) and those who were bottle feeding (n = 24).54 Building on this work, the same researchers conducted another prospective study in which 105 women were assessed for depressive symptomatology on 4 occasions during pregnancy and in the postpartum period.55 Although a marked deterioration in the marital relationship was reported by the depressed women, no other social or obstetric characteristics were found to be influential, including infant-feeding method. This lack of relationship may have been a result of the poor measure of PPD.

In a Canadian study of 409 mothers, the presence of depressive symptomatology across the postpartum period was not predictive of feeding practices or infant-feeding abilities.56 In an Irish study, 142 women completed the EPDS 6 weeks after delivery, with 38 mothers scoring positive for depressive symptomatology. From those who scored negatively, 28 controls were randomly selected and matched for age and socioeconomic status. Infant-feeding method was not found to be of etiologic significance: 17.8% (n = 5) of the mothers with depressive symptomatology were breastfeeding in comparison with 10.7% (n = 2) of the nondepressed mothers.57 In a Swedish case-control study, 132 women with an EPDS score of ≥9 were selected as an index group and 264 women without depressive symptomatology as a control group.58 Data related to sociodemographic status, medical, gynecologic, and obstetric history, pregnancy, and perinatal events were collected from standardized medical charts. No association was found between infant-feeding method and maternal mood (OR: 1.46 [95% CI: 0.46–4.70]). In a cross-sectional study of 1200 women in Hong Kong who were administered the EPDS 2 to 5 days after delivery, depressive symptomatology was not significantly associated with infant-feeding method.59 Although a lower proportion of mothers with an EPDS score of ≥9 compared with those with a score of ≤9 initiated breastfeeding (39% vs 44%, respectively) and had higher rates of formula feeding (33.5% vs 30.5%, respectively), the differences were not statistically significant. Finally, in a sample of 174 low-income black and Hispanic women, detailed interviews were conducted in the early third trimester and 2 and 12 weeks after delivery.60 Depressive symptomatology did not predict the continuation of breastfeeding at 12 weeks.

DISCUSSION

The purpose of this qualitative systematic review was to examine the relationship between postpartum depressive symptomatology and infant-feeding outcomes. Of the 49 included studies, 6 (12.2%) reported no relationship between these variables. Among these studies, 2 were conducted in the early 1980s,54,55 and all but 1 study60 had an imprecise definition of breastfeeding. Despite these results, trends in the research findings were found. In particular, 7 studies found an association between bottle feeding and higher levels of depressive symptomatology.13–19 Correspondingly, breastfeeding was associated with lower levels of depressive symptomatology in 7 studies.20–26 Our review also found 12 studies that suggested that mothers with depressive symptomatology were significantly more likely to discontinue breastfeeding earlier than nondepressed mothers.10–41 Despite the extensive examination of breastfeeding duration, there is only beginning evidence to suggest that depressive symptomatology among pregnant women may influence breastfeeding initiation.27,28 Although 3 studies found an association between maternal mood and breastfeeding exclusivity,42–44 1 study that included multivariate analyses45 did not find that depressive symptomatology significantly predicted exclusivity. Although several researchers specifically hypothesized that the development of depressive symptomatology preceded breastfeeding discontinuation,18,36,38,39 design limitations preclude causality, and additional research is warranted.

Women with depressive symptomatology may also worry more about breastfeeding.45 report increased breastfeeding difficulties,46,47 and express decreased satisfaction related to their infant-feeding method.41 These results are consistent with previous research that has suggested that depressive mood negatively influences cognitions.52,61 Moreover, an inverse relationship was found between depressive symptomatology and breastfeeding self-efficacy.51,52 This finding indicates that mothers with depressive symptomatology are less confident in their ability to breastfeed; this is an important finding considering that previous research has clearly demonstrated a significant relationship between breastfeeding self-efficacy and breastfeeding initiation, duration, and exclusivity.44–45 Because breastfeeding self-efficacy is determined by a mother’s evaluation of her past performance accomplishments, vicarious experience, verbal persuasion, and physiologic and psychological states,50 this finding further confirms the influence of depressive symptomatology on maternal cognitions.

Only 1 study completed a time-sequenced analysis and found a relationship between depressive symptomatology in the early postpartum period and negative infant-feeding outcomes (including breastfeeding, satisfaction, difficulties, and self-efficacy) 4 and 8 weeks after delivery.53 Importantly, the findings in this population-based study are consistent with the previous studies reviewed and highlight the negative influence of maternal mood in the immediate postpartum period on infant-feeding outcomes, rather than the reverse. Although the relationship between depressive symp-
tomatology and negative infant-feeding outcomes was evident across the postpartum period and among diverse populations, various methodologic weaknesses were noted. Several limitations affected the comparability of findings between studies. For example, few studies defined breastfeeding according to standardized categories, such as those proposed by Labbok and Krasovec. Many studies provided no definition of breastfeeding or defined it by using a basic yes/no format, whereas other researchers distinguished between levels of breastfeeding. The lack of a clear breastfeeding definition may also explain why few studies that examined the relationship between breastfeeding exclusivity and depressive symptomatology were found. Measurement limitations also existed. Although the EPDS was the most commonly used measure of depressive symptomatology, varying cutoffs decreased the comparability of research results; several studies also incorporated other self-report measures. Few researchers included a clinical diagnosis of PPD.

Another limitation found was that although most studies evaluated infant-feeding methods at various times throughout the postpartum period, few clearly indicated whether women actually initiated breastfeeding. As such, the studies that incorporated findings related to bottle feeding may have included both mothers who prematurely discontinued breastfeeding and those who chose not to initiate breastfeeding. In addition, all studies seemed to use self-report methods to assess infant-feeding method, which may have led to misclassifications. Although researchers have documented a high level of accuracy of self-reports for infant-feeding practices, there may have been some underreporting of the use of nonhuman milk by study participants because of research suggesting that preventive health behaviors tend to be overestimated by self-report measures. In addition, some of the retrospective studies may be more likely to have recall bias, especially where there is a lengthy time-period involved.

Despite these limitations, consistent trends were found that suggest that women with depressive symptomatology may be at increased risk to prematurely discontinue breastfeeding, report more breastfeeding wor-

tories and difficulties, and have decreased levels of breastfeeding self-efficacy. There is also beginning evidence to suggest that they might be less likely to initiate breastfeeding and to do so exclusively. Additional research is warranted to confirm these results and to examine the unidirectional pathway of maternal mood negatively influencing infant-feeding outcomes rather than vice versa. Clinically, these findings indicate that in addition to providing support to all new breastfeeding women, clinicians should identify and treat depressed breastfeeding mothers to decrease the associated morbidity and potential subsequent negative infant-feeding outcomes. Fortunately, effective treatment is available for PPD and, depending on symptom severity, may include cognitive behavior therapy, interpersonal psychotherapy, nondirective counseling, and enhanced support through 1-to-1 or group sessions. Although research suggests that the acceptability of pharmacologic interventions is particularly low among pregnant women and breastfeeding mothers because of concerns about infant health and breast milk transmission, antidepressant medication is also a viable treatment option. Thus, treatment should be based on maternal needs (severity of symptoms), preference of treatment options, availability of services, and choice of infant-feeding method. It is noteworthy that no study has specifically evaluated an intervention to support breastfeeding women who are experiencing PPD. As such, additional research is warranted to examine what type of breastfeeding support is most effective in improving infant-feeding outcomes among depressed mothers independent of depression treatment. It is important that this support be tailored to women’s infant-feeding preferences and goals to minimize maternal guilt in infant-feeding decisions.

CONCLUSIONS

PPD is a serious condition that affects many women from diverse cultures. The review findings suggest that in addition to the well-documented maternal and infant health consequence of PPD, women in the perinatal period who experience depressive symptomatology may be at increased risk for poorer infant-feeding outcomes including decreased breastfeeding initiation, duration, and exclusivity. These findings support the need for early identification and treatment of pregnant women and breastfeeding mothers with depressive symptomatology to improve infant-feeding outcomes. Research to determine effective interventions to support depressed breastfeeding mothers is warranted.

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