

Breastfeeding and Complementary Food: Randomized Trial of Community Doula Home Visiting

abstract

OBJECTIVES: Despite recent efforts to increase breastfeeding, young African American mothers continue to breastfeed at low rates, and commonly introduce complementary foods earlier than recommended. This study examines the effects of a community doula home visiting intervention on infant feeding practices among young mothers.

METHODS: Low-income, African American mothers ($n = 248$) under age 22 years participated in a randomized trial of a community doula intervention. Intervention-group mothers received services from paraprofessional doulas: specialized home visitors trained as childbirth educators and lactation counselors. Doulas provided home visits from pregnancy through 3 months postpartum, and support during childbirth. Control-group mothers received usual prenatal care. Data were obtained from medical records and maternal interviews at birth and 4 months postpartum.

RESULTS: Intent-to-treat analyses showed that doula-group mothers attempted breastfeeding at a higher rate than control-group mothers (64% vs 50%; $P = .02$) and were more likely to breastfeed longer than 6 weeks (29% vs 17%; $P = .04$), although few mothers still breastfed at 4 months. The intervention also impacted mothers' cereal/solid food introduction ($P = .008$): fewer doula-group mothers introduced complementary foods before 6 weeks of age (6% vs 18%), while more waited until at least 4 months (21% vs 13%) compared with control-group mothers.

CONCLUSIONS: Community doulas may be effective in helping young mothers meet breastfeeding and healthy feeding guidelines. The intervention's success may lie in the relationship that develops between doula and mother based on shared cultural background and months of prenatal home visiting, and the doula's presence at the birth, where she supports early breastfeeding experiences. *Pediatrics* 2013;132:S160–S166

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Dr Edwards carried out data analyses, drafted the initial manuscript, and reviewed and revised the manuscript; Dr Thullen assisted with data analyses and reviewed and revised the manuscript; Dr Korfmacher designed the interviews and reviewed and revised the manuscript; Dr Lantos served as the medical director for the study and participated in design of study methods; Ms Henson designed the interviews, coordinated and supervised data collection, and reviewed and revised the manuscript; Dr Hans conceptualized and designed the study and interviews and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted.

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Breastfeeding rates among young, African American, and low-income women remain very low despite increased efforts among health care providers to promote breastfeeding.^{1,2} In the 2006 National Health and Nutrition Study, for example, only 30% of black adolescent mothers had ever attempted to breastfeed their infants.² Research also indicates that young mothers commonly introduce cereal or other solid foods to their infants much earlier than the American Academy of Pediatrics recommended 4 to 6 months of age.^{3–6} Given the health, social, and economic benefits associated with breastfeeding^{7–13} and potential problems related to early introduction of complementary foods,^{14–16} young, low-income mothers remain an important group to target for intervention surrounding infant feeding practices.

Young, African American mothers often face numerous barriers to implementing healthy feeding practices, including a lack of information about the benefits of breastfeeding and risks associated with providing solid food to very young infants, inadequate support from their own mothers or other family and friends, lack of peer models and networks for breastfeeding, fear of pain, lack of space and privacy, embarrassment about breastfeeding, and a cultural context in which formula feeding and supplementing with cereal is normative practice.^{5, 17–19} Although the promotion of breastfeeding by hospital medical professionals and lactation consultants has greatly contributed to the increase in overall breastfeeding rates in the past few years,²⁰ professionals may have limited success among young, African American mothers given the complexity of the obstacles that these mothers face and the time constraints of medical and lactation professionals.

Research has shown that support from doulas, peer counselors, or other

paraprofessional or lay providers can lead to increased breastfeeding rates among both low- and high-risk mothers.^{21–25} The success of lay helpers, who often share socioeconomic and ethnic backgrounds with clients, is thought to derive from their understanding of the economic, environmental, and cultural context in which mothers live, their awareness of the particular personal challenges that the mothers face and resources available to them, and their availability to clients in time and place.²⁶

Doulas are childbirth support providers who have training and experience focused on childbirth but who are not medical professionals. Doulas' core roles include offering continuous comfort and emotional support to mothers during labor and delivery and encouraging bonding and breastfeeding during the immediate postpartum period.²⁷ Based on the well-documented success of hospital-based doula interventions in promoting healthy childbirth outcomes,²⁸ some community-based programs serving pregnant low-income or young mothers have developed a new model of doula services in which support is offered, not only in hospital settings, but also in the home during pregnancy and after birth.^{29,30} These "community doulas," who usually have deep connections to their clients' cultures and communities, expand the role of the doula to include specialized home visitation services focused on pregnancy health, childbirth preparation, fetal and infant bonding, child health, and breastfeeding.

Preliminary data suggest that young mothers who receive community doula services have breastfeeding rates that exceed those typically found among young mothers,²⁹ however, no studies to date have rigorously examined the model's efficacy. Therefore, a randomized, controlled trial of a community doula home visiting intervention was

designed to test, in part, the hypothesis that community doulas would enhance breastfeeding and healthy infant feeding outcomes in a group of young, African American mothers.

METHODS

Design

A randomized, controlled trial of a community doula intervention for young, pregnant women was conducted at a major urban university hospital. This study was approved by the Institutional Review Board of the affiliated university. All participants provided written informed consent before the baseline interview.

Inclusion and Exclusion Criteria

Pregnant women were recruited between January 2001 and April 2004 through a community health center and prenatal clinic affiliated with the university hospital. Women who were less than 34 weeks pregnant, under 21 years of age, and planning to deliver at the affiliated hospital were eligible to participate in the study. Mothers who were aware at the time of recruitment that they would require a surgical delivery, who planned to move from the area, or who planned to give up custody of the infant were excluded from the study. A total of 468 young, pregnant women were informed about the study and the doula services by a doula during a prenatal clinic appointment. Research interviewers then attempted to call women who expressed interest in the study to schedule a session for informed consent and the baseline interview. Fifty-three percent ($n = 248$) were enrolled in the study, 15% ($n = 70$) declined participation, 17% ($n = 80$) could not be reached, 11% ($n = 51$) did not show up for their consent sessions (often rescheduled multiple times), 2.4% ($n = 11$) had plans to move, 1.4% ($n = 7$) delivered or lost the infant before enrollment, and 0.2% ($n = 1$)

planned to give the infant up for adoption.

Randomization

At the end of the baseline interview, women were randomly assigned to receive usual prenatal health care services through the clinics ($n = 124$; control group) or a combination of usual services and a community doula intervention ($n = 124$; doula group). Randomization took place in blocks of 4, 6, or 8, with equal numbers assigned to the intervention and control groups within each block. A biostatistician prepared a set of opaque envelopes, each labeled with a subject ID number and containing a group assignment. Envelopes were opened by the interviewer in the presence of the mother at the completion of the baseline interview. Mothers in the 2 groups were compared on a variety of demographic, psychological, and health variables measured before randomization and no significant differences were found (Table 1).

Intervention Model

Doula-group participants were assigned 1 of 4 program doulas. The doulas were African American women from the communities surrounding the clinics who had not previously been trained as health professionals,

although 1 had worked as a clinic medical assistant, 1 had received breastfeeding peer counselor training, and all had informal experience counseling pregnant adolescents in their churches and communities. Three of the 4 doulas had been adolescent mothers, and 3 had breastfed their children. Before beginning their work with study families, the doula participated in an intensive 20-week doula training course provided by the Chicago Health Connection (Health Connect One) and a 10-week breastfeeding peer counselor training program from the same organization. After initial training, all doulas took continuing education courses. All 4 became certified childbirth educators and 3 became certified lactation counselors. Doula received weekly individual and group supervision sessions led by a pediatric nurse, who had also been trained as a doula. The nurse also provided doulas with emergency clinical consultation, support, and medical information.

The doulas focused on multiple aspects of maternal and infant well-being. Although the doulas did not follow a specific breastfeeding curriculum, breastfeeding advocacy and support were primary areas of focus of the program services.

During weekly prenatal home visits, the doulas focused on building relationships

with the mother while discussing pregnancy health, childbirth preparation, and bonding with the unborn infant. They engaged mothers in ongoing conversations about infant feeding, listened to mothers' ideas and concerns about breastfeeding, and worked to dispel any myths that the mothers held. Doulas sometimes shared their personal experiences of breastfeeding or the experiences of others in their community to help normalize the idea of breastfeeding for women from their cultural and community backgrounds. The doulas educated mothers about the benefits of breastfeeding, sometimes using printed, video, or other informational materials. The doulas included fathers and mothers' family members in discussions about the benefits of breastfeeding and helped mothers gain family acceptance for decisions around feeding.

During labor and delivery, the doulas were present in the hospital to provide continuous emotional support and offer physical comfort techniques. The doulas were present in the first moments after the birth to encourage mothers to put the infant to breast and to help the infants latch. During the hospital stay and after discharge home, the doulas continued to provide encouragement and guidance as mothers negotiated the initial challenges of breastfeeding, including relieving breast discomfort, getting the infant to latch, and finding effective holding positions. Doula suggested to mothers that they put the infant to breast at frequent intervals and that they not introduce formula to infants while establishing lactation. The doulas provided information on ways to assess and reassure mothers that the infant was getting enough milk.

During home visits made during the first 3 months postpartum, doulas helped mothers adjust to parenthood and get to know their infants and how to

TABLE 1 Baseline (Pre-Randomization) Characteristics of Control Group and Doula Group Mothers

Characteristics	Control Group ($n = 124$)	Doula Group ($n = 124$)
Maternal age at enrollment, mean (SD), yr	17.9 (1.7)	18.2 (1.7)
Maternal years in school completed, mean (SD)	10.6 (1.5)	10.9 (1.5)
Gestational age at enrollment, mean (SD), wk	23.8 (5.3)	23.3 (4.6)
Vocabulary Score (PPVT), mean (SD)	85.5 (11.4)	86.4 (11.2)
Expecting first child, No. (%)	109 (87.9)	110 (88.7)
Mother in school, No. (%)	68 (54.8)	67 (54.0)
Mother employed, No. (%)	27 (21.8)	10 (16.1)
Co-residing with parent figure, No. (%)	98 (79.0)	96 (77.4)
Partner with infant's father, No. (%)	83 (66.9)	89 (71.8)
Considering breastfeeding at enrollment, No. (%)	72 (58.1)	82 (66.1)
Own mother breastfed, No. (%)	44 (35.5)	44 (35.5)
Knew someone who had breastfed, No. (%)	72 (58.1)	79 (63.7)

PPVT, Peabody Picture Vocabulary Test.

care for them. Doulas were available to breastfeeding mothers by telephone 24 hours a day to help with problems. Doulas provided breast pumps for mothers who were returning to work or school. For mothers who were feeding breast milk from bottles or using formula, doulas discouraged the use of cereal in the bottle. Doulas discouraged the introduction of solid food during the early months of life for both breastfed and formula-fed infants.

Mothers in the community doula intervention group received an average of 10 prenatal and 12 postpartum home visits. A doula was present at the hospital for the birth for 81.5% of the intervention-group infants.

Outcome Measures

Data were collected by research staff through interviews with mothers and by chart review. Data on breastfeeding attempts were collected by mother report at the hospital the second morning after the birth and from review of the nursing notes in the mother's medical chart after the mother's discharge. For reporting in this paper, mothers were considered to have attempted breastfeeding if breastfeeding was indicated by either self report or nursing notes. At 4 months postpartum, the mothers participated in an interview on topics such as health, feeding practices, and parenting. Mothers reported on whether they were currently breastfeeding and, if not, when they had stopped breastfeeding. Mothers were also asked about whether they had started feeding their infants cereal, either in the bottle or by spoon, or other solid foods, and reported the infant age at which they had first introduced complementary foods.

Sample Retention

Data on 123 control group mothers and 122 doula group mothers were obtained during the postpartum period. One

infant in the control group and 1 infant in the doula group died at birth, and 1 mother in the doula group declined to participate in the study after the baseline interview. A total of 221 mothers, 113 in the control group and 108 in the doula group, participated in the 4-month interview. Reasons for subject loss at 4 months included inability to locate mothers and infant death (Fig 1).

Data Analysis

χ^2 tests of association were performed to examine group differences in attempted breastfeeding at the hospital, breastfeeding duration, and timing of cereal/solid food introduction. Breastfeeding duration was classified as "never," "less than 6 weeks," "6 weeks to 4 months," and "longer than 4 months." Mothers were also categorized into 3 groups based on the age at which they had introduced cereal or other solid foods to their infants: "younger than 6 weeks," "6 weeks to 4 months," and "older than 4 months." All analyses were by intent-to-treat.

RESULTS

Table 1 shows demographic characteristics of mothers in the control group and doula group. All of the mothers were African American, which was representative of women attending the prenatal clinics. A total of 93.8% of mothers received Medicaid, and 88.7% were giving birth for the first time. The mean age of the mothers at the birth was 18.3 years (SD = 1.7). Seventy-eight percent lived with a parent figure at the time of enrollment.

Results show that the community doula intervention was significantly associated with breastfeeding rates (Table 2). In the hospital, 63.9% of mothers in the doula group attempted breastfeeding, compared with 49.6% of mothers in the control group ($P = .02$). The impact of the intervention on breastfeeding duration was less clear. Although mothers

who received doula services were more likely to breastfeed longer than 6 weeks compared with control group mothers (28.7% vs 16.8%; $P = .04$), few mothers in either group were still breastfeeding by 4 months postpartum (8.3% of doula-group mothers and 4.4% of control-group mothers).

There was a significant association between timing of complementary food introduction and intervention status ($P = .008$). Although the majority of mothers in both groups were feeding their infants cereal or other solid foods before 4 months of age, more mothers in the intervention group (21.3%) compared with the control group (12.5%) had waited until at least 4 months. Additionally, only 5.6% of mothers in the doula group compared with 17.9% of mothers in the control group had introduced complementary foods during very early infancy (<6 weeks).

DISCUSSION

Previous research suggests that even short-term breastfeeding is associated with a variety of positive health outcomes for infants, including reduced risk for Sudden Infant Death Syndrome,¹⁵ lower incidence of otitis media, respiratory tract infections, and gastrointestinal tract infections during infancy,³¹ and lower rates of childhood obesity^{8,32,33} and type 2 diabetes.^{33,34} Additionally, delaying the introduction of complementary foods until infants are at least 4 months of age can prevent choking¹⁴ and gastrointestinal problems³⁵ among young infants, and may reduce the risk for childhood obesity.¹⁵ Given that rates of breastfeeding and delayed solid food introduction have traditionally been very low among young, African American, and low-income mothers, interventions are needed to enhance healthy feeding outcomes among these groups.

This study, using a sample of young, African American mothers, is the first to

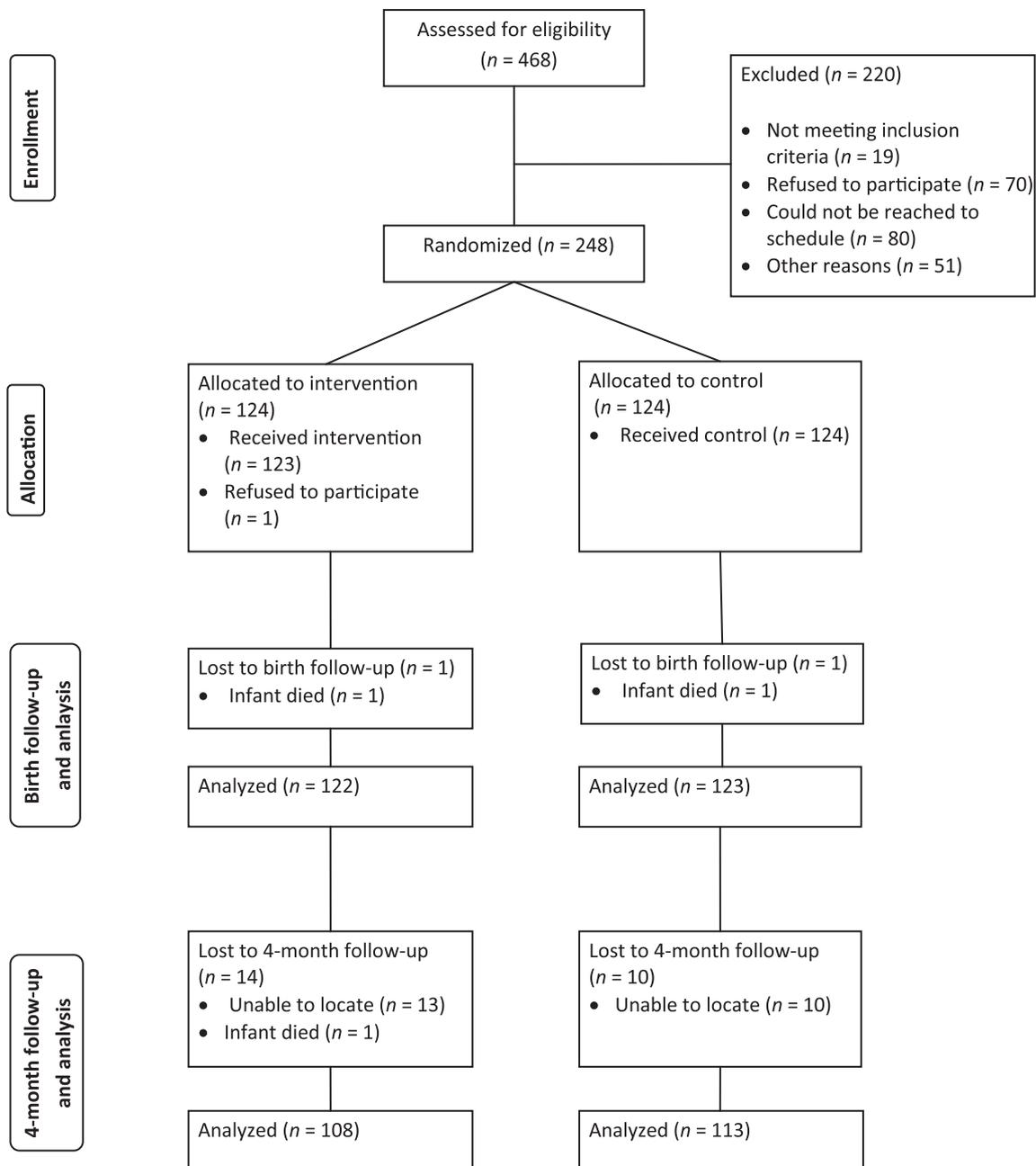


FIGURE 1
Participant flowchart.

examine the efficacy of a community doula home visiting intervention in promoting positive infant feeding outcomes. The results demonstrate that more mothers assigned to community doula services attempted to breastfeed their infants in the hospital and continued to breastfeed past 6 weeks postpartum compared with mothers who received usual prenatal care.

Doula services also impacted the age at which mothers first introduced complementary foods to their infants: doula-group mothers were less likely to feed cereal or other solids to newborns and more likely to wait until infants were at least 4 months old.

Qualitative interviews from mothers in this study, reported elsewhere,³⁶ suggest that the success of this community

doula intervention for breastfeeding promotion and healthy feeding may lie in the close relationship that develops between the community doulas and the mothers during pregnancy and the ongoing conversations and support that doulas provide around healthy feeding practices. Trust is facilitated by the community doulas' respectful, non-judgmental approach, their credibility

TABLE 2 Doula Intervention Effects on Breastfeeding and Infant Feeding Practices

	Doula Group % (95% CI) No.	Control Group % (95% CI) No.	P
Birth outcomes (n = 245)			
Attempted breastfeeding	63.9 (55.3–72.5) n = 78/122	49.6 (40.7–58.5) n = 61/123	P = .02
4-month outcomes (n = 221)			
Breastfeeding duration			P = .10
Never	34.3 (25.2–43.3) n = 37/108	48.7 (39.4–58.0) n = 55/113	
<6 wk	37.0 (27.8–46.2) n = 40/108	34.5 (25.7–43.4) n = 39/113	
6 wk to 4 mo	20.4 (12.7–28.0) n = 22/108	12.4 (6.3–18.5) n = 14/113	
>4 mo	8.3 (3.1–13.6) n = 9/108	4.4 (0.5–8.3) n = 5/113	
Timing of cereal/solid food introduction			P = .008
<6 wk of age	5.6 (1.2–9.9) n = 6/108	17.9 (10.7–25.0) n = 20/112	
6 wk to 4 mo of age	73.1 (64.7–81.6) n = 79/108	69.6 (61.0–78.2) n = 78/112	
>4 mo of age	21.3 (13.5–29.1) n = 23/108	12.5 (6.3–18.7) n = 14/112	

CI, confidence interval.

as women who share a cultural background, their presence in mothers' homes, their presence at the birth, and their availability by phone when most needed. Although doctors, nurses, and lactation professionals are knowledgeable and may be well-intentioned, clinic appointments and brief hospital interventions allow only limited windows of opportunity to counsel young mothers. These interactions may not coincide with times when questions arise for the young mothers or allow for the kind of relationship that the mothers may need to share very personal concerns and listen to advice. Because doulas are able to provide services in the home and thus facilitate a sense of comfort, mothers may be more receptive to the guidance doulas give regarding infant feeding and allow the doulas to physically support their breastfeeding attempts after the birth and in the early postpartum weeks.

Although the impact of the community doula intervention on feeding outcomes was statistically and clinically significant, the breastfeeding rate of 64%

found among the doula group mothers is lower than the Healthy People 2010 target rate of 75% and the 2020 target of 81.9%.³⁷ Additionally, the impact of the intervention was only modestly sustained over time. Even in the doula group, there was substantial drop-off in the number of mothers still breastfeeding at 6 weeks, and only 8% of mothers continued to breastfeed at 4 months. Many mothers (79%) who received the intervention also introduced complementary foods to their infants before 4 months of age. Given that current recommendations are for mothers to breastfeed exclusively for the first 6 months and introduce complementary foods after 4 to 6 months of age,⁷ these results highlight the ongoing challenges in promoting breastfeeding and healthy feeding practices in this population, even in the context of a close and supportive helping relationship. Other assistance is likely needed to further enhance healthy feeding practices, such as breastfeeding policies in schools and workplaces that are applicable to this population,

supplementing the doula intervention with longer term home visiting services, and peer support efforts.³⁸

There are many strengths of this study, including the randomized design, data collection from mother report and medical records, high levels of retention, intent-to-treat analyses, and the focus on a high-risk population. There are also several limitations. First, the intervention was limited to 1 site and participants were all young, African American mothers, which limits the generalizability of the findings to other geographic locations and other groups of mothers. Second, doulas received high levels of support around implementing the intervention. Further research is needed to assess outcomes when the intervention is used with other populations and when model fidelity may not be as high.

CONCLUSIONS

Community doula home visiting is a promising intervention to promote healthy infant feeding practices among young, African American mothers. Because this model is currently being used with mothers of various ethnic groups, ages, and geographic locations, further study is warranted to examine the effects of the model when implemented more broadly. Future research should also focus on understanding the components of the intervention most important to promoting healthy feeding practices, and examining whether intervention effects can be sustained when community doula services are implemented in the context of longer-term home visiting programs.

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