ABSTRACT: When physicians are faced with a postpartum depressed mother and her infant, they must deal with multiple complex etiologies that take them far beyond typical public health problems. To date, interventions have focused on maternal well-being, prevention, screening, and treatment. Some intervention models now recognize both maternal and infant symptoms in an effort to meet the multiple needs of family members and to provide timely access to services and professionals. Physicians should be aware of infant and maternal behaviors signaling dyadic distress, the impact of postpartum depression on infant development, and various treatment approaches. Currently, a team or community-based approach to comprehensive treatment and follow-up appears most likely to reduce adverse outcomes for mothers and their children.

“It was the best of times, it was the worst of times.”

With this opening to *A Tale of Two Cities*, Charles Dickens could easily have been referring to the first few months following childbirth. For many new mothers, childbirth is a tremendously hopeful and happy time, but for others it is associated with depressed moods ranging from the “baby blues” to postpartum psychosis. Postpartum depression (PPD) affects from 10% to 35% of new mothers and typically occurs in the first 3 to 12 months following childbirth. PPD increases the risk for future depression and can have lasting effects on mothers, children, and their families. Depressed maternal mood following pregnancy is a frequent mental health concern that directly affects mothers’ well-being and infants’ social and emotional development, extending into childhood. As a result, there have been calls for universal screening, early intervention, and treatment programs for PPD. Many models have been maternally focused, applying early interventions to improve maternal mood and provide strategies for prevention and treatment. These models have met with varying success. Interventions aimed at jointly improving maternal and infant outcomes are proliferating, but these models, too, have yielded inconsistent results. Such models may not be recognizing combinations and interactions of maternal and infant symptoms. They may not be acknowledging coexisting issues known to sometimes accompany PDD: marital tension; mother, partner, and family of origin mental health problems; poverty and other life stressors. Therefore, these models may fail to provide ongoing, timely, and

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Treating only one half of the mother-infant dyad with a single therapeutic approach is unlikely to have the success we wish for our patients—instead, a coordinated approach that treats the dyad and family can improve outcomes for both mother and child.

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Postpartum depression and the mother
PPD has been defined as at least 2 weeks of dysphoric mood or lack of interest or pleasure, along with several other possible symptoms, including low energy, insomnia, change in appetite, excessive guilt, and suicidal ideation. Mood changes can include irritability, emotional lability, and excessive anxiety. The onset can occur within 4 weeks of delivery, with the peak incidence ranging from 3 to 12 months postpartum.

There is no single causal factor for PPD. Risk factors include a personal and family history of depression or other mental health issues, marital disturbance, poor social support, poverty, and other stressful life events (e.g., moving from one community to another, losing a job). Symptoms can easily go unrecognized, and even when they are finally identified there may be a delay between referral, further evaluation, and treatment. Depressed women may not recognize the symptoms as depression because of the fatigue, early morning waking, and weight fluctuation that commonly occur after delivery. Clinicians may recognize only half of PPD cases during routine postpartum care, and in the US, where obstetricians provide primary postpartum care, symptoms may present well after the typical 4- to 6-week visit. Similarly, pediatricians, who frequently see infants early in life and are well positioned to detect and refer for PPD, are also less likely to detect a stressed mother-infant dyad or early signs of PPD because the mother is not the focus of their care, there is a lack of appropriate screening instruments, and the pediatrician may spend limited time with the dyad. A comprehensive approach to comprehensive treatment and follow-up.

Postpartum depression and the infant
From the earliest newborn period, infants are very sensitive to the emotional states of their mothers and other significant caregivers. Infants are very sensitive to the emotional states of their mothers and other significant caregivers. Postpartum depression can lead to substantial adverse consequences for infants via multiple direct biological mechanisms (e.g., medication exposure, maternal genetic factors) and environmental conditions (e.g., mother-child interaction). Even early neonatal behavior can be a reflection of maternal mood during gestation and postpartum. Maternal insensitivity and emotional unavailability can influence the infant’s ability to develop a neurobiological capacity for arousal regulation, as manifested by increased infant irritability, distress, and crying. When compared with controls, infants of postpartum depressed mothers display differences in frontal lobe EEG.

Depressed maternal behavior can contribute to compromised infant social, emotional, and, to a lesser extent, cognitive functioning during infancy and into childhood.
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Infant behavior as a red flag

Infant behavior and infant crying in particular can be used to diagnose dyadic distress, even though diagnosis for PPD typically focuses on maternal symptoms. Soothability (i.e., the infant’s ability to regulate behavior) may be altered in infants of depressed mothers and may affect crying behavior (duration, timing, fundamental frequency). Infant crying may even exacerbate or trigger postpartum depression, thereby increasing developmental risk. Infants may be more drowsy, more distressed and fussy, look less at their mothers, and engage in more self-directed activity. Reduced stimulation, which can be caused by the depressed mother having more negative perceptions of her infant and offering less stimulation, may lead to disrupted learning during nonsocial learning tasks. While these findings do not suggest a causal relationship between crying and maternal mood, they do highlight the importance of understanding infant crying as a possible reflection of a distressed mother-infant relationship.

Altered infant social behavior can be reflected in other areas as well. Withdrawn infant behavior or a general lack of sociability as seen through facial expression, eye contact, general level of activity, and briskness of response to stimulation may also be signs of a distressed and at-risk infant of a postpartum depressed mother. Difficulties with infant sleep and feeding patterns may signal stressors in the relationship. Such findings support the need to ask about a range of infant behaviors, including crying patterns, sleep, sociability, and feeding, which can signal distress and underscore the importance of careful observation of infant behavior.

While these infant social and emotional behaviors do not necessarily reflect a clinical disorder in the infant directly attributable to PPD, or a clinical disorder at all, they may serve as a red flag, signalling potential risk factors in the infant’s psychosocial context. These behaviors may reflect subclinical levels of maternal symptoms or highlight an increased risk for adverse infant outcomes that requires long-term follow-up.

Maternal behavior as a red flag

Evidence suggests that it is not postpartum depression per se that contributes to risk for infant development, but rather the parenting behaviors and responses that are associated with depression. According to Murray and Cooper, “it is the maternal interactive style, secondary to the affective disorder and/or social adversity, that is the potent causative agent.” This assertion is supported by evidence suggesting that depressed mothers gaze less at their infants, rock them less, are less active, and show poorer responsiveness overall. Not every infant of a postpartum depressed mother will manifest developmental difficulties. Protective factors such as other significant caregivers and attachment figures (e.g., fathers, grandparents) and a strong social support system for the mother can potentially buffer the full impact of the maternal postpartum depression. However, in addition to increased genetic risk, it is maternal behaviors associated with postpartum depression that can wield the most negative impact.

Two components of maternal behavior have been established as major contributors to infant mental health: sensitivity and responsivity. When a mother is sensitive to the meaning of the infant’s signals for food, sleep, comfort, and affection and the mother responds in a prompt and warm fashion, the infant feels safe, secure, trusting, and protected. Postpartum depression may affect maternal responsibility by altering the mother’s sensitivity to her infant’s signal. The perception of infant crying may vary with the level of postpartum depression. As levels of depression increase, the infant’s cry may be perceived as less urgent and sick sounding (i.e., less aversive and less arousing). Mothers who are more depressed...
report perceiving their infant’s cry as more difficult in general and are less sensitive to changes in cry frequency. Depression can lead the mother to ignore or misinterpret infant crying or other behavioral signals, thereby reducing her responsiveness and compounding her postpartum depression. Obvious lack of sensitivity and responsiveness may thus serve as a red flag, suggesting potential risk.

In addition to considering maternal sensitivity and responsivity to infant signals, the course of maternal mood from immediately postpartum to present has been found to be critical in assessing potential impact on the infant. Studies of mothers and their 3-month to 12-month infants found that infant social behavior was related to mother’s report of depressed or anxious mood since birth but not directly to her currently reported mood (assessed by Edinburgh Postnatal Depression Scale score). This finding highlights the importance of assessing maternal mood over the months after birth. Assessing current maternal mood alone may miss a vital link between altered infant behavior and the effects of exposure to maternal depressed mood over time.

The mother-infant dyad

Even when a mother receives treatment for her postpartum depression this does not necessarily improve infant outcomes. Unhealthy dyadic relationship patterns established during the earlier stages of the postpartum depression may continue. These are patterns that the infant has participated in as a way of coping with or “normalizing” interaction with a depressed caretaker (e.g., imitating depressed affect or behavior [or both]; accommodating less verbal and visual interaction). This provides further impetus for a treatment approach that addresses maternal, infant, and dyadic issues, as well as any concomitant individual or family problems. The following clinical scenario illustrates maternal and infant behaviors signaling distress.

Ann was a 21-year-old woman with a history of depression as a teen. During her pregnancy, she and her partner moved from a small town to a city, where her partner began attending university. The pregnancy was uneventful. Due to transportation difficulties and her partner’s schedule, Ann found it difficult to attend prenatal classes. Her daughter, Casey, was delivered after a long and complicated vaginal extraction. Her mother visited from out of town in the first few days after the birth. Once her partner returned to full-time classes Ann often found herself alone with her daughter for long periods. She had few friends and little social support in the city. After a month of regularly scheduled public health visits, the community public health nurse became concerned by Casey’s prolonged crying, Ann’s isolation at home, and her comment that “my daughter is bored with me.” She wondered whether Ann’s flat affect, lack of interest in the infant, and a crying infant who was not engaging might be the first signs of a postpartum depression. She reported this to Ann’s family physician who, during the next visit, recommended antidepressant medication. However,

The challenge with early screening tools is to establish what to screen for—the mother’s mental health, the infant’s mental and neurological health, the health of the dyadic interaction, the family history of mental health, the current socioeconomic situation, or all of the above.

Interventions to date: Comprehensive enough?

Early intervention work has focused on maternal outcomes, screening tools, and specific pharmacological and psychosocial interventions to manage and reduce the incidence of PPD. Work to develop universal PPD screening, in-home nurse-based interventions, or psychological therapy for postpartum mothers has had mixed results. The challenge with early screening tools is to establish what to screen for—the mother’s mental health, the infant’s mental and neurological health, the health of the dyadic interaction, the
family history of mental health, the current socioeconomic situation, or all of the above.\textsuperscript{15}

Many current interventions are including the infant in the process, focusing on the health of the dyadic relationship. Community- and hospital-based early intervention programs have had some success in addressing specific components of PPD and related infant development.\textsuperscript{8} Home- and office-based psychotherapeutic interventions appear to improve maternal mood, maternal sensitivity and responsiveness, maternal feelings of competence, and mother-infant interaction.\textsuperscript{41} Improved infant attachment patterns have been more difficult to achieve.\textsuperscript{41,44} Generally, more frequent and consistent improvement, at least in the short term, has been found where interventions are brief and cognitive/behaviorally focused. There is somewhat less success where interventions are longer in duration and focus on changing maternal representations or attachment status.\textsuperscript{8} Interventions aimed at improving maternal mood and marital supports have reported an effect on infant behavior\textsuperscript{41} but not on infant emotional development.\textsuperscript{8,48} In summary, it remains unclear whether any single intervention leads to a sustained improvement in both child development and maternal mood.\textsuperscript{8,49} The complexity of maternal and infant variables and the interactions therein require not a single intervention, but a comprehensive, community-based approach to intervention that adopts a public health orientation focusing on an integrated care model.\textsuperscript{47}

A comprehensive, community-based approach
Using a population health perspective,\textsuperscript{26} an efficacious approach to PPD and infant mental health may require recognition of a broader context that includes mental, social, and physical determinants of health, coping skills, and community resources. With such an approach there are four key factors:

- Close consideration of a wide range of infant behavioral red flags that might reflect poor maternal mental health.
- An extended index of suspicion well into the first year of life.
- Provision of community resources as problems arise.
- Recognition of broader familial and social contextual variables in determining assessment and treatment options to ensure a flexible dyad or family-centred community-level approach.

Many of the services required for such an approach are already in place in major centres. Existing services include community baby and parent support groups. Service providers include social workers, psychologists, family therapists, infant mental health workers, community health nurses, reproductive psychiatrists, and family physicians. The real challenge is to ensure that services and service providers work together effectively in a coordinated and collaborative manner.

One initiative toward this end can be seen locally. The Westcoast Family Resources Society and Family Services of Greater Vancouver have joined with the Ministry of Children and Family Development (MCFD) to offer referred families the assistance of a family preservation worker (oral communication, Dorene Sutton, Westcoast Family Resources Society, 24 April 2006). This person accesses and coordinates the range of services required by a family. The family must be MCFD clients. A variation of integrated mental health care exists in the Calgary area, where a physician with a concern about the mental health of a young child and his or her family can request a meeting with a consultant from the Collaborative Mental Health Care Service (CMHS) as well as the involved family. The consultant acts as a resource for treatment, case management, and referral.\textsuperscript{49} In the Netherlands, a network of services, embedded directly within the Dutch mental health service, is available to all depressed mothers and babies. This program offers a wide range of services, including mother-infant interaction support with a home visitor, treatment for the mother, social support, and other mental health services and social services. All of this is accessed and coordinated through the assignment of a home visitor.\textsuperscript{50}

These examples of a more collaborative system for dealing with mental health issues illustrate how we can ensure effective and timely treatment of postpartum depressed mothers and their infants. Returning to our clinical scenario, we can see what a collaborative approach to intervention might look like.

Weeks went by and after a few more office visits Ann's physician felt that her mood was not just "baby blues" and that a more comprehensive plan was needed. Ann and her physician, with input from a community health nurse, discussed the community resources available. Referrals were made to a postpartum support group and an infant mental health team for dyadic intervention. Ann found it difficult to function within the support group, although she did meet one mother with whom she continued a relationship. She found the in-home visits of a child and family therapist useful. As dyadic therapy progressed, Ann felt more confident about her relationship with her daughter and more attuned to her needs, but she still felt depressed. She agreed to a trial of
A flexible and responsive community-based approach that targets multiple aspects of the mother-infant dyad and relies on well-trained professionals will serve to continue the process of promoting healthy child and family development for all.

**Competing interests**
None declared.

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