

FINAL REPORT

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DOULA SUPPORT FOR YOUNG MOTHERS: A RANDOMIZED TRIAL

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The Maternal and Child Health Bureau Research Program, HRSA, DHHS

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I. Introduction

A. Nature of the Research Problem

Relatively few interventions for young parents and their children have been subjected to rigorous empirical scrutiny (Card, 1999; Olds & Kitzman, 1993). This study was designed to evaluate an intervention for young, low-income mothers and their infants and to study the long-term effects of this program through the children's second birthdays. The program used paraprofessional "doulas" from the local community to provide guidance and support during the prenatal, intrapartum, and postpartum periods in order to promote: good obstetrical outcomes, breastfeeding, responsive parenting, parental efficacy, and child health and development. Although previous research has demonstrated the immediate benefit of limited doula support for intrapartum outcomes, this study extends knowledge by: 1) examining a model of doula intervention designed especially for young mothers that expands into the prenatal and postnatal periods; 2) following families longitudinally to examine long-term benefits of doula support on the developmental trajectories of mothers and infants; and 3) elucidating psychological, programmatic, and contextual factors that affect the implementation of the program and that moderate the effect of doula support on the mother and child.

B. Background to the Study: The Chicago Doula Project

The Chicago Doula Project model was created by the Chicago Health Connection and the Ounce of Prevention Fund, agencies with long commitments to community-based intervention with young parents (Glink, 1998, 1999). The Chicago Doula Project expands on doula services studied in previous randomized trials by providing support to young, poor, urban mothers during the months immediately before and after birth.

With funding from the Harris Foundation and the Robert Wood Johnson Foundation the Chicago Doula Project began providing services to young mothers at program sites in three communities in the city – two social service centers and one community health clinic – beginning in 1996. The doulas at each of these sites are women hired from within their respective communities who have themselves given birth and raised children, and who have strong natural inclinations for helping others within their community. The doulas provide prenatal and postnatal home visiting services

and provide continuous support to mothers during labor and birth, and provide breastfeeding and other support in the hospital postpartum.

Data coming from these three sites indicated that this intervention could have important effects on pregnancy and birth outcomes, and aspects of mother-infant interaction that are central to young children's healthy development. A fourth site of the Chicago Doula Project was established at the University of Chicago with the goal of conducting a randomized intervention trial to evaluate the model.

In January of 2000 the doulas at the University of Chicago began to work with clients. They began working with clients who were part of the randomized trial beginning in January 2001.

B. Purpose, Scope, and methods of the investigation

In this study, young African-American mothers receiving prenatal care at clinics associated with the University of Chicago medical center were randomly assigned to receive either doula intervention or regular clinic services for young mothers. The doulas were specially trained community women supervised by a nurse practitioner. A variety of sources of research data, including interviews with the mothers, information abstracted from medical records, videotapes of mother-infant interaction, and developmental assessment of the children, were gathered during pregnancy and through the children's second birthdays. The following hypotheses were tested:

1. Doula support for young mothers will improve labor and delivery outcomes, will increase initiation of breastfeeding, will increase parental efficacy during the immediate postpartum period and decrease maternal anxiety and stress. This hypothesis replicates previous research on doula support during labor.
2. Doula support will have effects on the mother and her care of her child that extend beyond the neonatal period. Specifically, doula support will lengthen duration of breastfeeding, will increase adherence with other recommended feeding and immunization practices, will decrease postpartum depressive symptoms and feelings of stress, will increase mothers' positive feelings about their children and feelings of parental efficacy, and will increase responsive parenting. In addition, doula support will have long-term effects on infant development. Previous research on doula support has not evaluated its long-term effects on mother and child. The present study evaluates an expanded doula intervention model that makes long-term effects more plausible than a labor-only intervention.

As discussed in the review of the literature below, randomized trials have often neglected to examine whether a program has differential effectiveness depending on the background characteristics of mothers and their support networks. Based on previous studies of parenting, it was hypothesized that:

3. Doula support will be particularly effective for mothers who enter the intervention with low sense of personal efficacy and symptoms of depression and least effective for young mothers with histories of conduct problems. Doula support will be most effective for mothers whose families are supportive and who are not co-residing with their families.

Finally, the study explored issues related to program implementation by careful tracking of program implementation for all mothers in the treatment group and through intensive qualitative interviewing with a subsample of mothers and their doulas. Given that little literature exists on differential implementation of early intervention programs and none on implementation of doula programs, these analyses were designed to be more exploratory, addressing the following nonspecific hypotheses:

4. How mothers utilize doula services and the quality of the relationship that develops between the mother and the doula depends on a variety of characteristics of the young mother and her family. The nature of program implementation and the helping relationship will also be related to maternal and child outcome.

C. Nature of the findings (a brief general reference)

Findings suggest that the expanded doula intervention, as offered to young African-American mothers in Chicago, has effects on the mothers' experience of childbirth, breastfeeding rates, and parenting behavior and attitudes measured at the end of the intervention. Although mothers receiving the intervention tended to use less anesthesia during labor, other obstetric outcomes observed in previous doula studies were not observed, perhaps because of the inclusion of high-risk patients and perhaps because of the hospitals policy of active management of labor.

II. Review of the Literature

Young Mothers as a Target for Early Intervention

Young, urban mothers and their infants are at risk for poor health and development (Wellings, Wadsworth, Johnson, Field, & Macdowall, 1999). Compared to older women, young mothers are less likely to receive adequate prenatal care (Ventura & Curtin, 1999), less likely to take actions that promote infant and child health, including both the initiation and duration of breastfeeding (Report, 1996; Ryan, Wysong, Martinez, & Simon, 1990), and less likely to be responsive and responsible in their parenting (American Academy of Pediatrics Committee on Adolescence, 1989; Nord, Moore, Morrison, Brown, & Myers, 1992; Osofsky, Hann, & Peebles, 1993). As they develop, children of adolescent parents are at increased risk of developmental and behavioral problems, substance abuse and perpetuating a multigenerational cycle of disadvantage by becoming teenage parents themselves (Brooks-Gunn & Furstenberg, 1986; Coley & Chase-Lansdale, 1998; Maynard, 1997; Nord et al., 1992; Wakschlag & Hans, 2000). It is likely that these problematic outcomes are not related to maternal age per se, but to the fact that most young mothers are bearing and raising their children in a broader context of risk, including poverty, single parenthood, and limited educational background (Chase-Lansdale, Brooks-Gunn, & Zamsky, 1994; Geronimus, 1991).

It is also clear that, even though problematic outcomes are associated with early parenthood, there is considerable variability in the long-term developmental pathways and life experiences of among adolescent mothers and their children (Furstenberg, Brooks-Gunn, & Morgan, 1987; Wakschlag & Hans, 2000), and thereby hope for the effectiveness of intervention efforts. There is also considerable variability in the life experiences and developmental pathways that lead up to early parenthood and that are present at the time parenthood begins (Hamburg, 1986; Petersen &

Crockett, 1992). In the literature on adolescent parenthood, four highly intercorrelated sources of variability among adolescents tend to be emphasized.

First, although most studies of young parents, including the present one, focus on parents younger than age 21, obviously within that age range there is considerable variability in young women's cognitive and emotional maturity, educational attainment, readiness to accept mature roles such as parenting, and the degree to which families mothers and others in society accept view her as ready to parent (Flanagan, 1998; Petersen & Crockett, 1992). In fact, older adolescents are considerably more likely than young adolescents to become pregnant. In 1996, girls 14 years of age or younger had a rate of 13 pregnancies per 1000 females compared to a rate of 97 pregnancies per 1000 for 15-19 year old adolescents (Alan Guttmacher Institute, 1999).

Second, young parents vary in their degree of what Hamburg (1986) referred to as "problem proneness." For some young women early sexual activity and pregnancy may reflect the mothers' engagement in a broader group of risk behaviors (Ketterlinus, Lamb, & Nitz, 1991) or be related to problematic developmental histories such as sexual abuse (Musick, 1993). For other young mothers, adolescence, particularly late adolescence, may be a normative and appropriate time to become a parent (Flanagan, 1998). Ethnographic studies suggest that for many poor, African-American women, early childbearing may in fact be a rite of passage (Anderson, 1999) or adaptive strategy (Burton, 1990; Ladner, 1972; Stack, 1974) that maximizes the amount of economic and childrearing support they receive for childrearing.

Third, adolescents vary by whether they marry the fathers of their infants and by how much support they receive from their children's fathers. Most adolescent mothers in the United States do not marry the fathers of their infants, and the proportion of adolescents giving birth out of wedlock has increased dramatically from only 15% in 1955 to 76% in 1994 (McElroy & Moore, 1997). There are large cultural differences in rates of marriage for adolescent mothers, with 95% of births to African American adolescents, the focus of this study, occurring outside of marriage. Marriage is only one demographic indicator of level of involvement of a father to the mother of his infant. Among unmarried African-American fathers levels of paternal involvement vary greatly and in relation to fathers' economic instability, fathers' psychological characteristics, characteristics of couples' relationships, and extended family members' feelings about the father may contribute to fathers' noninvolvement (Anderson, 1999; Furstenberg & Harris, 1993; Sullivan, 1993).

Fourth, adolescent parents vary in terms of whether they reside with their families of origin and the type of support they receive from family members, most particularly their own mother. Over half of all young mothers, and a larger proportion of African-American young mothers live with their families at the time they give birth (Coley & Chase-Lansdale, 1998; Lindberg, Sonenstein, Ku, & Martinez, 1997; Taylor, Littlewood, Adams, Dore, & Glover, 1994). Within extended family households, significant adjustments need to be made to balance the needs of caring for an infant with the needs and capabilities of the young mother. Families vary in how they strike such a balance. Within African-American multigenerational families it has been noted that some grandmothers take on a role replacing the parent, others supplement the care provided by their daughters, and others support or mentor their daughters (Apfel & Seitz, 1991). But the traditional role of the caregiving African American grandmother within extended families may be waning (Hill, 1999). Studies suggest that low-income African-American grandmothers are often under 50

years of age, likely working outside the home, and resent the expectations of their children that they act as traditional grandmothers, and express less willingness to rear their grandchildren (Burton & Bengtson, 1985; Ladner & Gourdnine, 1984).

Doula Support as an Intervention for Young Socially High-Risk Mothers

One very promising early intervention for young mothers is doula support. There is increasing recognition that modern obstetrical practice, while offering clear medical benefits to mothers and children, places women in unfamiliar surroundings and isolates them from sources of comfort and support that were features of childbirth in traditional settings. It is believed that stress engendered by such isolation may have negative physiological impacts on the progress of labor. It has also been suggested that a mother's experiences of labor and delivery may have a strong influence on the mother's view of herself as a competent and confident parent, and be related to how she feels about and cares for her infant (Kennell, 1997), including whether she chooses to breastfeed.

In response to these concerns, hospital policies have been modified to allow important members of women's support networks, particularly *fathers*, to be present during labor and delivery. Currently there is a movement to provide "doula" support to women during labor and delivery. A doula is a woman, other than a friend or loved one, who provides continuous comfort, companionship, and emotional support to a woman during labor and delivery. A doula is not a medical professional, but an experienced lay helper. While doctors and midwives focus on medical issues during labor and delivery, doulas are primarily responsible for the emotional well-being of the mother, including providing nonmedical techniques for pain relief. For young mothers at psychosocial risk, the experience of a hospital delivery may be particularly stressful since they may be less likely to have the support of a partner during labor, less prepared to understand the processes of normal labor and delivery, and less confident about asking questions and advocating for their preferences with medical care providers (Lena et al., 1993).

An impressive body of research suggests that doula support during labor and delivery improves pregnancy outcomes for mothers, especially those at psychosocial risk (Hodnett & Osborn, 1989a; Hofmeyr, Nikodem, Wolman, Chalmers, & Kramer, 1991; Kennell, Klaus, McGrath, & Hinkley, 1991; Klaus, Kennell, Robertson, & Sosa, 1986; Sosa, Kennell, Klaus, Robertson, & Urretia, 1980). Meta-analyses of randomized clinical trials suggest that continuous support from trained doulas leads to reductions in the duration of labor, use of medications for pain relief, use of oxytocin, forceps deliveries, and caesarian deliveries (Scott, Berkowitz, & Klaus, 1999; Zhang, Bernasko, Leybovich, Fahs, & Hatch, 1997). A notable, recent multi-site study, employing nurses as doulas have not shown such strong findings (Hodnett et al., 2002).

The presence of a doula at birth also appears to have positive effects on the mother's well being. Data from studies of socially high risk mothers suggest that the presence of a doula during labor may increase the mother's positive feelings about labor (Gordon et al., 1999; Hofmeyr et al., 1991), decrease anxiety (Kennell et al., 1991; Wolman, Chalmers, Hofmeyr, & Nikodem, 1993), increase feelings of control and confidence as a mother (Hodnett & Osborn, 1989b; Hofmeyr et al., 1991; Langer, Campero, Garcia, & Reynoso, 1998), and decrease postpartum depression (Wolman et al., 1993).

Evidence also suggests that doula support has a positive impact on a variety of breastfeeding

parameters, including initiation and continuation of exclusive breastfeeding (Barron, Lane, Hannan, Struempfer, & Williams, 1988; Glink, 1998; Hofmeyr et al., 1991; Langer et al., 1998). Support during labor and delivery may also have positive effects on other aspects of parenting behavior and the relationship between mother and child. Data suggest that mothers who are assisted by a doula during labor may have increased acceptance of the baby immediately after birth (Hofmeyr et al., 1991) and may stroke, smile and talk to their babies more (Sosa et al., 1980).

Existing research on doula support fails to address two critical issues. First, although results of studies of doula support are promising, the long-term impact of doula support has not yet been tested. Second, research on doula support has not tried to consider under what circumstances such support is most effective, and for whom.

Rationale for Making Doula Support a Focal Point of an Expanded Intervention

Doula support is promising as a tool for improving health and psychosocial outcomes for young, socially and economically disadvantaged families. At the same time, it is unclear how beneficial doula support may be for long-term outcomes and non-medical outcomes, especially given that doula interventions in research settings have been extremely brief and time-limited. Although doulas in private practice often provide home-based birth preparation and postpartum support to women who hire them to assist during labor and delivery (DONA: Doulas of North America), this expanded model of doula support is not widely available to disadvantaged women and has not been studied in intervention trials.

Although the period immediately surrounding birth is likely a particularly powerful time for intervention, it cannot be viewed as a magical period. Many decisions regarding parenting, such as whether to breastfeed, are typically made before the birth (Sarett, Bain, & O'Leary, 1983). Similarly, support of proper parenting practices can best be achieved after the mother has the opportunity to experience the realities of parenting at home. Surprisingly there is little empirical research on the most appropriate window for supportive intervention to occur, although experts have advocated that supportive intervention occur both during pregnancy—when health-related behaviors that impact fetal growth and possible subsequent child development can be targeted—and infancy, when more specific elements of child care and development can be approached within an on-going relationship between parent and home-visitor (Olds et al., 1998; Olds & Kitzman, 1990).

Doula support is likely to be most effective when provided in the context of a relationship. Indeed, the importance of this helping relationship in promoting change in the parent and in the parent-child relationship has been noted in many different reviews and discussions of early childhood interventions (Barnard, 1998; Bernstein, Percansky, & Wechsler, 1996; Erikson, 1963; Heinicke & Ponce, 1998; Lieberman, 1991; Olds & Kitzman, 1993). For many parents, forming relationships of trust with a responsive and empathic intervener is an important step in being responsive and empathic towards their own child (Korfmacher, Kitzman, & Olds, 1998).

The Chicago Doula Project, an established and successful community-based doula program which provides the model for the proposed research, has made doula support during labor and delivery the focal point of an expanded intervention that begins during the last three months of pregnancy and extends through the first three months after birth. As such, it combines elements of the doula model

tested in previous studies with early childhood home visiting models that emphasize the development of a strong helping relationship between visitor and parent (Duggan et al., 1999; Olds et al., 1998). The Chicago Doula Project places its emphasis on the immediate pre- and post-natal period, encouraging doulas to remain focused on the essential elements of maternal and child health and development for this time period, such as breastfeeding and sensitive response to emerging infant cues.

Professional versus Paraprofessional Intervention

Given their lack of formal medical or psychosocial training, doulas are generally seen as paraprofessional helpers, and it must be acknowledged that the use of paraprofessionals in early childhood and health promotion intervention programs has been controversial. Theoretically, there are strong reasons to use them (Hans & Korfmacher, 2002; Wasik, 1993). Paraprofessionals are more likely to come from the same community as the program families, so that they understand the economic, environmental, and cultural issues with which families struggle. Because of this shared experience, families may find it easier to trust and accept guidance from such paraprofessionals, particularly those families who are mistrustful of professional systems. From a practical point of view, paraprofessionals are less expensive, and programs using paraprofessionals provide employment opportunities for members of the communities where these programs are based.

Empirically, however, the benefits of using paraprofessionals are less clear, with some crucial exceptions that are detailed below. Although a few reviews and meta-analyses of psychotherapeutic and prevention programs with adult clients have shown benefits of paraprofessional interventions (Durlak, 1979; Hattie, Sharpley, & Rogers, 1984; Roth & Fonagy, 1996), few established early childhood home-visiting programs that use paraprofessionals have demonstrated benefits in randomized trials. For example, one direct comparison of paraprofessionals and nurse home visitors for first-time, low-income mothers suggested that paraprofessionals had a more difficult time maintaining contact with families and following the program model (Korfmacher, O'Brien, Hiatt, & Olds, 1999), and mothers and infants visited by paraprofessionals did not show as many positive outcomes compared to those visited by nurse home visitors (Olds et al., 1999). Additionally, a recent evaluation of the Hawaii Healthy Start Model showed modest and inconsistent program effects (Duggan et al., 1999).

There is evidence, however, that when paraprofessional health-oriented interventions can provide comprehensive and on-going training, individualized supervision and consistent feedback from administrative staff to paraprofessional providers, programs can show effects (Ernst, Grant, Streissguth, & Sampson, 1999; Grant, Ernst, & Streissguth, 1999). Paraprofessional programs that provide circumscribed roles to their home visitors have also been successful. This has been true in particular with breastfeeding interventions that use peer counselors to target populations with traditionally low rates of breastfeeding and for whom interventions from medical professionals have been of limited success (Brent, Redd, Dworetz, D'Amico, & Greenberg, 1995; Grummer-Strawn, Rice, Dugas, Clark, & Benton-Davis, 1997; Humphreys, Thompson, & Miner, 1998; Kistin, Abramson, & Dublin, 1994; Morrow et al., 1999). In this case, receiving information and encouragement from a person within the mother's community who understands the contextual challenges of and barriers to breastfeeding seems more valuable than similar information from professionals.

Model for Change and Selection of Outcome Goals Focused on Parenting

The heart of the doula model is to create change by providing young mothers with social support, practical assistance, and knowledge that will increase maternal emotional well-being, which will in turn enable them to be better parents and support the development of their infants. Contemporary theory and research on parenting and parent-child relationships emphasizes the dyadic and transactional nature of early social interactions. Goldberg (1977) for example, presents a model of mutual competence in which the optimum developmental setting for the infant and the parent is one in which they both feel 1) secure, 2) valued, 3) successful, 4) happy, and 5) enjoy learning together. Maccoby (1992) presents a model of mutual responsiveness in which both mother and infant initiate interactive exchanges, both respond to the other's lead, and both anticipate the other's actions. Mutual responsiveness and mutual competence are closely related concepts (Kochanska, 1997). When a child's signals of upset, interest, and pleasure are acknowledged and responded to, that child feels a sense of control and security that enables exploration of the world (Ainsworth, Blehar, Waters, & Wall, 1978; Cassidy & Berlin, 1994). Similarly when a parent's efforts are met with success (e.g., when a baby ceases crying when picked up), that parent feels a sense of competence and efficacy as a parent. When parents and infants demonstrate mutual responsiveness through sharing smiles, taking turns in games and vocalizations, following each other's gazes and interests, both parents and infants feel valued and competent and both want more interaction. A positive spiral of parent-child responsiveness and competence is created.

Through the consistency of parents' caring involvement, children learn that their behavior makes a difference; when children experience success in affecting their environment they are more likely to be motivated to learn from the world of objects and people. Both environmental and constitutional risk factors are closely tied to the parent-child relationship. Environmental and family risk factors, such as an unstable family situation, lack of food or money, psychopathology or stressful events, can restrict parents' emotional availability, sensitivity, and skill in responding to their infants. This lack of maternal responsiveness can in turn cause the infant to become apathetic or irritable. Constitutional risk factors, such as infant prematurity or neurological problems, can be manifested in apathetic or disorganized infant behavior that in turn can lead to maternal harshness or withdrawal. Thus mutual patterns of unresponsiveness and failure begin (Bernstein et al., 1996; Crockenberg & Leerkes, 2000).

In examination of long-term outcomes of the Chicago Doula Project, we will focus on three interrelated domains of parenting that the doula model is believed to influence: maternal responsiveness, maternal wellbeing and efficacy, and breastfeeding. A brief description of the importance of each of these outcome domains for child development follows:

Sensitive Responsiveness. Research clearly documents that characteristics of the mother-infant relationship, particularly maternal sensitivity and responsiveness, are associated with the development of child cognitive and socioemotional competence (Erickson, Sroufe, & Egeland, 1985; Shaw, Owens, Vondra, Keenan, & Winslow, 1996; Wakschlag & Hans, 1999). Moreover, sensitive and responsive parenting has been shown to buffer children from the effects of high-risk environments (Egeland, Carlson, & Sroufe, 1993; Werner & Smith, 1982). In samples of young mothers, problems in parenting and parent-child relationships during infancy and toddlerhood have been related to insecure infant attachment (Lamb, Hopps, & Elster, 1987), angry noncompliant

toddler behavior (Crockenberg, 1987), preschool behavior problems (Leadbeater, Bishop, & Raber, 1996), and poorer cognitive development (Cooley & Unger, 1991; Field, Widmayer, Adler, & De Cubas, 1990).

Maternal Well-being and Efficacy. A large literature documents the impact of mothers' emotional well-being on parenting and children's development (Seifer & Dickstein, 2000). In studies specifically of young mothers, depression and other internalizing difficulties such as maternal anxiety and social withdrawal have been related to unresponsive parenting (Osofsky et al., 1993) and other parenting difficulties (Leadbeater et al., 1996; Serbin, Peters, McAffer, & Schwartzman, 1991; Zeanah, Keener, Anders, & Vieira-Baker, 1987). Young mothers' experience of stress and conflict has also been linked to less positive parenting (Crockenberg, 1987; Voight, Hans, & Bernstein, 1996). Positive aspects of maternal adjustment, such as self confidence, sense of efficacy, and self esteem are linked to higher-quality parenting (Caldwell & Koski, 1997), including in young mothers (East & Felice, 1996; Luster & Mittelstaedt, 1993).

Breastfeeding. Extensive research documents diverse and compelling advantages to infants, mothers, families and society from breastfeeding and the use of human milk for infant feeding. These include health, nutritional, immunological, developmental, psychological, social, economic, and environmental benefits. Breastfeeding appears to offer protection against infection particularly, but not solely, in disadvantaged populations (Cunningham, Jelliffe, & Jelliffe, 1991; Dewey, Heinig, & Nommsen-Rivers, 1995; Raisler, Alexander, & O'Campo, 1999; Scariati & Grummer-Strawn, 1997). Breastfeeding has been associated with decreased incidence and duration of respiratory illness, otitis media, and diarrheal infections (Duffy, Faden, Wasielewski, Wolf, & Vaughan, 1997; Duncan, Holberg, Wright, Martinez, & Taussig, 1993; Feachem & Koblinsky, 1984; Huffman & Combest, 1990). The evidence in support of the benefits of breastfeeding, particularly exclusive breastfeeding, is so compelling that one of the Surgeon General's National Objectives for the Year 2000 was to increase to at least 75 percent the proportion of mothers who breastfeed after birth, and to at least 50 percent the proportion who continue breastfeeding until their infants are six months old (Koop & Brannon, 1984). Recently, the American Academy of Pediatrics published a restatement of their previous position on breastfeeding and increased the recommended period of breastfeeding from 6 months to at least 12 months and thereafter for as long as mutually desired (American Academy of Pediatrics Working Group on Breastfeeding, 1997).

Although it is widely believed that close physical contact and mutual responsiveness inherent in successful breastfeeding may improve other aspects of parental efficacy and behavior (Virden, 1988; Weisenfeld & al., 1985) and nonmedical aspects of child development (Lanting, Fidler, Huisman, Touwen, & Boersma, 1994; Lucas, Morley, Cole, Lister, & Leeson-Payne, 1992; Uauy & De Andraca, 1995), relatively few studies have addressed this issue.

Only about 62 percent of American infants are ever breastfed, and only 26 percent are breastfed through six months, with many of these infants receiving artificial supplements (Ryan, 1997). The decision to breastfeed in the United States varies according to race, socioeconomic status, education, and geographical locale, with the highest rates of breastfeeding among white, middle to upper income, college educated women over thirty years of age living in the Mountain and Pacific regions of the United States (Bee, Baranowski, Rassin, Richardson, & Mirkut, 1991; Grossman, Fitzsimmons, Larson-Alexander, Sachs, & Harter, 1990; Kurinij, Shiono, & Rhoads, 1988; Locklin & Naber, 1993). Breastfeeding rates among young women, minority and low-income women are

very low (Centers for Disease Control and Prevention, 1999), despite recent improvements within those groups (Ryan, 1997). This is especially troubling because these populations stand to gain the most from the health, social, and economic benefits associated with breastfeeding.

Women's decisions to initiate and continue breastfeeding, derive from a variety of influences including cultural norms; information and support provided by health care professionals; social support from partners, family, and friends; and mothers' personal characteristics (Baranowski et al., 1983; Bryant, 1982; Jacobson, Jacobson, & Frye, 1991; Kessler, Gielen, Diener-West, & Paige, 1995; Losch, Dungey, Russell, & Dusdieker, 1995; McLorg & Bryant, 1989; Wiemann, DuBois, & Berenson, 1998). Although a relatively limited literature focuses on the correlates of breastfeeding specifically among low-income and minority women, it is clear that factors within their social networks, including support from partners, availability of peer models for breastfeeding, and grandmother experience with breastfeeding, are important contributors to the decisions to initiate and continue breastfeeding (Baranowski et al., 1983; Bevan, Mosley, Lobach, & Solimano, 1982; Humphreys et al., 1998; Lizarraga, Maehr, Wingard, & Felice, 1992).

Program Implementation

Typically intervention trials address effectiveness of the intervention as assigned: "Does the program work?" In such "intent-to-treat" approaches, there is an assumption of a monolithic treatment variable, no matter how much families vary in the extent of services received. An important set of questions, however, concerns efficacy, to explore this one needs to ask: "How did the intervention best work, for whom, and under what circumstances?" Participants will have differing experiences within a program that are related to variation in program outcomes. In other words, how a doula program is implemented across different intervention participants will likely influence the benefit they receive from it. As noted earlier, the helping relationship that develops between the service provider and the family is frequently noted as a crucial change agent in early intervention programs (Olds & Kitzman, 1993), and the quality of this relationship will vary across families. Previous studies have shown that a mother's motivated engagement to the program and its treatment goals (one element of the helping relationship) are related to positive program outcomes (Barnard et al., 1988; Belsky, 1986; Korfmacher, Adam, Ogawa, & Egeland, 1997; Lieberman, 1991; Rauh, Achenbach, Nurcombe, Howell, & Teti, 1988).

The helping relationship, however, is but one dimension of program implementation. Families will also differ in the amount and frequency of contact they have with their doula (the dosage of intervention) based on their own needs and preferences. Specific interventions or program content (didactic, transmitted information) will vary in all but the most rigidly manualized treatments. Providers and primary caregivers will also differ in how comfortable they feel in having other members of the family (such as the child's grandmother) involved in the intervention. It is important to examine such variation in program features in order to understand the differential response families show to doula services.

Factors Moderating Effectiveness of Intervention

How individuals use services and respond to an intervention also depends on their personal characteristics and on the amount and type of support they receive from family, partners, and

friends. Although these personal and environmental factors are crucial avenues of exploration for early intervention research, relatively few trials have incorporated them into their research designs.

Mothers' Personal Psychological Resources. A variety of dimensions of young mothers' personal adjustment have been related to parenting, including: intellectual resources and self esteem to maternal responsiveness (Mylod, Whitman, & Borkowski, 1997; Whiteside-Mansell, Pope, & Bradley, 1996); depression and conduct problems to maternal harshness (Cassidy, Zoccolillo, & Hughes, 1996; Leadbeater et al., 1996; Osofsky et al., 1993; Serbin et al., 1991); and cognitive ability and ego maturity to initiation of breastfeeding (Jacobson et al., 1991).

It is heartening, therefore, that research suggests that mothers with lower levels of psychological resources or negative personal characteristics who are at increased risk for parenting difficulties can be particularly helped by early interventions. For example, home visiting programs may be more successful among mothers with specific mental health difficulties such as depression (Lyons-Ruth, Connell, Grunebaum, & Botein, 1990). Studies that have examined global levels of psychological competence have also demonstrated how they moderate program effects. In particular, two home visiting interventions were more successful (in terms of child maltreatment, accidents and injuries, and parenting outcomes) in young, first-time mothers with lower psychological resources, defined by a composite measure of mental health, intelligence, and mastery, compared to mothers with more resources (Olds et al., 1999). This may be because mothers with lower resources in both trials were perceived as more in need by the home visitors and received more contact (Olds & Korfmacher, 1998).

Contextual Factors. Young mothers vary in their living arrangements, some co-residing with their families of origin, others with their infants' fathers, and a few independently or in other living arrangements. Young mothers also vary in the degree to which their social networks are supportive of their goals, the goals of the intervention, and in the amount of conflict within the network. Household living arrangements have been found in a number of recent studies to affect developmental outcomes in young mothers and their children. Although support from family members is important for young mothers, co-residence with grandmothers is often associated with stress and lack of opportunity for young mothers to experience competence, and may thus be associated with poorer parenting behavior (Black & Nitz, 1995; East & Felice, 1996; Spieker & Bensley, 1994; Wakschlag, Chase-Lansdale, & Brooks-Gunn, 1996). The interplay between residential patterns, social support and programs is less clear.

Level of support may be related to program use. Some studies show social support related to increased use and commitment to an intervention, while others demonstrate lower participation as social support increases (Birkel & Reppucci, 1983; Dunst, Leet, & Trivette, 1988; Powell, 1988; Unger & Wandersman, 1988). It has also been conceptualized that security in sense of self in relation to others (which is a likely by-product of the one's own history of care and support) will influence participation in early intervention programs. Studies have shown that mothers who had greater security when thinking about or describing either past relationships with their caregivers or current family relations have greater emotional engagement in mental-health-oriented home-visiting interventions (Heinicke & Ponce, 1998; Korfmacher et al., 1997). There has been less examination, however, of how social support moderates program outcomes. One study reported that partner support did not mediate impact of a year-long home-visiting program for at-risk mothers, even

through (as noted above) mothers who had a greater internal sense of security about their family relationships did show greater commitment to their visitor (Heinicke et al., 1998).

It is also less clear what effect residential patterns have on effectiveness of intervention, although in a Memphis nurse home visiting program household living arrangements appeared to moderate program outcomes (Cole, Kitzman, Olds, & Sidora, 1998). Mothers who lived by themselves or with their partner showed greater benefit in home environment outcomes than those living with their own mothers, possibly because they had greater control over the household environment when not living with their mothers.

III. Study Design and Methods

A. Study Design

This study was a randomized intervention trial of an expanded doula model. Young mothers receiving prenatal care at the University of Chicago Hospitals were randomized to receive either an approximately six-month doula intervention or usual perinatal care and services. This design gave the strongest possible assurance of validity among studies of human health and well being, offering the closest approximation to the controlled experiments of basic scientists. Strengths of the randomized intervention design for the proposed study included: reduction of the potential for selection bias (particularly self-selection) in the allocation of the intervention, and comparability of the intervention and control group in the distribution of both known and unknown confounding characteristics. Potential weaknesses of a randomized intervention can include difficulties in ensuring compliance with the intervention, differential loss to follow up among intervention and control group, and lack of generalizability or external validity. However, this study included specific exploration and analysis of the content of the doula intervention and the maternal and family characteristics that modify compliance and response. We had previously demonstrated expertise in maintaining follow up of young, high-risk mothers, and maintained methods of retaining subjects.

B. Intervention Model

During the course of the study, four doulas worked with clients at the University of Chicago. Doulas were women from the same communities as the patients who had demonstrated a commitment to helping others in their families and communities. Like their clients, all were African American. Three of them had been teenage mothers. Three of them had breastfed their infants and the fourth had encouraged her own teenage daughter to breastfeed. They ranged in age from their twenties to fifties.

Doulas participated in an intensive four-month training offered by the Chicago Health Connection, which provided them with technical information, hands on experience with clients, opportunity for self-exploration, and support in making the transition to becoming a helper. The training focused on issues of normal pregnancy, labor and childbirth, methods of pain relief during birth, breastfeeding, responsive parenting, and special characteristics of adolescent parents. The training model borrows ideas from Paulo Freire's techniques of popular education that place emphasis on empowerment of the doulas (Freire, 1974). The training experience can have a transforming effect

on their personal and professional views (Behnke & Hans, 2002). The Chicago Health Connection training program has been certified by Doulas of North America (DONA), a national certifying organization. As far as we know, this is the only doula training program developed to specifically meet the training needs of urban women of color.

After the period of initial training, doulas participated in monthly in-service sessions with other doulas from around the city. They also participated in monthly workshops with a psychologist who provided them with support around issues of building supportive relationships, intervening around the parent-child relationship. Doulas participated in weekly group and individual reflective supervision with their supervisor, a nurse. In addition, doulas attended conferences, such as the annual DONA meetings, and a variety of training programs. As the result of these trainings, they were certified as lactation counselor and childbirth educators.

The Chicago Doula Project program staff had a number of interrelated objectives related to health outcomes and parenting:

- helping young mothers understand that their health care practices and parenting behavior matter to the development of their infants;
- helping young mothers understand that their infants are people who have needs and interests and the importance of responding sensitively to those needs and interests;
- by providing genuine support and care to young mothers, showing them how they can support and care for the needs of their infants; and
- helping young mothers develop a sense of themselves as efficacious parents so that they can become strong advocates for the needs of their infants.

These objectives were reinforced throughout the intervention in many ways. During pregnancy, doulas built relationships with their clients while teaching them about normal pregnancy and health care practices during pregnancy that enhance the baby's development. Doulas helped to build the mother's self confidence and support her relationship with the baby growing inside of her. Doulas helped mothers develop a birth plan and discussed and role played interactions with medical providers. Doulas helped mothers make plans for when the baby arrives, and in particular, to prepare for breastfeeding. When possible doulas also built relationships with the babies' partners and the young women's mothers or other significant family members. Doulas attempted to have weekly visits with their clients, either in the home or the doulas' clinic office.

During labor and delivery, doulas provided continuous emotional support, offered physical comfort techniques, helped young mothers understand what they are experiencing, and helped young mothers and their families negotiate the medical care system. Sometimes doulas worked with clients in early labor in their homes, but more typically they joined their clients in the labor rooms of the hospital.

After the child is born, doulas helped mothers "join together" with their babies. Doulas helped mothers with breastfeeding, close holding, and gentle handling of the newborn. Doulas used the community based Family Administered Neonatal Activities (FANA) (Cardone & Gilkerson, 1990) as a tool for helping mothers learn about what their babies are able to do.

In the months after birth, working in their clients' homes and the clinic, doulas helped mothers with the adjustment to parenthood. They provided support to breastfeeding mothers and encouraged other mothers to follow recommended infant feeding practices. They monitored whether young mothers were returning for scheduled postpartum and well-baby clinic appointments. They helped mothers focus on what their babies were feeling and on how their responses matter to their babies. Doula encouraged mothers to spend time in face-to-face interaction with their infants, to listen to their babies' vocalizations, to read to their babies, and to engage their young infants in "conversations." Doula spent time listening and taking joy in their clients' birth stories and sharing the excitement surrounding the birth. Doula helped young mothers feel good about themselves as parents and encouraged them to take pride in the development of their infants.

C. Population Studied

The target population for the doula intervention study included all pregnant women receiving prenatal care at two urban health clinics: the Friend Family Health Center and the obstetric clinics at the University of Chicago hospitals who were less than 21 years old at their expected delivery date. The population of young mothers receiving prenatal care through these clinics is predominantly African-American (over 96%) and poor (over 80% Medicaid).

D. Sample Selection

Sample size and statistical power. A sample of 248 young mothers was recruited. With a sample of 124 women in each of the intervention and control groups, we estimated that we would have greater than 80% statistical power to detect expected effects on obstetrical outcomes, such as use of oxytocin and epidural anesthesia during labor and delivery, breastfeeding initiation and parenting sensitivity. The initial sample size was increased to 248 to allow us to examine interactions between the doula intervention and moderating factors and to compensate for non-differential attrition from the study.

Recruitment and randomization procedures. Eligible mothers were identified through prenatal clinic appointment records specifying mothers' ages and projected delivery dates. Clinic physicians or nurse practitioners asked the young women whether they would be interested in learning more about a research project designed to study support provided to young mothers. The doulas then explained the study, and each woman's willingness or refusal to participate was recorded in a log.

Over the course of recruitment beginning in January 2001 through May 2004, on average 53% of eligible pregnant teens approached for the study were eventually enrolled. Of the remaining young women invited to participate, 15% stated they were not interested either when the doulas approached them at the clinic or during a follow-up phone contact. An additional 17% of those who said they were initially interested were unable to be contacted by phone. Interviewers spent hours attempting to contact young women whose lives and living situations were often in flux, and at a particularly transitional phase of their lives. Lack of answering machines, frequent changing phone numbers, and schedules of young women who were not often at home made this an especially difficult group to reach, with researchers making as many as 15 attempts to telephone prospective participants.

Additionally, 11% of the women initially recruited were scheduled for interviews but failed to show

up. Researchers scheduled the recruited women for as many as 3 visits and after the third no-show they ceased contacting the women. Each no-show represented significant blocks of their time in preparation for an interview, and additional time spent rescheduling. The repeated inability of some of the women to get to an interview scheduled at their convenience points to the problems they may have had in accessing transportation or in organizing themselves to make it to a session. Due to this, it is likely that the most marginalized or most at-risk section of this population were self-selected out of the study. The remaining 4% that did not make it into the study included women who moved out of the city or who were no longer pregnant at follow-up contacts.

If they came to a research session, the young women were asked to sign a formal informed consent agreement and then scheduled for a prenatal research interview. After completion of the baseline interview, mothers were randomly assigned to the intervention group receiving doula services or to the comparison group receiving usual clinic services.

Women were individually randomized to the intervention or comparison group. Randomization took place in blocks of 4, 6 or 8 with equal numbers to intervention and comparison group within a block. In this way, we could ensure balanced numbers in the two groups throughout the study period so that the doulas could potentially have equal time for all women assigned to the intervention group. Prior to beginning the study, the project biostatistician generated a series of sealed envelopes each labeled with a subject identification number, and each containing an assignment to either the intervention or comparison group. At the end of the baseline research interview, the interviewer opened the envelope and explained to the mother the procedure for meeting her doula and/or for maintaining contact with the research staff during the remainder of her pregnancy. The staff members responsible for recruitment, the interviewers, and the clinic staff were not able to bias the process of assignment to the intervention group. The interviewer was blind to group assignment at the time of baseline assessment. At further follow-up assessments, interviewers could not be blind to group assignment since some of the interview questions focused on issues of intervention implementation. Examiners conducting direct assessment of the children as well as videotape coders were blind to group assignment.

Sample characteristics and adequacy of randomization. As was typical of the population attending the clinics, all women except one was African American, and women were predominantly from working class and lower income backgrounds. 93.8 % of the women received Medicaid, and the remainder 6.2 % held private insurance. At the baseline interview, 77 % of the subjects reported residing with their primary caregiver, 6.9 % with other adult family, 2 % with peer or same generation family, 4% with their baby's father's family, 4.8% with their baby's father as a couple, and 3.6% resided with roommates or alone while the remaining 1.6% resided in transitional or supervised housing. The women were primarily first-time mothers; 11.3% of subjects reported already having at least one child at the time of enrollment, while 88.7% reported having no children at the time of enrollment.

We conducted analyses to determine whether after randomization the two groups were in fact comparable. A priori we identified a set of 18 variables on which we expected the groups to be comparable (see table below). The two groups were comparable on all of the variables studied, except there were trends almost achieving statistical significance, for the mothers in the doula group to be slightly older (by an average of three months) and to have completed more school (by an average of a third of a year). These variables will be used as covariates in all published analyses.

Table: Characteristics of comparison and doula groups

		Comparison Group	Doula Group	Significant group comparisons
Mother age in years at enrollment	M (SD)	17.4 (2.7)	17.8 (1.8)	t(246)=1.75, p=.082
Mother years school completed in years at enrollment	M (SD)	10.6 (1.5)	10.9 (1.5)	t(246)=1.94, p=.053
Mother working at enrollment	n (%)	27 (21.8%)	20 (16.1%)	NS
Mother in school at enrollment	n (%)	68 (54.8%)	67 (54.0%)	NS
Expecting first child	n (%)	109 (87.9%)	110 (88.7%)	NS
Gestational age at enrollment	M (SD)	23.8 (5.3)	23.3 (4.6)	NS
Private health insurance	n (%)	9 (7.3%)	6 (4.8%)	NS
Vocabulary (PPVT)	M (SD)	85.5 (11.4)	86.4 (11.2)	NS
Depressive symptoms (CES-D)	M (SD)	16.9 (9.6)	15.7 (8.6)	NS
Conduct problems	M (SD)	5.1 (4.9)	4.4 (4.0)	NS
Childrearing attitudes (AAPI)	M (SD)	34.7 (5.5)	33.8 (5.7)	NS
Number of adults residing in household	M (SD)	1.9 (1.1)	2.0 (1.1)	NS
Household member working	n (%)	84 (67.7%)	91 (74.2%)	NS
Coresiding with mother or other primary caregiver	n (%)	98 (79.0%)	96 (77.4%)	NS
Education of mother or other primary caregiver		12.5 (2.1)	12.5 (1.7)	NS
Coresiding with baby's father		10 (8.1%)	12 (9.7%)	NS
Partner with baby's father		83 (66.9%)	89 (71.8%)	NS

Sample retention. In previous research with high-risk mothers delivering at Chicago Lying-In Hospital, we have been successful at maintaining a low rate of sample attrition over the course of long-term longitudinal follow up (Bernstein & Hans, 1994; Grattan & Hans, 1996). We have developed procedures for maintaining a longitudinal sample, including hiring staff who will make mothers feel respected and liked, providing mothers with transportation to visits, making the research assessments enjoyable and interesting, adequately compensating mothers for their time, giving mothers gifts for their children, giving the mothers copies of their videotapes as gifts, sending holiday and birthday cards, scheduling appointments at mothers' convenience, patiently rescheduling missed appointments, maintaining files for each mother that include a variety of friends and family members to contact should the mother not be able to be reached at a previous

address or phone number, and making phone contacts between scheduled research appointments (Hans, 1991).

Mothers and infants were assessed in the hospital after the birth and returned to the University to be interviewed at the child's age of 4 months, 12 months, and 24 months. Interviews for 221 subjects were completed as close to 4 months as possible. Reasons for subject loss at the 4 month data point include: one baby died of SIDS, one mother lost custody of her child, 3 refused follow up interviews, 8 mothers were unavailable at 4 months or for any further follow up, and 10 participants were unavailable at 4 months but returned for 12 month interviews. Numbers were closely balanced for attrition at 4 months, with data lacking on 10 comparison group and 13 doula group subjects.

Interviews for 219 women were completed at the time of their infants' one-year birthdays. Reasons for subject loss at 12 months include: 2 additional mothers lost custody of their children; one subject moved to another state; and 9 participants were unavailable at the 12 month visit although they had participated in the 4 month data collection. Of those lost to data collection at 12 months, 7 were in the doula group and 4 were comparison group.

As of September 1, 2005, 131 mothers and their children had participated in the final data collection point at 24 Months. This data collection will be ongoing through the summer of 2006 with funding from the Irving B. Harris Foundation.

Table: Sample retention

	Control Group	Doula Group	Total Number	Percentage
Prenatal	124	124	248	100%
Postpartum	123	121	244	98.4%
4 months	113	108	221	89.1%
12 months	112	107	219	88.3%
24 months			Ongoing	

E. Instruments Used

General procedures. Assessment of most constructs involved multiple sources of information, including medical records, questions asked of the mother, questions asked of the doula (for the treatment group), testing of mothers and infants, and direct observations of mothers and infants. Whenever possible the measures employed in this study were drawn from previous studies of doula support, from the investigators' previous research experience, and with consideration for psychometric properties of the instruments and their appropriateness for a low-income African-American sample.

Baseline information was gathered during a three-hour interview conducted prior to randomization when participants were on average 27 weeks pregnant. These research interviews were conducted in a research laboratory at the Friend Family Health Center. Randomization was done following the

prenatal interview from a series of sealed envelopes prepared by the biostatistician before the study was begun, each labeled with a sequential subject identification number and each containing an assignment to either intervention or comparison group. Postpartum outcomes were assessed by abstracting hospital charts, as well as during a birth story interview with mothers in their hospital rooms the morning following delivery and a videotape made at a time convenient for the mother during the day after delivery.

A member of the research team interviewed the mothers the first morning postpartum (or the second morning if the mother was unable to be interviewed the first day) and again twenty-four hours after that. First day interviews were conducted between 3 and 45 hours after birth; second interviews approximately twenty-four hours later between 23 and 59 hours after birth. During the first session interviewers asked a series of open-ended questions about the young women's experience during labor and delivery. At the second session mothers and infants were videotaped and interviewers asked several short questions about the baby. On both days, saliva samples were taken and state-trait inventories were administered. Further, on the first day teens answered a "feelings about labor and delivery" questionnaire and on the second day participants responded to the Neonatal Perception Inventory. Two hundred and forty women participated in the hospital data collection immediately postpartum. Birth data was not collected for eight women due to various circumstances: 2 of the babies died at birth, 4 mothers delivered at other hospitals and could not be interviewed, 1 refused doula attendance at birth, and 1 participant was uncertain as to whether she would retain custody of her child and refused the interview. Medical charts were available for review for 246 mothers/newborns; two were missing data because the mothers delivered at other hospitals. There were an additional 2 mother charts and 4 newborn charts missing, but for each of those where one was missing, the other was available for review.

Construct	Prenatal Assessment (Prerandomization)	Antepartum Assessment	Follow-Up Assessments (4, 12, 24 months)	Source of Data	Role in Analyses
Labor, Delivery Outcome		Duration labor; delivery mode; use of oxytocin, analgesia, anesthesia		Medical Charts	Short-term outcome
Mother General Well-being Outcomes					
	State-Trait Anxiety Scale	State Anxiety Scale		Maternal report	Short-term outcome
		Evaluation of birth experience		Maternal report	Short-term outcome
	CES-D Depression		CES-D Depression	Maternal report	Long-term outcome
			DIS Major Depression (4 month only)	Maternal report	Long-term outcome
	Cortisol	Cortisol	Cortisol	Saliva assay	Short-term outcome
Parenting Outcomes: Maternal Efficacy / Stress					
		Perception of Birth Experience		Maternal report	Short-term outcome
	Maternal Self-Efficacy Scale		Maternal Self-Efficacy Scale	Maternal report	Long-term outcome
		Neonatal Perception Inventory		Maternal report	Short-term outcome
			“Difficult child” questions from Parenting Stress Inventory	Maternal report	Long-term outcome
Parenting Outcomes: Sensitivity and Responsiveness					
	Adult Adolescent Parenting Inventory		Adult Adolescent Parenting Inventory (4 months only)	Maternal report	Long-term outcome
		Maternal responsiveness, negativity, encouragement of learning: PCOG	Maternal responsiveness, negativity, encouragement of learning: PCOG	Videotaped observation	Short-term outcome Long-term outcome
Parenting Outcomes Feeding Practices					
	Intent to breastfeed	Initiation of breastfeeding	Duration of breastfeeding	Maternal report	Short-term outcome Long-term outcome
			Feeding patterns	Maternal report	Long-term outcome
		Reasons for feeding choices	Reasons for feeding choices	Maternal report	
Parenting Outcomes: Health Care Utilization					
			Attendance at recommended prenatal visits	Maternal report	Long-term outcome
			Vaccinations	Maternal report	Long-term outcome
			Report of emergency room visits	Maternal report	Long-term outcome
Child Health & Development Outcomes					
			Child height and weight		Long-term outcome
			Child health history, including ear infections, respiratory infections, diarrhea	Maternal report	Long-term outcome
			PCOG: Child involvement with parent	Videotaped observation	Long-term outcome
			BITSEA (12 and 24 month only)	Parent report	Long-term outcome
			Mullen Scales of Early Learning (24 month only)	Examination	Long-term outcome

Construct	Prenatal Assessment (Prerandomization)	Antepartum Assessment	Follow-Up Assessments (4, 12, 24 months)	Source of Data	Role in Analysis
Resources: Family, Partner, and Friends					
		Presence of family members at hospital during labor, delivery, and post-partum period			
	Residence pattern		Residence	Maternal report	Moderator
	Support (family and baby's father)		Support (family and baby's father)	Maternal report	Moderator
	Conflict (family and baby's father)		Conflict (family and baby's father)	Maternal report	Moderator
	Autonomy given by family		Autonomy given by family	Maternal report	Moderator
	Inventory of Parent and Peer Attachment			Maternal report	Moderator
	Parental Acceptance-Rejection Questionnaire			Maternal report	Moderator
	Relationship Orientation Inventory			Maternal report	Moderator
	Network members with breastfeeding experience	Support from network members for breastfeeding	Advice from network members related to infant feeding	Maternal report	Moderator
Resources: Personal Psychological					
	Peabody Picture Vocabulary Test			Psychometric assessment	Moderator
	Pearlin Mastery Scale			Maternal report	Moderator
	Self Report of Delinquency			Maternal report	Moderator
	Mother Age			Maternal report	Moderator
	SES: Education and income factors			Maternal report	Moderator
	Readiness for Parenting			Maternal report	Moderator
				Maternal report	Moderator
Program Implementation					
		Mother's satisfaction with doula support at birth	Helper Relationship Inventory (4 months) Working Alliance Inventory (4 months)	Maternal report Doula records	Moderator
		Time with mother during labor, continuous support, comfort and advocacy techniques used	Checklist of what doula did	Maternal report Doula records	Moderator
	Quality of relationship between doula and mother		Quality of relationship between doula and mother	Transcribed open-ended interviews with subsample of mothers and doulas	Descriptive, qualitative information

Short-term (Peripartum) Outcome Measures: Hypothesis 1

A variety of measures were selected to measure short-term outcomes. Since these outcomes were partly intended to allow comparisons to previous work, instruments were selected to be consistent with those used in previous studies. For many instruments (as indicated in preceding chart) information was also collected at baseline so that outcomes could be compared not only as scores postpartum, but also as change from baseline.

Labor and delivery outcomes. The medical information system at the University of Chicago Hospitals provides abstracts on key labor and delivery outcomes. From those abstracts, we gathered information on obstetric outcomes that have been the focus of previous research on doula intervention: 1) duration of labor, 2) mode of delivery, 3) use of oxytocin, and 4) use of analgesia and anesthesia. Duration of first stage labor was estimated as time from 4 cm dilation to full dilation. In cases where this estimate could not be used, duration was assessed as time of admission to hospital to full dilation adjusted for dilation at admission. Use of oxytocin for labor initiation and augmentation was recorded separately. Three modes of delivery were recorded: vaginal unassisted, vaginal assisted with forceps or vacuum extraction, and cesarean. Use, timing, type, and dose of analgesia and epidural anesthesia were also recorded.

Maternal well-being. Mother-reported anxiety and fear was measured using the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, & Lushene, 1983). Trait anxiety, which is assumed to be a relatively stable characteristic of personality, was assessed prenatally for purposes of determining successful randomization. State anxiety, which measures temporary feelings of tension, nervousness and worry in response to stress, was assessed in the postpartum period. Test items are structured on 4-point Likert scales. The STAI is the most widely accepted anxiety assessment instrument and has been used in diverse populations. In previous research, reduction in STAI state anxiety scale has been associated with doula support (Hofmeyr et al., 1991).

Parenting stress. The mother's ratings of her infant on the Neonatal Perception Inventory was a key outcome from the antepartum period (Broussard, 1976, 1979). This instrument assesses the mother's perception of her infant relevant to other children in different behavioral domains (feeding, sleeping, crying, elimination) as well as the degree to which she is bothered by her infant's behavior in those domains. Scores from this instrument have been associated with later child development outcomes and sensitive to the effects of prenatal intervention (Broussard, 1976; Wiles, 1984).

Parenting efficacy. Questions addressing women's perceptions of the birth experience, particularly with respect to feelings of control and efficacy during the labor and delivery were drawn from the Labour Agency Scale (Hodnett & Simmons-Tropea, 1989) and the Perception of Birth Scale (Marut & Mercer, 1979).

Experience of birth. The first morning after giving birth, mothers were asked to describe their labor and delivery experience. A series of open-ended questions elicit their personal "birth story." Probes focused on the course of labor and birth, support and help received, and first experiences with the baby. Interviews were audio recorded and transcribed. The transcripts were edited to mask identity of support figures, including the doulas. The transcripts were rated on five dimensions, independently by two research assistants who established inter-rater reliability. These dimensions included positive feelings expressed about the first moments with her baby, expressed level of difficulty of her labor and delivery, reported level of support she received, feelings of efficacy during labor/delivery, and level of the descriptive power of her recounting.

Parental sensitivity and responsiveness. A brief videotape was made of the mother and infant in her room at the hospital. In order to observe the mother handling the infant, researchers gave the new mother a gift of an item of clothing for the infant and asked her to dress the baby in that item during the videotaping. Videotapes were coded using the Parent-Child Observation Guide (PCOG) (see detailed description below).

Feeding practices. Information was gathered regarding the mother's plans for feeding her infant and whether she initiated breastfeeding. Brief probes addressed the mother's reasons for her choice of feeding method. For those mothers breastfeeding, we also asked about perceived efficacy.

Cortisol. Salivary cortisol assays were used as a biological marker of stress. Saliva samples were collected with Salivette (Sartsted Inc.) or other commercially available kits. After the sample collection, Salivettes were centrifuged and frozen at -20 C until assayed. Cortisol was assayed with radioimmunoassay procedures using commercially available kits. Saliva was sampled once each morning following delivery when the mother was in the hospital postpartum.

Long-term Outcome Measures: Hypothesis 2

Long-term outcome measures were gathered at research visits to the Friend Family Health Center when infants were 4, 12, and 24 months of age. Additional information was gathered from breastfeeding mothers through telephone contacts at one, two, and three months postpartum.

Maternal well-being. The Center for Epidemiologic Studies-Depression Scale (CES-D) was administered to assess symptoms associated with depression (Radloff, 1977). The CES-D is a short (20-item) widely-used self-report scale designed for the general population which assesses symptoms experienced in the previous week on 4-point Likert scales. In validation studies with adolescents, CES-D scores were highly correlated with concurrent clinical depression (Lewinsohn, Hops, Roberts, & Seeley, 1992) and alphas for the instrument average around .88 (Aseltine, Gore, & Colten, 1998).

Because symptom check lists only reflect symptoms during the prior week and are not intended to assess whether levels of depression reach clinical significance, following administration of the CES-D, questions from the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981) designed to assess major depressive disorder were reworded to reflect the postpartum period only (American Psychiatric Association, 1994). These questions included a screening question asking whether during the four months after the birth of the child the mother had ever had a period of two weeks or more when she felt sad, blue, depressed or lost all interest and pleasure in things she usually cared about and enjoyed. For mothers who endorsed the screening question, a series of follow up questions was asked to determine whether diagnostic criteria are met (4 month assessment only).

Parenting stress. The child measures from the short version of the Parenting Stress Inventory (PSI) were used to assess the mother's perception of the child as "difficult" (Abidin, 1983). The PSI has been used with families from a broad socioeconomic range. Extensive validity data are available on the long form of the instrument, including its relation to measures of parenting behavior and its sensitivity to intervention effects. The six subscales for the child include measures of the child's adaptability, acceptability, demandingness, mood, distractibility/hyperactivity, and reinforcement of the parent. Alphas range from .62 (demandingness) to .70 (reinforces parent).

Parenting efficacy. A major goal of the Chicago Doula Project is to support young mothers in feeling competent and confident in handling the tasks of parenting. Previous research has shown that parents who feel a low sense of efficacy and control specifically related to parenting have difficulties in

interaction with their children (Bugental & Shennum, 1984). To assess mothers' sense of competence and efficacy in parenting, we used the Maternal Self-Efficacy Scale developed by Teti and Gelfand (Teti & Gelfand, 1991) for use with mothers of young infants. This domain specific scale address maternal efficacy in relation to specific domains of infant care such as soothing the baby, understanding what the baby wants, getting the baby to understand mother's wishes, maintaining joint attention and interaction with the baby, amusing the baby, knowing what the baby enjoys, disengaging from the baby, performing daily routine childcare tasks, and getting the baby to show off for visitors. In the authors' work the scale has had good internal scale consistency ($\alpha = .79 - .86$) and has been related to observed maternal behavior as well as maternal risk factors such as depression.

Parent beliefs and behavior. We assessed parents' beliefs and behavior through questionnaires and videotaped observation.

Adult-Adolescent Parenting Inventory (AAPI) is a questionnaire designed to assess parenting attitudes and childrearing practices endorsed by young parents (Bavolek, 1984). The AAPI was originally developed to be sensitive to the parenting and childrearing practices and beliefs of abusive parents. The AAPI consists of 32 items; the respondents indicate agreement with the item on a 5 point scale ranging from strongly agree to strongly disagree. The AAPI has four subscales assessing appropriateness of developmental expectations of children, empathetic awareness of children's needs, use of corporal punishment, and the reversal of parent-child roles. Bavolek reports that internal consistency coefficients for the four constructs range from .75 to .86.

The Parent-Child Observation Guide (PCOG) was used to code parent-child interaction from the videotapes (Bernstein, Percansky, & Hans, 1987). For the proposed research, videotapes of parent-child interaction were made at 4, 12, and 24 months in a playroom setting at the Friend Family Health Center. At each of the ages, dyads were taped while the mother undressed, weighed, and redressed the infant; showed her baby how to play with an age-appropriate toy/book, and engaged in free play. At the 24 month assessment, the mother was also asked to have the child help put the toys away. The full videotaping protocol was designed to take approximately twenty minutes. Typically, videotaping was done at the beginning of the research visit, unless the child was tired and needed a nap, in which case interviews with the mother were to be conducted first. The protocol was administered flexibly to take into consideration children's needs for rest, warm-up, diapering, and snacks. The PCOG coding instrument is a 45-item scale developed in close collaboration with an ethnically diverse group of paraprofessional home visitors at early intervention programs for adolescent mothers in Chicago. When used as a research tool, the maternal sensitive responsiveness scale has been correlated with toddler social competence (Bernstein & Hans, 1994) and has been effective at predicting child behavior problems up to eight years later (Wakschlag & Hans, 1999). The PCOG is coded into two parent strengths scales -- sensitive responsiveness, encouragement/guidance, and a parent negativity scale. Internal reliabilities of the subscales range from .70 to .80. The videotape coders were blind to information about parents' histories or group assignments and were trained to greater than 80% reliability with Dr. Bernstein, one of the co-investigators and a developer of the instrument. The two raters each rated the first twenty tapes in the sample and every fifth tape after that, conferring after these reliability tapes. Inter-rater agreement was greater than 80%.

Feeding practices. At each follow-up visit mothers were asked a series of questions about their infant feeding practices, including breastfeeding if applicable; frequencies and amounts of formula, cow's milk, water, juice or other liquids child received; and consumption of solid foods. In addition, mothers were asked whether they fed their children on demand or according to a schedule. For feeding practices that differ from recommendations made by the American Academy of Pediatrics (e.g., introduction of solid

foods before 4 months, introduction of cow's milks before 12 months), mothers were asked why they made their decisions and who influenced them to make their decisions.

Health care utilization. Through the follow-up interviews, and checks within the University of Chicago medical information system and other providers, we gathered information on utilization of health-care services within the University of Chicago system, and utilization of services at other facilities. We tracked whether infants receive well-child care and immunization at recommended times, and whether families utilized clinics or emergency room care for acute illnesses.

Child health and development. In order to determine whether there were long-term effects of the doula intervention on children's development, our assessments examined child social interaction with the mother, child competence in communication, and early child behavior problems.

The PCOG (see above under maternal responsiveness) was used to assess the child's social interaction with the mother at 4, 12, and 24 months of age. The primary child scale generated from the PCOG evaluated child social engagement with the mother and the toddler version included measures of the child's compliance/assertion and problematic interactive behaviors. The social engagement measure has been related in previous research to other measures of infant social competence, including the Strange Situation (Bernstein & Hans, 1994; Hans, Ray, Halpern, & Bernstein, 1996).

The brief version of the Infant-Toddler Social and Emotional Assessment (ITSEA) (Carter, Little, Briggs-Gowan, & Kogan, 1999) is a standard mother-report instrument for assessment of behavior problems in toddlers. The instrument yields normed scale scores for internalizing and externalizing behavior problems which have been related to laboratory observations of task mastery, emotion regulation, coping behaviors and attachment status. In the present study, mothers answered the ITSEA questions when their children were twelve and twenty-four months.

The Mullen Scales of Early Learning (Mullen, 1995) was administered at twenty-four months to obtain an assessment of child developmental functioning. The Mullen was chosen because it is a standardized assessment specifically designed to measure specific cognitive abilities independently rather than rely on a composite index of mental development. The Mullen was developed for use with children from birth to 68 months and yields t-scores and age equivalents in five domains: gross motor, fine motor, visual reception, expressive language and receptive language. The Mullen was standardized on a nationally representative sample and psychometric properties are sound.

Although we believe the sample is not large enough to test hypotheses regarding effects of doula support on child health, we are gathering information from mothers concerning children's respiratory infections, asthma, diarrheal infections, otitis media, accidents and injuries, and other major illnesses. Charts have been abstracted for children receiving their pediatric care through the University of Chicago Hospital and the Friend Family Health Center.

Background Variables as Moderators: Hypothesis 3

During the baseline interview conducted prior to randomization, the mother was interviewed and assessed on a variety of background characteristics including maternal demographics, personal psychological resources, past and present social support network, and health practices during pregnancy. These background variables were used to 1) to check on success of randomization, 2) to get pre-intervention assessments of key outcome measures from which to assess change, 3) to collect data on factors other than intervention that might explain outcomes, 4) to gather data on variables that might moderate the effects of program outcomes as stated in Hypothesis 3. Instruments used to collect data for potential

moderating factors focused on 1) mothers' personal psychological resources / characteristics, and 2) mothers' interpersonal networks. All of these assessments were made prenatally and were updated at each long-term follow-up assessment.

Mother personal psychological resources. Mother's verbal abilities were estimated using the Peabody Picture Vocabulary Test – Third Edition (PPVT), which is a widely used and in its revised form has attempted to be sensitive to issues of cultural bias. In exploring the role of intelligence as a potential moderator of the intervention we considered both uncorrected scores as well as age-corrected scaled scores.

Questions regarding delinquent and antisocial behavior were selected from the National Longitudinal Survey of Youth Survey to address mother's involvement during the prior year in delinquent/criminal behavior (including contacts with the juvenile or adult justice system), history of risky sexual activity, use of substances, and experience of victimization (Card, 1993; Chase-Lansdale, Mott, Brooks-Gunn, & Phillips, 1991; Windle, 1990).

To measure locus of control, the Pearlin Mastery Scale was used (Pearlin, Menaghan, Lieberman, & Mullan, 1981). This brief (7-item) instrument is widely used and has well-documented psychometric properties.

To measure mother's psychological readiness for parenting, questions related to mothers' worries, self confidence, body image, feelings about children, and denial were asked from the Childbearing Attitudes Questionnaire (Ruble et al., 1990). Additional questions were asked to determine the teenager's previous experience in caring for children (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988).

Mother relationships with family, partner, and peers. The mother's history of her relationships with her caregivers during childhood was assessed using the Rohner Parental Acceptance Rejection Questionnaire (Rohner, 1980). This instrument assesses three aspects of the respondent's views of their childhood relationships with caregivers: acceptance, rejection, and physical punishment. The instrument has good psychometric characteristics and has been used with urban minority populations (McGuire & Earls, 1993).

Aspects of the mothers' general orientation to relationships was assessed by The Relationship Orientation Inventory (also known as the Adult Attachment Style Scale), a 13-item 7-point Likert format scale (sample item: "I find it difficult to trust others completely.") (Simpson, Rholes, & Nelligan, 1992). Although the scale was originally developed to assess orientation toward romantic relationships, it can with minor revision be used to refer more generally to relationships with members of a support network. Cronbach's alphas range from .58 to .81 for the subscales.

Quality of the mothers' attachments toward specific people such as their own mothers and their babies' fathers was assessed using the Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987). This instrument was designed to assess adolescents' security with varied attachment figures, including peers. It includes a series of items addressing the respondent's trust that attachment figures understand and respect her needs and desires, and perceptions that attachment figures are sensitive and responsive to her emotional states and helpful with concerns. The instrument has three subscales: trust, communication, and alienation that have adequate psychometric properties and have been related in previous research to measures of adolescent well-being (Crowell, Fraley, & Shaver, 1999).

Questions were asked to determine the mother's living arrangements and in particular whether she resides with her own mother and/or her baby's father.

Supportive as well as stressful aspects of the mother's current relationship with her own family and her baby's father were assessed using questions developed for a survey of unmarried African American parents in Chicago (Hans et al., 1996). These questions include a modified version of the Conflict Tactics Scale (Straus, 1979), a standard assessment of domestic violence on which extensive reliability and validity data are available, that was shortened for use in the Early Childhood Longitudinal study (ECLS) program sponsored by the National Center for Education Statistics of the U.S. Department of Education. Questions also included a shortened version of the Arizona Social Support Scale (Barrera, 1981), a tool developed for assessing support networks in pregnant and parenting adolescents. In addition, questions were asked of mothers still living with their own families regarding negotiation of decisions and issues of autonomy (Kalil, Spencer, Spieker, & Gilchrist, 1998; Lamborn, Dornbusch, & Steinberg, 1996).

Questions were developed to determine whether the mother's own mother breastfed her children and whether the mother has others in her social network who breastfeed. Questions were developed to determine the mother's perception of her mother's and her baby's father's attitudes toward breastfeeding and other feeding practices.

Implementation of Intervention: Hypothesis 4

This study had two levels of data collection, with uniform quantitative data collected on all participating families, and in-depth qualitative data collected on a subset of cases. On the quantitative level, doulas tracked the amount, type, and quality of contact that they had with families on client contact sheets. This record-keeping system allowed researchers to determine the amount and frequency of contacts doulas had with mothers and with other family members. The content of the contacts (in other words, what doulas actually do with families) for the prenatal period, labor and delivery, and the postnatal period was also recorded by doulas using a checklist. Doulas used five-point scales to rate the emotional engagement of mothers and others family members on a visit-by-visit basis as well as mothers' understanding of session and conflict/tension during the session. These scales are modifications of those developed for nurse and paraprofessional home visitors (Korfmacher et al., 1999). Drafts of the client contact sheets were developed during the pilot phase of work.

Periodically, doulas also filled out the 12-item version of the Working Alliance Inventory (Horvath & Greenberg, 1989), a summary measure of helping relationships that exists in comparable provider and client versions. In outcome assessments, mothers rated the quality of the relationship with their doula using the client version of the WAI, as well as a relationship inventory developed for nurse home-visiting (Barnard, 1998), and also used with paraprofessional programs (Korfmacher et al., 1999). This enabled researchers to compare the doula's perspective with the mother's perceptions of the emotional qualities of the intervention.

On the qualitative level, a subset of cases were selected, where doulas and mothers were interviewed in a semi-structured format about the developing helping relationship. These interviews covered each party's subjective impression of the relationship formation, the doula's interaction style with the family, intervention content, the influence of the extended family, and how critical or difficult moments were handled. Two interviews were conducted per participant, one at the beginning of the alliance (before the birth of the child), and the second within one month of the mother's exit from the program. The interviews were audio-recorded and transcribed for later review and coding.

Between two to four families were selected from each doula's caseload, split between the first year and second year of program services. Intake data, specifically scores on The Relationship Orientation Inventory (Simpson et al., 1992), were used to select mothers at higher or lower risk for difficulties in

interpersonal relationships in order to compare mothers who were strongly engaged with their doula to those teen's with more ambivalent doula relationships. Using these selection criteria we were able to purposefully sample certain families who were likely to contrast each other in terms of issues of program implementation and service (Patton, 1987).

E. Data Analysis

Analysis of quantitative data. All interview, chart, and videotape coding data are stored in a password-protected, HIPAA compliant, ACCESS relational data base. From this data base, files can be derived for use in a variety of statistical software packages. Research staff are currently using SPSS, SYSTAT, STATA, and AMOS software. Data through 12 months have all been entered into the data base. Data entry for the 24 month follow up is ongoing. Data cleaning is ongoing for 12 and 24 month data sets.

Although hypotheses will eventually be tested with a variety of multivariate statistical techniques, including, as appropriate, multivariate logistic and multinomial regression, hierarchical linear modeling, structural equation modeling, and survival analysis, preliminary findings in this report are presented using simple univariate statistics such as chi square, t-tests, that allow for straightforward testing of differences between the two groups.

Analysis of qualitative implementation data. Content analysis is being used to identify recurrent themes and patterns in the interview narratives. Regular themes lead to an inductive classification system that will classify families based upon their experiences. These classifications are "analyst-constructed typologies" developed by coders in successive passes over the transcribed interviews. Credibility checks are being performed by alternate coders to ensure that there is consistency in interpreting the data.

IV. Presentation of Findings (detailed)

Labor, Delivery and Birth Outcomes

237 infants were delivered at the hospital associated with the research study, and 10 at varied other community hospitals. One mother was lost to followup before the birth, and it is not known where she delivered. Deliveries at these hospitals were usually the result of a mother who was not at her own home when labor started or who called an ambulance that transported her to the nearest hospital.

At the hospital where the study was based, mothers were routinely given an intravenous line at admission and infants are monitored continuously during labor. Although the hospital had birthing rooms, most of the mothers in this study were assigned to small labor rooms. All these factors limited doulas' ability to encourage mothers to walk during labor. When mothers reached four centimeters dilation, medical staff typically offered or encouraged epidural anesthesia for relief of pain unless it was medically counter-indicated.

Up to two family members or friends were allowed to be present in the labor rooms at any one time, and most women had family members or friends present with them at birth. Only 11 had no family member or friend with them in the hospital. Most infants were delivered by residents or attending physicians with whom the mother had not had prior contact.

Information was abstracted from each mother's medical chart by an experienced nurse working as a research assistant. Because the charts did not contain information about the presence of the doula, she

was blind to which group the mother was in. In addition to examining single obstetric outcome variables, Höbel scores for prenatal, labor, and newborn complications were calculated to give an overall level of obstetric risk. The groups did not differ with respect to prenatal complications or gestational age at the time of delivery. The average Höbel pregnancy complication score was greater than 10, suggesting an average of two complications before the onset of labor. Although at the time we began the study, we had intended, as in previous doula studies to only include obstetrically and medically low-risk mothers. Early during the implementation of the study we realized that many of the mothers we randomized developed complications after randomization, and we decided not to exclude mothers who had complications at the time of recruitment. Thus the sample included mothers with hypertension, sickle cell, diabetes, seizure disorder, and asthma. Ten of the births occurred when the infants were less than 34 weeks gestation (5 in each of the two groups).

Based on previous doula studies we hypothesized that mothers would use and need less medical intervention during labor (oxytocin and epidural anesthesia), that labors would be shorter, and that there would be fewer surgical deliveries. In the present study, it was difficult to assess duration of labor. Previous doula studies only included women who were admitted to the hospital in early labor. The mothers in our study arrived at the hospital in late labor, early labor, and prior to the beginning of labor. Medical charting for variables related to onset of labor was erratic. The length of labor variable below excluded mothers whose charts were missing relevant data, whose labors were induced, and for whom attempts were being made to slow preterm labor.

None of the labor and delivery variables showed statistically significant differences between the two groups, although there was a strong trend for women in the doula group to use less epidural anesthesia than comparison group women.

Table: Comparison of intervention and control groups on obstetric procedures and outcomes

		Control Group	n	Doula Group	n	Statistical significance
<i>Labor procedures and events</i>						
Artificial oxytocin used in induction	n (%)	30 (24.2%)	124	26 (21.1%)	123	NS
Artificial oxytocin used as enhancement	n (%)	63 (50.8%)	124	68 (55.3%)	123	NS
Epidural anesthesia	n (%)	94 (76.4%)	123	82 (67.2%)	122	NS
Epidural anesthesia –Caesareans excluded	n (%)	75 (75%)	100	64 (64%)	100	X ² (1)=2.85 , p=.09
Any analgesia/anesthesia	n (%)	112 (91.1%)	123	105 (86.1%)	122	NS
Length of labor total	M (SD)	13.8 (11.2)	85	13.9 (9.3)	86	NS
Length of labor (in hospital)	M (SD)	9.2 (9.7)	85	8.7 (5.7)	87	NS
Höbel labor complication score	M (SD)	22.8 (15.3)	121	23.3 (16.1)	121	NS
<i>Birth type</i>			124		123	NS
Unassisted vaginal	n (%)	92 (74.2%)		84 (68.3%)		
Assisted vaginal (forceps or vacuum extraction)	n (%)	9 (7.3%)		17 (13.8%)		
Unscheduled Caesarean	n (%)	17 (13.7%)		17 (13.8%)		
Scheduled Caesarean	n (%)	6 (4.8%)		5 (4.1%)		

Although we had not had specific hypotheses about infant outcomes at birth, the table below shows data indicating that there were no differences between the two groups with respect to infant health at the time of birth.

Table: Newborn outcomes

		Control Group	n	Doula Group	n	Statistical significance
Fetal heart tones	n (%)	39 (31.5%)	124	34 (27.6%)	123	NS
Live birth	n (%)	123 (99.2%)	124	122 (99.2%)	123	NS
Male infant	n (%)	68 (45.2%)	124	64 (48.0%)	123	NS
Gestational age at delivery in weeks	M (SD)	38.8 (2.1)	124	38.6 (2.5)	123	NS
Birth weight	M (SD)	3083.9 (547.8)	124	3090.7 (653.2)	123	NS
Birth weight < 2500 gm	n (%)	14 (11.3%)	124	14 (11.4%)	123	NS
Birth weight < 1500 gm	n (%)	1 (0.8%)	124	4 (3.3%)	123	NS
Mean 1 minute Apgar	M (SD)	8.0 (1.6)	121	7.9 (1.6)	121	NS
1 minute Apgar < 7	n (%)	15 (12.4%)	121	19 (15.7%)	121	NS
Mean 5 minute Apgar	M (SD)	8.6 (1.2)	121	8.7 (1.0)	121	NS
5 minute Apgar < 7	n (%)	5 (4.1%)	121	2 (1.7%)	121	NS
Resuscitation required	n (%)	25 (20.2%)	124	35 (28.5%)	123	NS
Höbel newborn scale	M (SD)	20.4 (21.8)	121	22.0 (19.9)	121	NS
Baby admitted to NICU	n (%)	38 (31%)	121	30 (25.4%)	118	NS
Days infant hospitalized	M (SD)	4.32 (5.84)	121	4.7 (6.1)	118	NS

The mother's experience of the birth was measured through both a structured instrument assessing her sense of efficacy during the birth and through the open ended "birth stories" which were coded by coders masked to group status on several dimensions, including: difficulty of the labor, efficacy at the birth, feelings of having been supported at the birth, positive feelings toward the infant. Mothers in the doula group were more likely on both the structured instrument and the birth story to receive higher efficacy scores. They were more likely to discuss feelings of having been supported during the birth stories. They did not differ in terms of the difficulty of the birth experience or positive feelings toward the baby. Mothers who had had a doula provided richer narrative depictions of their birth experiences.

Table: Mothers' experience of the birth

		Control Group	n	Doula Group	n	Statistical significance
Labour agency scale	M (SD)	34.3 (6.0)	102	36.5 (6.4)	109	t(209)=2.58, p = .006
Birth story: Difficulty of labor	M (SD)	2.2 (0.8)	120	2.3 (0.8)	120	NS
Birth story: Efficacy during labor	M (SD)	3.1 (0.8)	120	3.3 (0.8)	120	t(238)=1.7, p = .045
Birth story: Support during labor	M (SD)	3.1 (0.9)	120	3.7 (0.9)	120	t(238)=4.9, p < .000
Birth story: Richness of story	M (SD)	3.4 (0.9)	120	3.6 (1.0)	120	t(238)=1.8, p = .04
Birth story: Feel positive about baby	M (SD)	3.6 (0.9)	120	3.7 (0.9)	120	NS

Maternal Well-being

During the post-partum period, maternal well-being was measured as state anxiety. At follow-up, it was measured as depression. The table below provides mothers' mean anxiety and depression scores at these follow-up assessment periods, as well as during the prenatal baseline assessment.

All mothers in the study showed notable declines in depression from the prenatal period through their infants' first birthdays. Prenatally, 50% of the young women had CES-D depressive symptom scores above the level considered clinically significant (≥ 16). 28% had scores above the clinical level postpartum. Prenatal depressive symptoms were correlated with depressive symptoms at four months ($r=.43$). Approximately three quarters of the women who had levels of depressive symptoms above the clinical level at four months had also had clinically significant levels of prenatal depression (27 out of 37).

There were no differences between the two groups with respect to depression, except at twelve months, where the mothers in the doula groups reported fewer depressive symptoms.

Table: Maternal well-being

		Control Group	n	Doula Group	n	Statistical significance
State anxiety (prenatal)						
State anxiety (Day 1)	M (SD)	15.6 (4.8)	117	15.0 (4.4)	119	NS
State anxiety (Day 2)	M (SD)	15.1 (4.9)	116	14.8 (4.6)	107	NS
Depressive symptoms (prenatal)	M (SD)	16.5 (8.9)	124	16.4 (9.3)	124	NS
Depressive symptoms (4 months)	M (SD)	12.0 (9.1)	112	12.1 (9.9)	107	NS
Depressive symptoms (12 months)	M (SD)	12.4 (10.0)	110	9.9 (7.7)	105	t(213)=2.0, p=.02

Parenting Stress

During the newborn period, on the second day, parenting stress was measured by the Neonatal Perception Inventory, a structured questionnaire assessing the mother's perception of how difficult it is to take care of her newborn. At subsequent ages, parenting stress was measured by the Parenting Stress Inventory which included subscales related to perception of child difficulty and mother-infant interaction difficulty.

At twelve months, mothers in the doula group were less likely than other mothers to report difficulties in interaction with their infants.

Table: Parenting stress

		Control Group	n	Doula Group	n	Statistical significance
Newborn: Neonatal Perception Inventory, difficulty caring for baby	M (SD)	14.7 (3.5)	118	15.0 (3.3)	117	NS
Four Months: Parenting Stress Inventory, difficult interaction scale	M (SD)	16.5 (4.0)	113	16.0 (4.5)	108	NS
Four Months: Parenting Stress Inventory, difficult child scale	M (SD)	22.7 (7.0)	113	21.9 (5.9)	108	NS
Twelve Months: Parenting Stress Inventory, difficult interaction scale	M (SD)	17.0 (4.7)	112	16.0 (4.4)	106	t(213)=2.0, p=.02
Twelve Months: Parenting Stress Inventory, difficult child scale	M (SD)	23.9 (6.8)	112	23.5 (6.9)	105	NS

Parenting Efficacy

At the postnatal followup points, mothers were asked to complete the Maternal Self-Efficacy Scale to evaluate their sense of efficacy with respect to parenting. There were no group differences in these measures.

		Control Group	n	Doula Group	n	Statistical significance
4 month parenting efficacy	M (SD)	34.9 (2.6)	113	34.8 (2.7)	108	NS
12 month parenting efficacy	M (SD)	34.7 (2.7)	110	34.7 (2.5)	106	NS

Parenting Attitudes and Behavior

At each assessment, newborn, four months, and twelve months, videotaped observations of mother-child interaction were recorded. Two dimensions were coded: 1) sensitive responsiveness and 2) encouragement and guidance. Sensitive responsiveness is a scale that characterizes child-centered interaction on the part of the parent. It includes items related to careful handling, affection, and recognizing and responding appropriately to the infant's signals during the newborn period. At ages four and 12 months it expands to include a child-centered approach to learning activities such as interacting at

the child's pace, allowing the infant time to explore toys in his/her own way, and joining an activity where the child's attention is directed. Encouragement (Inviting Involvement) is a scale that examines how the parent actively engages with the child. It includes items that examine how the parent tries to get the infant's attention and make eye contact, has a conversation with the infant, and imitating the baby. At 4 and 12 months, it expands to include items such as helping the infant learn to talk, and teaching the child how to play with objects.

Data analysis showed that, with respect to observed behavior, mothers who had a doula showed more encouragement and guidance with their infants at four months than other mothers.

Parenting attitudes were assessed at four months using the Adult-Adolescent Parenting Inventory (AAPI). High scores on this self-report instrument measure undesirable parenting attitudes, including advocacy of corporal punishment, inability to show empathy, role reversal, and inappropriate developmental expectations.

Data analysis showed that, with respect to parenting attitudes, mothers in the doula group were less likely to endorse items suggestive of role reversal (e.g., “Children should know when their parents are tired,” and “Children should offer comfort when their parents are sad.”). Mothers in the doula group were also less likely to have unrealistic developmental expectations for their children (e.g., “Children should be taught to obey their parents at all times,” and “Parents spoil babies by picking them up when they cry”). Both of these variables, in the instruments’ validation sample, were shown to be correlated with child abuse and neglect.

Table: Parenting Attitudes and Behavior

		Control Group	n	Doula Group	n	Statistical significance
<i>Newborn behavior</i>						
PCOG Sensitive responsiveness	M (SD)					NS
PCOG Encouragement guidance	M (SD)					NS
<i>Four months behavior</i>						
PCOG Sensitive responsiveness	M (SD)					NS
PCOG Encouragement guidance	M (SD)					YES
<i>Twelve months behavior</i>						
PCOG Sensitive responsiveness	M (SD)					NS
PCOG Encouragement guidance	M (SD)					NS
<i>Four month attitudes</i>						
Total score	M (SD)	32.4 (5.7)	113	31.1 (5.1)	108	$t(219)=1.9, p=.03$
Corporal punishment	M (SD)	7.8 (2.2)	113	7.6 (2.2)	108	NS
Inability empathy	M (SD)	5.8 (1.8)	113	5.7 (1.6)	108	NS
Role reversal	M (SD)	8.7 (2.4)	113	8.0 (2.4)	108	$t(219)=2.0, p=.03$
Inappropriate developmental expectations	M (SD)	10.2 (2.2)	113	9.8 (2.2)	108	$t(219)=1.4, p=.07$

Feeding Practices

Although extensive data were gathered on feeding and other child-rearing practices, for this report we focus on breastfeeding initiation and duration. Data were derived from mother report and medical charts abstraction.

A minority of young women in the study (35%) indicated that their own mothers had breastfed. However, a majority (61%) indicated that they knew someone personally who had breastfed.

Mothers in the doula group were more likely to initiate breastfeeding than the mothers without the doula intervention. The doula group also had longer durations of breastfeeding. It should be noted, however, that despite the success doulas had to getting mothers to initiate breastfeeding in the hospital, only a minority of mothers breastfeed after leaving the hospital.

Table: Breastfeeding initiation and duration

		Control Group	n	Doula Group	n	Statistical significance
Initiated feeding breast milk	N (%)	61 (49.2%)	124	78 (62.9%)	124	$X^2(1)=4.7, p = .03$
Mean weeks breastfeeding	M (SD)	2.9 (7.1)	121	4.9 (10.0)	118	$t(237) = 1.8, p = .04$
Breastfeed after leaving hospital	N (%)	41 (33.9%)	121	48 (40.7%)	118	NS

Health Care Utilization

Since pediatric chart data abstraction was only recently completed, analyses of pediatric care utilization reported below are limited to mother reports of pediatric visits and immunizations.

There were no differences between the groups in pediatric well baby visits and immunization rates during the first year of life.

Table: Pediatric visits and immunizations

		Control Group	n	Doula Group	n	Statistical significance
At least 3 well baby visits by 4 months	n (%)	68 (60%)	113	72 (69%)	105	NS
Up to date on shots by 4 months	n (%)	79 (70.5%)	112	78 (73.6%)	106	NS
At least 6 well-baby visits by 12 months	n (%)	51 (46.8%)	109	44 (42.3%)	104	NS
Up to date on shots by 12 months	n (%)	77 (73%)	105	70 (70%)	100	NS

Child Development

Developmental assessments of the children are being conducted at twenty-four months and are ongoing.

Child behavior was assessed by maternal report at the twelve-month assessment, using the BITSEA. There were no differences between the two groups in mother perception of child competence or problem behavior.

Table: Child behavior problem and competence

		Control	n	Doula Group	n	Statistical significance
BITSEA problems 12 months	M (SD)	21.8 (9.2)	111	22.3 (8.6)	112	NS
BITSEA competence 12 months	M (SD)	16.1 (3.2)	112	16.1 (2.8)	107	NS

Cortisol Values

Saliva samples were gathered prenatally, on each of the first two postpartum days, and at four months. We had hypothesized that mothers with doula support would show neuroendocrine changes indicative of lower stress. We saw no differences between the two groups with respect to salivary cortisol levels.

Table: Salivary cortisol

Cortisol Values		Control Group	n	Doula Group	n	Statistical significance
Prenatal	M (SD)	5.9 (5.7)	121	5.6 (3.8)	123	NS
Day 1 postpartum	M (SD)	6.0 (7.1)	104	6.5 (7.5)	100	NS
Day 2 postpartum	M (SD)	5.9 (4.9)	109	5.5 (4.6)	105	NS
Four months	M (SD)	6.8 (7.9)	107	5.9 (6.8)	104	NS

There were limited correlations between cortisol levels and some measures related to parenting. Notably, prenatal cortisol levels were positively related to maternal report of fondness for children. These analyses are ongoing.

Analysis of Moderation Effects

We have only begun to explore whether mothers' personal characteristics and social relationships may moderate effects of the doula intervention. For purposes of this report, a set of possible moderating variables measured at the baseline, pre-randomization interview session were included in a principal components analysis. This analysis suggested that there were five dimensions of background characteristics: relationship with primary caregiver, relationship with baby's father, mental health, maturity (age and education), and vocabulary. The variables were standardized. Unit-weighted sums were computed and then dichotomized at the mean. To examine moderation, ANOVAs were computed on parenting behavior and attitudes at 4-months, as well as breastfeeding duration, entering doula group and a dichotomous risk factor in each analysis. Similar logistic regression was computed on breastfeeding initiation. There were no significant interaction effects involving relationship with primary caregiver, relationship with baby's father, and mother mental health.

There were a number of interaction effects involving mother maturity and vocabulary. Specifically, it appears that the intervention was effective with respect to breastfeeding for only the older, better educated mothers and those with high vocabulary test scores. More mature and more verbally skilled mothers who had a doula, were more likely to breastfeed than mature and more verbally skilled mothers without a doula and were more likely to breastfeed than less mature and less verbally skilled mothers who received the intervention.

There was also evidence of moderation with respect to parenting behavior and attitudes. Here the pattern of effects was somewhat different, with effects concentrated in the less mature and less verbal mothers, with the doula intervention appearing to prevent poor parenting in those more vulnerable parents.

Table: Significant moderation effects for breastfeeding and 4-month parenting variables

		n	PCOG: Encouragement and guidance	AAPI: Total problem attitudes		Duration breastfeeding (weeks)		Breastfeeding ever	
Low maturity	Control	60	2.5 (1.9)	***				55%	ns
Low maturity	Doula	48	3.7 (2.0)					58%	
High maturity	Control	48	3.0 (1.8)	ns				41%	**
High maturity	Doula	58	3.1 (2.0)					67%	
Low PPVT	Control	59			33.6 (5.8)	*	3.4 (9.3)	ns	48%
Low PPVT	Doula	53			31.1 (5.6)		2.8 (5.7)		51*
High PPVT	Control	49			31.2 (5.4)	ns	2.2 (4.3)	**	49%
High PPVT	Doula	53			31.0 (4.7)		7.2 (12.8)		76%

Implementation Analyses

Data on program implementation has been collected throughout the study. Sources include:

- Baseline information collected from each mother regarding their motivation for being part of the study;
- Careful tracking of program use for all mothers in the treatment group via doula record-keeping, including the intensity of mother's participation (across home, clinic, hospital, and phone contacts), the mother's emotional engagement during visits, the content or topics covered in visits, and the participation and engagement of other family members;
- Intensive qualitative interviewing with a sub-sample of 12 mothers and their doulas about the quality of the helping relationship, both prenatal and postnatal;
- Wrap-up summaries from doulas regarding each of their client's program involvement;
- Monthly group interviews with doulas, providing details of their duties and activities;
- Retrospective caseload review with each doula at the end of the program, where they reflected

- overall on their entire caseload;
- g. Collecting “birth stories” from each mother immediately after birth that included questions regarding the role and helpfulness of the doula;
 - h. Interviewing mothers as part of the overall study’s follow-up interviews (4, 12, and 24 months postpartum) about their perception of their doula, their satisfaction services received, what aspects of the program were most helpful, and how much they continue to think about their doula after the program is over.

As can be seen, this is a very rich and comprehensive collection of both qualitative and quantitative longitudinal implementation data, from both the perspective of the mother and of the doula. It is certainly the most data ever collected about the inner-workings of a doula program. Analysis of this data will provide crucial context for understanding the outcomes of the participating families.

Preliminary analyses have been conducted with many of these datasets. To date, emphasis has been placed on aggregating and summarizing data from the doula’s recordkeeping system (b & d), and coding and analyzing the qualitative helping relationship interviews (c). Summaries of these analyses are reported below:

Mothers’ participation in the program. Doulas had flexibility in how the program was individualized to each mother, but there was an expectation of weekly contact, preferably in-person. On average, doulas managed weekly contact with the mothers in their caseload, although a considerable proportion of that contact was conducted by phone, which tended to be shorter contacts than in-person home or clinic visits.

Table: Number of Length of Program Contacts: M (SD), n=124

	Home	Clinic	Phone	Other ¹	Total
Prenatal: # Visits	2.49 (2.59)	3.65 (2.77)	5.04 (5.38)	.79 (.98)	11.98 (9.31)
Postnatal: #Visits	3.82 (2.93)	1.50 (1.23)	4.88 (4.50)	1.96 (.90)	12.17 (6.49)
Prenatal: Av. Length (min)	56 (50)	61 (45)	17 (16)	30 (73)	39 (30)
Postnatal: Av. Length (min)	57 (35)	51 (42)	20 (17)	32 (36)	38 (19)

As part of their record-keeping, doulas estimated the percentage of time spent during each visit on the major program areas. During *prenatal* contacts, doulas and mothers spent the greatest proportion of their time covering topics related to having a healthy pregnancy (34%), followed by preparing for labor and delivery (24%), support around personal concerns (23%), preparing for parenting and child care (11%), and mother’s own development (7%). During *postnatal* contacts, doulas and mothers spent the greatest proportion of their time covering topics related to parenting and child care (39%), support around personal concerns (30%), the mother’s own development (14%), mother’s postpartum health (12%), and revisiting the birth experience (5%). These numbers are not surprising, with the possible exception that the doulas spent a greater time on health issues prenatally than preparing for labor and delivery.

On average, the program was implemented according to the program’s general guidelines: doulas managed to stay in regular contact with mothers both prenatally and postnatally, and they covered topics important to the program model. Future analyses will focus on specific checklist items that were used in

¹ Includes hospital visits

the record keeping, permitting more detailed report of what topics were covered (e.g., breastfeeding, use of specific comfort measures).

Quality of the helping relationship. In addition, doulas and mothers both reported positive relationships with each other using a standardized measure of the helping relationship (the Working Alliance Inventory) that was adapted for this program. Mothers on average rated the relationship more positively than the doulas did (averaging 3.54 on a 4-point scale, versus 2.65 by doula report). This is not unusual for this measure. Clients often show strong positive bias in their reports, while service providers—who have a larger number of clients and relationships to use as a comparison show greater range in their responses.

Our review of the in-depth qualitative interviews conducted with the doulas and 12 of their clients suggest that doulas and mothers both viewed the relationship in very personal terms: they often noted that the doula was like a member of the family or a close friend. It was not unusual for the mother or the client to use the word “love” when the relationship was particularly strong, as these examples shows:

Doula: “It [labor and delivery] almost made me go against my big rule [to] never cry. And I was just like okay, I just couldn’t believe it and after everything was over she hugged me so tight and she says, ‘I love you.’ And I said, Oh I love you ...”

Mother: “...I’ve been knowing her for the longest and that’s just how we communicate, but she’s just like a friend. We’ve been through like everything, labor was really hard, but she was there for me though. I actually asked if she would be my baby’s godmother. That’s because I feel that close to her now.”

Sometimes, however, doulas could have positive relationships with their clients and still feel as though they did not accomplish what they hoped to. A clear message from the interviews was that doulas took care to treat the mothers with respect and acceptance, a deliberate strategy given their belief that young mothers (especially young, low-income African-American mothers) often do not have the experience of service providers treating them this way. This meant, however, that doulas had to accept that mothers were not always going to follow their advice, as this example shows regarding breastfeeding:

Doula: “She said I’m not going to do it. I said but you haven’t even given it a try. ‘Why should I try something that I know I’m not going to finish?’ And so I tried to go through the whole thing about the baby being healthy. ‘Well I had a bottle and I’m pretty healthy. I know other people that had a bottle and they’re healthy.’ So it was just that constant back and forth...”

Mother: That’s the only thing we disagreed about...I didn’t do it, I didn’t want to go through it...I was just like hm, hm, hm, hm, hm, hm. I listened to her, and I’m like I’m still not doing it. And you know she finally accepted the fact that this girl has made up her mind”

It is clear from these interviews that the doulas had to be particularly careful in providing support or guidance that may contrast with family beliefs, and we are currently analyzing how the doula’s relationship with the members of the extended family (in particular, the child’s grandmother) impacts the mother’s acceptance of the program.

Predicting differential program participation. Analyses are underway examining how variables related to mother’s motivation (such as her general anxiety or specific fears regarding pregnancy, her

sense of support from family or friends, and her specific interest in the program) relate to her participation and engagement in the program. Our initial analyses suggest that although these baseline variables relate to the quality of the relationship reported by both parties (and especially by the doula), they do not relate to the amount of program contact the mother has. In general, doulas reported stronger alliances with mothers who were older, more educated, showed more mastery, fewer worries, less anxiety, and more general social support. Mothers who reported stronger relationships were older and had more social support. There was no relation between reporting a desire to get support or have a doula and either amount of contact or strength of alliance; however, mothers who came into the study reporting a stronger desire to be paid or get a videotape had less contact with their doula.

Interestingly, doula report of the alliance is strongly associated with amount of contact (both prenatal and postnatal). Client report is associated as well with amount of contact, but less so. We are currently conducting more in-depth analyses to understand why mother baseline characteristics predict the quality of the helping relationship but not program contact, even though the quality of the helping relationship also predicts program contact.

Linking program implementation to client outcomes. These analyses are planned, but have yet to be conducted. In particular, we are interested in examining whether: a) participants at higher risk (using baseline measurements) who do develop a positive relationship with their doula will have better outcomes in feelings of parenting mastery and parenting sensitivity than those who do not, and b) when doulas are unable to resolve conflicts with the client's extended family and support system, whether clients will have less engagement and more negative outcomes.

V. Discussion of Findings

A. Conclusions to be drawn from findings (with reference to supporting data and other studies)

Birth outcomes. Previous randomized trials have shown a variety of positive effects on medical and psychosocial birth outcomes, including notably shorter length of labor, less use of epidural anesthesia, less use of oxytocin to augment labor, and mother experience of labor and delivery (see more thorough review of literature in section II).

The present study, using a greater number and variety of measures than previous studies, found consistent effects of the doula intervention across different measures of maternal experience. Mothers who had a doula reported greater labor agency when responding to a structured questionnaire, used more themes of efficacy in narrating their birth experience, and spoke of feeling more supported during labor and delivery. In doula work, providing support and allowing empowerment are two central goals. There is a fine balance between these two goals – too much of one can undermine the other. Yet, in the present intervention, the program was successful at achieving both goals.

In the present study, there was no evidence that the doulas had an impact on obstetric outcomes such as length of labor, use of oxytocin, or rate of surgical delivery. There was a strong trend for fewer women to elect epidural anesthesia if they had a doula. Although meta-analyses suggest effects of doula intervention on such obstetric outcomes, a close look at the literature, shows that few individual studies have shown consistent patterns of effects across these domains. It is likely that hospital obstetric practice plays a strong role in whether doula effects can be observed. In the present study, aggressive active management of labor was practiced. Mothers were routinely provided intravenous lines and received fetal monitoring. Only those who arrived at the hospital in advanced labor or who signed waivers did not

receive those interventions. Labor augmentation was common. The small size of most labor rooms and nursing procedures usually prohibited mothers from standing or walking during labor. Epidural anesthesia was offered by medical staff with strong encouragement to all mothers in active labor. The doulas in the study often felt frustrated, because many of the best practices they had learned in their training, such as encouraging mothers to walk and explore alternative labor positions, were more often than not impossible to implement. Doula support most typically involved provision of emotional support, advocacy, and physical comfort measures such as massage and back pressure. Given the context of obstetric practice at this hospital, it may not be surprising that the doula intervention had no impact on most obstetric variables. Notably, the one variable on which there seemed to be an effect was use of epidural anesthesia, with mothers in the doula groups tending to use less anesthesia. It is notable that of the obstetric outcomes investigated, anesthesia use is the only one around which mothers are offered a choice, and in this study, they were more likely to choose natural childbirth if they had worked with a doula. There is currently controversy in the obstetrics literature about the consequences of anesthesia use. Natural childbirth advocates often point to literature suggesting that epidural use may result in a slowing of labor that ultimately may increase the risk of surgical delivery (Thorp & Breedlove, 1996), while other studies suggest that the risks of epidural use are minimal (Liu & Sia, 2004). It is also claimed that natural childbirth is associated with a greater experience of maternal efficacy.

Just as doula studies have varied with respect to the hospital environments, they have also varied with respect to the patient populations. Most randomized trials of doula intervention have only worked with extremely low risk pregnancies, typically women who are admitted to hospitals in early labor with no medical or obstetric complications. An exception is an HMO-based study that recruited prenatally and also showed limited obstetric outcomes (Gordon et al., 1999). Our study included a sample of women who were far more representative of a typical urban obstetric practice and who presented in labor. This created a methodologic challenge for measuring labor length, since unlike in prior studies, they were not all enrolled into the study in active early labor. It also may have limited the ability of doulas to have an impact on obstetric outcome when powerful risk factors were affecting the obstetric outcome. Yet, it is important to study the effects of doula intervention in such high-risk populations. Our clinical observation was that mothers who were at higher medical risk were often the ones who were in the greatest emotional distress and had the greatest need for emotional support.

It is also important to note that there is debate in the doula research literature about differential patterns of effects depending on the characteristics of the doula. It has been noted that studies employing nurses and other hospital staff have more limited effectiveness than when doulas are outsiders (Hodnett, 2005). The doulas in the present study fell into an intermediate category. They were employees of the university, but not members of the hospital medical staff. Thus over time they became familiar to many doctors, nurses, and residents, but were never perceived as close insiders. On the other hand, their relationship with hospital staff was rarely, if ever, adversarial, as has sometimes been reported (Hwang, 2004). Physicians and nurses were usually pleased when a doula was present, particularly for very young mothers. They were generally provided full access to the birth setting, although were not allowed in the labor triage room, and depending on who the attending physicians were, sometimes were denied access to surgery rooms. The doulas themselves, as is being documented in our qualitative research, although paraprofessionals, increasingly perceived themselves as professionals (Korfmacher, 2004). In fact it was important to them to seem professional, especially when attending births. In their work they walked a fine line between providing mothers encouragement to consider natural childbirth, supporting mothers in their personal preferences, respecting the opinions of family members, and recognizing the authority of the medical staff. The doulas in this study showed impressive social skills in negotiating these different interests.

Breastfeeding outcomes. As has been the case in previous studies, the doula intervention had clear effects on breastfeeding initiation, even in this population of young African-American mothers who would not typically elect to breastfeed their infants. Sixty-three percent of the mothers in the doula intervention group initiated breastfeeding, compared to less than half of those not receiving the intervention.

The intervention was also successful at increasing breastfeeding duration, compared to the control group. This success, however, must be tempered by the fact that most mothers in the intervention group did not continue to breast feed after leaving the hospital. Virtually none of them breastfed through their infants' first birthdays as is currently recommended by the American Academy of Pediatrics {, 1997 #351}.

As has been documented extensively in the research literature on breastfeeding, there are many challenges to breastfeeding promotion. The women in the present study were from a cultural group that has very low rates of breastfeeding, and most did not have a mother who had breastfed. As our qualitative research is documenting, the doulas struggled to promote breastfeeding with resistant clients in a way that was respectful of clients' wishes and that did not do damage to the relationship between the doula and client. From the clients' perspective, breastfeeding promotion was often a tension in the relationship.

We noted that the challenge in supporting breastfeeding is offering support after mothers are discharged from the hospital. Most mothers need considerable support with breastfeeding during the first couple of weeks postpartum if they are to be successful. Doulas made home visits to offer breastfeeding support in the first few days after births, even though the doulas and their families were still recuperating from the stress of labor and delivery. It was more typical, however, for doulas to have only telephone contact during the first week after the birth, unless the mothers requested that they visit. In fact, doulas often suggested it would be intrusive and culturally inappropriate to make such a visit without an invitation. Moreover, once home, young mothers were often with mothers and other family members who are discouraging of their efforts at breastfeeding. Mothers often report that returning to school and work, as is required by TANF regulations, is the reason for discontinuing breastfeeding. It is notable that the breastfeeding intervention was most successful in the more mature and more verbal mothers. These women may have been better able to understand the public health message about breastfeeding that the doulas were providing. They also may have been better able to overcome the many challenges in establishing breastfeeding and resisting pressure to not breastfeed.

Mental health outcomes. Our data suggest limited impact of the doula intervention on maternal mental health. At least one prior doula study has shown effects of the doula intervention on reducing postpartum depression (Wolman et al., 1993), although the methods for assessing depression in that study were less rigorous than those used in the present investigation. Also the timing of the assessments were different. In the other study depression was measured at one-month postpartum; in our study, at 4 and 12 months postpartum. We also found in the present study that mothers who had the doula intervention experienced less stress than other mothers in their interactions with their infants.

The effects we found on maternal mental health and parenting stress, surprisingly, were at the 12-month assessment – long after the end of the supportive intervention. Such “sleeper” effects must always be viewed with skepticism. We are still considering explanations for this finding, and will be conducting more data analysis in an attempt to understand the finding. Notably, twelve months is a challenging time for many young mothers, a time when infants become increasingly active and demanding. It may be that the doula-supported mothers have been prepared by their doulas to understand and accept the normal developmental challenges of this period.

Notably, the data on maternal depressive symptoms show very high rates for both groups prenatally, that actually drop somewhat in the initial postpartum months and even more by twelve months. Also notably, maternal depression at four months is correlated with prenatal depression ($r=.43$).

Parenting attitudes and behavior. The doula intervention had positive impact on parenting attitudes and behavior at four months, shortly after the intervention ended. Mothers in the doula intervention had more realistic developmental expectations for their children and were less likely to endorse statements suggestive of role reversal. These data suggest that the doulas were successful at educating young mothers about the developmental needs of young infants, especially that babies are in need of nurturing and that the maternal role is to nurture infants (and not the reverse). Doulas spent the greatest proportion of their time postnatally dealing with issues of parenting and childcare, educating mothers about what their babies can do, but also emphasizing that it is normal for infants to cry and to need to be held. Doulas, in working with the young mothers in the study, also spent much effort helping mothers understand their roles as nurturers of their babies, emphasizing that being a mother requires accepting responsibility.

The doula intervention also had a positive impact on parenting behavior at four months, shortly after the intervention ended. We measured two dimensions of parenting behavior: 1) sensitive responsiveness, and 2) encouragement and guidance. Sensitive responsiveness involves parenting behavior such as gentle handling, noticing the child's cues, responding to the child's cues, and following the child's lead. Encouragement and guidance, involves parenting behavior such as smiling and talking to the baby, and actively encouraging the baby's play. One can think of these dimensions as mapping onto two different maternal roles: the mother as nurturer and the mother as teacher. The impact of the doula intervention was on maternal encouragement and guidance. In thinking about why the effects were concentrated on that dimensions we are hypothesizing that it is because the encouragement and guidance variable assesses dimensions of behavior that can be most actively taught and modeling. Our doulas did much of that kind of teaching, encouraging mothers to talk with, read to, and play with their infants. Our doulas often spoke openly about the high value they placed on education. This was reflected in their seeking educational opportunities for themselves, their encouragement of mothers to return to school, and we think, in their encouragement of mothers in childrearing practices that might be promotive of cognitive development.

This is the first study to document the effects of a doula intervention on long-term parenting behavior. One previous abstract reported such an effect, but was never published in full form (Landry, McGrath, Kennell, Martin, & Steelman, 1998).

B. Limitations of the study and suggestions for further research

As is the case with all scientific research, the present study raises new questions and calls for alternative research designs and measures that were not included.

A limitation of the present study was that it investigated the effectiveness of the intervention at only one site, a major teaching hospital. The effects of the intervention, especially with respect to obstetric practice, may not generalize to other practice settings with different practice philosophies.

A limitation of the present study is that it focused exclusively on young, urban, African-American women. While arguably a population at unusually high risk for poor obstetric outcomes and for low rates of breastfeeding, the data only speak to the effectiveness of the intervention for that particular age and cultural group. The expanded doula model used in the present study is being used in Chicago currently for working with Latina women and we know from our communications with those programs, that there are different challenges in working with that group of young mothers (e.g., less challenge around issues of

breastfeeding, but different family structures and different levels of acceptance of health care systems, especially for recent immigrants).

The present study presents very promising data with respect to the potential this model has for impacting parenting. Future studies would want to augment considerably the measures of parenting. Although a strength of the study is that it adopted multiple methods for assessing parenting: structured questionnaires, maternal narratives, and direct observations of videotaped interaction between mother and baby, an important omission was observation of parenting behavior in the home setting.

Although the data with respect to breastfeeding are also encouraging, clearly they fall short of current public health goals. The present model needs to be re-evaluated with respect to how to best encourage breastfeeding during the weeks immediately postpartum. Ideas that would follow from the present research might include, more intensive home visiting might be a solution, better advance education of other family mothers, and better support for nursing mothers who are attending school or at work.

An important limitation of our data is that there is relatively infrequent followup of mothers. We intentionally only gathered data at one point during the intervention (immediately postpartum), so as not to burden families with assessment or bias the intervention. Yet, four months postpartum, may not be the optimal time for assessing maternal postpartum depression.

Finally, although data are encouraging with respect to the intervention, they leave many questions open about why and for whom the intervention works. Our ongoing analyses of implementation data may shed light on some of these issues. However, future studies employing randomized designs might want to consider randomizing to intervention groups that offer service packages that offer different levels of intensity or different types of doula services.

C. Policy and practice implications

The data from this paper suggest continued focus on doula programs as intervention strategy for high-risk mothers.

Obstetric outcomes. If the yardstick for evaluating these programs, is limited to obstetric outcomes, the evidence remains somewhat unclear as to the benefits of doula intervention. Existing data suggest that for obstetrically low risk mothers delivering in hospital settings that do not routinely employ high levels of medical intervention, doulas have positive impacts on labor and delivery outcomes. Our data, suggest a relatively limited impact of such services for populations that include women who are not all at medical low risk and who deliver in hospital settings engaging in active medical management of labor, there may be limited obstetric benefits.

Breastfeeding. Our data suggest that paraprofessionals are effective promoters of breastfeeding, supporting other studies suggesting that paraprofessionals may be even more effective than professional lactation consultants at promoting breastfeeding. These studies suggest that paraprofessional lactation support staff should be more widely hired within prenatal care and hospital birth settings to provide services to mothers. Although our data did not address cost effectiveness issues, paraprofessional lactation support has obvious cost saving advantages. On the other hand, our data also suggest that it remains a challenge to promote long-term breastfeeding in this population, and that paraprofessionals may need specific training in how to sensitively address how breastfeeding fits within family and cultural traditions.

Depressive symptoms. Our data suggest that young mothers are at very high risk for depression, but that depressive symptoms typically emerge during pregnancy, rather than the postpartum period. The data strongly suggest that women should be routinely screened for depressive symptoms, and that such screening may be most effectively done in prenatal care settings.

Parenting. This study provides encouraging data with respect to the role that paraprofessional, community doulas can play in promoting more positive parenting beliefs and behavior. Such effects have obviously public health implications with respect to prevention of child maltreatment. Although more study of this issue is clearly warranted, it is notable that the effects on parenting seemed to wane after the end of the intervention. Sustaining effects on parenting behavior likely requires ongoing intervention to help mothers deal with challenges in their lives as well as the changing developmental needs of their children.

Use of paraprofessionals for early intervention. As was discussed in the literature review and in one of our publications (Hans & Korfmacher, 2002), there is considerable debate in the field of early intervention as to whether preventive, home-based services can be effectively provided by paraprofessionals. The present study suggests that they can. It should be noted, however, that in this program, the paraprofessionals had supports not typically offered by other programs. Salaries were not at minimum wage levels. Doulas were employees who had full medical benefits. Doulas received extensive initial training and regular ongoing training. Supervision was intensive and encouraged reflective practice {Bernstein, 2003 #1744}. Such supports are critical for individuals working with high-risk families, especially those who do not have the advantage of years of professional training with supervision. Doulas also increasingly viewed themselves in a professional role in relation to other staff members, even though their relationships with the mothers in their caseload bore many hallmarks of paraprofessional service provision.

Funding for doula programming. The clearest challenge for programming of this kind relates to funding. Currently doula services are not reimbursable under Medicaid in most states, and there are no incentives for hospitals operating under tight financial constraints, to pay for such services. We have been able to secure ongoing funding for our doula program through aggressive ongoing applications to private foundations and after the randomized trial was completed we received a contract through the Ounce of Prevention Fund to support two of our doulas through state block grant funds. That contract was only possible because of a current state government with progressive views on early intervention and active lobbying to make doula services eligible for such money. Such lobbying required resources, effort, and influence that would not have been possible for any single institution to have mounted.

VI. List of products to date

Papers

Hans, S.L., & Korfmacher, J. (2002). The professional development of paraprofessionals. *Zero to Three*, 23, 4-8.

Behnke, E.F., & Hans, S.L. (2002). Becoming a doula. *Zero to Three*, 23, 9-13.

Presentations

- Hans, S.L. (2002, January). The Chicago Doula Project. Workshop presented at the Children's Health Workshop, The Irving B. Harris Graduate School of Public Policy Studies and Department of Pediatrics, The University of Chicago.
- Hans, S.L. (2002, March). The Chicago Doula Project. Presentation made at the Child Psychiatry Colloquium. Department of Psychiatry, The University of Chicago.
- Bowie, A., Hans, S.L., & Henson, L.G. (2004, March). Relationship characteristics as correlates of depression during adolescents' transition to parenthood. Poster presented at the meetings of the Society for Research on Adolescence. Baltimore, MD.
- Bowie, A., Hans, S.L., & Henson, L.G. (2004, March). Impact of depression on adolescent mothers' parental values and beliefs. Poster presented at the meetings of the World Congress on Women's Mental Health. Washington, DC. Paper featured in June 2004, Psychiatric dispatches, *Primary Psychiatry*, 11, 22-26. Paper featured in May 2004, Clinical updates in neuropsychiatry, *CNS Spectrums: The International Journal of Neuropsychiatric Medicine*, 9, 329-332.
- Korfmacher, J., Humphries, M., & Hans, S. (2004, May). The helping relationship in a doula support program for young mothers and their infants. Poster presented at the meetings of the International Society on Infant Studies. Chicago, IL.
- Korfmacher, J. (2004, May). Evaluating doula support for young women. Plenary session presentation at the Seventeenth Annual Maternal and Child Health Leadership Conference. Chicago, IL.
- Korfmacher, J., Humphries, M., & Hans, S. (2005, April). Predicting parent involvement in a doula support program for young mothers and their infants. Poster presented at the meetings of the Society for Research in Child Development. Atlanta, GA.
- Hans, S. L., & Korfmacher, J. (2005, October). Early findings from the Chicago Doula Project. Papers presented at the conference honoring the opening of "A Doula Story." University of Illinois at Chicago.
- Korfmacher, J. (2005, November). Supporting parents during early childhood. Paper presented at the Johnson & Johnson Pediatric Roundtable: Eating Behaviors of the Young Child. Yountville, CA.
- Thullen, M., Hans, S. L., & Henson, L. G. (2006, January). Giving birth without the support of family and friends: Mothers at psychosocial risk. Poster accepted for presentation at the meetings of the Society for Social Work Research. San Antonio, TX.

Reference List

- Abidin, R. R. (1983). *The Parenting Stress Index - Manual*. Charlottesville, VA: Pediatric Psychology Press.
- Ainsworth, M. D. S., Blehar, M. D., Waters, E., & Wall, S. (1978). *Patterns of attachment: a psychological study of the strange situation*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Alan Guttmacher Institute. (1999, 1999). *Why is teenage pregnancy declining? The roles of abstinence, sexual activity and contraceptive use*. Retrieved, from the World Wide Web: http://www.agi-usa.org/pubs/or_teen_preg_decline.html
- American Academy of Pediatrics Committee on Adolescence. (1989). Adolescent pregnancy. *Pediatrics*, 83, 138-146.
- American Academy of Pediatrics Working Group on Breastfeeding. (1997). Breastfeeding and the use of human milk. *Pediatrics*, 100, 1035-1039.
- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders Revised 4th Edition (DSM-IV)*. Washington, DC: APA.
- Anderson, E. (1999). *The code of the street: Decency, violence, and the moral life of the inner city*. New York: W. W. Norton.
- Apfel, N. H., & Seitz, V. (1991). Four models of adolescent mother-grandmother relationships in black inner-city families. *Family Relations*, 40, 421-429.
- Armsden, G. C., & Greenberg, M. T. (1987). The Inventory of Parent and Peer Attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence*, 16, 427-454.
- Aseltine, R. H., Jr., Gore, S., & Colten, M. E. (1998). The co-occurrence of depression and substance abuse in late adolescence. *Developmental Psychopathology*, 10, 549-570.
- Baranowski, T., Bee, D. E., Rassin, D. K., Richardson, C. J., Brown, J. P., Guenther, N., & Nader, P. R. (1983). Social support, social influence, ethnicity and the breastfeeding decision. *Social Science and Medicine*, 17, 1599-1611.
- Barnard, K. E. (1998). Developing, implementing, and documenting interventions with parents and young children. *Zero to Three*, 18, 23-29.
- Barnard, K. E., Magyary, D., Sumner, G., Booth, C. L., Mitchell, S. K., & Spieker, S. (1988). Prevention of parenting alterations for women of low social support. *Psychiatry*, 51, 248-253.
- Barron, S. P., Lane, H. W., Hannan, T. E., Struempfer, B., & Williams, J. C. (1988). Factors influencing duration of breast feeding among low-income women. *Journal of the American Dietetic Association*, 88, 1557-1561.
- Bavolek, S. J. (1984). *Handbook of the AAPI*. Eau Claire, Wisconsin: Family Development Resources.
- Bee, J. E., Baranowski, T., Rassin, D. K., Richardson, J., & Mirkut, W. (1991). Breastfeeding initiation in a triethnic population. *American Journal of Clinical Dietetics*, 145, 306-309.
- Behnke, E. F., & Hans, S. L. (2002). Becoming a doula. *Zero to Three*, 23, 9-13h.
- Belsky, J. (1986). A tale of two variances: Between and within. *Child Development*, 57, 1301-1305.
- Bernstein, V. J., & Hans, S. L. (1994). Predicting the developmental outcome of two-year-old children born exposed to methadone: The impact of social-environmental risk factors. *Journal of Clinical Child Psychology*, 23, 349-359.
- Bernstein, V. J., Percansky, C., & Hans, S. L. (1987). *Screening for social-emotional impairment in infants born to teenage mothers*. Paper presented at the Meetings of the Society for Research in Child Development, Baltimore, MD.
- Bernstein, V. J., Percansky, C., & Wechsler, N. (1996). Strengthening families through strengthening relationships: The Ounce of Prevention Fund developmental training and support program. In M. Roberts (Ed.), *Model programs in child and family mental health* (pp. 109-133). Hillsdale, NJ: Erlbaum.

- Bevan, M. L., Mosley, D., Lobach, K. S., & Solimano, G. R. (1982). Factors influencing breastfeeding in an urban WIC program. *Journal of the American Dietetic Association*, *84*, 563-567.
- Birkel, R. C., & Reppucci, N. D. (1983). Social networks, information-seeking, and the utilization of services. *American Journal of Community Psychology*, *11*, 185-205.
- Black, M. M., & Nitz, K. (1995). Grandmother co-residence, parenting, and child development among low income, urban teen mothers. *Journal of Adolescent Health*, *16*.
- Brent, N. B., Redd, B., Dworetz, A., D'Amico, F., & Greenberg, J. J. (1995). Breast-feeding in a low-income population. *Archives of Pediatric and Adolescent Medicine*, *149*, 798-803.
- Brooks-Gunn, J., & Furstenberg, F. F., Jr. (1986). The children of adolescent mothers: Physical, academic, and psychological outcomes. *Developmental Review*, *6*, 224-251.
- Broussard, E. R. (1976). Neonatal prediction and outcome at 10/11 years. *Child Psychiatry and Human Development*, *7*, 85-93.
- Broussard, E. R. (1979). Assessment of the adaptive potential of the mother-infant system: The neonatal perception inventories. *Seminars in Perinatology*, *3*, 91-100.
- Bryant, C. A. (1982). The impact of kin, friend, and neighbor networks on infant feeding practices. *Social Sci Med*, *16*, 1757.
- Bugental, D. B., & Shennum, W. A. (1984). "Difficult" children as elicitors and targets of adult communication patterns: An attributional-behavior transactional analysis. *Monographs of the Society for Research in Child Development*, *49*(1, Serial No. 205).
- Burton, L. M. (1990). Teenage childbearing as an alternative life-course strategy in multigeneration black families. *Human Nature*, *1*, 123-143.
- Burton, L. M., & Bengtson, V. L. (1985). Grandmothers: Issues of timing and meaning in roles. In V. L. Bengtson & J. F. Robertson (Eds.), *Grandparenthood: Research and policy perspectives* (pp. 61-77). Beverly Hills, CA: Sage.
- Caldwell, C. H., & Koski, L. R. (1997). Child rearing, social support, and perceptions of parental competence among African American mothers. In R. J. Taylor & J. S. Jackson & e. al. (Eds.), *Family life in Black America*. Thousand Oaks, CA: Sage Publications.
- Card, J. (1993). *Handbook of adolescent sexuality and pregnancy: Research and evaluation instruments*. Newbury Park, CA: Sage Publications.
- Card, J. J. (1999). Teen pregnancy prevention: Do any programs work? *Annual Review of Public Health*, *20*, 257-285.
- Cardone, I., & Gilkerson, L. (1990). Family Administered Neonatal Activities: A first step in the integration of parental perceptions and newborn behavior. *Infant Mental Health Journal*, *11*, 127-131.
- Carter, A. S., Little, C., Briggs-Gowan, M. J., & Kogan, N. (1999). The infant-toddler social and emotional assessment (ITSEA): Comparing parent ratings to laboratory observations of task mastery, emotion regulation, coping behaviors and attachment status. *Infant Mental Health Journal*, *20*, 375-392.
- Cassidy, B., Zoccolillo, M., & Hughes, S. (1996). Psychopathology in adolescent mothers and its effects on mother-infant interactions: A pilot study. *Canadian Journal of Psychiatry*, *41*, 379-384.
- Cassidy, J., & Berlin, L. J. (1994). The insecure/ambivalent pattern of attachment: Theory and research. *Child Development*, *65*, 971-991.
- Centers for Disease Control and Prevention. (1999). September 24, 1999. MMWR. *CDC Surveillance Summaries*, *48*(No. SS-5).
- Chase-Lansdale, P. L., Brooks-Gunn, J., & Zamsky, E. S. (1994). Young African-American multigenerational families in poverty: Quality of mothering and grandmothering. *Child Development*, *65*, 373-393.
- Chase-Lansdale, P. L., Mott, F. L., Brooks-Gunn, J., & Phillips, D. A. (1991). Children of the National Longitudinal Survey of Youth: A unique research opportunity. *Developmental Psychology*, *27*, 918-931.

- Cole, R., Kitzman, H., Olds, D., & Sidora, K. (1998). Family context as a mediator of program effects in prenatal and early childhood home visitation. *Journal of Community Psychology, 26*, 37-48.
- Coley, R. L., & Chase-Lansdale, P. L. (1998). Adolescent pregnancy and parenthood: recent evidence and future directions. *American Psychologist, 53*(2), 152-166.
- Cooley, M. L., & Unger, D. G. (1991). The role of family support in determining developmental outcomes in children of teen mothers. *Child Psychiatry and Human Development, 217-234*.
- Crockenberg, S. (1987). Predictors and correlates of anger toward and punitive control of toddlers by adolescent mothers. *Child Development, 58*, 964-975.
- Crockenberg, S., & Leerkes, E. (2000). Infant social and emotional development in family context. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd Edition ed., pp. 60-90). New York: Guilford Press.
- Crowell, J. A., Fraley, R. C., & Shaver, P. R. (1999). Measurement of individual differences in adolescent and adult attachment. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 434-465). New York: Guilford Press.
- Cunningham, A. S., Jelliffe, D. B., & Jelliffe, E. F. P. (1991). Breast-feeding and health in the 1980s: A global epidemiologic review. *Journal of Pediatrics, 118*, 659-666.
- Deutsch, F. M., Ruble, D. N., Fleming, A., Brooks-Gunn, J., & Stangor, C. (1988). Information-seeking and maternal self-definition during the transition to motherhood. *Journal of Personality and Social Psychology, 55*, 420-431.
- Dewey, K. G., Heinig, M. J., & Nommsen-Rivers, L. A. (1995). Differences in morbidity between breast-fed and formula-fed infants. *Journal of Pediatrics, 126*, 696-702.
- DONA: Doula of North America. Retrieved, from the World Wide Web: <http://www.dona.org>
- Duffy, L. C., Faden, H., Wasielewski, R., Wolf, J., & Vaughan, L. (1997). Exclusive breast-feeding protects against bacterial colonization and day care exposure to otitis media. *Pediatrics, 100*, E7.
- Duggan, A. K., McFarlane, C. E., Windham, A. M., Rohde, C. A., Salkeer, D. S., Fuddy, L., Rosenberg, L. A., Buchbinder, S. B., & Sia, C. C. J. (1999). Evaluation of Hawaii's Healthy Start Program. *Future of Children, 9*, 66-90.
- Duncan, D., Holberg, C. J., Wright, A. L., Martinez, F. D., & Taussig, L. M. (1993). Exclusive breast-feeding for at least 4 months protects against otitis media. *Pediatrics, 91*, 867-872.
- Dunst, C. J., Leet, H. E., & Trivette, C. M. (1988). Family resources, personal well-being, and early intervention. *Journal of Special Education, 22*, 108-116.
- Durlak, J. A. (1979). Comparative effectiveness of paraprofessional and professional helpers. *Psychological Bulletin, 86*, 80-92.
- East, P. L., & Felice, M. E. (1996). *Adolescent pregnancy and parenting: Findings from a racially diverse sample*. Mahwah, NJ: Lawrence Erlbaum Associate.
- Egeland, B. R., Carlson, E., & Sroufe, L. A. (1993). Resilience as process. Milestones in the development of resilience. *Development and Psychopathology, 5*, 517-528.
- Erickson, M. F., Sroufe, L. A., & Egeland, B. (1985). The relationship between quality of attachment and behavior problems in preschool in a high-risk sample. *Monographs of the Society for Research in Child Development, 50*, 147-167.
- Erikson, E. (1963). *Childhood and society* (2nd edition ed.). New York: Norton.
- Ernst, C. C., Grant, T. M., Streissguth, A. P., & Sampson, P. D. (1999). Intervention with high-risk alcohol and drug-abusing mothers: II. Three-year findings from the Seattle model of paraprofessional advocacy. *Journal of Community Psychology, 27*, 19-38.
- Feachem, R. G., & Koblinsky, M. A. (1984). Interventions for the control of diarrheal diseases in young children: Promotion of breastfeeding. *Bulletin of the World Health Organization, 62*, 271-291.
- Field, T., Widmayer, S., Adler, S., & De Cubas, M. (1990). Teenage parenting in different cultures, family constellations, and caregiving environments: Effects on infant development. *Infant Mental Health Journal, 11*, 158-174.

- Flanagan, P. (1998). Teen mothers: Countering the myths of dysfunction and developmental disruption. In C. G. Coll & J. L. Surrey & K. Weingarten (Eds.), *Mothering against the odds: Diverse voices of contemporary mothers* (pp. 238-254). New York: Guilford Press.
- Freire, P. (1974). *Pedagogy of the oppressed*. New York: Seabury Press.
- Furstenberg, F. F., Jr., & Harris, K. M. (1993). When and why fathers matter: Impacts of father involvement on children of adolescent mothers. In R. I. Lerman & T. J. Ooms (Eds.), *Young unwed fathers* (pp. 117-138). Philadelphia: Temple University Press.
- Furstenberg, F. F., Jr., Brooks-Gunn, J., & Morgan, S. P. (1987). *Adolescent mothers in later life*. New York: Cambridge University Press.
- Geronimus, A. T. (1991). Teenage childbearing and social and reproductive disadvantage: the evolution of complex questions and the demise of simple answers. *Family Relations*, 40, 463-471.
- Glink, P. (1998). The Chicago Doula Project: a collaborative effort in perinatal support for birthing teens. *Zero to Three*, 18, 44-50.
- Glink, P. (1999). Engaging, educating, and empowering young mothers: The Chicago Doula Project. *Zero to Three*, 20, 41-44.
- Goldberg, S. (1977). Social competence in infancy: a model of parent-infant interaction. *Merrill-Palmer Quarterly*, 23, 163-178.
- Gordon, N. P., Walton, D., McAdam, E., Derman, J., Gallitero, G., & Garrett, L. (1999). Effects of providing hospital-based doulas in health maintenance organization hospitals. *Obstetrics and gynecology*, 93, 422-426.
- Grant, T. M., Ernst, C. C., & Streissguth, A. P. (1999). Intervention with high-risk alcohol and drug-abusing mothers: I. Administrative strategies of the Seattle model of paraprofessional advocacy. *Journal of Community Psychology*, 27, 1-18.
- Grattan, M. P., & Hans, S. L. (1996). Motor behavior in children exposed prenatally to drugs. *Journal of Occupational and Physical Therapy in Pediatrics*, 16, 89-109.
- Grossman, L. K., Fitzsimmons, S. M., Larson-Alexander, J. B., Sachs, L., & Harter, C. (1990). The infant feeding decision in low and upper income women. *Clinical Pediatrics*, 29, 30-37.
- Grummer-Strawn, L. M., Rice, S. P., Dugas, K., Clark, L. D., & Benton-Davis, S. (1997). An evaluation of breast-feeding promotion through peer counseling in Mississippi WIC clinics. *Maternal Child Health Journal*, 1, 35-42.
- Hamburg, B. A. (1986). Subsets of adolescent mothers: developmental, biomedical, and psychosocial issues. In J. B. Lancaster & B. A. Hamburg (Eds.), *School-age pregnancy and parenthood: biosocial dimensions* (pp. 115-146). New York: Aldine.
- Hans, S. L. (1991). *Following drug-exposed infants into middle childhood: Challenges to researchers* (Vol. 114). Rockville, MD: National Institute on Drug Abuse.
- Hans, S. L., & Korfmacher, J. (2002). The professional development of paraprofessionals. *Zero to Three*, 23(2), 4-8.
- Hans, S. L., Ray, A. S., Halpern, R., & Bernstein, V. B. (1996). *Caregiving in the Inner City*. Chicago, IL: Department of Psychiatry, The University of Chicago.
- Hattie, J. A., Sharpley, C. F., & Rogers, H. J. (1984). Comparative effectiveness of professional and paraprofessional helpers. *Psychological Bulletin*, 95, 423-541.
- Heinicke, C. M., Goorsky, M., Moscov, S., Dudley, K., Gordon, J., & Guthrie, D. (1998). Partner support as a mediator of intervention outcome. *American Journal of Orthopsychiatry*, 68, 534-541.
- Heinicke, C. M., & Ponce, V. A. (1998). Relation-based early family intervention. In D. Cicchetti & S. L. Toth (Eds.), *Rochester symposium on developmental psychopathology, vol 9: Developmental approaches to prevention and intervention*. Rochester, NY: University of Rochester Press.
- Hodnett, E., & Simmons-Tropea, D. A. (1989). The labour agency scale: Psychometric properties of an instrument measuring control during childbirth. *Research in Nursing Health*, 12, 289-297.
- Hodnett, E. D. (2005). Caregiver support for women during childbirth. *Cochrane Database of Systematic Reviews*, 2, no page #.

- Hodnett, E. D., Lowe, N. K., Hannah, M. E., Willan, A. R., Stevens, B., Weston, J. A., Ohlsson, A., Gafni, A., Muir, H. A., Myhr, T. L., Stremler, R., & Nursing support care in labor trial group. (2002). Effectiveness of nurses as providers of birth labor support in North American hospitals: A randomized controlled trial. *JAMA*, 288(11), 1371-1381.
- Hodnett, E. D., & Osborn, R. W. (1989a). Effects of continuous intrapartum professional support on childbirth outcomes. *Research in Nursing and Health*, 12, 289-297.
- Hodnett, E. D., & Osborn, R. W. (1989b). A randomized trial of the effects of monitrice support during labor: Mothers views of two to four weeks postpartum. *Birth*, 16, 4.
- Hofmeyr, G. J., Nikodem, V. C., Wolman, W. L., Chalmers, B. E., & Kramer, T. (1991). Companionship to modify the clinical birth environment: Effects on progress and perceptions of labor, and breast feeding. *British Journal of Obstetrics and Gynaecology*, 98, 756-764.
- Horvath, A., & Greenberg, L. (1989). Development and validation of the Working Alliance Inventory. *Journal of Counseling Psychology*, 36, 223-233.
- Huffman, S. L., & Combest, C. (1990). Role of breastfeeding in the prevention and treatment of diarrhea. *Journal of Diarrhoeal Diseases Research*, 8, 68-81.
- Humphreys, A. S., Thompson, N. J., & Miner, K. R. (1998). Intention to breastfeed in low-income pregnant women: The role of social support and previous experience. *Birth*, 25, 169-173.
- Hwang, S. (2004, January 20). As 'doulas' enter delivery rooms, conflicts arise. Hired to help in childbirth, they sometimes clash with doctors and nurses. *The Wall Street Journal*.
- Jacobson, S. W., Jacobson, J. L., & Frye, K. F. (1991). Incidence and correlates of breast-feeding in socioeconomically disadvantaged women. *Pediatrics*, 88, 728-736.
- Kalil, A., Spencer, M. S., Spieker, S. J., & Gilchrist, L. D. (1998). Effects of grandmother coresidence and quality of family relationships on depressive symptoms in adolescent mothers. *Family Relations*, 47, 433-441.
- Kennell, J. (1997, 1997). *Remarks*. Paper presented at the Doulas of North America Annual Meeting, Austin, TX.
- Kennell, J., Klaus, M., McGrath, S. R., S., & Hinkley, C. (1991). Continuous emotional support during labor in a US hospital: A randomized controlled trial. *JAMA*, 265, 2197-2201.
- Kessler, L. A., Gielen, A. C., Diener-West, M., & Paige, D. M. (1995). The effect of a woman's significant other on her breastfeeding decision. *Journal of Human Lactation*, 11, 103-109.
- Ketterlinus, R. D., Lamb, M. E., & Nitz, K. (1991). Developmental and ecological sources of stress among adolescent parents. *Family Relations*, 40, 435-441.
- Kistin, N., Abramson, R., & Dublin, P. (1994). Effect of peer counselors on breastfeeding initiation, exclusivity, and duration among low-income urban women. *Journal of Human Lactation*, 10, 11-15.
- Klaus, M. H., Kennell, J. H., Robertson, S. S., & Sosa, R. (1986). Effects of social support during parturition on maternal and infant morbidity. *British Medical Journal*, 293, 585-587.
- Kochanska, G. (1997). Mutually responsive orientation between mothers and their young children: implications for early socialization. *Child Development*, 68, 94-112.
- Koop, C. E., & Brannon, M. E. (1984). Breast feeding -- the community norm. Report of a workshop. *Public Health Reports*, 99, 550-558.
- Korfmacher, J. (2004). *Evaluating doula support for young women*. Paper presented at the Plenary session presentation at the Seventeenth Annual Maternal Child Health Leadership Conference, Chicago, IL.
- Korfmacher, J., Adam, E., Ogawa, J., & Egeland, B. (1997). Adult attachment: Implications for the therapeutic process in a home visitation intervention. *Applied Developmental Science*, 1, 43-52.
- Korfmacher, J., Kitzman, H., & Olds, D. (1998). Intervention processes as predictors of outcomes in a preventive home-visit program. *Journal of Community Psychology*, 26, 49-64.
- Korfmacher, J., O'Brien, R., Hiatt, S., & Olds, D. (1999). Differences in program implementation between nurses and paraprofessionals in prenatal and infancy home visitation: A randomized trial. *American Journal of Public Health*, 89, 1847-1851.

- Kurini, N., Shiono, P. H., & Rhoads, G. S. (1988). Breast-feeding incidence and duration in black and white women. *Pediatrics*, *81*, 365-371.
- Ladner, J. A. (1972). *Tomorrow's tomorrow*. Garden City, NY: Anchor Books.
- Ladner, J. A., & Gourdnine, R. M. (1984). Intergenerational teenage motherhood: Some preliminary findings. *Sage: A Scholarly Journal of Black Women*, *1*, 22-24.
- Lamb, M. E., Hopps, K., & Elster, A. B. (1987). Strange situation behavior of infants with adolescent mothers. *Infant Behavior and Development*, *10*, 39-48.
- Lamborn, S. D., Dornbusch, S. M., & Steinberg, L. (1996). Ethnicity and community context as moderators of the relations between family decision making and adolescent adjustment. *Child Development*, *67*, 283-301.
- Landry, S. H., McGrath, S. K., Kennell, J. H., Martin, S., & Steelman, L. (1998). The effects of doula support during labor on mother-infant interaction at 2 months. *Pediatric Research*, *43*(3, Part 11), 13A.
- Langer, A., Campero, L., Garcia, C., & Reynoso, S. (1998). Effects of psychosocial support during labour and childbirth on breastfeeding, medical interventions, and mothers' wellbeing in a Mexican public hospital: A randomised clinical trial. *British Journal of Obstetrics and Gynaecology*, *105*, 1056-1063.
- Lanting, C. I., Fidler, V., Huisman, M., Touwen, B. C., & Boersma, E. R. (1994). Neurological differences between 9-year-old children fed breast-milk and formula-milk as babies. *Lancet*, *344*, 1319-1322.
- Leadbeater, B., Bishop, S., & Raber, C. C. (1996). Quality of mother-child interactions, maternal depressive symptoms, and behavior problems in preschoolers of adolescent mothers. *Developmental Psychology*, *32*, 280-288.
- Lena, S. M., Marko, E., Nimrod, C., Merritt, L., Poirer, G., & Shein, E. (1993). Birthing experiences of adolescents at the Ottawa General Hospital Perinatal Centre. *CMAJ*, *148*, 2149-2154.
- Lewinsohn, P. M., Hops, H., Roberts, R. E., & Seeley, J. R. (1992). Adolescent psychopathology: Prevalence, comorbidity, and psychosocial correlates. *Verhaltenstherapie*, *2*, 132-139.
- Lieberman, A. F. (1991). Attachment theory and infant-parent psychotherapy: Some conceptual, clinical, and research considerations. In D. Cicchetti & S. L. Toth (Eds.), *Rochester Symposium on Developmental Psychopathology, Vol. 3: Models and Integrations*. Rochester, NY: University of Rochester Press.
- Lindberg, L. D., Sonenstein, F. L., Ku, L., & Martinez, G. (1997). Age differences between minors who give birth and their adult partners. *Family Planning Perspectives*, *29*, 61-66.
- Liu, E. H. C., & Sia, A. T. H. (2004). Rates of caesarean section and instrumental vaginal delivery in nulliparous women after low concentration epidural infusions or opioid analgesia: systematic review. *BMJ*, *328*(7453), 1410.
- Lizarraga, J. L., Maehr, J. C., Wingard, d. L., & Felice, M. E. (1992). Psychosocial and economic factors associated with infant feeding intentions of adolescent mothers. *Journal of Adolescent Health*, *13*, 676-681.
- Locklin, M. P., & Naber, S. J. (1993). Does breastfeeding empower women? Insights from a select group of educated, low-income, minority women. *Birth*, *20*, 30-35.
- Losch, M., Dugny, C. I., Russell, D., & Dusdieker, L. B. (1995). Impact of attitudes on maternal decisions regarding infant feeding. *Journal of Pediatrics*, *126*, 507-514.
- Lucas, A., Morley, R., Cole, T. J., Lister, G., & Leeson-Payne, C. (1992). Breast milk and subsequent intelligence quotient in children born premature. *Lancet*, *339*, 261-264.
- Luster, T., & Mittelstaedt, M. (1993). Adolescent mothers. In T. Luster & L. Okagaki (Eds.), *Parenting: An ecological perspective* (pp. 35-68). Hillsdale, NJ: Lawrence Erlbaum.
- Lyons-Ruth, K., Connell, D. B., Grunebaum, H. U., & Botein, S. (1990). Infants at social risk: Maternal depression and family support services as mediators of infant development and security of attachment. *Child Development*, *61*, 85-98.

- Maccoby, E. E. (1992). The role of parents in the socialization of children: an historical overview. *Developmental Psychology*, 28, 1006-1017.
- Marut, J. S., & Mercer, R. T. (1979). Comparison of primiparas' perceptions of vaginal and Cesarean births. *Nursing Research*, 28, 260-266.
- Maynard, R. (1997). The study, the context and the findings in brief. In R. Maynard (Ed.), *Kids having kids: Economic costs and social consequences of teen pregnancy* (pp. 1-22). Washington, DC: Urban Institute Press.
- McElroy, S. W., & Moore, K. A. (1997). Trends over time in teenage pregnancy and childbearing: The critical changes. In R. Maynard (Ed.), *Kids having kids: Economic costs and social consequences of teen pregnancy* (pp. 23-53). Washington, DC: The Urban Institute Press.
- McGuire, J., & Earls, F. (1993). Exploring the reliability of measures of family relations, parental attitudes and parent-child relations in a disadvantaged, minority population. *Journal of Marriage and the Family*, 55, 1042-1046.
- McLorg, P. A., & Bryant, C. A. (1989). Influence of social network members and health care professionals on infant feeding practices of economically disadvantaged mothers. *Medical Anthropology*, 10, 265-278.
- Morrow, A. L., Guerrero, M. L., Shults, J., Calva, J. J., Lutter, C., Bravo, J., Ruiz-Palacios, G., Morrow, R. C., & Butterfoss, F. D. (1999). Efficacy of home-based peer counselling to promote exclusive breastfeeding: A randomised controlled trial. *Lancet*, 353, 1226-1231.
- Mullen, E. (1995). *Mullen Scales of Early Learning*. Circle Pines, MN: American Guidance Service, Inc.
- Musick, J. S. (1993). *Young, poor, and pregnant: The psychology of teenage motherhood*. New Haven, CT: Yale University Press.
- Mylod, D., Whitman, T., & Borkowski, B. (1997). Predicting adolescent mothers' transition to adulthood. *Journal of Research on Adolescence*, 7, 457-478.
- Nord, C. W., Moore, K. A., Morrison, D. R., Brown, B., & Myers, D. E. (1992). Consequences of teenage parenting. *Journal of School Health*, 62, 310-318.
- Olds, D., Henderson, C., Kitzman, H., Eckenrode, J., Cole, R., & Tatelbaum, R. (1998). The promise of home visitation: Results of two randomized trials. *Journal of Community Psychology*, 26, 5-21.
- Olds, D., Robinson, J., Luckey, D., O'Brien, R., Korfmacher, J., Hiatt, S., Pettitt, L., & Henderson, C. (1999). *Comparison of pregnancy and infancy home visitation by nurses versus paraprofessionals: A randomized controlled trial*. Final Report to the Colorado Trust on Home Visitation 2000 (Grant #93059).
- Olds, D. L., & Kitzman, H. (1990). Can home visitation improve the health of women and children at environmental risk? *Pediatrics*, 86, 108-116.
- Olds, D. L., & Kitzman, H. (1993). Review of research on home visiting programs for pregnant women and parents of young children. *The Future of Children*, 3, 53-92.
- Olds, D. L., & Korfmacher, J. (1998). Maternal psychological characteristics as influences on home visitation contact. *Journal of Community Psychology*, 26, 23-36.
- Osofsky, J. D., Hann, D. M., & Peebles, C. (1993). Adolescent parenthood: Risks and opportunities for parents and infants. *Handbook of infant mental health*, 106-119.
- Patton, M. Q. (1987). *How to use qualitative methods in evaluation*. Newbury Park, CA: Sage.
- Pearlin, L. I., Menaghan, E. G., Lieberman, M. A., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior*, 22, 337-356.
- Petersen, A. C., & Crockett, L. J. (1992). Adolescent sexuality, pregnancy, and child rearing: Developmental perspectives. In M. K. Rosenheim & M. F. Testa & e. al. (Eds.), *Early parenthood and coming of age in the 1990s* (pp. 34-45). New Brunswick, NJ: Rutgers University Press.
- Powell, D. R. (1988). Toward an understanding of the program variable in comprehensive parent support programs. In H. B. Weiss & F. H. Jacobs (Eds.), *Evaluating family programs* (pp. 267-286). New York: Aldine de Gruyter.

- Radloff, L. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Journal of Applied Psychological Measure*, 1, 385-401.
- Raisler, J., Alexander, C., & O'Campo, P. (1999). Breast-feeding and infant illness: A dose-response relationship? *American Journal of Public Health*, 89, 25-30.
- Rauh, V. A., Achenbach, T. M., Nurcombe, B., Howell, C. T., & Teti, D. M. (1988). Minimizing adverse effects of low birthweight: Four year results of an early intervention program. *Child Development*, 59, 544-553.
- Report, B. P. C. (1996). *Breastfeeding: Investing in California's Future*. Sacramento, CA: California Department of Health Services, Primary Care and Family Health.
- Robins, L. N., Helzer, J. E., Croughan, J., & Ratcliff, K. S. (1981). National Institute of Mental Health Diagnostic Interview Schedule: History, characteristics, and validity. *Archives of General Psychiatry*, 38, 381-389.
- Rohner, R. (1980). Worldwide tests of parental acceptance-rejection theory: An overview. *Behavior Science Research*, 15, 1-21.
- Roth, A., & Fonagy, P. (1996). *What works for whom? A critical review of psychotherapy research*. New York: The Guilford Press.
- Ruble, D. N., Brooks-Gunn, J., Fleming, A. S., Fitzmaurice, G., Stangor, C., & Deutsch, F. (1990). Transition to motherhood and the self: Measurement, stability, and change. *Journal of Personality and Social Psychology*, 58, 450-463.
- Ryan, A. S. (1997). The resurgence of breast-feeding in the United States. *Pediatrics*, 99, E12.
- Ryan, A. S., Wysong, J. L., Martinez, G. A., & Simon, S. D. (1990). Duration of breast-feeding patterns established in the hospital. Influencing factors. Results from a national survey. *Clin Pediatr (Phila)*, 29, 99-107.
- Sarett, H. P., Bain, K. R., & O'Leary, J. C. (1983). Decisions on breastfeeding or formula feeding and trends in infant-feeding practices. *American Journal of Diseases of Children*, 719-725.
- Scariati, P. D., & Grummer-Strawn, L. M. (1997). A longitudinal analysis of infant morbidity and the extent of breastfeeding in the United States. *Pediatrics*, 99, E5.
- Scott, K. D., Berkowitz, G., & Klaus, M. (1999). A comparison of intermittent and continuous support during labor: A meta-analysis. *American Journal of Obstetrics and Gynecology*, 180, 1054-1059.
- Seifer, R., & Dickstein, S. (2000). Parental mental illness and infant development. In C. H. J. Zeanah (Ed.), *Handbook of infant mental health* (2nd ed ed.). New York: Guilford Press.
- Serbin, L., Peters, P., McAffer, V., & Schwartzman, A. (1991). Childhood aggression and withdrawal as predictors of adolescent pregnancy, early parenthood and environmental risk for the next generation. *Canadian Journal of Behavioral Science*, 23, 313-331.
- Shaw, D. S., Owens, E. B., Vondra, J. I., Keenan, K., & Winslow, E. B. (1996). Early risk factors and pathways in the development of early disruptive behavior problems. *Development and Psychopathology*, 8, 679-699.
- Simpson, J., Rholes, W., & Nelligan, J. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. *Journal of Personality and Social Psychology*, 62, 434-446.
- Sosa, R., Kennell, J., Klaus, M., Robertson, S., & Urretia, J. (1980). The effect of a supportive companion on perinatal problems, length of labor and mother-infant interaction. *The New England Journal of Medicine*, 303, 597-600.
- Spieker, S. J., & Bensley, L. (1994). Roles of living arrangements and grandmother social support in adolescent mothering and infant attachment. *Developmental Psychology*, 30, 102-111.
- Spielberger, C. D., Gorusch, R. L., & Lushene, R. E. (1983). *State-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stack, C. B. (1974). *All our kin*. New York: Harper and Row.
- Straus, M. (1979). Measuring intra-family conflict and violence: The conflict Tactics (CT) Scales. *Journal of Marriage and the Family*, 41, 75-88.

- Sullivan, M. (1993). Young fathers and parenting in two inner-city neighborhoods. In R. I. Lerman & T. J. Ooms (Eds.), *Young unwed fathers: Changing roles and emerging policies* (pp. 52-73). Philadelphia: Temple University Press.
- Taylor, A., Littlewood, J., Adams, D., Dore, C., & Glover, V. (1994). Serum cortisol levels are related to moods of elation and dysphoria in new mothers. *Psychiatry Research, 54*, 241-247.
- Teti, D. M., & Gelfand, D. M. (1991). Behavioral competence among mothers of infants in the first year: The mediational role of maternal self-efficacy. *Child Development, 62*, 918-929.
- Thorp, J. A., & Breedlove, G. (1996). Epidural analgesia in labor: an evaluation of risk and benefits. *Birth, 23*(2), 63-83.
- Uauy, R., & De Andraca, I. (1995). Human milk and breastfeeding for optimal mental development. *Journal of Nutrition, 125*(8 Supp), 2278S-2280S.
- Unger, D. G., & Wandersman, L. P. (1988). The relation of family and partner support to the adjustment of adolescent mothers. *Child Development, 59*, 1056-1060.
- Ventura, S. J., & Curtin, S. C. (1999). Recent trends in teen births in the United States. *Statistical Bulletins -- Metropolitan Insurance Companies, 80*, 2-12.
- Virden, S. F. (1988). *Journal of Nurse-Midwifery, 33*, 31-35.
- Voight, J. D., Hans, S. L., & Bernstein, V. J. (1996). Support networks of adolescent mothers: Effects on parenting experience and behavior. *Infant Mental Health Journal, 17*, 58-73.
- Wakschlag, L., Chase-Lansdale, P. L., & Brooks-Gunn, J. (1996). Not just "Ghosts in the Nursery": Contemporaneous intergenerational relationships and parenting in African-American families. *Child Development, 67*, 2132-2147.
- Wakschlag, L. S., & Hans, S. L. (1999). Relation of maternal responsiveness during infancy to the development of behavior problems in high-risk youths. *Developmental Psychology, 35*, 569-579.
- Wakschlag, L. S., & Hans, S. L. (2000). Early parenthood in context: Implications for development and intervention. In C. Zeanah (Ed.), *Handbook of Infant Mental Health* (2nd edition ed., pp. 129-144). New York: Guilford Press.
- Wasik, B. H. (1993). Staffing issues for home visiting programs. *The Future of Children*(3), 140-157.
- Weisenfeld, A. R., & al., e. (1985). Psychophysiological response of breast- and bottle-feeding mothers to their infants' signals. *Psychophysiology, 22*, 79-86.
- Wellings, K., Wadsworth, J., Johnson, A., Field, J., & Macdowall, W. (1999). Teenage fertility and life chances. *Rev Reprod, 4*, 184-190.
- Werner, E. E., & Smith, R. S. (1982). *Vulnerable but invincible: A longitudinal study of resilient children and youth*. New York: McGraw-Hill.
- Whiteside-Mansell, L., Pope, S., & Bradley, R. (1996). Patterns of parenting in young mothers. *Family Relations, 45*, 273-281.
- Wiemann, C. M., DuBois, J. C., & Berenson, A. B. (1998). Racial/ethnic differences in the decision to breastfeed among adolescent mothers. *Pediatrics, 101*, E11.
- Wiles, L. S. (1984). The effect of prenatal breastfeeding education on breastfeeding success and maternal perception of the infant. *JOGN Nursing, 13*, 253-257.
- Windle, M. (1990). A longitudinal study of antisocial behaviors in early adolescence as predictors of late adolescent substance use: Gender and ethnic group differences. *Journal of Abnormal Psychology, 99*, 86-91.
- Wolman, W. L., Chalmers, B., Hofmeyr, G. J., & Nikodem, V. C. (1993). Postpartum depression and companionship in the clinical birth environment: A randomized, controlled study. *American Journal of Obstetrics and Gynecology, 168*, 1388-1393.
- Zeanah, C. H., Keener, M. A., Anders, T. F., & Vieira-Baker, C. C. (1987). Adolescent mothers' perceptions of their infants before and after birth. *American Journal of Orthopsychiatry, 57*, 351-360.

Zhang, J., Bernasko, J. W., Leybovich, E., Fahs, M., & Hatch, M. C. (1997). Continuous labor support from labor attendant for primiparous women: A meta-analysis. *Obstetrics and Gynecology*, 88, 739-744.