BREASTFEEDING MEDICINE
Volume 6, Number 6, 2011

DOI: 10.1089/bfm.2010.0088

What Predicts Intent to Breastfeed Exclusively? Breastfeeding Knowledge, Attitudes, and Beliefs in a Diverse Urban Population

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Abstract

Background: Maternal knowledge and comfort with breastfeeding affect prenatal feeding intentions, and these intentions are strong predictors of feeding outcomes. However, predictors of exclusive breastfeeding intention have not been well characterized.
Methods: We measured the association between intentions to exclusively breastfeed and knowledge of infant health benefits, feeding guidelines, and comfort related to breastfeeding in social settings. Participants were lower-income, ethnically diverse women in two randomized, controlled trials of breastfeeding support. We compared results with data from the national Infant Feeding Practices Study II.
Results: Among 883 women in our trials, exclusive breastfeeding, mixed feeding, and exclusive formula feeding intentions were 45.9%, 46.1%, and 8.0%, respectively. In multivariate-adjusted models, women who disagreed that "Infant formula is as good as breastmilk" were more likely to intend exclusive breastfeeding versus exclusive formula feeding (odds ratio 3.44, 95% confidence interval 1.80–6.59) compared with women who agreed with this statement. Increasing levels of agreement that breastfed infants were less likely to develop ear infections, respiratory infections, diarrhea, and obesity were positively associated with intentions to exclusively breastfeed (p for trend < 0.001 for all). Compared with the national sample, our study participants were more likely to agree with all of these statements. Women who felt comfortable breastfeeding in public intended to exclusive breastfeed for 0.84 month longer (95% confidence interval 0.41–1.28) than those who felt uncomfortable.
Conclusions: Maternal knowledge about infant health benefits, as well as comfort with breastfeeding in social settings, was directly related to intention to exclusively breastfeed. Prenatal interventions that address these issues may increase exclusive breastfeeding intention and duration.

Introduction

Breastfeeding is a significant predictor of health outcomes for mother and child.[1,2] Infants who are not breastfed face increased risks of otitis media, gastroenteritis, lower respiratory tract infections, obesity, diabetes, childhood leukemia, sudden infant death syndrome, and necrotizing enterocolitis. Among mothers, not breastfeeding is associated with an increased risk of type 2 diabetes, breast and ovarian cancer, and myocardial infarction. Many of these health differences are dependent upon exclusive breastfeeding.[3,4] All major medical organizations endorse exclusive breastfeeding for the first 6 months of life.[5–8] However, only 13.3% of infants in the United States are exclusively breastfed through 6 months, with marked disparities in rates by maternal race, ethnicity, education, and income.[9] There are substantial costs to these suboptimal breastfeeding rates: An estimated $13 billion would be saved and 911 infant deaths prevented if 90% of women complied with guidelines.[10]

Prenatal intentions are among the strongest predictors of breastfeeding duration and intensity.[11,12] Several authors have assessed predictors of maternal intention to breastfeed[13–18]—which for women of color often includes concerns about breastfeeding in public[19]—but few have measured modifiable predictors of intention to breastfeed *exclusively*. Provider education interventions during residency training[20]

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significantly increased exclusive breastfeeding rates, although neither hospital staff training[21] nor postpartum nurse phone support was effective in doing so.[22] Among Latinas randomized to a Special Supplemental Nutrition Program for Women, Infants and Children (WIC)–based lactation consultant intervention or control group, there were no prenatal versus 3 months postpartum differences in breastfeeding knowledge or attitudes or in exclusive breastfeeding at any time.[23] Given baseline lack of differences in knowledge and attitudes, these variables were not analyzed as predictors of feeding intention or outcome. Identifying maternal knowledge of breastfeeding's evidence-based benefits, attitudes, and beliefs associated with exclusive breastfeeding intentions in a more heterogeneous sample may inform development of prenatal interventions to increase exclusive breastfeeding, particularly among high-risk groups.

We therefore measured maternal knowledge, attitudes, and beliefs associated with exclusive breastfeeding intentions among participants in the BINGO and PAIRINGS studies, two randomized controlled trials of a pre- and postnatal breastfeeding support intervention. Our study interview used questions from the Infant Feeding Practices Study (IFPS) II, a national longitudinal study.[24] We were therefore able to compare our study population with a large national sample of pregnant women.

Subjects and Methods

The BINGO and PAIRINGS studies are ongoing single-blind randomized controlled trials of routine provider, primary care–based, breastfeeding promotion interventions in a high-risk population in New York, NY. The intervention incorporates electronic medical record prompts for prenatal providers and prenatal, perinatal, and postnatal lactation consultant support. The prenatal electronic prompts follow an adapted version of the *Clinical Care Path for Breastfeeding*.[25] These open-ended items facilitate non-judgmental discussion at five points throughout prenatal care. Each participanct is also scheduled for two 45-minute prenatal sessions with a lactation consultant while awaiting her routine prenatal visit. The lactation consultant protocol seeks to increase maternal breastfeeding self-efficacy and lists specific queries and responses, strategies, materials, and follow-ups. After birth, the lactation consultant makes daily hospital rounds, and if there is difficulty or ambivalence with breastfeeding, the lactation consultant attempts a home visit 2–4 days postdischarge.

Study participants were recruited during routine prenatal care at two sites affiliated with Montefiore Medical Center from 2008 to 2010. Enrollment was limited to English- or Spanish-speaking women 18 years of age or older in the first or second trimester of pregnancy with a singleton pregnancy without known risk factors for premature birth, medical contraindications to breastfeed, or infant conditions that would prevent breastfeeding. All participants signed informed consents. The site's institutional review board approved both studies.

All participants from the BINGO ($n = 639$) and PAIRINGS ($n = 269$) sites who had completed the baseline prenatal interview were eligible for our analysis. We excluded those women who were unsure about their feeding intentions at the time of the baseline interview ($n = 25$), leaving 883 women for this analysis.

Measurement of feeding intentions

After randomization, study participants completed a baseline interview that assessed sociodemographic information, medical history, intended infant feeding plans, and knowledge, attitudes, and beliefs about breastfeeding. The interviews were conducted in English or Spanish. All study materials were printed in both languages. To assess feeding intention, the prenatal interviewers used questions adapted from the IFPS II, a national longitudinal study of infant feeding. Mothers reported how they planned to feed their infant in the first weeks of life ("Just breastfeed/No formula," "Just formula/no breastfeeding," "Both breast and formula feed," or "Unsure"). Mothers who intended any breastfeeding were asked how old they thought their baby would be when he or she was first fed formula or baby food (<1, 1–2, 3–4, 5–6, 7–9, or >9 months).

Measurement of breastfeeding attitudes and knowledge

If a participant intended to breastfeed, interviewers asked how comfortable she would be breastfeeding among close women friends, among close male and female friends, or in public, using a 5-point Likert scale from "Really uncomfortable" to "Really comfortable." Interviewers asked all women, whether they intended to formula feed, mixed feed, or breastfeed, to what extent they agreed or disagreed with a series of evidence-based statements about breastfeeding and child health, using a 5-point Likert scale ranging from "Really disagree" to "Really agree."

Measurement of covariates

During the interview, study staff collected sociodemographic information, including race, ethnicity, nativity (United States or non–United States), education (<high school vs. high school diploma or GED), maternal participation in WIC, and intention to return to work or school after the birth. Women also reported number of prior births, whether they had ever breastfed, and duration the youngest child was breastfed.

IFPS II data

The IFPS II was a longitudinal study that enrolled women during prenatal care and collected data through the infant's first year of life. Surveys were conducted between May 2005 and June 2007. The study methods have been described in detail elsewhere.[24] We used IFPS II data to compare our population with a national sample of pregnant women. Compared with nationally representative samples, the IFPS II sample breastfed longer and with greater exclusivity and had fewer risk factors associated with limited or no breastfeeding, i.e., they were older, had higher income and education, were less likely to smoke, and were more likely to be middle-income, employed, and nulliparous.

Statistical analysis

The objective of our study was to measure the association between maternal opinions about breastfeeding and exclusive breastfeeding intentions, independent of known sociodemographic predictors of breastfeeding intention. To com-

pare our participants with a national sample of pregnant women, we obtained the IFPS II data set. We used χ^2 tests to compare categorical variables and t tests to compare continuous variables. We used Spearman correlation to measure the correlation among responses to questions about comfort in feeding in public and the health effects of breastfeeding.

We then used multinomial logistic regression to quantify the association between maternal opinions about health effects of infant feeding and prenatal intention to exclusively breastfeed, mixed feed, or exclusively formula feed. Among women intending any breastfeeding, we used logistic regression to measure the association between comfort in breastfeeding in social settings and intention to exclusively breastfeed, compared with intention to mixed feed. Finally, we used linear regression to quantify the association between intended duration of exclusive breastfeeding and maternal opinions about infant feeding. For Likert scale questions, we reported p values for trend. A $p < 0.05$ was considered statistically significant.

All models were adjusted for *a priori* predictors of feeding intention,[26] including maternal age, self-identified race/ethnicity (white, black, Asian, Hispanic, other), nativity (United States or non–United States), maternal participation in WIC, education (high school graduate or not high school graduate), intention to return to work or school in the first year after birth (no, yes, <6 weeks, 5 weeks–3 months, 3–6 months, >6 months, not sure), parity (0, 1, 2, 3, or more), and duration the last child was breastfed (months). To determine whether predictors of exclusive intention varied among nulliparous versus parous women, we tested for an interaction between nulliparity and maternal knowledge and comfort in feeding in social settings.

All analyses were performed using SAS version 9.2 (SAS Institute, Cary, NC). Values of $p < 0.05$ were considered statistically significant.

Results

Of the 883 women in our study population, the majority self-identified as Hispanic (59.9%) or non-Hispanic black (31.6%). One-third were born outside the United States (50 states), and 46.3% were enrolled in WIC. Three-quarters planned to return to work in the infant's first year. Among parous women, 21.7% had never breastfed. Compared with the IFPS II population, our population was considerably more diverse (Table 1). BINGO and PAIRINGS participants were less likely to have graduated from high school, more likely to be enrolled in WIC, and more likely to be returning to work in the first year. Parous participants in our study were less likely to have ever breastfed.

Of our study group, 405 (45.9%) intended exclusive breastfeeding, 407 (46.1%) intended mixed feeding, and 71 (8.0%) intended to formula feed. Compared with our study group, a significantly greater proportions of IFPS II participants intended to exclusively breastfeed (59.3%) and exclusively formula feed (15.1%), while significantly fewer intended to mixed feed (25.7%, $p < 0.001$ for all comparisons).

Despite multiple risk factors predisposing our sample to less favorable attitudes and knowledge about breastfeeding compared with the IFPS II, results were surprising. Women in our study were significantly more likely than women in the IFPS II sample to report feeling "Comfortable" breastfeeding in front of close woman friends or in public and were similarly comfortable in front of men and women who are close to them (Table 2). Regarding the statement "infant formula is as good as breastmilk," 65.0% of our sample disagreed compared with 59.3% of the IFPS sample ($p < 0.001$). Compared with the IFPS II sample, our study group was also significantly more likely to agree with statements that breastfed infants are less vulnerable to ear infections (68.0% vs. 63.8%), respiratory infections (66.7% vs. 64.4%), diarrhea (53.9% vs. 50.2%), and obesity (45.2% vs. 36.9%) and that babies should only get breastmilk in the first 6 months (52.4% vs. 36.9%) (Table 3).

There were strong correlations among the six items pertaining to maternal knowledge about the health effects of breastfeeding in our study group (Spearman correlation coefficients 0.08–0.65, all p values ≤ 0.01). We similarly found strong correlations among the three items pertaining to mothers' degree of comfort in breastfeeding in social situations (Spearman correlation coefficients 0.52–0.71, all p values < 0.0001).

Maternal knowledge of breastfeeding's health effects was significantly associated with prenatal feeding intentions in a dose-dependent manner (all p values for trend < 0.05) (Table 4). In multivariate-adjusted models, women who disagreed with the statement about formula's equivalence with breastmilk were 3.44 times more likely to intend to exclusively breastfeed than exclusively formula feed (95% confidence interval 1.80–6.59) than women who agreed. Moreover, women who disagreed were 2.13 times as likely to plan to mixed feed rather than exclusively formula feed (95% confidence interval 1.13–4.02), compared with women who agreed with this statement. We similarly found marked differences in breastfeeding intention by degree of agreement with statements about breastfeeding and infant risk of ear infections, respiratory infections, diarrhea, and obesity, as well as with the statement "Babies should be fed only breastmilk for the first 6 months."

Maternal agreement with statements about health effects also predicted exclusive breastfeeding versus mixed feeding intention, as well as duration of intended exclusive breastfeeding (Table 4). Mothers who agreed that babies should be fed only breastmilk for the first 6 months were 3.16 times as likely to intend to exclusively breastfeed versus mixed feed than women who held the opposite opinion (95% confidence interval 2.28-4.37, Table 4). This statement was also strongly associated with intended duration: Women who agreed that babies should be fed only breastmilk for the first 6 months had exclusive breastfeeding intentions 1.65 months longer (95% confidence interval 1.27–2.04) than women who disagreed. Women who agreed that breastfed babies were less likely to get ear infections, respiratory infections, or diarrhea or become obese were 1.98–2.73 times as likely to intend to exclusively breastfeed, and they intended to exclusively breastfeed for 0.62–1.26 months longer, than those who disagreed with these statements.

We also found associations between maternal comfort in breastfeeding in social situations and intent to exclusively breastfeed. Women who were comfortable in breastfeeding in front of close women friends, men and women they were close to, and in public were 1.77, 1.72, and 1.63 times as likely to plan exclusive breastfeeding versus mixed feeding as women who were uncomfortable in these settings in multivariate-adjusted models (Table 5). Increasing comfort was also

Table 1. Characteristics of the BINGO and PAIRINGS Patient Populations, Compared with the Infant Feeding Practices Study II Population

	BINGO and PAIRINGS	*IFPS II*	p[a]
Total number	883	4,711	
Race/ethnicity			
White/Non-Hispanic	53 (6.0)	3,721 (79.0)	< 0.001
Black/Non-Hispanic	279 (31.6)	288 (6.1)	< 0.001
Hispanic	529 (59.9)	319 (6.8)	< 0.001
Asian/other	63 (7.1)	243 (5.2)	0.02
Born in United States/50 states	592 (67.0)	N/A	—
Mother enrolled in WIC	409 (46.3)	1,560 (33.2)	< 0.001
High school graduate	705 (79.9)	3,927 (95.5)	< 0.001
Plan to return to work			< 0.001
Not planning to return in 1st year	242 (27.4)	1,733 (37.1)	
Before 12 weeks	199 (22.5)	2,272 (48.6)	
After 12 weeks	374 (42.4)	645 (13.8)	
Unsure	68 (7.7)	N/A	
Missing		26 (0.6)	
Nulliparous	350 (39.6)	1,619 (34.4)	0.003
Among parous, prior breastfeeding experience			< 0.001
Never breastfed	115 (21.7)	538 (17.7)	
Breastfed youngest child			
<1 month	75 (14.1)	304 (10.0)	
1–2 months	73 (13.7)	359 (11.8)	
3–4 months	90 (16.9)	325 (10.7)	
5–6 months	71 (13.4)	308 (10.1)	
7+ months	107 (20.2)	1,212 (39.8)	
Feeding intention			
Just breastfeed/no formula	405 (45.9)	2,781 (59.3)	< 0.001
Just formula/no breastfeeding	71 (8.0)	706 (15.1)	< 0.001
Both breast and formula	407 (46.1)	1,203 (25.7)	< 0.001
Age (years) [mean (SD)]	28.3 (5.9)	28.2 (5.7)	0.78

Data are number (% of total number).
[a]χ^2 p value for proportions, *t* test for means.
N/A, not asked on the Infant Feeding Practices Study II (IFPS II) survey; WIC, Special Supplemental Nutrition Program for Women, Infants and Children.

associated with longer intended exclusive duration: Women who were comfortable breastfeeding in public planned to breastfeed exclusively 0.84 month longer (95% confidence interval 0.41–1.28 months) than women who were uncomfortable breastfeeding in public.

When we tested for interactions among nulliparity, maternal knowledge and comfort, and intended exclusive duration, we found no evidence that parity altered the observed associations (all interaction p values > 0.10).

Discussion

Ours is the first study to our knowledge to measure the effect of maternal awareness of both general and specific health effects of breastfeeding on intention to breastfeed exclusively in an urban U.S. population. Maternal agreement with current guidelines regarding 6 months of exclusive breastfeeding, as well as evidence-based statements about breastfeeding's association with selected infant health outcomes, predicted intentions to breastfeed, to breastfeed exclusively, and to breastfeed exclusively for longer periods of time. We similarly found that comfort with breastfeeding in social settings was directly related to intention to exclusively breastfeed. In this diverse population of urban women, these associations were independent of sociodemographic factors, intended return to work or school, and prior breastfeeding experience.

Demographically, our population differed substantially from the IFPS II, with a far larger proportion of black women and Hispanic women, as well as more WIC participants and fewer high school graduates. Moreover, women in our study were more likely to plan to return to work in the first postpartum year. Nevertheless, compared with IFPS II participants, our study participants were more comfortable breastfeeding in social settings and were more likely to agree with statements about the health benefits of breastfeeding. This may, in part, reflect characteristics of our sample, one-third of whom are foreign-born. Women born outside the United States, particularly those from the Carribbean, a dominant demographic group in the study area, have high rates of intention to breastfeed.[11,16] These differences in responses may also reflect social desirability bias—women in our study group were interviewed in person, whereas the IFPSII used mailed questionnaires. It is also possible that these differences reflect educational efforts by the WIC program at our study sites. Of note is that women in our study were much less likely to select "neither" as an answer to Likert scale questions than IFPS II participants, which may be an artifact of the data collection process. Finally, as breastfeeding rates among lower-income women have edged up since 2005, our

Table 2. Maternal Comfort with Feeding in Social Settings for the BINGO and PAIRINGS Versus Infant Feeding Practices Study II Populations

How comfortable would you feel breastfeeding in the following situations?	*BINGO and PAIRINGS*	*IFPS II*	p[a]
Number	811	3,980	
. . .in front of your close women friends			< 0.0001
Comfortable	603 (74.4)	2,669 (67.1)	
Neither	8 (1.0)	531 (13.3)	
Uncomfortable	200 (24.7)	780 (19.6)	
. . .in front of men and women who you are close to			< 0.0001
Comfortable	320 (39.5)	1,609 (40.5)	
Neither	8 (1.0)	843 (21.2)	
Uncomfortable	482 (59.5)	1,525 (38.3)	
. . .in public			< 0.0001
Comfortable	209 (25.8)	793 (19.9)	
Neither	16 (2.0)	743 (18.7)	
Uncomfortable	586 (72.3)	2,440 (61.4)	

Data are number (%). Only women intending to breastfeed, either partially or exclusively, were asked these questions.
[a]χ^2 *p* value for differences across all response categories.

sample's more favorable attitudes may be reflective of historical changes between the fielding of the IFPS from 2005 to 2007 and our study's implementation from 2008 to 2010.[9]

Compared with the IFPS II sample, fewer women in our population intended to formula feed, but considerably more planned to mixed feed. This finding is consistent with an ethnographic study by Kaufman et al.[27] that examined perceptions and practices surrounding breastfeeding among African American and Puerto Rican women in Brooklyn. In that work, practical (i.e., shared/cramped living quarters) and sociocultural challenges dampened women's initial commitment to breastfeeding, often resulting in substantial ambivalence, which was then reflected in combining breastmilk and formula. Of note is that women who "really agreed" with statements about health effects of breastfeeding were more likely than women who "somewhat agreed" to plan exclusive breastfeeding (data not shown). We similarly found that degree of comfort in breastfeeding in social settings

Table 3. Maternal Knowledge About the Health Effects of Breastfeeding for the BINGO and PAIRINGS Versus Infant Feeding Practices Study II Populations

How much do you agree or disagree with the following statements?	*BINGO and PAIRINGS*	*IFPS II*	p[a]
Infant formula is as good as breastmilk.			< 0.0001
Agree	284 (32.2)	1,300 (27.7)	
Neither	25 (2.8)	610 (13.0)	
Disagree	574 (65.0)	2,781 (59.3)	
Breastfed babies are less likely to get ear infections.			< 0.0001
Agree	609 (69.0)	2,983 (63.8)	
Neither	143 (16.2)	1,159 (24.8)	
Disagree	131 (14.8)	533 (11.4)	
Breastfed babies are less likely to get respiratory infections.			< 0.0001
Agree	589 (66.7)	3,017 (64.4)	
Neither	164 (18.6)	1,161 (24.8)	
Disagree	130 (14.7)	507 (10.8)	
Breastfed babies are less likely to get diarrhea.			< 0.0001
Agree	476 (53.9)	2,352 (50.2)	
Neither	219 (24.8)	1,664 (35.5)	
Disagree	188 (21.3)	666 (14.2)	
Babies should be fed only breastmilk for the first 6 months.			< 0.0001
Agree	463 (52.4)	2,238 (48.0)	
Neither	64 (7.2)	1,229 (26.3)	
Disagree	356 (40.3)	1,199 (25.7)	
Breastfed babies are less likely to become obese.			< 0.0001
Agree	399 (45.2)	1,726 (36.9)	
Neither	180 (20.4)	1,987 (42.5)	
Disagree	304 (34.4)	967 (20.7)	

Data are number (%).
[a]χ^2 *p* value for differences across all response categories.

Table 4. Among BINGO and PAIRINGS Participants, Maternal Opinions About the Health Effects of Breastfeeding and Intention to Breastfeed Exclusively or Mixed Feed Versus Formula Feed by Multinomial Logistic Regression Model

	Multivariate-adjusted odds ratio (95% CI)			*Multivariate-adjusted PE (95% CI): difference in planned duration of exclusive breastfeeding (months) vs. referent*
	Plans exclusive breastfeeding vs. plans formula feeding	*Plans mixed feeding vs. plans formula feeding*	*Plans exclusive breastfeeding vs. plans mixed feeding*	
Infant formula is as good as breastmilk.				
Agree	1.0 (referent)	1.0 (referent)	1.0 (referent)	0.0 (referent)
Neither	2.83 (0.26–31.28)	2.45 (0.23–26.64)	1.15 (0.48–2.76)	–0.09 (–1.21, 1.03)
Disagree	3.44 (1.80–6.59)	2.13 (1.13–4.02)	1.61 (1.172.23)	0.64 (0.23, 1.05)
p for trend	0.0001	0.0001	0.0001	0.002
Breastfed babies are less likely to get ear infections.				
Agree	8.16 (3.65–18.25)	4.12 (1.92–8.85)	1.98 (1.26–3.12)	0.62 (0.05, 1.18)
Neither	2.86 (1.12–7.30)	1.74 (0.71–4.27)	1.64 (0.952.85)	0.33 (–0.37, 1.03)
Disagree	1.0 (referent)	1.0 (referent)	1.0 (referent)	0.0 (referent)
p for trend	< 0.0001	< 0.0001	< 0.0001	0.02
Breastfed babies are less likely to get respiratory infections.				
Agree	6.58 (2.98–14.53)	2.90 (1.37–6.13)	2.27 (1.44–3.58)	1.02 (0.46, 1.58)
Neither	3.11 (1.22–7.92)	2.23 (0.92–5.40)	1.40 (0.82–2.40)	0.53 (–0.14, 1.20)
Disagree	1.0 (referent)	1.0 (referent)	1.0 (referent)	0.0 (referent)
p for trend	< 0.0001	< 0.0001	< 0.0001	0.0001
Breastfed babies are less likely to get diarrhea.				
Agree	7.12 (3.21–15.78)	3.29 (1.52–7.10)	2.17 (1.47–3.20)	0.95 (0.47, 1.44)
Neither	1.83 (0.83–4.04)	1.28 (0.60–2.73)	1.43 (0.92–2.23)	0.35 (–0.21, 0.91)
Disagree	1.0 (referent)	1.0 (referent)	1.0 (referent)	0.0 (referent)
p for trend	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Babies should be fed only breastmilk for the first 6 months.				
Agree	7.54 (3.57–15.89)	2.39 (1.15–4.97)	3.16 (2.28–4.37)	1.65 (1.27, 2.04)
Neither	1.74 (0.56–5.42)	1.27 (0.43–3.79)	1.37 (0.75–2.51)	0.54 (–0.20, 1.28)
Disagree	1.0 (referent)	1.0 (reference)	1.0 (referent)	0.0 (referent)
p for trend	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Breastfed babies are less likely to become obese.				
Agree	9.07 (3.84–21.39)	3.32 (1.42–7.72)	2.73 (1.92–3.89)	1.26 (0.83, 1.69)
Neither	3.59 (1.61–8.01)	1.71 (0.78–3.74)	2.10 (1.39–3.18)	0.87 (0.36, 1.39)
Disagree	1.0 (referent)	1.0 (referent)	1.0 (referent)	0.0 (referent)
p for trend	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Models were adjusted for maternal age, race/ethnicity, nativity, WIC participation, educational attainment, intention to return to work or school, parity, and prior breastfeeding experience.

CI, confidence interval; PE, parameter estimate.

predicted exclusive intention and duration. These findings suggest that strong, multiply reinforcing messages about the health effects of breastfeeding and strategies for breastfeeding in social settings may increase intended exclusivity and duration.

Our findings confirm and extend earlier work on predictors of breastfeeding intention. Wen et al.[15] assessed maternal awareness of the World Health Organization recommendation for 6 months of exclusive breastfeeding among 409 mothers in Sydney, Australia, and they found that those who were aware of this recommendation were 5.6 times as likely to intend to breastfeed exclusively for 6 months. Nommsen-Rivers et al.[13] assessed predictors of breastfeeding intention and found an inverse association between comfort with formula feeding and breastfeeding intention category, measured using the Infant Feeding Intentions Scale. Other authors have found associations between intention to initiate breastfeeding and both general breastfeeding knowledge and comfort in social settings.[16,28]

Our findings must be interpreted within the context of the study design. As noted above, we collected data on maternal attitudes and feeding intention during an in-person interview of women who had just enrolled in an infant feeding study. Social desirability bias may have therefore affected responses. Rates of intended formula feeding were also very low, leading to wide confidence intervals for odds ratios and effect estimates. This study did not assess contextual factors that may sidetrack a woman's stated intention to breastfeed.

Moreover, because this is a cross-sectional analysis, we could not disentangle the direction of associations between maternal attitudes and feeding intention. It may be that women who were made aware of health effects choose to breastfeed; it is also possible that women who have already chosen to formula feed disregard public health messages about breastfeeding. In the case of multiparous women, those who have breastfed previously may have done so because of preexisting beliefs about the health benefits of breastfeeding, or they may have agreed more strongly with statements about

Table 5. Among BINGO and PAIRINGS Participants, Maternal Comfort with Breastfeeding in Social Settings and Intention to Exclusively Breastfeed Versus Mixed Feed

How comfortable would you feel breastfeeding in the following situations?	*Plans exclusive breastfeeding vs. mixed feeding*[a]	*Difference in planned duration of exclusive breastfeeding (months) vs. referent*[b]
. . .in front of your close women friends		
Comfortable	1.77 (1.26–2.49)	0.54 (0.11, 0.98)
Neither	1.25 (0.29–5.37)	0.69 (–1.20, 2.59)
Uncomfortable	1.00 (referent)	0.00 (referent)
p for trend	0.001	0.01
. . .in front of men and women who you are close to		
Comfortable	1.72 (1.27–2.32)	0.72 (0.34, 1.10)
Neither	0.17 (0.02–1.43)	–1.20 (–3.05, 0.66)
Uncomfortable	1.00 (referent)	0.00 (referent)
p for trend	< 0.001	< 0.001
. . .in public		
Comfortable	1.63 (1.16–2.30)	0.84 (0.41, 1.28)
Neither	2.06 (0.68–6.27)	2.02 (0.70, 3.34)
Uncomfortable	1.00 (referent)	0.00 (referent)
p for trend	0.004	< 0.001

Models adjusted for maternal age, race/ethnicity, nativity, WIC participation, educational attainment, intention to return to work or school, parity, and prior breastfeeding experience.
[a]Multivariate-adjusted odds ratio (95% CI).
[b]Multivariate-adjusted PE (95% CI).

health effects because of a positive prior breastfeeding experience. Our adjustment for prior breastfeeding experience may therefore attenuate the true associations between maternal opinion and breastfeeding intention. Longitudinal studies measuring maternal knowledge before her first birth, during infant feeding, and before her next birth would be needed to clarify these associations.

Conclusions

This lower-income, ethnically diverse sample of urban women was more likely to report favorable attitudes towards breastfeeding's effects upon infant health and breastfeeding in social settings, compared with a national sample. In turn, these attitudes were associated with increased intentions to exclusively breastfeed and to do so for longer durations. Our ongoing trials of routine, primary care–based interventions spanning the continuum of pre- to postpartum care target the modifiable factors reported in this study—breastfeeding knowledge, comfort, and intentions. Thus, trial results may inform interventions that enable women to plan for longer durations of exclusive breastfeeding, thereby improving health outcomes across two generations.

Acknowledgments

The authors wish to thank the study participants, as well as Jennifer Lischewski, M.P.H. and Jason Fletcher, Ph.D. This study was supported by grants from the National Institute of Child Health and Human Development (R01 HD04976301) and from the National Center for Minority Health and Health Disparities (P60 MD 000516).

Disclosure Statement

No competing financial interests exist.

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