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Effect of Guided Participation on Feeding Competencies of Mothers and Their Premature Infants

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Abstract: The effect of guided participation (GP) on premature infant and maternal feeding competencies was examined, controlling for infant, maternal, and family conditions. Competencies were examined longitudinally and within age (1, 4, 8, and 12 months post-term age) for 42 mother–infant pairs randomly assigned to either GP or Standard Care (SC) groups. The hypothesized GP effect on competencies across infant age received support for infants (at 1 and 8 months) and for mothers (at 4 months). The hypothesized contribution of conditions was most strongly supported by the negative relationship between family poverty status and the two maternal competency variables. The hypothesized GP moderator effect on the relationship between depressive symptoms and maternal competency variables was supported for regulation of negative affect and behavior at 8 months. Despite study limitations in power and sensitivity to detect effects, findings indicate that further study of the GP intervention is merited.

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Feeding competencies of mothers and their premature infants are important for the infant's nutrient intake and growth, the relationship of mother and infant, and the family's emotional well-being (Hawdon, Beauregard, Slattery, & Kennedy, 2000; Maldonado-Duran, 2000; Ramsay, Gisel, McCusker, Bellavance, & Platt, 2002). However, longitudinal or cross-sectional study of feeding competencies for both mothers and full-term or premature infants is limited, and little is known about conditions that influence feeding competencies. The extent of feeding experience, infant and maternal attributes (e.g., infant biologic condition, maternal mental health), and family economic status are conditions that may contribute to feeding competency and its development (Bronfenbrenner, 1993; Sameroff & Fiese, 2000). When an infant is born very prematurely and of very low birth weight (VLBW; weight <1500 g), feeding is likely to be a new experience for a mother, and guidance from a more knowledgeable person is needed to support competency development (Rogoff, 1990). Our purpose was to explore the effect of a method of supporting development (guided participation [GP]) on maternal and infant feeding competencies, accounting for infant, family, and maternal conditions.

Feeding is a complex process that involves not only the transfer of nutrients but also a social relationship between parent and infant. Infant competencies in taking in age-appropriate nutrients include oral-motor (e.g., coordinating sucking, swallowing, and breathing), postural (e.g., maintaining a mid-line position of the head), and hand skills (Morris & Klein, 2000). For both infants and mothers, feeding task and relationship competencies may be described in terms of: (a) positive affect and behavior, and (b) regulation of negative affect and behavior (Schore, 1994; Sroufe, 1995). A mother expresses positive affect and behavior in the warmth and kindness of her tone of voice, the gentleness of her touch, her enjoyment of her infant, and in what she makes of her infant's emotions. A mother's experience of positive affect increases her sensitivity and responsiveness to the infant and enhances the infant's awareness of her and interest and pleasure in feeding (Schore). A mother's regulation of negative affect and behavior is expressed in tempering of displeasure, anxiety, and intrusive and inconsistent actions. A mother is more available and attentive to her infant when negative affect and behavior are regulated (Sroufe). In addition, she structures the feeding in ways that support the infant's feeding and pleasure. Infant positive affect and behavior are observed in attentiveness to the feeding and responsiveness to the mother's social initiatives. Infant regulation of negative affect and behavior is expressed in organized behavior, recovery from distress, and tempered irritability (Clark, 1999; Sroufe).

Feeding becomes a more complex activity for mother and infant as infant's neuromotor, cognitive, social, and communicative capacities develop through the first year (Sroufe, 1995). By about 4 months post-term age (PTA), infants reciprocate their mothers' smiles and vocalizations and may be inconstantly attentive to the feeding task. By 8 months, infants are likely to have their own agendas, including feeding themselves. Mothers may or may not view these developmental changes positively and support them. Holditch-Davis, Miles, and Belyea (2000) observed that mothers of 6-month-old premature infants gave their infants little opportunity to finger feed despite infant ability to put objects in the mouth.

Infant, Family, and Maternal Conditions

Evidence of the effect on developmental outcomes of infant prematurity, family poverty, and maternal depression is mounting (Miceli et al., 2000; National Research Council and Institute of Medicine, 2000). The greater the prematurity, the less well equipped an infant is for the feeding task and interaction (Singer et al., 1996). The incidence of chronic lung disease, most commonly diagnosed as bronchopulmonary dysplasia (BPD), increases as birth weight decreases (Hack, Klein, & Taylor, 1995). BPD is likely to contribute directly to feeding difficulties through a VLBW infant's first post-term year (Singer et al., 1996). In addition, BPD is a marker for other perinatal morbidities that may influence feeding (Holditch-Davis, Docherty, Miles, & Burchinal, 2001). In a prospective study of 35 infants discharged from a neonatal intensive care unit, 80% of whom were prematurely born, over half of their parents reported feeding problems at 6 months. At 12 months, almost half of the parents described feeding problems (Hawdon et al., 2000).

Evidence for the effect of poverty on developmental outcomes may be found in studies relevant to parenting and infant competencies for interaction in general and feeding in particular. The limited resources and multiple risks associated with poverty make it a family condition likely to interfere with competent parenting (Raver & Leadbeater, 1999; Rutter et al., 1997).

Symptoms of depression are indices of a mother's well being and availability to engage and respond to her infant (Beck, 1995; Singer et al., 1999; Tronick & Weinberg, 1997) and, consequently, may influence the feeding competencies of mothers and infants. Singer et al. (1996) observed that mothers of premature infants with more depressive symptoms were less interactive and did less verbal prompting to encourage feeding. Infants of depressed mothers may be fussier and more avoidant and display less positive affect than infants of non-depressed mothers (Beck).

Interventions to Support Feeding Competency Development

Individualized, relationship-based intervention has been proposed as the method of choice to support premature infant development (Lawhon, 2002). Barnard (1997) advised early initiation of a home-based program to prevent parent–infant interaction problems in infants at risk for developmental delay. Clinical trials of programs to aid the transition of premature infants to home care (Brooten et al., 1986) or to nurture infant development (Infant Health and Development Program [IHDP]; Ramey, Sparling, Bryant, & Wasik, 1997) have addressed mothers' caregiving responsibilities for their premature infants. However, none of these interventions were specifically designed to support maternal caregiving or infant competencies in day-to-day functioning.

Guided participation (GP) is an intervention that has as its goal development of competencies for a practice that has social value (Rogoff, 1990). A practice requires competencies in multiple domains, including relationships with others who have an interest in the practice, technical knowledge and skills, communication and problem solving with others, and regulation or management of emotions, expectations, and intentions about the practice (Lave, 1996). The goal of GP is learning or development through experience much as an apprentice becomes a practitioner (Rogoff). Developed through Rogoff's anthropological study, GP relies for its instructional principles on the experience-based educational theory of John Dewey (1916) and on Vygotsky's (1978) concept of the zone of proximal development. This zone refers to the level of competency, relative to current or observed competency, that may be achieved with the guidance of a more knowledgeable, experienced person. An individual develops in this zone through co-participation with the guide in activity that challenges and, thereby, extends current competency. The activity (e.g., feeding an infant) proceeds in light of the issues (e.g., goals, problems, difficulties, or concerns) that are personally and socially of practical importance (Lave). In our application of GP in this study, the aim of guidance for a mother of a premature infant is to enhance her relationship with her infant, augment the sensitivity of her expectations and caregiving actions to her infant's needs, increase her caregiving skills, promote problem solving and communicating with others concerning these needs, and support her management of her emotions and expectations, including confidence and assurance of being a central and effective participant (Bowlby, 1988; George & Solomon, 1996; Lave & Wenger, 1991; Rogoff).

The GP processes identified by Rogoff (1990) that we adapted and extended for use in clinical and home settings with mothers of a premature infant include: (a) jointly attending to caregiving task and relationship issues, proceeding from a mother's perspective, the caregiving issues on her mind, and the meaning of these issues to her; (b) structuring conditions for maternal learning (e.g., arranging opportunities for new understandings about issues and to try out or reflect on ways of giving care); (c) making connections (e.g., from what is already known to what is currently experienced) and problem solving caregiving issues; and (d) transferring primary problem-solving responsibility from the guide to the mother, a process that a guide has in mind from the beginning of joint activity (Pridham, Limbo, Schroeder, Thoyre, & Van Riper, 1998). In our clinical application, GP was done collaboratively with a family service clinician who aided a family in procuring resources and supported relief of depressive symptoms or treatment of depression.

In this study, we explored GP effectiveness, compared to standard care (SC), for feeding competency development in mothers and their VLBW, premature infants at 1, 4, 8, and 12 months Postterm age (PTA). Hypotheses were as follows for each of the four ages:

1. GP as compared to SC will positively affect infant feeding skills as well as maternal and infant positive affect and behavior and mater-

nal and infant regulation of negative affect and behavior, accounting for infant diagnosis of BPD, family poverty, and maternal depressive symptoms.
2. Infant diagnosis of BPD, family poverty, and maternal depressive symptoms will negatively affect maternal and infant feeding competencies for both GP and SC groups.
3. GP compared to SC will moderate the relationship of maternal depressive symptoms and maternal feeding competencies.

METHOD

A randomized clinical trial was conducted to examine the study hypotheses after institutional review board approval was received from the University of Wisconsin-Madison Clinical Sciences Center and from each of the three participating hospitals. Although some fathers were involved in the care of their infants, at this stage of our examination of GP we included only mothers because of their consistent participation in care–giving and their greater availability. All eligible families were recruited to the study as soon as the infant's medical condition was stable in the neonatal intensive care unit of one of three Milwaukee County hospitals from March, 1995, through December, 1997. Generally, recruitment occurred at about the time the infant was 28 weeks post-conceptional age. Informed consent was obtained from the mother and father, if available. GP began immediately after random assignment to group and continued through the end of the infant's 12th month, PTA. At the end of the study, all families received a copy of the feeding video tapes and a $50 grocery store gift certificate.

SC consisted of the usual medical and therapeutic services provided by the hospital special care nurseries, primary care providers, specialist physicians, and developmental therapists. Although some of the families received home care or public health nurse services for a short period of time after the infant's discharge to home, no SC family had access to a nurse or other clinician specifically for development or support of caregiving competencies. Contamination of SC with GP was unlikely, given that only one or two families received GP in a nursery at any one time.

Nurses worked exclusively with either the GP group or the SC group. All training was specific to the group. The first assignment of any one nurse to a family in either group was random. Subsequent assignments depended on case load and nurse availability. Data for the GP group were collected by the GP nurse to reduce study impact on the family. GP and SC nurses were trained in separate groups for administration of data collection instruments in two 3-hour sessions. They were monitored in administration of all data collection instruments on every 10th visit by the Project Director or Project consultant. The GP and SC nurses recorded to the nearest 5 minutes of time spent face-to-face and on the telephone with a mother. SC nurses helped mothers with their questions and problems by encouraging contact with the infant's primary-care provider. The Family Service Clinician (FSC), a staff member of a family service agency who worked only with mothers in the GP group, was oriented to GP practice in one 2-hour session that included the supervisor of family service clinicians.

Participants and Setting

Mothers of VLBW premature infants who were eligible for the study were 17 years or older, English-speaking and -reading, breast or bottle feeding, and planning to be responsible for the infant's care. Mothers with a positive screen for alcohol and other drug use were excluded. Eligible infants weighed 1,250 g or less at birth and were of appropriate weight for gestational age (Lubchenco, Hansman, Dressler, & Boyd, 1963). Gestational age was determined by the method of Ballard et al. (1991). The infant of a twin birth who was hospitalized the longer of the two infants was included in the study due to the likelihood of being at higher risk than the sibling and more in need of the mother's attention. Infants with a history of respiratory distress syndrome (RDS) were included because of its high incidence in VLBW infants (Hack & Fanaroff, 2000). Some of these infants were diagnosed with BPD at 36 weeks post-conceptional age (Bancalari, 1997). Infants with other congenital or chronic conditions were excluded.

An adaptive randomization method (Pocock & Simon, 1978) was used to establish equivalence between the GP and SC groups on four variables that potentially could make a difference in feeding competency: (a) infant gender; (b) maternal race or ethnicity (African-American, other minority, Euro-American); (c) formal education (high school or less, more than high school); and (d) type of milk feeding (some breast, all bottle).

Sample size was estimated based on the small effect sizes (.20) detected for mother and child interactive behaviors for the intervention group in the Infant Health and Development Program

(IHDP) study (Spiker, Ferguson, & Brooks-Gunn, 1997). Because the GP intervention was more directly and intensively focused on mother–infant interaction than was the case for the IHDP study, we estimated an effect size of .35. In addition, because this was an exploratory study, we were willing to tolerate more error in rejecting a true null hypothesis and in accepting an alternative to it. Fifty-six families and an effect size of .35 would provide power of .70 with an alpha = .10 (Cohen, 1988).

Of the population of 80 eligible mother–infant pairs in the approximately 2-year study period, 57 (71.25%) agreed to participate. Thirty were randomly assigned to the GP group and 27 to the SC group. The data from 42 mother–infant pairs were included in this study. These data were obtained from 24 of the GP group (80%) and 18 of the SC group (66.7%) who were recruited to the study and who were available for collection of feeding interaction data at one or more of the four data collection points. Data from one mother–infant pair in the GP group were not included because the infant was placed in a foster home soon after leaving the special care nursery. For each of the four study visits, the number and percent of the 42 mother–infant pairs whose data were collected as scheduled and included in the study were as follows: (a) at 1 month, 39 (92.8%); (b) at 4 months, 41 (97.6%); (c) at 8 months, 38 (92.7%); and (d) at 12 months, 40 (95.2%). All but one of the five mothers in the GP group who withdrew had done so by 1 week after the infant's hospital discharge to home. All but one of the nine SC group mothers who withdrew had done so by 1 month, infant PTA. One mother in each group withdrew between 1 and 4 months. Reasons given for leaving the study were: (a) feeling overwhelmed; (b) lacking time; (c) needing to avoid thinking of the baby as different from a normal baby; and (d) not feeling the need for the program. Despite repeated attempts, two mothers could not be contacted soon after recruitment and two could not be contacted after 1 or 2 visits. The 14 mothers who withdrew from the study prior to contributing interaction data did not differ significantly from the 42 participating mothers on age, education, or marital status. Nor did participant and non-participant families differ significantly on race/ethnicity or on infant gender, birth weight, or gestational age. Mothers in the non-participating group had significantly more children on average than mothers in the participating group ($M = 3.14$ children, $SD = .47$; $M = 2.24$ children, $SD = .19$, respectively).

Missing data for participating families were primarily due to family crises or the infant's medical condition at the scheduled time for data collection. One infant was exclusively fed by gastrostomy tube in the last half of the first post-term year, and assessment of mother and infant feeding competencies was not possible. One mother in each group was not available for the final visit despite expressed interest in completing the study and repeated attempts by project staff to contact the family and arrange the visit. One of these families had been evicted from their own home and was living with relatives.

Intervention

GP was provided to a family by a project nurse through the duration of study participation. Weekly home visits were made through at least the first month after the infant's hospital discharge. Depending on the infant's condition, family circumstances, the mother's availability, and the extent of her need for support with feeding, the nurse made visits at weekly, biweekly, or monthly intervals through the remainder of the infant's first post-term year. The nurse made telephone calls between visits to answer questions and problem-solve concerns.

GP practice was guided by a manual for in-hospital and at-home sessions with families and by protocols for conditions requiring specific caregiving activities (e.g., gastroesophageal reflux, poor growth, developmental delay). The manual and protocols supported consistency in GP practice within and across families and enabled a practice tailored to the needs and preferences of a specific family. Four components of GP were received by each family. First, effort was directed toward achieving joint attention to and shared understanding of a feeding issue as the grounds for extending a mother's caregiving knowledge, skills, and strategies. Second, this extension relied on processes of making connections between what a mother already knew or skills she already had and new understandings, competencies, and processes of problem solving to better adapt feeding practice and the infant's general care to infant needs and family circumstances. Third, learning conditions were arranged or structured when a mother needed specific resources for making connections (e.g., a weight and caloric intake graph, a map of developmental expectations) or problem solving (e.g., the input of primary or specialty clinicians). Fourth, the nurse supported mothers in taking greater responsibility for these processes and for recruiting the nurse's assistance for making connections or problem solving.

The processes of GP were implemented in the context of tangible issues on which a mother was working or needed to work. Issues were identified and joint attention and shared understanding were supported through the reflection of nurse and mother on a feeding interaction. This reflection was accomplished at least once a month through systematic video-tape replay and discussion of mother- or nurse-selected sections of a just-completed feeding. At least once a month, the mother's 3-day record of infant food intake was analyzed by a dietitian and reviewed with the mother by the nurse. Infants were weighed and measured, and the growth graph was discussed with mothers in the context of food intake, acute illnesses, and other circumstances potentially related to growth. The assessments of infant feeding skills, made at 1, 4, 8, and 12 months, and mental and motor development, made at 4, 8, and 12 months, were reviewed with the mother. The feeding video tape, food record, the dietitian's analysis of nutrient intake, growth graphs, and feeding skill and developmental assessments were used as vehicles to structure learning. These audio and visual aids extended the experience in which mother and nurse jointly participated and provided bases for sharing understanding. Discussion of the information provided by the aids was a means of learning about a mother's attention to and understanding of feeding issues as well as her competencies in giving care and relating to her infant, problem solving and communicating with family members and clinicians, and the expectations and feelings she had about her own role and effectiveness in managing feeding issues and in caregiving and parenting in general.

Communication with primary-care providers and with specialist clinicians (physicians, nutritionists, and therapists) was initiated by the nurse in collaboration with the mother as frequently as needed for integration of goals and plans. Issues discussed by mothers and GP nurses with other clinicians included the infant's growth, breathing difficulties while feeding, signs of gastroesophageal reflux, and advancement to new foods and feeding modes. The FSC saw each GP family prior to or soon after the infant's discharge from hospital and made at least two home visits to assess family adaptation and available resources. FSC visits were offered for in-home therapy for mental health or family problems and for care coordination when multiple agencies were involved.

GP is a practice that develops competencies through past, present, and anticipated experience. Experience, shared by nurse and mother during a home visit, either directly through joint observation, indirectly through a mother's accounting of what had happened and how things had gone, or constructed through the information revealed in assessment aids, was used deliberately and systematically to develop specific caregiving competencies. Competencies that mothers developed through GP activities could be observed in their task and social-emotional behavior during feeding, their patterns of relating to their infants, the skills they displayed in problem solving and communicating with the GP nurse, family members, and clinicians, and the confidence they expressed in their caregiving effectiveness.

Nurses were prepared for GP in 12 hours of classroom work followed by quarterly, 3-hour in-service sessions for brush-up and development of intervention skills in relation to frequently occurring caregiving issues. GP integrity was monitored in three ways: (a) the GP nurse's progress notes, written for each visit according to a specified format to chart competency development and guide GP practice, were reviewed immediately after the visit by the project supervisors; (b) weekly, 2-hour group sessions were held to supervise and guide GP practice (Gilkerson & Stott, 2000) and to identify need for additional training; and (c) each nurse's GP practice was observed by a supervisor at least quarterly. The SC and GP nurses met with the family service agency and Project supervisors approximately every 2 months for case review.

Instruments and Measures

Demographic and attribute data needed for randomization or description of the sample were obtained from the family information form completed by mothers after recruitment to the study. Infant condition information (e.g., gender, birth weight, gestational age, days in hospital, BPD diagnosis) was abstracted from the hospital record by a trained chart auditor. The 13-item Bayley Infant Neurodevelopmental Screener (BINS; Aylward, 1995) was administered at 8 months PTA to describe communicative and cognitive development as well as neurological functions and intactness (e.g., muscle tone and quality of movement). A total score is computed from the sum of the items for which optimal performance is observed. Reliability of scoring was determined by a second rater according to Aylward's directions. The BINS score has concurrent validity with the Bayley II Scales of Infant Development (Aylward).

Infant feeding skills. Infant feeding skills were assessed with an observational instrument,

Child Feeding Skills (Pridham, Schroeder, Limbo, & Thoyre, 1999). This instrument was derived primarily from Gesell and Ilg's (1937) maturational study and from clinical observations (Morris & Klein, 2000). Four areas of skill were assessed and scored from direct observation as performed or not performed: (a) oral-motor; (b) hand-to-mouth and fine motor; (c) body positioning (head and trunk); and (c) communication-social (e.g., hunger and satiety signals). Skills assessed at each observation were as follows: (a) at 1 month, 8 skills (e.g., suckles or sucks so that milk is effectively extracted, swallows liquids without choking, gives some vocal or behavioral indication of hunger or interest in food); (b) at 4 months, 21 skills (e.g., opens mouth and poises it to receive the nipple; makes hand to mouth movements as the nipple is removed); (c) at 8 months, 38 skills (e.g., removes food quickly from a spoon; hands reach for food; sits unsupported); and at 12 months, 23 skills (e.g., takes a controlled bite of soft solid or crunchy food; finger feeds small pieces of food with a pincer grasp). Beginning at 4 months, infants who had not had an opportunity to demonstrate spoon-feeding or cup-drinking skills were given rice cereal with a lightweight plastic infant spoon and formula in a cup made with a thin rim and cutout section to accommodate the infant's nose (Equipment Shop, Bedford, MA). A missing code was given for a skill that could not be observed due to conditions of the observation. A mother's report of skill performance was accepted for skills generally observed by parents (e.g., takes pureed foods). The type of milk feeding (i.e., breast, bottle) was noted at each observed feeding. Inter-rater percent of item agreement for approximately 10% of the feedings was 87%, on average. The validity of the measure of infant feeding skills (FDGSKILL), computed as the percent of performed feeding skills relative to expected feeding skills for age, was shown by the significant correlation of 12-month FDGSKILL with the 12-month Bayley Scales of Infant Development-II Psychomotor Index (Bayley, 1993), $r = .49, p < .01$.

Maternal and infant feeding interaction competencies. Maternal and infant task and social-emotional competencies during feeding were assessed with four scales constructed from items of the Parent-Child Early Relational Assessment (PCERA; Clark, 1999). These scales, theoretically derived and confirmed by factor analysis (Clark, Hyde, Essex, & Klein, 1997), were for mothers: (a) maternal positive affect and behavior (MPAB, 16 items), and (b) maternal regulation of negative affect and behavior during feeding (MRNAB, 14 items). MPAB includes the warmth and kindness of a mother's tone of voice; expression of positive affect and enjoyment; lack of a withdrawn mood; visual contact; amount and quality of verbalizations; social initiative; responsiveness to infant positive behavior; connectedness with the infant; mirroring of the infant's affect; responsiveness and sensitivity to infant cues; and creativity. MRNAB includes how capably a mother structures a feeding and mediates the environment to support adequate nutrient intake and a positive social-emotional experience for her infant; responsiveness and sensitivity to infant cues; and curtailment of such behaviors as talking with an angry tone of voice, expression of negative feelings, intrusiveness, responsiveness to infant negative behavior, negative physical contact with the infant, and inflexibility of response. The two infant scales were: (a) expression of positive affect and behavior (IPAB, 12 items) and (b) regulation of negative affect and behavior (IRNAB, 11 items). IPAB includes expressed positive affect; happy, pleasant mood and lack of an apathetic, withdrawn mood; alertness; social initiative and responsiveness; robustness; visual contact; communicative competence; and readability. IRNAB includes the infant's fearfulness or wariness, irritability, or avoiding or averting behavior as well as attention to feeding, organization of feeding behavior, and interest in the environment.

Mothers fed their infants at a time of their own determination and in the usual manner, except, potentially, for the request that they stay with the infant during feeding. The video tape made of the entire feeding was coded in a laboratory setting by trained coders who were blind to group membership. The second 5-minute segment of the videotape was used to rate each item on a 5-point scale, the low end of the scale indicating less positive or more negative affect or behavior, and the high end of the scale indicating predominantly positive or regulated affect and behavior. For clinical application, the five scale points are organized as follows: (a) 1–2, clinical concern; (b) 3, potential concern; and (c) 4–5, no clinical concern. Coders were trained to at least 80% reliability for these three categories. To maintain inter-rater agreement, drift sessions were held every 2 weeks. In all, 20% of the tapes were rated by two raters. Inter-rater agreement averaged 85%. The Kappa statistic (Brennan & Hays, 1992) averaged .66 ($SD = .23$), signifying substantial agreement (Landis & Koch, 1977). Alpha coefficients, computed for each PCERA scale for each of the four observations, ranged as follows: (a) MPAB, .96–.97; (b) MNAB, .81–.91; (c) IPAB, .84–.92; and (d) INAB, .78–.90. The

PCERA has demonstrated discriminant and concurrent validity with women and children from a broad spectrum of the population, including low-income women (Clark, 1999; Clark et al., 1997) and African-American women and children (Black, Hutcheson, Dubowitz, Starr, & Berenson-Howard, 1996).

Other data. Mothers' symptoms of depression were assessed within the 3 days prior to each visit with the total score of the self-report, 20-item Center for Epidemiologic Studies-Depression (CES-D) Scale (Radloff, 1977). The CES-D Scale items, developed for use with a community population, refer to the major symptoms in the clinical syndrome of depression (Radloff & Locke, 1986). A 4-point scale is used to rate the duration or frequency of symptoms in the past week (*rarely/none of the time*, 0; *most or all of the time*, 3). A total score (range 0–60) is obtained by reversing the ratings for 4 items characterizing positive experience and then summing the ratings for the 20 items. The higher the score, the more intense the depressive symptoms experienced. A score of 16 corresponds to the 80th centile of scores found in community samples (Comstock & Helsing, 1976) and is used as a cut point for high risk of clinical depression. Test-retest reliability, internal consistency, and concurrent validity have been shown in studies with demographically diverse samples (Roberts, Vernon, & Rhoades, 1989). The CES-D Scale alpha coefficients were .68, .78, .74, and .81 respectively, for the 1-, 4-, 8-, and 12-month assessments of this study.

Family poverty status below or at or above federal thresholds (U.S. Census Bureau, 1998) was estimated with the mother's categorical report of yearly before-tax family income (i.e., $5,000 increments between $10,000 and $24,999; $10,000 increments between $25,000 and $54, 999; and $55,000 or more) used in combination with the number of children living in the home.

Data Analyses

Fixed occasion analysis (Diggle, Liang, & Zeger, 1994; Goldstein, 1986; Yang, Heath, & Goldstein, 2000) was used to explore the intervention effect on maternal and infant feeding competencies, accounting for infant biologic and environmental conditions. This strategy has a hierarchical structure with time (1, 4, 8, and 12 months infant PTA) nested in the mother–infant dyad. The strategy also models dependency or covariation in the feeding competency (outcome) variable across time. Contrasts in feeding competency outcomes across assessments were analyzed using Goldstein's (1995) procedure.

Within-assessment, fixed occasion analysis, which includes all available information, was used to provide estimates of effects of intervention group and covariates for time spent with the family by a GP nurse and for each of the five feeding competency variables (FDGSKILL, MPAB, MRNAB, IPAB, and IRNAB). Variance and covariance estimates were provided for each of the five feeding competency variables, modeled separately as outcome variables. The estimates for the fixed portion of the model (i.e., intervention group) together with the standard errors of the random estimates (i.e., BPD status, poverty status, and symptoms of depression) were adequate for hypothesis testing or confidence interval construction for each parameter. The interaction effect of intervention group (GP or SC) on the relationship of depressive symptoms with mother's regulation of negative affect and behavior was examined with the graphical interaction program, Italassi-Interaction Viewer (Provalis Research, 1997).

RESULTS

Although infants in both GP and SC groups, on average, were extremely low birth weight (weight less than 1000 g), heterogeneity in acuity of condition was relatively large, as demonstrated by the total days spent in the special care nursery. Although the GP group had more infants with BPD than the SC group (67% vs. 39%), the Cochran-Armitage (Armitage, 1955) exact test for proportions by group showed that the difference was not significant ($p = .08$). Overall, GP infants performed significantly less well on the BINS at 8 months PTA than SC group infants (see Table 1). A little over half of the infants in each group were male. Other than BINS scores, infant and maternal attributes did not differ significantly between groups. On average, mothers in both groups had completed 1 year of education beyond high school and were in their mid-twenties (see Table 1). Approximately 70% of mothers in both groups were married or living with a partner, in most cases, the infant's father. A little over 60% of mothers in both groups were of minority racial or ethnic status. In the GP group, 13 mothers were African-American, 9 were Euro-American, and 2 were Latina. In the SC group, 10 mothers were African-American, 7 were Euro-American, and 1 was Asian. Of the GP families, 58% had incomes below poverty level compared to 50% of the SC group. The majority of mothers worked, at least

Table 1. Participant Attributes

	Guided Participation ($n=24$)			Standard Care ($n=18$)		
	M	*SD*	Range	*M*	*SD*	Range
Infant: Birth weight (grams)	866.92	220.88	530–1,240	898.33	194.52	595–1,230
Gestational age (weeks)	26.30	2.03	23.29–30.43	26.57	1.87	23.50–29.00
Total days in hospital	85.29	28.50	52–158	81.17	27.67	35–135
BINS[a], 8 months[b]	6.48	3.25	0–11	8.53	2.96	3–13
Mother: Age (years)	25.50	5.27	19–35	26.17	5.58	18–37
Formal education (years)	13.25	3.30	8–21	13.00	1.61	11–16
Number of children	2.21	1.35	1–6	2.28	1.18	1–4
Hours of work[c]	26.6	16.1	0–44	25.6	15.0	0–400

Note: For all attribute variables, differences between groups were not significant, except for the Bayley Infant Neuro-Developmental Screener (BINS). For this test, GP group scores were significantly lower [t (39 df) = 2.01, $p = .05$]. The BINS scale ranges from 1–13. The lower the score, the poorer the infant's performance.
[a]Bayley Infant Neuro-Developmental Screener, completed for 21 GP group infants and 17 SC group infants.
[b]Post-term age.
[c]Averaged across self-reported hours at 1, 4, 8, and 12 months PTA.

for some period of time, during the study. The extent and duration of work primarily depended on the infant's condition or a welfare-work waiver (W2). In both groups, approximately 45% had this waiver. At least half of the mothers in both groups worked throughout the infant's first 12 months PTA (62.5% of the mothers in the GP group; 50% of the mothers in the SC group). The work differences were not significant. The three mothers (1 GP, 2 SC) who partially breast fed their infants had stopped by the 4-month visit.

In total, mothers in the GP group spent almost 44 hours with the nurse, whereas, on average, mothers in the SC group spent 9 hours with the data collector nurse. The variability in time spent with the nurse by mothers in the GP group was large for each of the study periods. The average time spent with the GP nurse after the first month PTA was relatively constant through the infant's 12th post-term month (see Table 2).

Feeding Competencies

Descriptive data for the feeding competency scores are shown in Table 3. At 1 month, infants in the GP group demonstrated 69% of expected feeding skills and SC group infants demonstrated 70%. At 4, 8, and 12 months, the performance of expected feeding skills was lower than at 1 month for infants in both groups and ranged from 55% to 63%. For mothers in both groups, mean scores on positive affect and behavior (MPAB) were less than 3 on the 5-point scale, indicating clinical concern, whereas mean scores on regulation of negative affect and behavior (MRNAB) were between 3 and 4, indicating potential concern. Mean scores for infants on the IPAB scale ranged between 3 and 4, and mean scores on the IRNAB ranged between 4 and 5, indicating that the infants, on the whole, were competent in regulating negative affect and behavior.

Table 2. Time (Hours) Spent with the Project Nurse by Group

	Guided Participation ($n=24$)			Standard Care ($n=18$)		
Study Period	*M*	*SD*	Range	*M*	*SD*	Range
In hospital	6.72	3.90	0–15.75	1.29	1.62	0–4.90
Hospital discharge (month)						
To 1[a]	4.59	3.23	0–2.33	1.37	1.58	0–4.50
1–4	9.71	7.56	1–32.35	1.96	2.04	0–8.07
4–8	12.57	10.75	.42–42.70	2.23	1.40	0–4.83
8–12	14.57	8.71	0–33.27	4.77	1.73	2.08–7.17
Total time	43.98	24.84	9–97.02	9.04	3.38	2.17–15.73

[a]Post-term age for all assessments.

Mothers' Depressive Symptoms

Scores for mothers' depressive symptoms averaged below 16 for the GP group mothers at all assessments (see Table 3). Approximately 22% of the mothers in the GP group had CES-D scores of 16 or above at 1 month; 33% at 4 months; 22% at 8 months; and 41% at 12 months. Approximately 42% of the SC group mothers had CES-D scores of 16 or above at 1 month; 26% at 4 months; 21% at 8 months; and 26% at 12 months. The Cochran-Armitrage Trend Test (Armitage, 1955), used to examine change in CES-D scores, revealed, within each group, random fluctuation in proportions rather than a significant trend (2-sided $p = .27$ for the GP group; .31 for the SC group). Time contrasts for the proportion of mothers in each group with CES-D scores ≥ 16 were not significant for any of the four assessments.

Tests of the Hypothesized Intervention Effect

Fixed occasions analysis showed no significant contribution of time spent by a GP or project nurse with a family during a study period to any of the five feeding competencies. The final analytical model included group ($GP = 1$, $SC = 0$), infant BPD diagnosis ($yes = 1$, $no = 0$), poverty status ($yes = 1$, $no = 0$), mother's CES-D score, and the interaction of group and CES-D score.

Hypothesis 1. The parameter estimates of fixed occasion analyses for the effect of GP on each of the five feeding competency variables within each of the four assessments are shown in Table 4. GP significantly and positively contributed to mothers' regulation of negative affect and behavior (MRNAB) at 4 months, and to the infant's regulation of negative affect and behavior (IRNAB) at 1 month and at 8 months. Fixed occasions analysis demonstrated a significant change in the effect of GP on IRNAB across the four assessments. Contrasts showed that the 1 month GP effect was significantly higher ($p < .05$) than either the 4- or 8-month effects but not the 12-month effect. That is, the infant's regulation of negative affect and behavior at 1 and 12 months was higher than at 4 and 8 months.

Hypothesis 2. Examination of covariate effects revealed a trend of a significant negative BPD effect on FDGSKILL at 8 months ($p < .10$) and a significant negative effect on IRNAB at 4 months ($p < .05$). The significant effect of BPD on MPAB at 1 month was positive ($p < .05$), meaning that mothers of infants with a diagnosis of BPD scored higher in positive affect and feeding behavior. Poverty status made a significant and negative contribution to maternal positive as well as negative affect and behavior (MPAB and MRNAB) for

Table 3. Descriptive Statistics for Variables in the Analytic Model by Intervention Group and Infant Age

	Guided Participation Group ($n = 24$)							
	1 Month		4 Months		8 Months		12 Months	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
CES-D	14.00	8.54	15.47	10.16	12.75	8.20	13.52	7.43
FDGSKILL	.7011	.2253	.5561	.1755	.5767	.1922	.5694	.19342
MPAB	2.96	1.00	2.97	.93	3.03	.88	2.83	.82
MRNAB	3.91	.36	3.67	.44	3.51	.61	3.41	.55
IPAB	3.12	.76	3.16	.63	3.24	.68	3.32	.60
IRNAB	4.58	.36	4.18	.52	4.24	.42	4.20	.40
	Standard care ($n = 18$)							
CES-D	16.50	10.28	13.12	8.57	13.14	7.63	11.50	5.20
FDGSKILL	.7014	.2062	.6190	.1583	.6332	.2042	.5556	.1554
MPAB	2.88	.95	2.67	.72	2.84	.94	2.71	.98
MRNAB	3.69	.45	3.30	.60	3.26	.55	3.32	.58
IPAB	3.21	.75	3.15	.63	3.27	.74	3.40	.57
IRNAB	4.30	.39	4.20	.46	4.05	.65	4.23	.44

Note: Key to variable names: CES-D, Center for Epidemiological Studies-Depression Score; FDGSKILL, Percent of expected feeding skills observed; Parent-Child Early Relational Assessment Scales: MPAB, Mother's Positive Affect and Behavior; MRNAB, Mother's Regulation of Negative Affect and Behavior; IPAB, Infant's Positive Affect and Behavior; IRNAB, Infant's Regulation of Negative Affect and Behavior.

Table 4. Parameter Estimates of Fixed Occasions Models of Maternal and Infant Feeding Competencies

Competency/Effects	1 Month	4 Months	8 Months	12 Months
Infant feeding skills (FDGSKILL)				
Fixed effects				
Intercept	78.41 (10.89)[a]	61.72 (7.31)	70.73 (9.45)	48.27 (9.77)
Intervention group[b]	−11.65 (13.76)	12.72 (8.99)	8.86 (10.52)	9.14 (11.97)
BPD[c]	4.10 (7.37)	−7.75 (5.51)	−10.62 (6.04)*	−2.09 (5.79)
Poverty[d]	3.31 (7.76)	−1.22 (5.16)	−6.55 (5.82)	−4.06 (5.47)
CES-D	−.62 (.49)	.23 (.40)	−.09 (.55)	.81 (.72)
Group X CES-D	.46 (.78)	−.82 (.50)	−.66 (.67)	−.36 (.86)
Random effects				
Variance, competency	409.3(99.3)****	229.9 (55.3)****	291.1(69.1)****	254.7(59.3)****
Maternal positive affect & behavior (MPAB)				
Fixed effects				
Intercept	3.33 (.34)	3.35 (.32)	3.14 (.38)	3.28 (.42)
Intervention group	−.60 (.41)	.23 (.38)	.39 (.42)	−.05 (.49)
BPD	.56 (.26)**	.18 (.25)	.37 (.25)	.15 (.25)
Poverty	−1.22 (.27)****	−.85 (.24)****	−.76 (.24)***	−.94 (.24)****
CES-D	.04 (.01)****	−.02 (.02)	−.01 (.02)	−.01 (.03)
Group X CES-D	.03 (.02)	.01 (.02)	−.01 (.03)	.02 (.03)
Random effects				
Variance, competency	.56 (.13)****	.50 (.12)****	.50 (.12)****	.55 (.12)****
Maternal regulation of negative affect & behavior (MRNAB)				
Fixed effects				
Intercept	3.81 (.15)	3.44 (.21)	4.22 (.27)	3.60 (.24)
Intervention group	.11 (.18)	.54 (.26)**	−.39 (.31)	.38 (.28)
BPD	.18 (.11)	−.17 (.16)	.07 (.17)	.16 (.15)
Poverty	−.49 (.11)****	−.42 (.15)***	−.76 (.16)****	.07 (.17)
CES-D	.01 (.01)	.01 (.01)	−.04 (.02)**	−.01 (.02)
Group X CES-D	−.002 (.01)	−.005 (.01)	.05 (.02)**	−.02 (.02)
Random effects				
Variance, competency	.09 (.02)****	.20 (.05)****	.22 (.05)****	.19 (.04)****
Infant positive affect & behavior (IPAB)				
Fixed effects				
Intercept	3.27 (.34)	3.13 (.27)	3.60 (.39)	3.34 (.33)
Intervention group	.46 (.43)	.47 (.34)	.09 (.45)	.01 (.39)
BPD	.20 (.25)	.30 (.20)	.11 (.23)	.07 (.19)
Poverty	−.37 (.26)	−.36 (.19)*	−.38 (.22)*	−.35 (.18)*
CES-D	.01 (.02)	.01 (.01)	−.01 (.02)	.02 (.02)
Group X CES-D	−.04(.02)**	−.04 (.02)**	−.01 (.03)	−.01 (.03)
Random effects				
Variance, competency	.47 (.12)****	.30 (.07)****	.39 (.10)****	.30 (.07)****
Infant regulation of negative affect & behavior (IRNAB)				
Fixed effects				
Intercept	4.04 (.15)	4.36 (.20)	4.83 (.22)	3.96 (.22)
Intervention group	.93 (.17)****	.11 (.23)	.55 (.25)*	.31 (.26)
BPD	−.04 (.11)	−.32 (.16)**	.12 (.15)	.04 (.13)
Poverty	−.05 (.12)	−.20 (.15)	−.29 (.15)	−.17 (.13)
CES-D	.02 (.01)**	.01 (.01)	−.03 (.01)	.03 (.02)
Group X CES-D	−.04 (.01)****	−.01 (.01)	.03 (.01)***	−.03 (.02)
Random effects				
Variance, competency	.11 (.03)****	.20 (.05)****	.20 (.05)****	.15 (.03)****

NOTE: BPD, bronchopulmonary dysplasia; CES-D, Center for Epidemiological Studies-Depression Score.
[a]Standard error.
[b]Guided Participation group = 1. Standard Care group = 0.
[c]Bronchopulmonary disease diagnosis = 1; no chronic lung disease diagnosis = 0.
[d]Poverty = 1, status of at or above poverty level = 0.
*$p < .10$.
**$p < .05$.
***$p < .01$.
****$p < .001$.

all but the 12 month assessment of MRNAB. In addition, poverty status had a trend toward a significant negative effect on IPAB at 4, 8, and 12 months ($p < .10$). Depressive symptoms made a significant and positive contribution to MPAB at 1 month ($p < .001$), the expected negative contribution to MRNAB at 8 months ($p < .05$), and a positive contribution to IRNAB at 1 month ($p < .05$).

Hypothesis 3. For infant feeding affect and behavior, the effect of the interaction of group with depressive symptoms on IPAB was negative and significant at 1 and 4 months ($p < .05$), and on IRNAB, the effect was negative and significant at 1 month ($p < .001$). The results are shown in Table 4. These interactions showed that mothers in the GP group who had higher CES-D scores had infants who were lower in positive affect and behavior and lower in regulation of negative affect and behavior. However, at 8 months, GP group mothers who were higher in depressive symptoms had infants who were higher on IRNAB ($p < .01$). Mothers in the GP group who were higher in depressive symptoms had significantly higher scores on regulation of negative affect and behavior (MRNAB) at 8 months ($p < .05$).

DISCUSSION

Results provide modest support for the three study hypotheses, expand knowledge of the contribution of GP to the adaptiveness of maternal and infant feeding competencies in the context of infant, maternal, and family conditions, and raise questions for further study. Overall, mothers and infants benefited from GP through greater competency in regulating negative affect and behavior during feeding at one or more times within the first post-term year. This result occurred despite wide variability in time spent by the nurse with mothers in the GP group. The infant, maternal, and family conditions examined in this study each made a difference in maternal or infant feeding competencies at one or more assessments, with family poverty status being most consistent in effect across time. GP moderated the relationship of depressive symptoms with maternal feeding competency in regulating negative affect and behavior at 8 months. The study's low power limits confidence in the adequacy of the study's assessment of GP effectiveness. However, the longitudinal design is a strength of the study as is the use of both observational and self-report types of measurement. Furthermore, the fixed occasions analysis permitted examination of the contribution of GP to feeding competencies at four specific infant ages, accounting for all relationships of condition and outcome variables.

The GP effects are notable in light of the heterogeneity of participating mothers on education, mental health, and life circumstances, infants on health and developmental status, and families on income and other resources. Furthermore, the time a GP nurse spent with a family varied widely and depended not only on the number and complexity of infant feeding issues a family experienced, but also on a mother's availability and social and psychological freedom to attend to these issues in light of competing family and work-related demands. For many of the families who participated in the study, the realities of life presented severe challenges to the development of caregiving competencies and feeding practices. The importance of the responsiveness of the GP intervention to infant, maternal, and family conditions while maintaining the integrity of its goals and processes is indicated in the retention of all families who stayed in the study through the infant's first post-term year.

Partial support for the first hypothesis was demonstrated by the GP effect on maternal regulation of negative affect and behavior at 4 months PTA and on infant regulation of negative affect and behavior at 1 and 8 months PTA. At 1 month infant PTA, maternal feeding processes supported by GP, including sensitivity and responsiveness to infant cues and reflection on a broad spectrum of infant needs, may have been less compelling to mothers than the aims and techniques of standard feeding practice they had learned from special-care nursery nurses. Mothers were oriented by the infant's clinicians to maintain a feeding long enough for adequate intake, a goal that required a mother to keep the infant in an alert enough state to feed. Maternal behavior directed to this clinician goal may have appeared intrusive when assessed with the PCERA scale and lacking in sensitivity and responsiveness to infant cues. The consequence would have been lower MRNAB scores, signifying less adaptiveness. At about 4 months infant PTA, mothers' increased confidence in the infant's robustness and pleasure in the infant's developing social initiative and responsiveness may have supported their engagement in GP and readiness to adapt their feeding affect and behavior to infant cues. However, at both 8 and 12 months, we observed that some mothers in both the GP and SC groups actively managed feedings to assure adequate nutrient intake for infants who were attempting to be more active in regulating their own feeding. Sensitive responsiveness to

infant cues as a maternal goal may have had less importance than nutrient intake, a goal that was likely perceived by some mothers to be of central importance to the infant's primary care clinician.

GP was designed to address social-emotional or relationship competencies as either a primary objective or secondary to its support of task-related feeding competencies. Lack of GP effect on maternal feeding competencies other than regulation of negative affect and behavior at 4 months may be due to the concern mothers had about their infant's vulnerability and a primary attentiveness to what would help the infant stay organized and engaged in feeding. Despite GP activities to support mothers in assessing and responding to infant readiness to move forward in self-feeding, infant development of these skills may have been affected by overriding maternal concern about the infant's nutrient intake or growth and consequent management of feedings to assure intake (Crockenberg & Leerkes, 2000). Infants in the GP group performed less well on the neurodevelopmental items of the BINS, which may have delayed acquisition of self-feeding skills.

Evaluation of a mother's structuring of a feeding to support self-feeding is likely to require a more comprehensive assessment than observation of her response to infant hand-to-mouth, oral-motor, and postural skills. Investigation should also be made of the help a mother believes her infant needs from her for adequate intake in the context of growth, health, or neurodevelopmental problems and the help a mother is willing or expects herself to give (Solomon & George, 1996).

Evidence in support of the second hypothesis—that infant, family, and maternal conditions (infant BPD diagnosis, family poverty status, and maternal depressive symptoms) would have an effect on feeding competencies—was strongest for poverty status in relation to both maternal positive affect and behavior and maternal regulation of negative affect and behavior. How and why poverty status made a significant contribution to both maternal feeding competencies (MPAB, MRNAB) at all assessments except that of MRNAB at 12 months and in the expected, negative direction requires further study to determine the mechanisms of the effect and the kind of resources and supports mothers who are impoverished need. How poverty may make a difference for the relationship of depressive symptoms and maternal feeding competencies is a question for further study. Poverty is known to be associated with a higher incidence of depression in mothers (Reading & Reynolds, 2001). However, it is not known how poverty is associated with symptoms of depression in women with VLBW infants through their first post-term year.

The categorical BPD variable we used may have contained too little information about the extent and character of the infant's chronic lung disease to be sensitive enough to detect an effect on feeding competencies. However, the finding of a positive contribution of BPD to a mother's positive affect and behavior at 1 month and a negative contribution to the infant's regulation of negative affect and behavior at 4 months indicates that BPD should be examined with a measure that better accounts for the relationship of chronic lung disease or its lack with feeding outcome variables.

Although the negative effect of symptoms of depression on maternal regulation of negative affect and behavior at 8 months was in the predicted direction, the positive effect at 1 month requires explanation. The extent of maternal compensation for depressive symptoms when feeding their very young infants should be studied (Holditch-Davis, Cox, Miles, & Belyea, 2003). The increase in the number of mothers in the GP group with CES-D scores of 16 or greater at 12 months, although not a significant trend, is consistent with the results of Chaudron, Szilagyi, Kitzman, Wadkins, and Conwell (2004) for a sample of mothers whose infants were patients of a large pediatric primary care practice. These investigators found a drop in high depressive symptoms at about 4 months but an increase later in the year. The increase in depressive symptoms may have been associated with increasing awareness of mothers in the GP group of functional imitations of infants who were lower in neurodevelopmental function at 8 months. Although the effect of an adult care recipient's behavior on the depressive symptoms of the caregiver have been examined (Miller et al., 2001), the effect with increasing age of an infant's functional limitations on the depressive symptoms a mother experiences has not been studied. Furthermore, the greater opportunities of mothers in the GP group to express their concerns in depth with both the GP nurse and the FSC over the infant's first post-term year may have contributed to confidence in revealing a greater degree of symptoms on the CES-D.

Results indicate that GP may have a moderating effect on the relationship of depressive symptoms and adaptive feeding behavior. The direction of the effect and its pattern across the first year for mothers and infants, however, raises questions about mechanisms of the effect and suggests longitudinal study. The negative interaction effect

of group and CES-D score on infant positive affect and behavior (IPAB) and infant regulation of negative affect and behavior (IRNAB) was observed only during the infants' first quarter postterm year. The positive interaction effect at 8 months on IRNAB suggests that GP helped mothers who were higher in depressive symptoms to sensitively respond to or anticipate infant dysregulated behavior during the first 4 months such that infant patterning of more regulated feeding behavior had occurred by 8 months PTA. The significant interaction effect in the predicted direction on both MRNAB and IRNAB of GP and the CES-D score, although it was observed at only the 8-month assessment for both mothers and infants, indicated that mothers higher in depressive symptoms and their infants showed greater regulation of negative affect and behavior if they were in the GP group. This finding, however, does not suggest that GP would be sufficient support for mothers who are higher than other mothers in depressive symptoms or even clinically depressed. Mental health therapy may be needed for support of both maternal and infant well-being. Family therapy and care coordination may need to be continued at a relatively intense level through the first year for some families for maximal benefit from GP. The kinds of supports that mothers of VLBW infants need, in the context of poverty, to make maximal use of GP for development of feeding competencies and to reduce the negative effects of poverty on these competencies should be identified and examined in further study.

Finally, there are several ways future research can expand understanding of GP aims and processes that would best support the development of the broad scope of maternal and infant competencies needed for feeding and caregiving, in general. These competencies include relationship competencies as well as competencies in providing direct care, problem solving with family members and clinicians, and regulating emotions. The kind of maternal support a VLBW infant can best use to assure adequate nutrient intake in light of neuro-motor development and self-regulatory initiative is a clinical issue that has had little study. PCERA items may need further specification for valid description of maternal feeding behavior that is adaptive for VLBW infants. Other observable aspects of maternal and infant behavior that reflect the development of competencies potentially influenced by GP should be identified and investigated. GP effects could be studied in the direct assistance and problem-solving support that family members give each other with infant caregiving and in a mother's expectations for herself and her infant (Huth-Bocks, Levendosky, Bogat, & von Eye, 2004).

Further study is needed of the functions of the family service clinician and care coordinator and how they relate to and best work in tandem with those of the GP nurse. Researchers should investigate how the impact of GP could be enhanced by goals that are clearly communicated and adopted or endorsed among all clinicians who make care plans for an infant. Collaborative practice among nurses, physicians, nutritionists, and therapists would aid the development and implementation of a coherent and comprehensive set of goals simultaneously addressed to both the social-emotional and task-related aspects of feeding. Formal incorporation within primary or acute care could result in more effective GP practice.

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