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Introducing mother-baby interaction therapy for mothers with postpartum depression and their infants

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A B S T R A C T

Postpartum depression (PPD) and other perinatal mental health disorders have profound adverse effects on maternal-infant interaction and child health. However, standard psychiatric treatment does not necessarily improve the quality of mother-infant interaction. The purpose of this article is to describe the evidence-based CARE intervention and its translation to practice as Mother-Baby Interaction (MBI) Therapy to promote infant outcomes by supporting mothers' sensitive, responsive, and contingent interactions with their infants. Two vignettes illustrate MBI. We advocate that MBI needs to be a requisite adjunct treatment for PPD, and other perinatal mental health disorders, to promote maternal functioning, and positive long-term infant health outcomes.

Introduction

Postpartum depression (PPD) has profound adverse effects on the mother-infant relationship that persist despite resolving maternal depressive symptoms (Forman et al., 2007). Although women with PPD may experience symptom improvement, standard treatment does not necessarily improve the quality of the mother-infant interaction or address impairments in the relationship (Forman et al., 2007). The effects of PPD may derail the mother-infant relationship because mothers typically are less sensitive, responsive, and contingent in interaction with their infants than mothers without PPD (Barry, Kochanska, & Philibert, 2008; Feldman, 2009; Field, 2010; Ford-Jones, Williams, & Bertrand, 2008; Murray, 1992; Raposa, Hammen, Brennan, & Najman, 2014). Specifically, during a sensitive time of infant neurodevelopment, mothers with PPD are by and large unable to engage optimally with their infants and often show intrusive or withdrawn behaviors (Goodman & Gotlib, 2002; Timmer et al., 2011; Toth, Rogosch, Manly, & Cicchetti, 2006). Unfortunately, these maternal behaviors can have lifelong adverse socioemotional effects on infants (Feldman et al., 2009; Raposa et al., 2014).

Infants depend on their mothers to provide emotional scaffolding to ensure that they are capable of engaging with others and eliciting positive affect and responsive behaviors (Tronick & Beeghly, 2011). Through behavioral observation and coding of maternal-infant interaction, we know that mothers without PPD and their infants usually develop a synchronous emotional dance (Feldman, 2007a, 2007b; Feldman, Greenbaum, & Yirmiya, 1999). In this harmonious and flexible dance, mothers without PPD and their infants typically move from matched affective states to mismatched states and back again in repeated repair sequences. These repetitive sequences help infants develop tolerance and resilience when exposed to environmental stressors, and contribute to mutual affect regulation and attachment, foundational processes critical to infant neurodevelopment (Feldman, 2007a, 2007b; Feldman et al., 1999). These sequences also support social engagement, self-regulation and adaptation to stress, modulation of arousal, and facilitation of emotional development, social adaptation, empathy and development of moral internalization (Feldman, 2007a, 2007b; Feldman et al., 1999). By contrast, exposure to PPD disrupts the mother-infant dance resulting in less emotional repair, longer periods of social mismatching and negative affect, and more time needed to repair mismatches between a mother and her infant (Feldman et al., 2009).

Adverse psychosocial effects of the mismatch between mother and infant include behavioral, emotional, and cognitive impairments for the infant that may become increasingly difficult to treat as the infant progresses into childhood (Raposa et al., 2014). Indeed, extensive research has shown that infants of mothers with PPD, during their childhood and adolescence, often experience rates of conduct, anxiety, and substance use disorders that exceed 40% (Goodman & Gotlib, 2002). Moreover, children exposed to PPD, in comparison to children not exposed to PPD, show poorer school performance (e.g., difficulty understanding and following simple directions, maintaining attention, solving complex problems); lower social competency (e.g., being less cooperative with others); reduced self-esteem; higher levels of behavioral problems (e.g., poor control of aggression); more physical problems (e.g., poor growth, colds, chronic illness) and more disorganized

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attachment (Gentile, 2017; Goodman & Gotlib, 2002; Lloyd-Fox et al., 2017; Raposa et al., 2014; Stein et al., 2014; Timmer et al., 2011; Toth et al., 2006).

We do not know precisely when children in the preverbal stage begin to show adverse mental health consequences, but sub-optimal mother-infant interaction may be the primary mechanism of impaired infant neurocircuitry that increases risk for these adverse outcomes. Indeed, the findings of several cortical activation EEG studies of infants between 1 and 15 months old of mothers with depression indicate greater relative right frontal cortical activation, which mirror EEG findings among mothers and adults with major depression (Dawson, Frey, Self et al., 1999; Dawson, Frey, Panagiotides et al., 1999; Dawson, Klinger, Panagiotides, Hill, & Spieker, 1992; Diego et al., 2002; Diego, Field, Hernandez-Reif et al., 2004; Diego, Field, Jones et al., 2004; Field et al., 2001; Field et al., 2004; Jones, Field, & Almeida, 2009). In groundbreaking "still face" experiments, Tronick and colleagues showed that when mothers deliberately shut down their emotional connection and simulated withdrawn behaviors to their infants, the infants became alarmed and responded through a series of increasingly distressed behaviors to try to re-engage (Cohn & Tronick, 1983). These engagement behaviors initially included reaching out to their mothers, and when there was no response, progressed to protesting, turning away, and eventually emotional “meltdown.”

Studies of infants of mothers with depression who demonstrated intrusive behaviors found that the infants looked away from their mothers, showed little interest in objects, cried infrequently, and expressed anger (Tronick & Reck, 2009). With exposure to either type of maternal disconnection (i.e., withdrawn or intrusive), over time, without emotional connection and intervention, infants may become less responsive to other individuals. Indeed, both Tronick and Field and their colleagues found that infants of mothers with depression showed disordered and withdrawn interpersonal behaviors even in new interactions with emotionally sensitive adults without depression (Field et al., 1988; Field, Diego, & Hernandez-Reif, 2009; Tronick & Reck, 2009).

Although we consider therapy a valid intervention to repair poor interpersonal relationships in childhood and adulthood, mother–infant therapy designed to improve and support the maternal-infant relationship, and thereby prevent threats to infant mental health, has not yet received widespread consideration. We propose Communicating and Relating Effectively (CARE) and our more recently adapted Mother-Baby Interaction (MBI) Therapy as novel mother-infant approaches to address impaired mother-infant relationships prior to the development of infant neurocircuitry deficits and the development of infant/child mental health problems. The purpose of this article is to review the components of the CARE intervention and its adaptation to clinical practice as Mother-Baby Interaction Therapy in our Mother Baby Connections program (Geller, Posmontier, Horowitz, Bonacquisti, & Chiarello, 2018). We present two case vignettes to illustrate how this approach can promote infant mental health by helping mothers who are recovering from PPD and other postpartum mood and anxiety disorders to become more sensitive, responsive, and contingent in their interactions with their infants.

Care intervention

Tested in the *Baby Talk* study (Horowitz et al., 2001), the CARE intervention is built upon and adapted from the Interaction Coaching for At-Risk Parents and their Infants (ICAP) intervention. The ICAP intervention was originally designed to strengthen the early dyadic relationship between adolescent mothers and their infants (Censullo, 1994). In a subsequent trial, the coaching strategies of ICAP were further tailored and extended into the CARE intervention to target withdrawn or intrusive interactive patterns characterizing negative interpersonal relationships between mothers with PPD and their infants (Horowitz et al., 2013). Among mothers with PPD who demonstrated withdrawn or intrusive interaction patterns, the CARE intervention showed a positive effect on maternal-infant responsiveness (Horowitz et al., 2001; Horowitz et al., 2013).

The CARE intervention is designed to improve the quality of mother-infant interaction between mothers with PPD and their infants. Mothers with PPD learn to interact with their infants sensitively and contingently through purposeful use of touch, positioning, eye contact, vocalization, verbal language, play, soothing actions, mirroring, and affective expression strategies. Specifically, the CARE intervention is comprised of two major components: 1) teaching mothers to understand their infants' behavioral/communication cues, and 2) coaching mothers to respond effectively. CARE intervention strategies are individually tailored to alter problematic patterns of maternal communicating and relating.

Teaching about infants' behavioral/communication cues

The core of the CARE intervention begins with teaching mothers to interpret their infants' behavioral and communication cues. Specifically, the clinician begins the first session by teaching the mother how infants communicate through behaviors in the context of infant development. The clinician encourages the mother to interact with her infant and then teaches her about potent and subtle infant engagement and disengagement cues observed during the interaction (Sumner & Spietz, 1994). Once the mother learns to identify behavioral cues exhibited by the infant, the clinician reinforces the mother's ability to identify and interpret them. Visual aids illustrating these cues are used and the mother receives a listing of cues to reinforce the content about infant communication. Table 1 lists commonly displayed engagement and disengagement cues. In practice, we describe baby's engagement cues as messages meaning “I want to talk or play” and disengagement cues as meaning “I need a break.” To avoid overwhelming the mother with too much information to process at one time, the clinician emphasizes two or three cues exhibited by the infant.

To engage mothers in the process, the clinician asks the mother to describe her infant's behaviors and then matches these with the engagement and disengagement cues. The mother's homework is to observe her baby and identify engagement and disengagement cues most frequently displayed. Based on the CARE intervention model, the

Table 1
Common infant engagement and disengagement cues.[a]
Adapted from Sumner and Spietz (1994), p. 29.

Potent engagement cues	Subtle engagement cues	Potent disengagement cues	Subtle disengagement cues
Babbling	Brow raising	Back arching	Cling posture
Mutual gaze	Eyes wide and bright	Crying	Diffuse body movements
Reaching toward caregiver	Facial brightening	Cry face	Dull looking face/Eyes- facial grimace
Smiling	Hands open, fingers slightly flexed	Moving away gaze/aversion	Gaze aversion
Smooth cycling movements	Head raising	Coughing	Turning head
Giggling	Immobility, still posture	Tray pounding	Yawn
Talking		Fussing	Wrinkled forehead
Turning head to caregiver			Ugh face

[a] Cues are linked to infant development.

Table 2
CARE intervention components: teaching how to interpret infant's cues & behavioral coaching.

First session	Subsequent sessions
• Teach how infants signal readiness to interact with behavioral engagement cues • Teach how infants signal the need for a break in interaction with behavioral disengagement cues • Identify cues demonstrated by the infant during play observation • Elicit mother's observations of infant's cues • Assign homework to observe baby cues	• Review homework and discuss observations • Reinforce knowledge about infant's cues • Repeat steps from Session I in relation to new infant cues • Relate changes in cues to infant development • Identify problematic maternal behaviors indicative of withdrawal or intrusiveness from play observation • Use coaching strategies to: • Suggest, model, and/or encourage 2–3 contingent, sensitive behavioral responses to baby cues • Encourage mother to try out suggested responses • Assign homework to practice suggested responses to infant cues; give mother homework assignment in writing • Review homework and discuss outcomes • Discuss play observations re: maternal infant interaction patterns • Repeat steps from Session I in relation to observations • Expand repertoire of behavioral responses • Praise and encourage • Evaluate intervention outcomes • Reinforce effective responses • Expand suggestions across variety of play and parenting situations.

mother's repertoire of infant behavioral cues is expected to build over the course of the intervention sessions. To develop effective interpersonal interaction skills, the mother must learn to attend to the infant's communication behaviors and accurately interpret their meaning.

Behavioral coaching

Behavioral coaching begins with identifying maternal behaviors including withdrawal or intrusiveness associated with PPD and postpartum anxiety and linked with adverse infant outcomes. These behaviors are manifested by either inadequate or excessive use of touch, positioning, eye contact, vocalization, verbal language, play, soothing actions, movement, mirroring, and affective expression.

Maternal withdrawal is characterized by little or no touching during interaction; positioning that does not promote eye contact; little or no eye contact; little or no vocalization; little or no verbal language use; failure to respond to infant distress with soothing actions; little or no mirroring or "playback" of infant's action, vocalizations, and facial expressions; and flat or restricted range of affect/facial expression. *Maternal intrusiveness* is characterized by frequent touching that may be rough or abrupt; positioning that may restrict the infant's movement (e.g., restriction of hands); continuous or nearly continuous attempts to have eye contact; continuous or nearly continuous vocalization or angry tone of voice with little or no pausing; continuous or nearly continuous verbal language use or angry tone of voice with little or no pausing; response to infant distress with actions that do not soothe (e.g., abrupt rocking or position change); insistence on directing behavioral interactions (i.e., directing rather than using mirroring or "playback" of infant's action, vocalizations, and facial expressions); and angry or hostile facial expressions.

The clinician coaches the mother, who exhibits withdrawal or intrusiveness, to modify her behaviors and respond to the infant's behaviors with more contingency and sensitivity. By linking maternal behaviors to the infant's engagement and disengagement cues, the clinician helps the mother understand the patterning of interactive responses (i.e., the mother-infant "dance") and to adjust her responses accordingly. The clinician models effective responses and then invites the mother to engage with her infant. The clinician then encourages the mother to modulate or change her responses to the infant's behavior as needed. Also, the clinician praises the mother's efforts and reinforces all sensitive and contingent responses shown. Next the clinician again models and suggests ways to extend, expand, and vary the effective responses demonstrated by the mother, and invites the mother to try such new behaviors when engaging with her infant. The clinician shapes less effective maternal responses by suggesting and modeling adjustments such as modulating withdrawn maternal behaviors to increase vocalization, touch and movement; and modulating intrusive maternal behaviors by suggesting reduced and more gentle, contingent use of voice, touch and movement. Encouraging practice, providing feedback, praising efforts, and modeling are key to promoting maternal behavioral changes.

After the mother demonstrates new behaviors, the clinician encourages the mother to identify the instances when her infant exhibited engagement and disengagement cues and to monitor her own responses. During observation of a 5-minute play interaction during each CARE session, the clinician evaluates changes in interaction and identifies target maternal behaviors (i.e., withdrawn or intrusive) that require behavioral coaching. In vivo coaching with the infant and mother during sessions enables the clinician to demonstrate desired behaviors and to provide specific feedback to the mother to increase, decrease, or alter any of her behavioral responses. The clinician responds to any safety risk to mother or infant by taking the appropriate action (e.g., initiating emergency services and referral). Importantly, in testing the CARE intervention, Horowitz et al. (2013) researchers showed that the supportive and stable presence of a caring, attentive clinician was a critical ingredient in supporting mothers' ability to increase their ability to interact with their infants in a sensitive, contingent, responsive manner. See Table 2.

Mother-baby interaction therapy: enhancements to CARE

We have translated the CARE intervention to Mother-Baby Interaction therapy (MBI) in our *Mother Baby Connections* program, an intensive outpatient mental health treatment program for women with perinatal mood and anxiety disorders) in the greater Philadelphia area (Geller et al., 2018). We enhanced the CARE intervention from its original research protocol to include infant developmental assessment in the first session, using the *Ages and Stages Questionnaire-3 (ASQ-3)* (Squires & Bricker, 2009), a standardized developmental screening measure. Incorporating *Ages and Stages* in the treatment plan has enabled us to detect any developmental concerns that may indicate the need for referral to an outside entity, and to match our teaching and coaching to infant development more precisely than by observation alone. When administering the *Ages and Stages Questionnaire*, we engage the mother in a conversation about her infant's developmental abilities and what she has observed at home during their daily routines. We

Table 3
Interview guide and script for initial MBI session.

Discuss that approach to MBI therapy is to support mothers and foster development of your child	• "We want to partner with you and provide support for you to nurture and care for your baby and help your baby learn and develop." • "We will focus on how baby interacts, communicates, learns, grows, moves, plays, and uses hands." • "We will ask you some questions about your baby and family life, so we understand what you want for yourself and your baby and what guidance we can provide to achieve those goals."
Gathering information on the mother's perceptions about her infant	• How would you describe your baby's personality? • What does your baby like and dislike? • Share with me something your baby does or something about your baby that you like.
Exploring mother's perceptions and experiences of parenting	• What do you find most satisfying about being a mother? • How do you like to interact and play with your baby? Describe your relationship with your baby. • What do you find most difficult about being a mother?
Learning about family life	• Tell me about your family and friends who are an important part of your baby's life. • Tell me about your other responsibilities that you are trying to balance.
Establishing goals together	• What would you like to see changed? • What would you like your baby to learn to do in the immediate future? • What would you like help with regarding caring for your baby?

invite the mother to show us how the baby interacts, communicates, plays, learns, moves, and uses his or her hands. Through this process, we learn about the infant's development as well as the mother's knowledge and understanding of child development. We readily acknowledge and respect the mother's expertise regarding her own baby, and thereby we begin to share information regarding developmental domains and expectations. Positive verbal reinforcement is provided for healthy/adaptive interactions that are observed in sessions.

Our MBI approach is an expansion of CARE with sound principles of early intervention and family-centered care within the field of early childhood disability (Chiarello, 2013; Chiarello & Catalino, 2017; Chiarello & Palisano, 1998; King & Chiarello, 2014). In establishing our therapeutic relationship, we ask the mother how she would like us to serve her and elicit the mother's perception of her infant and her mothering (see Table 3). This approach enables us to establish mutual goals. Inherent in our approach is building on competencies, especially self-efficacy, to support the mother as she learns skills and how to care for and nurture her infant. In our approach, we have also expanded our emphasis on modeling and guidance on various approaches to play and usual parenting activities, such as promoting sleep habits, taking the baby on outings, promoting safety, balancing responsibilities, and managing feeding, bathing, and dressing issues as these arise in the clinical encounters with mothers. Through supporting these parenting activities, we can assist mothers in establishing a meaningful and manageable structure of their daily routines and optimizing maternal functioning, mother-infant relationship, and healthy infant development.

Weekly MBI sessions are grounded in the mother's goals, experiences over the past week, positive and challenging interactions and situations, and priorities, as well as attention to the infant's needs. Sessions primarily occur in a clinic environment; however, efforts are made to provide a meaningful context. We invite mothers to bring in favorite toys or materials from home to set the context for the MBI therapy. For instance, mothers can bring in baby food and related supplies, and the session may focus on interactions during infant feeding. The mother and therapist may also take the baby for a walk outside to a nearby park to extend opportunities to observe and promote interaction. Mothers are asked to share photos or videos of their daily interactions with their babies to observe interactions at home so that the therapist can guide mothers in applying strategies. The videos also provide a meaningful mechanism for the therapist and mother to acknowledge progress.

Coordination of therapeutic modalities

As our experience within our *Mother Baby Connections* program grows (Geller et al., 2018), we have focused increasingly on the complementary relationship between MBI and other therapeutic modalities, most notably cognitive-behavioral therapy (CBT). Given the interdisciplinary nature of *Mother Baby Connections*, MBI in our program has been and can be provided by professionals from various training backgrounds (e.g., nursing, physical therapy) who have expertise in family-centered care, mother-baby interactions, and infant development. When the MBI provider has psychiatric or mental health professional training, a natural extension is to blend these therapies. When the MBI provider is not someone with this specialized training, that provider benefits from consultation with the CBT therapist regarding certain interactions or concerns that may arise with the mothers. The MBI provider's observations inform the CBT therapist of maternal functioning or manifestations of psychiatric symptoms in the context of maternal-infant interaction.

Regardless of MBI providers' professional background and training, a bi-directional relationship exists between MBI and CBT, and ongoing communication between providers benefits both therapeutic approaches. We have noted that the work in MBI sessions informs, validates, and supports the work done in CBT sessions and vice-versa. For example, MBI providers can refer patients to their CBT therapist to discuss topics that are beyond the scope of the MBI modality (such as history of trauma, mental health symptoms, and medication response). The MBI provider can in turn share information on mothering and infant development so that the CBT therapist has a better understanding of the context of her/his work. For mothers who express worry that their baby is not meeting expected developmental milestones/behaviors, the MBI provider can provide accurate information for both the mother and the CBT therapist, and suggest consultation with the baby's pediatric provider. With mothers who express significant anxiety about their performance, CBT sessions can address the mothers' doubts, fears, and anxieties about parenting. Concurrently, MBI therapists can give direct and positive feedback and guidance about mothering/parenting skills from an objective in vivo and informed point of view. Maternal perceptions and beliefs are challenged and explored in CBT, while MBI provides feedback and support about parenting style and hands-on skills to interact with the infant. Having both perspectives examined in coordinated therapeutic approaches is a powerful demonstration of how maternal cognitive and affective/behavioral manifestations of mothering can be examined and integrated effectively in therapy.

In CBT, many mothers are afraid to show negative emotions in front of their babies (e.g., sadness, anger) and fear that expressing a range of emotions will "disrupt" child development. The confirmation from the MBI provider to mothers that their babies are on track developmentally helps to corroborate CBT sessions during which these distorted beliefs are challenged. In many cases, CBT therapy involves discussion of severe traumatic and distressing events. Collaboration with the MBI provider is essential in these cases to ensure that the mother-infant bond is in place and remains intact, or to promote it, as CBT treatment progresses. Thus, together, MBI and CBT providers collaborate to

explore how mothers manage difficult situations involving their infants and significant others (e.g., conflicts about parenting), help mothers to problem-solve, and plan alternate approaches to conflicts, and encourage mothers to adopt new, healthy, and adaptive coping strategies.

An additional component of *Mother Baby Connections* that complements the collaborative efforts of MBI and CBT is the infant caregiving service. The infant caregiving service primarily functions to allow mothers to focus fully on themselves and the content of CBT sessions without needing to attend to the infant's needs, which can distract from full engagement in the CBT therapy session. For mothers who have difficulty with separating from their infants and/or feel anxious about allowing others to care for their infants, the infant caregiving service provides the additional benefit of in-vivo exposure to these experiences, while these issues are addressed in CBT and MBI intervention sessions.

At the start of infant caregiving, the infant caregiver conducts a brief interview with the mother to obtain the mother's input on feeding, diaper care, sleep schedule, and infant preferences for soothing and positioning. In addition, to be informative for the infant caregiver, this interaction both empowers and validates the mother as the expert on her infant's care, and also reinforces content addressed in MBI and CBT sessions.

Vignette illustrations

In the section that follows, we provide two vignettes (comprised of a compilation of case material) to demonstrate MBI in operation in our *Mother Baby Connections* program.

Case one

During the initial MBI session, Tania was quiet and looked down at her lap, not making eye contact with her baby or the therapist. When asked to describe her relationship with her baby, she noted that she did not feel “in love” with her 3-month-old baby girl. Tania shared that her baby slept a lot and was often irritable when awake. During the developmental screening, we acknowledged the baby's strengths: she babbled and kicked her legs when placed on her back. However, we observed together that the baby fussed when placed on her tummy, was not exploring objects, and infrequently smiled. Tania identified that her priorities were to be closer to her baby and to make sure that her baby was “developing okay” because she did not want her depression to affect the baby. During MBI sessions, the therapist and mother discussed and explored strategies to calm and interact with the baby as well as ways to introduce new activities. They established collaboratively two short-term goals: 1) each morning the mother would spend 5–10 min playing with the baby on the floor or in her lap by trying one of the new activities, such as slow dancing to music, and 2) two afternoons a week the mother would take the baby outside for a walk or a location outing. The mother shared that she missed having time for herself, and especially engaging in her hobby of taking photographs. The therapist suggested that during the week she identify times when the baby appeared to be happy and to capture it in a photo or video. The MBI therapist collaborated with the *Mother Baby Connections* team, especially the CBT therapist, to share information on the baby's temperament and development and Tania's positive and challenging experiences with mothering. The MBI therapist benefitted from the CBT therapist's insights about the mother's condition and strategies that they were working on in therapy so she could acknowledge and reinforce the mother's use of these strategies during MBI sessions. Over a period of 3 months, Tania built on her strengths of understanding her baby and expanded on her repertoire of playful interactions that facilitated the baby's social and motor behaviors. The baby's father was invited for one session so he could be supported in his interactions with the baby. This session provided a positive experience for the family and increased the father's confidence in caring for the baby independently so that Tania had some time to meet her own needs.

Case two

During the initial MBI session, when the therapist was explaining the focus of the therapy, Janelle noted that she did not believe play was important for her 2-month-old baby boy. She explained that her focus was on teaching her baby to read and behave correctly. Janelle was concerned that her baby was “bad” and that her baby “ignored” her when she called to him. The therapist acknowledged the important role that parents have in teaching their children and that reading to a baby and instilling a love for reading are especially beneficial. When conducting the developmental screening, the therapist learned that the baby had not had exposure to rattles. The therapist made sure to emphasize that a variety of household materials, such as a plastic measuring cup and rolled-up socks, can be used as objects for a baby to learn how to hold and manipulate things and to learn about how the world around him operates (e.g., object permanence, and cause and effect). The therapist asked the mother if it was okay to give the baby a rattle and after receiving her permission, the therapist modeled several games and activities while engaging the baby. At the beginning of the next session, Janelle shared that she had bought a rattle for the baby and wanted to show the therapist what her baby had learned. The therapist developed a trusting relationship with the mother. The therapist respected Janelle's perspective and the mother became open to considering other possibilities to “playing” and interacting with her baby. The therapist reframed play as teaching the baby to match Janelle's framework, and also reframed the baby's inattentiveness to his mother's call as a possibility that the baby was attending visually to other stimuli The therapist also reinforced instances when the baby gazed at his mother and reached toward the mother as signs of the baby's affection and connection to his mother. Janelle began to demonstrate new strengths in matching her interactions to the baby's needs and pace, and by providing her baby with warm touches and expressions.

Implications/conclusions

MBI is an evidence-based therapy to mitigate adverse effects of PPD and other perinatal mental health disorders, notably anxiety, on the maternal-infant relationship and infant developmental outcomes. We have demonstrated its feasibility and acceptability along with positive clinical outcomes in our Mother Baby Connections intensive outpatient program. We engage in collaborative practice through regular communication between our CBT and MBI clinicians to achieve mutual treatment goals, and we encourage such close coordination for others who wish to integrate MBI with standard psychiatric treatment. We encourage adopters of our MBI approach to establish collaborative links to mothers' individual therapists (even if based externally to the treatment program that houses MBI) to provide coordinated care. MBI can be provided in a primary care practice, mental health setting, or home environment.

Ongoing evaluation of outcomes is a mandate of translational research. We have evaluated our early treatment outcomes specific to MBI with self-report measures of maternal functioning and clinician notes, and have documented significant improvements (Geller et al., 2018; Horowitz et al., 2001; Horowitz et al., 2013). We also plan to extend our MBI outcome evaluation from current use of self-report measures related to MBI by adding observational evaluation of the quality of maternal-infant interaction at baseline and post-MBI treatment/discharge. Importantly, we stress that timely evidence-based psychiatric treatment for PPD, perinatal anxiety and other disorders is necessary but not sufficient to address impaired maternal-infant interaction and resultant possible adverse infant mental health outcomes. We advocate that MBI needs to be a requisite type of adjunct treatment for PPD, perinatal anxiety and other disorders to ensure support for maternal functioning and infant's well-being and positive long-term mental health outcomes. Moreover, we suggest that MBI could be

implemented to improve the quality of maternal-infant interaction whenever sub-optimal interaction is assessed, even when PPD or other perinatal mental health disorders are not present. For example, we suggest that mothers who do not interact intuitively in a responsive way with their infants can benefit from MBI along with their infants.

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