

The Impact of a Prenatal Education Video on Rates of Breastfeeding Initiation and Exclusivity during the Newborn Hospital Stay in a Low-income Population

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Abstract

Background: Guidelines recommend prenatal education to improve breastfeeding rates; however, effective educational interventions targeted at low-income, minority populations are needed as they remain less likely to breastfeed.

Objective: To determine whether a low-cost prenatal education video improves hospital rates of breastfeeding initiation and exclusivity in a low-income population.

Methods: A total of 522 low-income women were randomized during a prenatal care visit occurring in the third trimester to view an educational video on either breastfeeding or prenatal nutrition and exercise. Using multivariable analyses, breastfeeding initiation rates and exclusivity during the hospital stay were compared.

Results: Exposure to the intervention did not affect breastfeeding initiation rates or duration during the hospital stay. The lack of an effect on breastfeeding initiation persisted even after controlling for partner, parent, or other living at home and infant complications (adjusted odds ratio [OR] = 1.05, 95% CI, 0.70–1.56). In addition, breastfeeding exclusivity rates during the hospital stay did not differ between the groups ($P = .87$).

Conclusion: This study suggests that an educational breastfeeding video alone is ineffective in improving the hospital breastfeeding practices of low-income women. Increasing breastfeeding rates in this at-risk population likely requires a multipronged effort begun early in pregnancy or preconception.

Keywords

breastfeeding, education, exclusive, exclusivity, hospital, human, initiation, low-income, milk, prenatal, video, WIC

Well Established

Women of lower socioeconomic status and certain minority women are less likely to initiate breastfeeding and to breastfeed exclusively. Use of educational videos prenatally is a potentially cost-effective strategy to promote breastfeeding.

Newly Expressed

This study tested the effectiveness of a breastfeeding education video in the prenatal clinic. The results suggest that an educational video alone is ineffective in improving the hospital breastfeeding practices of low-income women.

Background

Breastfeeding provides substantial health, psychosocial, economic, and environmental benefits for both infant and mother, and exclusive breastfeeding grants even greater health benefits than partial breastfeeding.^{1–4} Currently, 79.2%

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of women in the United States initiate breastfeeding; however, one-quarter have already introduced infant formula or artificial breast milk substitute before leaving the hospital.^{5,6} These rates lag behind the US Healthy People 2020 objectives.⁷ More importantly, however, these crude rates do not account for substantial underlying racial and socioeconomic disparities. Rates of breastfeeding initiation among low-income women who participate in the US Special Supplemental Nutrition Program for Women, Infants and Children (WIC) lag behind non-WIC-eligible mothers by approximately 24%, and only 59% of black women initiate breastfeeding.^{5,8} In addition, WIC participation is positively related to the use of artificial breast milk substitute.⁹

Exclusive breastfeeding during the newborn hospital stay is a public health goal and is associated with prolonged duration of breastfeeding.¹⁰⁻¹² In fact, the effect of exclusive breastfeeding in the hospital on duration is so great that the Joint Commission has added the rate of in-hospital exclusive breastfeeding as a Perinatal Core Measure.¹³ However, the 2013 Centers for Disease Control and Prevention (CDC) Maternity Practices in Infant Nutrition and Care (mPINC) survey shows that on average, only 26.6% of hospitals have succeeded in adopting the recommended practice of limiting supplementation in the hospital and using artificial breast milk substitute for medical reasons only.¹⁴

Evidence-based, prenatal breastfeeding education is recommended and is one of the World Health Organization's 10 steps to support breastfeeding.^{2,6,7,15,16} The Academy of Breastfeeding Medicine; Academy of Pediatrics; Association of Women's Health, Obstetrics, and Neonatal Nurses; and American College of Obstetricians and Gynecologists (ACOG) Guidelines for Perinatal Care each recommend that all women receive counseling on the benefits of breastfeeding and encouragement to breastfeed.¹⁷⁻¹⁹ Despite these recommendations, however, studies have shown that the number of women receiving prenatal breastfeeding education from a health care provider is suboptimal.^{20,21} The current ACOG form F includes only 1 item regarding plans/education for infant feeding ("breast or bottle feeding"), and based on clinical experience, this question is commonly the only point of discussion regarding infant feeding that occurs prenatally. A recent study documented breastfeeding discussions in only 29% of initial prenatal visits.²¹ Potential barriers to providing education in a clinical setting include lack of adequate provider training, time constraints, lack of reimbursement, and the wide array of other topics that must be addressed at each visit.²²⁻²⁴ One-on-one peer counseling has been shown to be effective; however, cost and training requirements may hinder implementation.²⁵ A recent review of 19 studies documented that antenatal breastfeeding education may increase breastfeeding initiation and duration but called for more randomized clinical trials to provide more conclusive evidence.²⁶

Use of educational videos, a potentially cost-effective strategy, is emerging as an effective mode of patient education.²⁷ Research conducted in Asia has shown that video education can be effective at increasing exclusivity and duration of breastfeeding. Results from a randomized trial conducted in Singapore that investigated the use of a 16-minute breastfeeding video delivered in a clinical setting during the prenatal period, along with counseling by a lactation counselor for 15 minutes and written materials, showed improved rates of exclusive breastfeeding at 6 weeks through 6 months postpartum.²⁸

This study aimed to investigate whether the use of a breastfeeding education video shown in the prenatal setting would impact the rates of breastfeeding initiation and exclusivity during the newborn hospital stay in a low-income population in the US.

Methods

Overview

The Prenatal Education Video Study, a randomized, controlled intervention trial, was conducted at the University of Virginia (UVA) Health System and the Virginia Commonwealth University (VCU) Health System, both located in the state of Virginia in the US, where the overall rate for breastfeeding initiation was 79.8% in 2010.^{6,20} At the time of this study, neither hospital had Baby-Friendly certification, but both had lactation consultants who saw women on an as-needed basis. The study was approved by the Institutional Review Boards of the University of Virginia, the Virginia Commonwealth University, and the Virginia Department of Health.

Study Population

The medical records of pregnant women were screened daily for eligibility at 4 participating prenatal clinics between the 2 sites from 2009 to 2012. Women of 24 to 41 weeks gestation who were WIC eligible (income of 185% or less of the federal poverty income guidelines) were eligible to participate. Women were excluded if they had a multiple-gestation pregnancy, any known contraindication to breastfeeding (eg, HIV infection, drug use, or receipt of chemotherapy), or their primary language was not English.

Study Procedures

Trained research assistants recruited eligible women in the prenatal clinic waiting area. The study was explained and the consent process initiated among interested women. During the consent process, potential participants were told that they would be randomly assigned to view 1 of 2 educational videos. It was not explained, however, that the intervention was education on breastfeeding specifically or that increased

breastfeeding initiation and exclusivity were the outcomes of interest. Once informed consent was documented, research assistants interviewed participants to collect baseline data on a number of characteristics, including demographic and employment information, social support, parity, previous infant feeding experience, and intended infant feeding method(s). After these data were collected, women were randomly assigned to the intervention or control group.

A computer-generated block randomization sequence using random block sizes, stratified by prenatal clinic, was used. One member of the study team with no direct contact with participants prepared all of the consecutively numbered, sealed, opaque envelopes, which the research assistant opened just prior to loading the video for the participant to view. Women assigned to the intervention group were shown a 25-minute educational breastfeeding video (*Better Breastfeeding*, Injoy Productions, 2008), and women assigned to the control group were shown a 20-minute educational video about nutrition during pregnancy (*Healthy Pregnancy Nutrition*, Injoy Productions, 2007). The intervention video provided general information about breastfeeding, including importance, latch, hunger cues, positioning, sore nipples, engorgement, how breast milk is made, and lifestyle issues. The control video covered topics including healthy diet and the importance of exercise during pregnancy. The videos were shown using a laptop and earbuds either in an alcove in the waiting room and/or in the examination room while the participant waited to be seen by the physician or nurse practitioner.

Following delivery, data were abstracted from both the mother's and infant's medical records regarding labor, delivery, hospital stay, feeding methods, and complications. Research assistants abstracting these data were blinded to the group to which the participant was assigned.

Statistical Analysis

The primary outcomes for this analysis were the initiation of breastfeeding and the exclusivity of breastfeeding during the newborn hospital stay. All analyses were conducted on an intention-to-treat basis. Descriptive statistics including frequencies with percentage, medians with interquartile range, and means with standard deviation were computed for maternal, infant, and delivery characteristics. Mantel-Haenszel chi-square tests (for categorical variables) and Friedman tests (a nonparametric test that accounts for a design variable such as site in this analysis) or simple linear regression controlling for the variable site (for continuous data depending on whether a parametric or nonparametric test was appropriate) were utilized to test for differences between the intervention and control groups as well as the primary outcomes and other hospital procedures related to breastfeeding. A logistic regression model was fit to estimate the effect of the intervention on breastfeeding initiation. An additional logistic regression model was fit controlling for variables that

varied significantly between the treatment groups to explore whether the effect estimate may have been confounded. All analyses were performed, controlling for the design variable, site, using SAS version 9.3. Alpha was set a priori at .05.

Results

Research assistants screened a total of 2875 medical charts of pregnant women attending 4 obstetric clinics at the 2 study sites. Of those, 1580 women met the eligibility criteria (1069 at UVA, 511 at VCU), 816 were invited to participate (727 at UVA, 89 at VCU), and 522 were enrolled (459 at UVA, 63 at VCU), for an overall participation rate of 64% (63% at UVA, 71% at VCU).

Demographic and Social Characteristics

Participants were most often non-Hispanic white or black, educated at the high school level or below, never married, and/or unemployed; the treatment groups did not differ significantly by any of these characteristics. The intervention and control groups did differ, however, by other adults living in the home: Women in the control group were more likely to live with a partner or other adult, and women in the intervention group were more likely to live with a parent (Table 1).

Maternal, Infant, and Delivery Characteristics

Approximately two-thirds of women in each group intended to feed their infant at least some breast milk. Roughly two-thirds of deliveries were vaginal, the majority of births were term, and less than one-tenth were classified as low birth weight. Half of mothers in each group experienced a complication at delivery; however, significantly more infants of mothers in the intervention group experienced a complication (Table 2).

Primary Outcomes

Approximately 70% of women in each group initiated breastfeeding in the hospital. Thus, women in the intervention group were about as likely to initiate breastfeeding as their counterparts in the control group (unadjusted odds ratio [OR] = 1.03; 95% CI, 0.70-1.50). After adjusting for characteristics that differed between the study groups despite randomization (partner, parent, or other living at home and infant complications), the effect was largely unchanged (adjusted OR = 1.05; 95% CI, 0.70-1.56).

Among women who initiated breastfeeding, there were no differences between the intervention and control groups with regard to breastfeeding exclusivity during the hospital stay or practices in the hospital thought to be associated with breastfeeding success (Table 3). The minority of infants in both groups were breastfed within the first hour after delivery. Only about a third of women

Table 1. Characteristics of Women Enrolled in the Prenatal Education Video Study by Intervention Status (N = 497).^a

Characteristic	Intervention n = 249	Control n = 248	P Value ^b
Age, mean (SD)	25.0 (5.7)	24.9 (5.5)	.93
Race/ethnicity			.77
Non-Hispanic, white	99 (40)	107 (43)	
Non-Hispanic, black	117 (47)	108 (44)	
Non-Hispanic, other	14 (6)	12 (5)	
Hispanic	18 (7)	20 (8)	
Educational attainment			.89
College graduate	11 (4)	14 (6)	
Some college	66 (27)	60 (24)	
High school diploma, GED, and/or technical training	121 (49)	122 (49)	
Less than high school diploma	51 (21)	51 (21)	
Marital status			.73
Married	61 (25)	63 (25)	
Separated, divorced or widowed	23 (9)	18 (7)	
Never married	165 (66)	166 (67)	
Not in committed relationship	43 (17)	44 (18)	.83
Other adults living in the home ^c			
Partner	117 (47)	140 (57)	.04
Parent	96 (39)	71 (29)	.02
Grandparent	17 (7)	20 (8)	.61
Other	43 (17)	62 (25)	.04
No others living in the home	28 (11)	18 (7)	.12
Works outside of home	110 (44)	98 (40)	.32
BMI, mean (SD)	32.0 (8.3)	32.0 (9.2)	.63

Abbreviations: BMI, body mass index; GED, general educational development test.

^aNot all categories sum to the total due to missing data. Data are provided as n (%) unless otherwise noted.

^bAll analyses controlled for site.

^cCategories are not mutually exclusive; women could report more than 1 type of adult living in the home.

in each group introduced formula for medical reasons (data not shown). However, the majority of woman-infant dyads in both groups were visited by lactation services and had a feeding directly observed during the hospital stay.

Discussion

In the US, breastfeeding initiation rates and exclusivity in the hospital continue to fall short of national goals, especially among certain populations.¹⁰ Low-income women are less likely to breastfeed and are therefore an important high-risk group to target for interventions.^{5,8,29} This randomized controlled trial aimed to test a low-cost intervention, a breastfeeding education video that was easy to implement for staff in the prenatal clinic setting. However, in this sample of low-income women, this intervention did not influence rates of breastfeeding initiation and exclusivity during the hospital stay.

These findings are similar to those of a randomized clinical trial of a similar video conducted in Singapore that found that rates of breastfeeding did not differ significantly at hospital discharge and at 2 weeks, though rates of exclusivity were higher for the intervention group at 6 weeks and 6 months postpartum.²⁸ Thus, the educational intervention did not impact initiation but did increase duration for mothers who initiated breastfeeding. Another randomized controlled trial of an antenatal education intervention aimed at improving breastfeeding outcomes found that women were no more likely to exclusively breastfeed after being exposed to a 1-time antenatal education session. These researchers suggest that more intensive, individually targeted antenatal education may be more effective at improving breastfeeding exclusivity and duration.³⁰

Reasons for the lack of impact of the video may relate to the timing and/or mode of the intervention and/or to the lack of other support mechanisms for participants. The video was shown in the third trimester to reach women close to the time

Table 2. Maternal and Delivery Characteristics of Women Enrolled in the Prenatal Education Video Study by Intervention Group (N = 497).^a

Characteristic	Intervention n = 249	Control n = 248	P Value ^b
Prenatal planned infant feeding method			
Any breast milk	164 (66)	171 (69)	.76
Artificial breast milk substitute only	70 (28)	64 (26)	
Don't know	14 (6)	12 (5)	
Delivery			
Vaginal	156 (63)	160 (65)	.62
Cesarean section	93 (37)	87 (35)	
Any maternal complication ^c	135 (55)	131 (53)	.68
Any infant complication ^d	145 (58)	122 (50)	< .05
Mean gestational age, wk (SD)	38.8 (2.0)	38.8 (1.9)	.86
Gestational age			.94
< 34 wk	5 (2)	5 (2)	
34 to < 37 wk	21 (9)	19 (9)	
≥ 37 wk	201 (89)	203 (89)	
Mean infant birth weight, g (SD)	3293.5 (603.1)	3302.6 (625.1)	.94
Birth weight			
< 2500 g	20 (8)	19 (8)	.39
≥ 2500 g	228 (92)	226 (92)	
Service to which infant was admitted			
Well newborn only	204 (83)	216 (88)	.13
Ever NICU and/or ICN	42 (17)	30 (12)	
Maternal median length of stay in days (IQR)			
Well newborn only	3 (2-3)	3 (2-3)	.53
Ever NICU and/or ICN	3 (3-4)	4 (3-6)	.07
Infant median length of stay, d (IQR)			
Newborn nursery only	2 (2-3)	2 (2-3)	.54
Ever NICU and/or ICN	7 (3-15)	7.5 (4-19)	.55

Abbreviations: ICN, intermediate care nursery; IQR, interquartile range; NICU, neonatal intensive care unit.

^aNot all categories sum to the correct total due to missing data. Data are provided as n (%) unless otherwise noted.

^bAll analyses controlled for site.

^cMaternal complications included placental abruption, uterine atony, pre-eclampsia, chorioamnionitis, methadone use, and others.

^dInfant complications included hypoglycemia, rule-out sepsis, hypothermia, transient tachypnea of the newborn, other breathing problems, cardiac problem, hyperbilirubinemia, and others.

of delivery. However, this may be too late to impact a mother's decision to initiate breastfeeding. It has been shown that this decision occurs early in pregnancy, or perhaps pre-conception.^{20,26} Thus, women in their third trimester may be less influenced by an educational intervention than women targeted earlier.

Alternatively, this mode of breastfeeding education may be ineffective in general or not effective in this population. Young women might be more influenced by a different type of media or by social media.³¹ Combinations of different educational approaches might be more effective, such as prenatal breastfeeding classes, personal counseling, and/or peer counseling along with video.³²⁻³⁵ In a systematic review of video-assisted patient education, videos were not always found to be effective, and those with a

narrative (as opposed to didactic) format were more effective in changing behavior.³⁶ Although potentially more effective, these strategies are more costly as well as time- and labor-intensive.

In addition, the videos were somewhat long (25 minutes for the intervention and 20 minutes for the control). This length may have been a barrier to the participant's full attention and ease of implementation among the staff. In this study, due to the necessary flow of the prenatal clinic, approximately half of participants did not view the video in 1 sitting (this proportion did not differ significantly by group). However, over 90% of the women were able to view the entire video. A more effective intervention might be educational material of shorter duration delivered more frequently. Using creative and interactive approaches and

Table 3. Breastfeeding Behaviors and Support Services among Women Enrolled in the Prenatal Education Video Study Who Initiated Breastfeeding by Intervention Group (N = 346).^a

	Intervention n = 174	Control n = 172	P Value ^b
Breastfeeding			
Exclusive (100%)	84 (50)	84 (50)	.87
Partial, high (80%-99%)	29 (17)	24 (14)	
Partial, medium (20%-79%)	40 (24)	44 (26)	
Partial, low (< 20%)	16 (9)	16 (10)	
Time of first feeding			
Less than 30 min postpartum	26 (16)	19 (11)	.48
30-59 min postpartum	34 (20)	37 (22)	
60+ min postpartum	107 (64)	114 (67)	
Documented visits from lactation services			
Yes	124 (76)	130 (82)	.19
No	40 (24)	29 (18)	
Feeding was directly observed during stay			
Yes	147 (92)	157 (96)	.13
No	12 (8)	6 (4)	

^aNot all categories sum to the total because of missing data. Data are provided as n (%).

^bAll analyses controlled for site.

providing education in small, frequent bursts throughout prenatal care may be more effective.³⁷

Finally, support for a woman to initiate breastfeeding and exclusively breastfeed in the hospital is a critical element for success. Support during the hospital stay may enhance the effect of breastfeeding education.⁴ Some evidence shows that prenatal education is only helpful when women deliver in an environment that is supportive of breastfeeding and that has implemented evidence-based strategies to optimize breastfeeding management.⁵ Thus, in different populations with more social and/or cultural support, for example, among those with higher socioeconomic status or Latina ethnicity, this type of education might be more effective. In addition, interventions that involve fathers, grandmothers, and/or other identified sources of social support may be more successful.³⁸

Limitations

The study population was limited to English-speaking mothers who qualified for WIC, which limits the generalizability of the study findings. One-third of eligible women did not enroll, creating the possibility that selection bias occurred. However, the data reported were abstracted from medical records, and research assistants abstracting the data were blinded to the participant's group assignment, limiting the potential for information bias to occur. The study had an overall participation rate of 64%, and it is not known whether the intervention video would have affected those who did not participate any differently. In addition, randomization was

not completely effective in balancing potential confounders evenly between the intervention groups. However, no systematic or other explanation for the imbalance was identified, and when adjusted for these variables in the analysis, the results remained unchanged. In addition, both the intervention and control groups in this study had relatively high exclusive breastfeeding rates in the hospital. However, according to the CDC, national and state breastfeeding initiation rates were 79.2% and 80.5%, respectively, and approximately 18% to 19% of breastfeeding infants were receiving some formula before 2 days of age.⁶ Because this study included a limited population of low-income women in 1 state in the US from only 2 hospitals, it is not clear whether or not the rates of exclusive breastfeeding would have differed in other populations or locations with exposure to the intervention.

Conclusion

These findings suggest that 1 breastfeeding educational video viewed in the prenatal clinic by low-income, at-risk pregnant women during the third trimester is not enough to influence the initiation and exclusivity of breastfeeding during the hospital stay. Increasing breastfeeding rates in this at-risk population likely requires a multifaceted approach begun early in pregnancy or prior to conception. Small, frequent bursts of breastfeeding education throughout prenatal care may be more effective than a single intervention. Hospital practices may also play an important role and should be synergistic with prenatal education. Further research is needed to determine best

practices to help reduce disparities in breastfeeding rates for low-income and minority populations. For example, qualitative research could be conducted to solicit input from women about educational program content and modalities that might prove more effective.³⁹

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