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Evaluation of breastfeeding promotion, support, and knowledge of benefits on breastfeeding outcomes

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Abstract

We examined how prenatal exposure to breastfeeding information from various media sources, maternal knowledge of benefits, family and clinician support, and peer practices influence breastfeeding outcomes in early infancy. Initiation of breastfeeding, any breastfeeding at two months, and exclusivity of breastfeeding at two months were examined in a cohort of US women using data from the Infant Feeding Practices Study II. Descriptive statistics, chi-square analyses and logistic regression were conducted. Approximately 85 percent of the women initiated breastfeeding. At two months, 63.8 percent continued breastfeeding, while only 38.1 percent breastfed exclusively. Mothers with greater knowledge about breastfeeding benefits were 11.20 (95%CI: 6.87–18.45) times more likely to initiate breastfeeding and 5.62 (95% CI: 4.19–7.54) times more likely to breastfeed at two months than those with lower levels of knowledge. Women whose families prenatally supported exclusive breastfeeding were 8.21(5.12–13.2) times more likely to initiate and continue breastfeeding (OR 3.21, 95%CI: 2.51–4.11). Clinicians who supported breastfeeding only also increased the odds of a woman initiating breastfeeding (OR 1.95, 95% CI: 1.31–2.88). Interventions to increase maternal knowledge of breastfeeding benefits and family and clinician support of breastfeeding in the prenatal period may help increase breastfeeding rates. The encouragement of breastfeeding needs to be a priority among health care providers to improve the health of mothers and infants.

Keywords

breastfeeding; clinician; exclusive breastfeeding; family; lactation initiation; prenatal

Introduction

Although the health benefits of breastfeeding are well established, the rates of breastfeeding initiation, continuation, and exclusive breastfeeding during the first few months of infancy are lower than expected among US mothers (Crespo et al., 2011; Grummer-Strawn and Shealy, 2009; Ip et al., 2009). Multiple health organizations, including the Centers for

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Disease Control and Prevention (CDC), the World Health Organization, and the American Academy of Pediatrics, recommend exclusive breastfeeding for the first four to six months of life (AAP, 2005; CDC, 2011; WHO, 2011). Despite this, the CDC estimates the national rate for exclusive breastfeeding among new US mothers at infant age three months to be only 35 percent (CDC, 2011). Many studies over the past decade have examined barriers to breastfeeding, including education, smoking, working full time, and disparities that contribute to differences in breastfeeding rates among different socio-demographic groups (Fein et al., 2008; Forste et al., 2001; Lee et al., 2009). Mothers who are married and multiparous are more likely to exclusively breastfeed, while those who are obese or smoke are less likely (Perrine et al., 2012). Findings from smaller studies indicate that breastfeeding intent is associated with positive breastfeeding attitudes and having family, peer and partner support (Chezem et al., 2003), while others have found prenatal factors such as an increased number of prenatal visits and having a breastfeeding mother influence the decision to breastfeed (Kupratakul et al., 2010). Knowledge of breastfeeding benefits has also been associated with positive breastfeeding outcomes (Persad and Mensinger, 2008).

Although these studies have yielded valuable knowledge and information on factors that influence breastfeeding practices, many have small sample sizes or are limited to cross-sectional analyses. Further, more attention should be given to the influence of modifiable psychosocial factors on breastfeeding behavior in early infancy. The purpose of the present study was to evaluate in a large, nationally distributed US sample the influence that various prenatal factors, such as prenatal media exposure to breastfeeding practices, knowledge of breastfeeding benefits, family and clinician's opinion/support about breastfeeding, and peer-influence, may have on selected breastfeeding patterns in the first two months of infant life.

Methods

Sample

The Infant Feeding Practices II study (IFPS) was a longitudinal study that followed US women from the end of pregnancy through the first year of their infant's life (Fein et al., 2008). The study was conducted by the US Food and Drug Administration and the CDC from May 2005 through June 2007. The nationally distributed convenience sample was recruited from among 500,000 households that participated on a national consumer opinion panel. Mother-infant pairs were excluded from the study if either had a health condition that would affect feeding, the infant weighed less than 5.5 lbs at birth, was born before 35 weeks gestation, or stayed in intensive care after birth for more than three days. Approximately 4900 women participated at the beginning of the study. Information was collected through mailed questionnaires sent prenatally and at regular intervals during the first 12 months of life. After excluding women with missing data on variables of interest in this study, 3033 women-infant dyads were analyzed for breastfeeding initiation after birth, and 2546 women were analyzed for breastfeeding practices at two months after birth.

Materials and procedures

Dependent variables

Three main outcome variables were considered. Breastfeeding initiation was measured as any breastfeeding that occurred during the study, regardless of duration/continuation. Any breastfeeding at infant age two months was breastfeeding that had been started in the neonatal period, and continued either with or without formula supplementation for the first two months. Exclusive breastfeeding at infant age two months was defined as complete infant nutrition through breast milk without any other nutritional supplementation for the infant with the exception of liquid vitamin supplements and up to four ounces of water per day. Each of the dependent variables was defined dichotomously (breastfed/not breastfed).

Independent variables

Exposure to media sources of information—Level of exposure to media sources of breastfeeding information was defined as exposure to various media sources including exposure to the Internet, television, radio, newspapers and outdoor posters/billboards. Questions on exposure to six sources of breastfeeding information were framed dichotomously (exposed/not exposed). A composite variable was created based on the responses. This continuous composite variable was then divided based on quartile analyses to create the independent variable, *exposure to media sources of information*, with three levels: high (exposed to greater number of sources), medium (exposed to lower number of sources), and low/no (exposed to little or no sources).

Knowledge/agreement with breastfeeding benefits—Level of knowledge of exclusive breastfeeding benefits and recommendations was measured by answers to five questions about various benefits seen in breastfed babies, including decreased ear infections and upper respiratory infections, decreased incidence of diarrhea, less obesity in breastfed babies, and that babies should be exclusively breastfed for six months; for example, ‘How strongly do you agree or disagree with the following statement: If a baby is breastfed, he or she will be less likely to get ear infections’. Information on knowledge of breastfeeding benefits was obtained by answers to the five questions using a Likert scale with the following values: disagree, no opinion and agree. A three-category variable was created based on the categories of disagree with benefits of breastfeeding, no opinion/somewhat agree and agree.

Family and clinician opinions about infant feeding—Family member and clinician opinions about infant feeding were assessed during the prenatal period by asking the mother what her partner, mother and clinician’s beliefs were about the best way to feed the baby. Family opinion included four categories according to the preferred infant feeding method: breastfeed only, both formula and breastfeed, formula only, and no opinion. Due to lower response rates on the clinician opinion, the category of both formula and breastfeed was combined with formula only to create the category ‘formula only or both’ resulting in three categories: breastfeed only, formula only or both, no opinion.

Parental history of being breastfed—Questions about whether the father of the baby and mother of the baby were breastfed as infants were combined to create a variable with three categories. The categories comprised: neither parent was breastfed or don't know, one parent was breastfed, and both parents were breastfed.

Number of friends who did/did not breastfeed – peer influence—Mothers were asked during the prenatal period the number of friends they had with infants who were not breastfeeding. This question was used to create the peer influence variable. The responses were categorized as all friends breastfed, one or two did not, three or more did not, or unknown.

Independent variables—Information about various prenatal socio-demographic and maternal characteristics were adjusted for in the analyses. These included maternal age (18–24, 25–34, > 34), race/ethnicity (white, black, Hispanic, other), smoking status during pregnancy (no, yes), and education level (high school or less, some college, 4-year college or more).

Data analysis

Descriptive statistics and chi-square analyses were conducted to identify any associations between the independent prenatal variables and breastfeeding patterns in the first two months of infancy. Separate logistic regression models were used for each outcome variable (breastfeeding initiation, breastfeeding at two months, and exclusivity of breastfeeding at two months) to evaluate the impact of exposure to media breastfeeding information, family/clinician opinion, and knowledge of breastfeeding benefits on these outcome variables while controlling for several covariates.

Results

Table 1 presents descriptive statistics of the sample stratified by breastfeeding patterns at two months. The majority of women initiated breastfeeding (85.3%), and continued to do some combination of breastfeeding and formula in the second month (63.8%). The prevalence of exclusive breastfeeding at two months was 38.1 percent. Overall, women older than 25 years old were significantly more likely ($p < 0.05$) to initiate and continue breastfeeding at two months. A significantly higher proportion of Hispanic mothers initiated breastfeeding, while white women were more likely to exclusively breastfeed at two months ($p < 0.05$). Higher educational achievement was significantly associated with breastfeeding initiation and continuation at two months age. Smoking during pregnancy was associated with lower likelihood of breastfeeding initiation or continuation.

Table 2 provides information on the associations between breastfeeding promotion, support and knowledge-related variables with breastfeeding initiation and continuation at the second month. All associations were significant ($p < 0.05$). Women exposed prenatally to low/no media sources of breastfeeding had the least likelihood of initiating breastfeeding (78.1%), continuing any breastfeeding at two months (53.0%) or exclusively breastfeeding (32.8%) at the same period. Approximately 98 percent of the women who agreed with the benefits of breastfeeding initiated breastfeeding. However, 61.3 percent of the women who disagreed

with the benefits of breastfeeding did not initiate breastfeeding. Among those women who were exclusively breastfeeding at two months, 82.8 percent reported agreement with breastfeeding benefits, as compared to 62.3 percent reporting no opinion/somewhat agree, and 33.0 percent reporting disagreement with benefits of breastfeeding. Around 98 percent of women who initiated breastfeeding had families who supported breastfeeding only, as did 82.5 percent of those who were breastfeeding at two months, and about 55.8 percent of women who were exclusively breastfeeding at two months postpartum. Similar findings were observed when clinicians supported breastfeeding only. In families where one or both parents were breastfed as infants, women were more likely to initiate and continue breastfeeding at two months. Women with friends who breastfed their babies were also more likely to initiate and continue breastfeeding.

Logistic regression analyses (Table 3) revealed that the odds of breastfeeding initiation (OR 1.44, 95% CI: 1.02–2.04) and continuation at two months (OR 1.39, 95% CI: 1.04–1.87) were significantly higher among those with medium levels of breastfeeding-related information exposure compared to those with low percent information exposure. Women who had a high agreement with the benefits of breastfeeding were approximately 11 times more likely to have initiated breastfeeding as compared with those who disagreed with the benefits (OR 11.2, 95% CI: 6.87–18.45). They also had higher odds of any breastfeeding (OR 5.62, 95% CI: 4.19–7.54) or exclusive breastfeeding (OR 4.13, 95% CI: 3.03–4.62) at two months. Further, women who had no opinion/somewhat agreed with the benefits of breastfeeding were 3.21 (2.42–4.23) times more likely to initiate breastfeeding and 2.35 (1.74–3.17) times more likely to exclusively breastfeed at two months than women who disagreed with breastfeeding benefits.

Women whose families prenatally preferred only breastfeeding were more likely to initiate (OR 8.21, 95% CI: 5.12–13.2) or continue breastfeeding as compared to women whose families supported formula only or a combination of formula and breastfeeding. The prenatal clinician's opinion about breastfeeding seemed to have the strongest impact on breastfeeding initiation, rather than on continued breastfeeding at two months. Specifically, if the woman's clinician supported breastfeeding only, then a woman was 1.95 (1.31–2.88) times more likely to initiate breastfeeding compared to those women whose clinician encouraged the use of formula only or both formula and breastfeeding. Increased odds of breastfeeding initiation (OR 2.85, 95% CI: 1.83–4.44), any breastfeeding at two months (OR 1.51 95% CI: 1.15–1.99) or exclusively breastfeeding (OR 1.47, 95% CI: 1.15–1.87) were found among women if they and their partners were breastfed as babies. Further, women who had only one or two friends who did not breastfeed their babies were more likely to initiate breastfeeding (OR 1.54, 95% CI: 1.10–2.16) than women with three or more friends who did not breastfeed their babies. These same relationships were predictive of the two-month breastfeeding status among those with friends who breastfed their babies only.

Discussion

A mother's decision to breastfeed can be influenced by many factors, including family, health care providers, employers, media, and cultural norms/community. The findings of the current study indicate that both individual and interpersonal influences such as family and

friends have an impact on the mother's decision to initiate and continue breastfeeding. Our finding of a significant relationship between maternal prenatal knowledge of breastfeeding benefits and subsequent breastfeeding initiation and continuation is consistent with previous findings (Chezem et al., 2003; Kupratakul et al., 2010). A study of primiparas in an urban US setting found breastfeeding attitudes to be associated with breastfeeding intent (Persad and Mensinger, 2008). Another study of first-time mothers in the US found prenatal breastfeeding knowledge to be significantly associated with breastfeeding duration and achievement of breastfeeding goals set in the prenatal period (Chezem et al., 2003). The current finding that knowledge contributes to exclusive breastfeeding behavior at two months adds to existing evidence that can help shape prenatal interventions designed to increase this behavior.

Family, friends and prenatal clinician opinions also play a role in predicting breastfeeding initiation. Women whose families supported exclusive breastfeeding had significantly higher odds of initiating or continuing breastfeeding at two months. In addition, women had greater odds of breastfeeding initiation if they perceived their clinician to be supportive of exclusive breastfeeding. These findings are consistent with research in the UK suggesting that women felt their decision to breastfeed was influenced by their family, friends and health provider's opinions (Andrew and Harvey, 2011). Women in the UK were also found to be influenced by whether they had themselves been breastfed as infants (Andrew and Harvey, 2011; Noble et al., 2003). Similarly, we found that if both parents were breastfed as infants, then women were significantly more likely to initiate breastfeeding. These findings indicate that breastfeeding interventions should target not only the mother but also the mother's immediate family and social environment in increasing breastfeeding rates.

The number of friends who did/did not breastfeed their babies had an effect on breastfeeding initiation and any breastfeeding at two months. This suggests that social norms are important factors in the decision to breastfeed. Having several friends who did not breastfeed their babies, however, did not affect breastfeeding continuation in our study. More information is needed to determine if there is a relationship between the number of friends a woman has who do/do not breastfeed their infants and her subsequent decision on breastfeeding. As our sample was relatively homogenous with respect to demographic characteristics, future research might also focus on the impact of peer-influence on breastfeeding outcomes among women with different socio-demographic characteristics.

Exposure to different levels of sources of breastfeeding information was not found to be a significant predictor of breastfeeding status after adjusting for certain maternal characteristics and prenatal factors. Previous studies have examined the media portrayal of breastfeeding and found that few media outlets present breastfeeding benefits and some tend to diminish the role of social and partner support for breastfeeding (Frerichs et al., 2006; Henderson et al., 2000; Noble et al., 2003). An older study from the UK indicated that the media rarely present positive information on breastfeeding (Henderson et al., 2000), while a recent study found that women with no prior breastfeeding experience did not trust breastfeeding information presented from the media (Andrew and Harvey, 2011). This may partly explain the lack of a significant effect of exposure to various media information about breastfeeding on breastfeeding outcomes in the current study. A narrative study of African-

American women found evidence that factors such as the media and infant formula marketing interact with individual level factors such as age, marital status and employment status to influence a woman's decision to breastfeed (Bentley et al., 2003). To our knowledge, however, no studies have been conducted to examine specifically how exposure to different sources of information on breastfeeding might impact breastfeeding rates. More research is needed to determine how the content of the breastfeeding information presented by the media and the frequency of this information influence breastfeeding outcomes.

Limitations and strengths

A limitation of this study was the method of measurement for sources of information. No information was available on the content of breastfeeding information and the extent of exposure to each medium, as well as the mother's exposure to competing media sources of formula companies which provide many advertisements in parenting magazines. It is plausible that a woman could obtain all of her information about breastfeeding from one source and still have a high level of knowledge and awareness of breastfeeding. Despite these limitations, the use of this large, longitudinal sample is a substantial strength in this study.

Conclusions and recommendations

Many women in the US are not initiating breastfeeding, and rates of exclusive breastfeeding during the first months of life are low. Information on how various prenatal factors, including health information, knowledge, and clinician, family and peer influences affect breastfeeding patterns is needed to plan effective interventions. Further, more research is needed on how exposure to different media sources of information on breastfeeding in the prenatal period affects breastfeeding outcomes. The results of this study suggest that health care providers should focus on increasing prenatal knowledge of breastfeeding benefits to increase the likelihood that mothers will initiate and continue exclusive breastfeeding. Breastfeeding interventions should target not only the mothers, but also the mothers' immediate family members as their opinions/knowledge can influence the decision to initiate and continue breastfeeding. It is evident from the findings of this study that a clinician's opinion can influence a woman's decision to initiate breastfeeding. Thus, the encouragement of breastfeeding needs to be a priority among health care providers in improving the health of mothers and their children.

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Table 1

Characteristics (%) of women stratified by breastfeeding status.*

	Ever breastfed, n = 3033 (%)		Any breastfeeding month 2, n = 2546 (%)		Exclusively breastfed month 2, n = 2546 (%)	
	No	Yes	No	Yes	No	Yes
Total (%)	14.7	85.3	36.2	63.8	61.9	38.1
Maternal age						
18–24 yrs	18.2	81.8	53.1	46.9	75.7	24.3
25–34	13.6	86.4	31.9	68.1	57.4	42.6
> 34	14.0	86.0	30.5	69.5	60.6	39.4
Race						
White	15.6	84.4	35.8	64.2	60.3	39.7
Black	16.1	83.9	46.1	53.9	75.5	24.5
Hispanic	8.2	91.8	34.0	66.0	69.4	30.6
Other	5.2	94.8	30.9	69.1	62.7	37.3
Maternal Education						
High school or less	24.1	75.9	55.3	44.7	76.0	24.0
Some college	12.8	87.2	37.3	62.7	65.0	35.0
4-year college or more	9.3	90.7	22.1	77.9	48.3	51.7
Smoking						
No	12.9	87.1	33.0	67.0	59.4	40.6
Yes	30.4	69.6	67.1	32.9	86.4	13.6

Note:

* All associations were significant (p -value < 0.05) between each independent and dependent variable with the exception of race and any breastfeeding at month 2.

Table 2

Breastfeeding promotion, support and knowledge of benefits stratified by breastfeeding status.*

	Ever breastfed (%)		Any breastfeeding month 2 (%)		Exclusively breastfed month 2 (%)	
	No	Yes	No	Yes	No	Yes
Exposure to media sources of information						
High number of sources	14.2	85.8	37.2	62.8	65.5	34.5
Medium number of sources	13.0	87.0	32.7	67.3	58.6	41.4
Low/no number of sources	21.9	78.1	47.0	53.0	67.2	32.8
Knowledge/agreement with breastfeeding benefits						
Agreement	2.2	97.8	17.8	82.8	45.8	54.2
No opinion/somewhat agree	13.5	86.5	37.7	62.3	64.8	35.2
Disagreement	38.7	61.3	67.0	33.0	85.8	14.2
Family opinion on infant feeding						
Breastfeed only	2.1	97.9	17.5	82.5	44.2	55.8
Formula only or both	24.3	75.7	52.5	47.5	80.0	20.0
No opinion	34.1	65.9	63.2	36.8	81.3	18.7
Clinician opinion on infant feeding						
Breastfeed only	6.1	93.9	26.5	73.5	53.4	46.6
Formula only or both	22.8	77.2	48.8	51.2	76.7	23.3
No opinion	21.8	78.2	42.7	57.3	65.8	34.2
Parent was breastfed as infant						
Neither/Don't know	21.8	78.2	45.6	54.4	70.5	29.5
One parent was breastfed	11.3	88.7	30.3	69.7	56.8	43.2
Both were breastfed	4.4	95.6	24.5	75.5	50.9	49.1
Friends who did/did not breastfeed						
Only friends who breastfed their babies	5.9	94.1	21.6	78.4	47.4	52.6
One or two friends did not breastfeed	9.1	90.9	29.0	71.0	57.2	42.8
Three or more friends did not breastfeed	19.1	80.9	40.1	59.9	63.9	36.1
Don't know	17.5	82.5	43.6	56.4	69.1	30.9

Note:

* All associations were significant at $p\text{-value} < 0.05$.

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Table 3

Adjusted odds ratios (95% confidence intervals) of breastfeeding promotion, support and knowledge of benefits influencing breastfeeding initiation, any breastfeeding at two months and exclusive breastfeeding at two months.

	Breastfeeding initiation	Any breastfeeding month 2	Exclusive breastfeeding month 2
	Adjusted OR (95% CI)	Adjusted OR (95% CI)	Adjusted OR (95% CI)
Exposure to media sources of information			
High number of sources	1.23 (0.83, 1.82)	1.05 (0.76,1.45)	0.79(0.52, 0.98)
Medium number of sources	1.44 (1.02, 2.04)	1.39 (1.04,1.87)	1.05(0.78, 1.39)
Low/no number of sources	Reference	Reference	Reference
Knowledge/agreement with breastfeeding benefits			
Agreement	11.2 (6.87, 18.45)	5.62 (4.19, 7.54)	4.13 (3.03, 4.62)
No opinion/somewhat agree	3.21 (2.42, 4.23)	2.73 (2.11, 3.53)	2.35 (1.74, 3.17)
Disagreement	Reference	Reference	Reference
Family opinion on infant feeding			
Breastfeed only	8.21(5.12,13.2)	3.21(2.51,4.11)	3.27(2.58,4.15)
No opinion	0.83(0.61,1.13)	0.76(0.57,1.03)	1.10(0.78,1.56)
Formula only or both	Reference	Reference	Reference
Clinician opinion on infant feeding			
Breastfeed only	1.95 (1.31, 2.88)	1.23 (0.98, 1.67)	1.27 (0.93, 1.73)
No opinion	0.89 (0.65, 1.25)	0.93 (0.74, 1.33)	1.11 (0.81, 1.51)
Formula only or both	Reference	Reference	Reference
Parent was breastfed as infant			
1 parent was breastfed	1.37 (0.98, 1.92)	1.36 (1.05, 1.75)	1.33 (1.51, 1.68)
Both were breastfed	2.85 (1.83, 4.44)	1.51 (1.15, 1.99)	1.47 (1.15, 1.87)
Neither/don't know	Reference	Reference	Reference
Friends who did/did not breastfeed			
Only friends who breastfed their babies	1.73 (0.84, 3.55)	1.57 (1.01, 2.47)	1.34 (0.92, 1.95)
One or two friends did not breastfeed	1.54 (1.10, 2.16)	1.29 (0.99, 1.67)	0.96 (0.76, 1.22)
Don't know	1.24 (0.89, 1.71)	0.95 (0.73, 1.24)	0.80 (0.62, 1.03)
Three or more friends did not breastfeed	Reference	Reference	Reference