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# The Evidence Base for the Cues Program for Mothers of Very Low Birth Weight Infants: An Innovative Approach to Reduce Anxiety and Support Sensitive Interaction

Nancy Feeley, RN, PhD

Phyllis Zelkowitz, EdD

Ruta Westreich, MA

David Dunkley, PhD

## ABSTRACT

Very low birth weight (VLBW) infants, born weighing less than 1,500 g, are at risk for several developmental problems. Consequently, there has been interest in developing intervention programs to prevent such problems. This article describes the empirical evidence that guided the development of an innovative, multicomponent intervention program for mothers of VLBW infants, as well as the program content and features. Based on the evidence, the program was designed to include six sessions and commence shortly after birth to reduce maternal psychological distress during the infant's hospitalization in the neonatal intensive care unit and to promote sensitive mother–infant interaction. The program incorporates various learning activities, including written materials, observational exercises, discussion, and video feedback.

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Infants born weighing less than 1,500 g or about 3 pounds are referred to as very low birth weight (VLBW) infants. Most VLBW infants are also born preterm; some are born as early as 14 weeks before their expected date of birth. These infants often require lengthy hospitalization in a neonatal intensive care unit (NICU) until their expected date of birth. Abundant evidence from numerous well-designed studies demonstrates that VLBW children, without major handicapping conditions such as cerebral palsy, are at greater risk for subtle deficits in cognitive and language abili-

ties, academic skills and achievement, and social and behavioral competence (e.g., attention problems, hyperactivity) compared with their normal birth weight peers (Aarnoudse-Moens, Weisglas-Kuperus, van Goudoever, & Oosterlaan, 2009; Bhutta, Cleves, Casey, Cradock, & Anand, 2002; Hayes & Sharif, 2009; Nadeau, Tessier, Boivin, Lefebvre, & Robaey, 2003; Samuelsson et al., 2006; Taylor, Espy, & Anderson, 2009). Long-term follow-up studies indicate that as adolescents and young adults, VLBW infants continue to have lower IQ scores and poorer academic achievement as well as

more behavioral and emotional difficulties than normal birth weight infants (Hack, Cartar, Schluchter, Klein, & Forrest, 2007; Mathisen, Worrall, O'Callaghan, Wall, & Shepherd, 2000; Reuner, Hassenpflug, Pietz, & Philippi, 2009; Saigal, 2000; Strang-Karlsson et al., 2008).

Because it is widely recognized that VLBW children are more likely to have developmental problems, intervention programs have been devised to prevent these problems. Although some comprehensive, multicomponent intervention programs have had some positive effects on development (Brooks-Gunn et al., 1994), the programs are of long duration (i.e., 1–3 years), expensive, and time consuming for both professionals and families. For these reasons, intervention programs have not been adopted into the routine services provided to children born with VLBW. Subsequently, researchers have turned their attention to the development and evaluation of shorter, less expensive, but well-timed interventions that focus on the particular needs of VLBW infants and their parents. Brief, focused interventions may be as effective but more readily adopted into clinical practice. With this in mind, the Cues intervention program was developed for mothers of VLBW newborns. The purpose of this article is to outline the empirical evidence that guided the development of the innovative Cues intervention program as well as to describe the program.

## DEVELOPMENT OF THE CUES PROGRAM

The goal of intervention development is to operationalize the intervention program so that it can be assessed for feasibility, efficacy, and effectiveness. The process of intervention development must address decisions about what should be done (content), when (timing), how much (dose), where, how (methods), and by whom (van Meijel, Gamel, van Swieten-Duijffes, & Grypdonck, 2004). Current empirical evidence (Aranda, 2008; van Meijel et al., 2004; Whitemore & Grey, 2002) as well as feasibility issues (van Meijel et al., 2004) need to be considered in the process of intervention program development.

### *The Focus and Content of the Cues Program*

**Factors that influence the development of children born with VLBW.** The content of any intervention program should be evidence based (Aranda, 2008). In the process of developing the Cues program, the evidence on the factors affecting the development of children born with VLBW, as well as the efficacy of various interventions to enhance their development, was examined. The evidence indicates that

One of the major challenges that mothers experience when they bring home their VLBW infant is interpreting the infant's behavior.

two factors influence the development of VLBW children: maternal sensitivity and maternal psychological distress.

Maternal sensitivity is important for the development of all children. *Sensitivity* refers to the ability to accurately perceive the child's communication signals and respond promptly and appropriately (Juffer, Bakermans-Kranenburg, & Van Ijzendoorn, 2008). One of the major challenges that mothers experience when they bring home their VLBW infant is interpreting the infant's behavior (Reyna, Pickler, & Thompson, 2006). Numerous studies have found that VLBW infants are challenging social interaction partners. Compared with normal birth weight infants, VLBW infants are less responsive, and they look at and vocalize less with their caregivers (Barratt, Roach, & Leavitt, 1992; Singer et al., 2003). The infant's lack of responsivity to stimulation provokes anxiety in mothers (Garel, Dardennes, & Blondel, 2007).

Mothers also confront several challenges in interacting sensitively with their infant during a feeding. VLBW infants have difficulty coordinating sucking, swallowing, and breathing (Neu & Zhang, 2005; Vice & Gewolb, 2008). Mothers note that their VLBW infants often choke, gag, or regurgitate during feedings (MacDonald, 2007; Reyna et al., 2006) and are sleepy (Reyna et al., 2006). Furthermore, mothers are not readily able to recognize signs that their infant is hungry or satiated (Reyna et al., 2006).

Maternal sensitivity promotes the child's cognitive, language, and social development and is of particular importance during infancy and early childhood (Belsky, Bakermans-Kranenburg, & Van Ijzendoorn, 2007; Landry, Smith, & Swank, 2006; Paavola, Kempainen, Kumpulainen, Moilanen, & Ebeling, 2006; Wachs, Chang, Walker, & Gardner, 2007). Maternal sensitivity promotes school readiness, academic achievement, and the need for special education services (Downer & Pianta, 2006; Mann, McCartney, & Park, 2007; Taylor, Anthony, Aghara, Smith, & Landry, 2008). VLBW infants appear to benefit even more from maternal sensitivity than their normal birth weight peers (Landry et al., 2006). Children born with VLBW who receive consistently sensitive parenting from their mothers over the first 4 years of life have IQ scores 14 points higher than VLBW children exposed to less sensitive maternal

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behavior, even controlling for socioeconomic status (Smith, Landry, & Swank, 2006).

Evidence that suggests how maternal sensitivity may enhance children's development is beginning to emerge. VLBW infants whose mothers received training on how to interact sensitively with their infants had improved brain white matter microstructure compared with infants whose mothers did not receive training (Milgrom et al., 2010). Thus, when a mother interacts sensitively with her infant (e.g., accurately interpreting the infant's communication signals, not overwhelming the infant with stimulation, and responding promptly and effectively to minimize distress), this may decrease stress to the infant's developing brain. Similarly, maternal sensitivity appears to support the infant's ability to focus and maintain attention and helps to organize the infant's behavior (Landry, Garner, Swank, & Baldwin, 1996), which, in turn, promotes infant development. Finally, mothers confront many challenges when interacting with their VLBW infant, and helping mothers to interact sensitively with their infant is thought to be important to optimize the infant's cognitive, behavioral, and social development.

Studies of mothers from various cultures have found that psychological distress (e.g., symptoms of anxiety, depression, and posttraumatic stress) is common among mothers of VLBW infants (Ahlund, Clarke, Hill, & Thalange, 2009; Garel et al., 2007; Giakoumaki, Vasilaki, Lili, Skouroliakou, & Liosis, 2009; Miles, Holditch-Davis, Schwartz, & Scher, 2007; Padovani, Carvalho, Duarte, Martinez, & Linhares, 2009; Pinelli et al., 2008; Shaw et al., 2006; Vigod, Villegas, Dennis, & Ross, 2010). Psychological distress may persist for up to 2 years after the birth (Ahlund et al., 2009; Elklit, Hartvig, & Christiansen, 2007; Feeley, Gottlieb, & Zelkowitz, 2005; Garel et al., 2007; Miles et al., 2007). Psychological distress can adversely affect maternal sensitivity as well as infant development (Feldman & Eidelman, 2007; Feldman et al., 2007; Karatzias, Chouliara, Maxton, Freer, & Power, 2007; Korja et al., 2008). Anxious mothers have difficulty attending to and processing emotional information (Dennis & Chen, 2007) and, thus, may have difficulty noticing and responding to their infant's communication signals (Kaitz & Maytal, 2005). Mothers who are anxious in the early

months after their VLBW infant's birth interact less sensitively with their infant in later infancy, and their child has more internalizing behavior problems and poorer cognitive development in early childhood (Feeley et al., 2005; Zelkowitz & Papageorgiou, 2005). Consequently, researchers have called for the development and evaluation of interventions to reduce maternal psychological distress during their VLBW infant's NICU hospitalization (Elklit et al., 2007; Erdeva et al., 2009; Latva, Korja, Salmelin, Lehtonen, & Tamminen, 2008; Lee, Hwang, Chen, & Chien, 2009; Olshtain-Mann & Auslander, 2008; Saigal & Doyle, 2008).

***Effective interventions to reduce psychological distress and enhance sensitivity.*** Clinical trials to reduce psychological distress in women experiencing postpartum depression provide insights concerning the design of interventions to promote the mental health and parenting of women in the postpartum period. These studies suggest that single-component intervention programs that are designed to reduce mothers' psychological distress do reduce distress but have no effect on maternal interactive behavior (Forman et al., 2007). In contrast, teaching new mothers who are depressed how to interact sensitively with their infant improves maternal sensitivity but has no effect on mothers' depression (van Doesum, Riksen-Walraven, Hosman, & Hoefnagels, 2008). This evidence has led to a recognition that multicomponent interventions that target both maternal psychological distress and the mother-child relationship are required (Forman et al., 2007; Milgrom, Ericksen, McCarthy, & Gemmill, 2006; Nylen, Moran, Franklin, & O'Hara, 2006).

Reliable evidence demonstrates that both relaxation and cognitive behavioral therapy are efficacious interventions for anxiety (Chambless & Ollendick, 2001; DeRubeis & Crits-Christoph, 1998; Epp & Dobson, 2009). Deep breathing and guided imagery are nonpharmacological relaxation techniques commonly used in anxiety and stress management intervention programs. Deep breathing involves focusing on slow, deep, rhythmic breaths (i.e., inhaling through the nose and exhaling through the mouth) to reduce the flight-or-fight stress response. In guided imagery, the person guides her imagination to a place or situation in which she feels calm, happy, and relaxed. Relaxation techniques such as these have been found to have a medium effect size in the management of anxiety (Manzoni, Pagnini, Castelnuovo, & Molinari, 2008), and relaxation and

deep-breathing training have been found to reduce anxiety in pregnant women (Bastani, Hidarnia, Kazemnejad, Vafaei, & Kashanian, 2005). Cognitive therapy focuses on the cognitive content or thought processes related to the person's response to upsetting events (DeRubeis, Webb, Tang, & Beck, 2009) and helps the person learn to examine her beliefs about these events and consider them as hypotheses rather than facts. The goal is to modify anxiety beliefs and appraisals of threat (Clark & Beck, 2009). Cognitive therapy techniques such as these have also been effective in reducing anxiety and stress in childbirth (Saisto, Salmela-Aro, Nurmi, Kononen, & Halmesmaki, 2001).

A meta-analysis of interventions aimed at improving maternal sensitivity among mothers of normal birth weight and VLBW children younger than 4 years old found that various types of interventions appear to be moderately effective in improving sensitivity (Bakermans-Kranenburg, Van Ijzendoorn, & Juffer, 2003). However, interventions that focus primarily on improving sensitivity at a behavioral level are more effective than other types of interventions, such as support or counseling. Sensitivity teaching seeks to enhance parent-child interaction by addressing parental sensitivity at the behavioral level (Bakermans-Kranenburg et al., 2003). Parents learn to recognize and interpret their child's nonverbal and verbal communication cues and to respond appropriately to the child's cues or signs of distress in a timely fashion.

In light of this evidence, the content of the Cues program was designed to include two components: anxiety reduction and sensitivity teaching. The program aims to teach mothers the knowledge and skills required in recognizing and managing their own anxious feelings, and it also helps them develop the knowledge and skills needed to interact sensitively with their VLBW infant.

### ***Strength and Timing***

Another important aspect of intervention program design concerns decisions related to the strength and timing of the intervention program. *Strength* refers to the amount, frequency, and duration of time required for the program (Aranda, 2008; Conn, Rantz, Wipke-Tevis, & Maas, 2001); *timing* refers to the optimal time when the program should be delivered (Whittemore & Grey, 2002). A balance must be achieved between the amount of intervention required to achieve the desired effects and the burden to the participants (Aranda, 2008). In the early

childhood intervention literature, there is a growing consensus that brief interventions may be equally or even more effective than interventions that offer a large number of sessions. A meta-analysis of interventions aimed at improving maternal sensitivity found that interventions with fewer than five sessions are as effective as those with five to 16 sessions, but interventions with more than 16 sessions are less effective (Bakermans-Kranenburg et al., 2003).

It is well established that the NICU hospitalization is a stressful period for mothers of VLBW infants (Dudek-Shriber, 2004; Joseph, Mackley, Davis, Spear, & Locke, 2007; Miles, Burchinal, Holditch-Davis, Brunssen, & Wilson, 2002). Furthermore, the early weeks after the infant's discharge from the hospital are also stressful. Mothers' concerns are greatest in the week following birth and the week after discharge (Gennaro, Zukowsky, Brooten, Lowell, & Visco, 1990). Parents experience mixed feelings at discharge and feel unprepared to assume responsibility for their infant's care (Jackson, Ternstedt, & Schollin, 2003). It has been argued that intervention programs for parents of VLBW infants continue after discharge because of the high level of stress observed in parents at this time (Olshtain-Mann & Auslander, 2008). A trial of an intervention for mothers that began after discharge from the NICU observed that problematic maternal interactive behaviors (e.g., overstimulating the infant) had already been established; thus, interventions to promote mother-infant interaction should begin soon after birth (Johnson, Ring, Anderson, & Marlow, 2005). Furthermore, mothers who participated in a sensitivity intervention during their children's early infancy demonstrated a positive effect in interactions with their infants more quickly than mothers who received the intervention when their children were toddlers (Landry, Smith, Swank, & Guttentag, 2008).

Based on this evidence, the Cues program was designed to include six sessions and commence shortly after birth to reduce maternal psychological distress during the NICU hospitalization and promote sensitive interaction soon after birth. The program continues after the VLBW infant's discharge home, because this is a period marked by increasing stress for parents as they assume full responsibility for their infant's care.

### ***Format and Methods***

Decisions also need to be made concerning the methods that will be used to deliver an intervention program (Aranda, 2008). The feasibility of the methods,

as well as their acceptability for participants, requires consideration. New mothers have indicated a preference for one-on-one interventions that allow for discussion (Gaffney & Altieri, 2001). Moreover, a high level of nonattendance has been reported among postpartum women participating in group interventions (Dennis, 2004). Feasibility challenges, such as mothers' different visiting patterns and language preferences, also preclude providing the program to mothers as a group while their infant is hospitalized in the NICU.

Adult learners have different learning styles, and intervention programs should include various learning activities that will appeal to different learners (Tomei, 2010). Video feedback is a method used to develop skill in interacting; the method involves videotaping a mother interacting with her infant and then reviewing it and providing personalized feedback to her concerning her interactive behavior as well as that of her infant (Bakermans-Kranenburg, Juffer, & Van Ijzendoorn, 1998). Video feedback allows parents to learn to observe their child as well as their own interactive behavior (Bernstein, 1998). Parents see themselves and become more aware of how they and their infant communicate with one another. Evidence suggests that programs that use video feedback are more effective in helping parents learn to interact sensitively compared with programs that do not offer video feedback (Bakermans-Kranenburg et al., 2003).

Therefore, the Cues program was designed to be provided in one-on-one sessions between the mother and the intervener. The program incorporates a range of learning activities, including written materials, observational exercises, discussion, and video feedback.

#### **DESCRIPTION OF THE CUES PROGRAM**

As described earlier, the Cues program consists of two major components: anxiety reduction component and sensitivity component. The first two sessions provide mothers with the knowledge and skills to manage their anxiety, whereas the remaining four sessions teach mothers about infant behavioral cues, infant states, and sensitive mother–infant interaction. The program begins with the anxiety management sessions, because highly anxious mothers will have difficulty learning how to interact effectively with their infant. The first five sessions are designed to take place in the NICU (approximately once per week), and the last session takes place in the family's home (approximately 4 weeks after discharge from the NICU). Each session requires 60 minutes. Prior

to each session, the mother is given a booklet outlining the major ideas to be discussed. The various topics addressed in each session are outlined in Table 1. At each session, the mother and the intervener discuss the content of the booklet and how the content applies to the mother and her infant. Observational exercises help mothers learn about their infant's behavior and apply the knowledge they acquire. For example, after learning about infant states, mothers are asked to observe and identify their infant's state.

In the first session, information about the mother's thoughts and feelings is collected. The notion that anxiety is a normal response to the experience of having a newborn hospitalized in the NICU is discussed. The relationship between thoughts, feelings, and behaviors is also addressed. Mothers learn that changing their way of thinking about a situation can affect their feelings and behavior. Finally, the importance of relaxation in reducing anxiety is considered; mothers learn and practice deep breathing as a technique to relax and manage their anxious feelings.

In the second session, imagery relaxation is taught and practiced. Mothers learn to create a vivid mental image that promotes focused concentration, which, in turn, promotes relaxation. For example, they might envision that they are walking on a beautiful white sandy beach, and imagine all the sensory experiences associated with this image (e.g., the sun is warm, the ocean is blue, and the sound of the waves can be heard). The mother is asked to describe a situation during her week when she felt particularly worried or distressed; this example is used to revisit the idea that there is a connection between thinking, feeling, and behaving. In addition, mothers learn to identify their own negative automatic thoughts and to consider alternative ways of thinking. For example, a mother might worry because her infant has not gained weight that particular week. She perceives this event as "a step backwards" in her infant's medical progress, and she worries about further negative consequences. In this case, the mother would be asked to consider alternative ways of viewing this stressful situation (e.g., "Is there another way of looking at the situation?"). In this situation, the mother might be focusing on this one incident and discounting all the progress her infant has made up until this time. Lastly, the intervener checks with the mother regarding whether she has been able to resume any of her previously enjoyable activities (e.g., exercise, time alone with her spouse), and assists her with problem solving to achieve this.

TABLE 1  
**Outline of the Content of the Cues Program**

Session	Topics	Associated Learning Activities
1	Managing anxious feelings: <ul style="list-style-type: none"> <li>• The occurrence of anxiety and stress is normal in this situation</li> <li>• The relationship between thoughts, feelings, and behaviors</li> <li>• The importance of relaxation to reduce anxiety</li> <li>• Deep breathing</li> </ul>	Practice deep-breathing technique
2	Managing anxious feelings: <ul style="list-style-type: none"> <li>• Negative automatic thoughts and stress</li> <li>• Imagery relaxation</li> </ul>	Practice changing maladaptive thought patterns Practice imagery relaxation
3	Infant state: <ul style="list-style-type: none"> <li>• The behavior of VLBW infants</li> <li>• The appearance of preterm infants</li> <li>• Infant states and state modulation</li> </ul>	Observe infant behaviors Observe infant state Identify what calms her infant Identify what comforts her baby
4	Infant cues: <ul style="list-style-type: none"> <li>• Infant engagement and disengagement cues</li> <li>• What is responsive and sensitive interaction</li> </ul>	Observe infant cues Identify cues that baby is ready to communicate (engage), and cues that baby needs to take a break (disengage)
5	Feeding interactions: <ul style="list-style-type: none"> <li>• Hunger and satiation cues</li> <li>• Bringing the infant to quiet alert state for feeding</li> <li>• Feeding as a social interaction</li> </ul>	Mother and intervener observe infant behavior during a feeding, and intervener coaches mother on how to respond and apply knowledge from previous sessions
6	Putting it all together: <ul style="list-style-type: none"> <li>• Review of previous sessions</li> <li>• Importance of pausing in interactions and allowing for infant response</li> <li>• Review relaxation techniques and ways of challenging automatic thoughts</li> </ul>	Mother–infant interaction is videotaped, and mother and intervener review tape for infant cues and maternal behavior

The sensitivity component of the Cues program is based on two existing programs that were adapted with the permission of the developers. The first program, developed by Kathryn Barnard (1990), is the *Keys to Caregiving: Parent’s Guide to Learning How Babies Behave*. The *Keys to Caregiving* program consists of a series of five booklets written for parents on topics related to parent–infant interaction, and each booklet addresses a new topic. The *Keys to Caregiving* program was developed for parents of full-term, normal birth weight infants; thus, the program and materials were altered to meet the needs of parents of infants hospitalized in an NICU. Content on the behavior of VLBW infants is also included in the Cues program and was adapted from the *Creating Opportunities for Parent Empowerment (COPE)* program developed by Melnyk and colleagues (Melnyk, Alpert-Gillis, Feinstein, & Fairbanks, 2001; Melnyk, Crean, Feinstein, & Fairbanks, 2008).

Sensitivity teaching begins in the third session. The appearance and behavior of VLBW infants are addressed. Mothers are taught the signs of overstimulation, as well as how to respond when this occurs. The notion of infant state is discussed, and mothers

learn how to identify different states (e.g., quiet alert, active sleep), as well as how to help their infant move from one state to another. The concept of corrected age is explained, and the implications are discussed.

The fourth session addresses infant disengagement cues (i.e., signals that the infant needs a break from interaction, such as looking away) and engagement cues (i.e., signals that the infant is interested or available to engage in interaction, including behaviors such as smiling or reaching out). The idea that both the parent and the infant play an important role in interaction and the roles of each partner in interaction are also discussed. For example, the infant has to be able to clearly communicate needs, and the mother must respond to the infant’s signals of distress in a timely manner. The importance of the face-to-face position in effective interactions is underscored and demonstrated. Mothers view a DVD that shows various engagement and disengagement cues.

The final session to take place during the infant’s hospitalization focuses on infant feeding and mother–infant interaction during feedings. This important session brings together much of the

**W** “Corrected age,” also called “adjusted age,” is the age a premature infant would be if he had been born on his due date. Corrected ages are useful when evaluating a premature infant’s size and development.

knowledge that the mother has acquired to date. The session is carefully timed to occur soon after the mother begins to feed her infant, and it takes place at the infant's bedside during a feeding. Prior to the feeding, the mother is asked to observe for cues that her infant is hungry; during the feeding, she is asked to note indicators of satiation. The importance of the face-to-face position and the opportunity for social interaction during feeding are highlighted. In addition, mothers are instructed on how they can use various stimulation to gently maintain their infant's alertness during feeding.

Telephone contact is made 1 to 2 weeks after the infant's discharge from the NICU to assess the mother's adjustment to the transition to home. This contact and the final session present an opportunity to review some of the knowledge acquired in earlier sessions. For example, the use of the relaxation techniques taught in the first few sessions is discussed. The last session of the program takes place at home 1 month after discharge. During this session, mothers are videotaped while interacting with their infant. Videotaped interactions are reviewed by the intervention provider and the mother together. The objective is to facilitate the integration of the knowledge acquired from the previous sessions. During the review of the videotape of their interaction, mothers are also encouraged to "speak for the baby" (Carter, Osofsky, & Hann, 1991). This teaching method involves asking the mother to provide a description and rationale for the infant's communications signals (e.g., facial expressions, bodily movements) that she observes while watching the videotape of her infant's behavior, thereby promoting skill in reading infant communication cues.

#### ***Intervention Provider Training***

The intervention providers receive about 35 hours of training to prepare them to deliver both components of the Cues program. Two experienced cognitive behavior therapists provide training concerning the anxiety management component of the program. This training involves reviewing and discussing readings on the use of cognitive behavioral approaches to reduce anxiety, as well as role-playing how to teach deep-breathing techniques and cognitive reframing. The intervention providers learn about sensitive interaction by reviewing the Keys to Caregiving program (Barnard, 1990), which consists of a series of videotapes 5.5 hours in length. Training also includes reviewing the Cues program manual, which describes the information that needs to be presented, as well as the specific procedures for each session.

#### **IMPLICATIONS FOR RESEARCH**

The outcome of intervention design is the formulation of the intervention program that then must be assessed for feasibility (van Meijel et al., 2004). In the case of the Cues program, it was necessary to determine if it was possible to provide the program to mothers during the highly stressful NICU hospitalization. Thus, the feasibility of the program was assessed in a single group pretest–posttest design study. The findings of this pilot study indicated that it was possible to provide the program to mothers during their infant's hospitalization because 80% of mothers received all six sessions of the program (Feeley et al., 2008). Most of the mothers were very satisfied with the program, reported that it met their needs, and would recommend it to a friend in a similar situation.

Currently, the efficacy of the Cues program is being tested in a randomized controlled clinical trial in which 121 mothers are randomly assigned to receive either the experimental Cues program or a structurally equivalent attention control program in which mothers receive six sessions of general information on basic infant care and health (Zelkowitz et al., 2008). The short-term and longer term effects of the Cues program on both mothers and children are being examined at 2 and 6 months postdischarge from the NICU, as well as when the children are 2.5 years old. The efficacy of the Cues program has yet to be determined. If, however, the findings indicate that the program is efficacious in reducing mothers' anxiety and promoting their ability to interact sensitively with their VLBW infant, then it could be incorporated into routine care provided to mothers while their infant is hospitalized in the NICU.

#### **IMPLICATIONS FOR CHILDBIRTH EDUCATION**

The evidence reviewed for the development of the Cues program indicates that mothers of infants born with VLBW are highly anxious for some time after their infant's birth. Furthermore, anxiety has negative consequences for mothers, their interaction with their infants, and their child's later development. The National Health Service (NHS) in Britain recently developed a set of policies to guide the development of neonatal intensive care services (NHS & Department of Health, 2009). Helping parents cope with stress, anxiety, and altered parental roles is one of the key policies. Mothers are anxious not only during their infant's NICU hospitalization, but the evidence indicates that their anxiety

can remain high for the first few years after birth. Evidence-based methods, such as those described in this article, exist to help people manage stress and anxiety. Mothers can be taught these techniques to manage their anxiety. We recommend that NICU units consider having psychological services available for mothers, and that NICU staff systematically refer mothers to these services. We also recommend that neonatal follow-up services and individuals involved with mothers in the first few years after birth assess mothers' psychological well-being after discharge and refer mothers who require assistance. Discharge from the NICU is a stressful transition for mothers as they assume full-time responsibility for the care of their infant for the first time. NICU staff can help mothers prepare for this transition during the infant's hospitalization, and follow-up care can be provided after discharge to provide mothers with the support they require.

Many pregnant and postpartum women experience anxious feelings, and anxiety in pregnancy can have adverse effects for both the woman and her developing fetus. The evidence-based methods incorporated into the first two sessions of the Cues program (deep breathing, guided imagery [replacing negative thoughts]) have been found to reduce anxiety in pregnant women (Bastani et al., 2005). Thus, childbirth educators could incorporate the teaching of these techniques into childbirth preparation classes to help women and their partners manage stress and anxiety during the women's pregnancy or childbirth. Although all women might benefit from learning techniques to manage anxious feelings, women who experience difficulties during their pregnancy might find these techniques to be particularly useful. Our experience indicates that clinicians can readily learn how to teach anxiety-reduction techniques to women and that not much time is required to do so.

Sensitive and responsive maternal interactive behavior is important for the optimal development of children born with VLBW. The evidence indicates that mothers can be taught to interact sensitively with their infants. Efficacious programs focus on helping mothers learn about their own behavior, as well as that of their infant. Childbirth educators can use one of the programs currently available, such as the Keys to Caregiving program (Barnard, 1990) incorporated into the Cues intervention or other programs such as The HUG (Tedder, 2008), to help mothers learn how to read their infant's communication cues and to respond in ways that promote the

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infant's regulation and development. Video feedback is a teaching method that has been shown to be particularly effective and, thus, can be incorporated as one of the teaching methods used. Finally, current evidence suggests that in order to optimize the development of children born with VLBW, the mothers' psychological distress and their interactive behavior need to be addressed. It behooves childbirth educators to address both of these goals in their work with expectant mothers.

## CONCLUSION

Advances in technology and neonatal intensive care have resulted in increasing numbers of children born with VLBW. The experience of having a child born early and small is stressful for mothers. Childbirth educators need to be cognizant of the evidence indicating that the well-being of the mother will have an effect on the health and development of her child. Two particular aspects of maternal well-being need to be addressed: anxiety and the ability to interact with the infant in a way that promotes the infant's cognitive, behavioral, and social development.

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NANCY FEELEY is an associate professor in the School of Nursing at McGill University in Québec, Canada, and a senior researcher at the Jewish General Hospital in Québec. She is also the codirector of GRIISIQ (The Québec Interuniversity Nursing Intervention Research Group). PHYLLIS ZELKOWITZ is the director of research for the Department of Psychiatry at the Jewish General Hospital and an associate professor in the Department of Psychiatry at McGill University. RUTA WESTREICH is the director of the Cognitive Behavior Therapy Service at the Jewish General Hospital. DAVID DUNKLEY is a researcher at the Jewish General Hospital and an assistant professor of psychiatry and associate member of psychology at McGill University.