

Opinions and Practices of Clinicians Associated With Continuation of Exclusive Breastfeeding

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ABSTRACT. *Background.* The American Academy of Pediatrics recommends exclusive breastfeeding for the first 6 months of life. Recent statistics indicate that initiation and maintenance of exclusive breastfeeding are low in the United States. Unfortunately, little information is available on how clinicians and health care organizations can best promote continuation of exclusive breastfeeding.

Objective. To identify clinicians' opinions and management practices that are associated with continuation of exclusive breastfeeding.

Methods. We conducted a prospective cohort study of low-risk mother-newborn pairs in a large, multispecialty group practice in which the mother was breastfeeding at 4 weeks. Mothers completed telephone interviews at 4 and 12 weeks postpartum, and their data were linked with their obstetric and pediatric clinicians' responses to a cross-sectional mailed survey conducted during the same time period. Obstetric and pediatric clinicians included medical doctors, nurse practitioners, and nurse midwives. Overall response rates were 63% for mothers and 82% for clinicians (54 obstetric and 67 pediatric clinicians). Bivariate and multivariate analyses were conducted to identify the characteristics of clinicians and mothers that predicted exclusive breastfeeding at 12 weeks.

Results. Of the 288 mothers who were breastfeeding at 4 weeks and had a complete 12-week interview, 152 (53%) were exclusively breastfeeding their infants at 12 weeks. Mothers who discontinued exclusive breastfeeding were more likely to have experienced problems with their infant latching on or sucking (odds ratio [OR]: 3.8; 95% confidence interval [CI]: 1.5–9.7) or report that a health care provider recommended formula supplementation (OR: 2.3; 95% CI: 1.1–5.0).

Clinicians reported limited time during preventive visits to address breastfeeding problems as a very important barrier to promoting breastfeeding. Obstetric providers were least confident in resolving problems with mothers not producing enough breast milk. Pediatric providers

were least confident in resolving problems with breast pain or tenderness or cracked or painful nipples.

In the final multivariate model, mothers whose pediatric providers recommended formula supplementation if an infant was not gaining enough weight (OR: 3.2; 95% CI: 1.04, 9.7) or who considered their advice to mothers on breastfeeding duration to be not very important (OR: 2.2; 95% CI: 1.2–3.9) were more likely to have discontinued exclusive breastfeeding by 12 weeks postpartum. Black mothers were significantly more likely to discontinue exclusive breastfeeding by 12 weeks.

Conclusions. Clinicians' practices regarding formula supplementation of healthy infants and their opinions about the importance of their breastfeeding advice are associated with the likelihood that mothers will continue exclusive breastfeeding. Policies to enhance clinicians' abilities to address breastfeeding problems within the constraints of busy practices could improve their ability to support exclusive breastfeeding. *Pediatrics* 2004;113:e283–e290. URL: <http://www.pediatrics.org/cgi/content/full/113/4/e283>; *exclusive breastfeeding, clinician support, formula supplementation, and health services research.*

ABBREVIATIONS. AAP, American Academy of Pediatrics; HVMA, Harvard Vanguard Medical Associates.

In the United States, the promotion and support of breastfeeding has emerged as a public health priority in recent years. Because of the compelling evidence that prolonged and exclusive breastfeeding has multiple health benefits for infants and their mothers,^{1–4} both the American Academy of Pediatrics (AAP) and the World Health Organization recommend exclusive breastfeeding for the first 6 months of life.^{5,6} Statistics indicate, however, that initiation and maintenance of exclusive breastfeeding are low in the United States. Between 1991 and 1994, 47% of mothers were exclusively breastfeeding at 7 days after birth, but exclusive breastfeeding rates were only 10% at 6 months.⁷ In 2001, exclusive breastfeeding rates at 6 months were found to be just 7.9% in a national study of 896 households.⁸

Both the AAP and the American College of Obstetricians and Gynecologists recommend that clinicians counsel mothers about breastfeeding.⁹ Studies suggest, however, that both obstetrician/gynecologists and pediatricians lack confidence in their skills to support breastfeeding.^{10,11} In addition, little is known about the supports and barriers clinicians experience when counseling on breastfeeding during

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routine preventive visits, and information is scant on how clinicians and health care organizations can best promote continuation of exclusive breastfeeding to 6 months. To improve rates of exclusive breastfeeding, specific information about the clinical beliefs and practices that influence this outcome is needed.

This study aimed to address these information gaps by 1) identifying management practices and other characteristics of clinicians associated with continuation of exclusive breastfeeding among mothers, 2) describing mothers' perspectives on both health care system-level supports and barriers to exclusive breastfeeding, and 3) describing clinicians' perspectives on these issues. We tested the hypothesis that clinicians' opinions and practices are associated with continuation of exclusive breastfeeding even after adjustment for maternal characteristics.

METHODS

Overview

We conducted 1) a prospective cohort study of low-risk mother-newborn pairs and 2) a cross-sectional study of their obstetric and pediatric clinicians, both within Harvard Vanguard Medical Associates (HVMA), a multispecialty provider group in the greater Boston, Massachusetts area. Mothers were interviewed by telephone at 4 and 12 weeks postpartum. Obstetric and pediatric clinicians in HVMA were mailed a self-administered survey during the same time period. Bivariate and multivariate analyses were conducted to identify clinician- and maternal-specific predictors of continuation of exclusive breastfeeding at 12 weeks. The institutional review board at Harvard Pilgrim Health Care approved this study.

Study Population

We studied low-risk mother-newborn pairs in which the infant was born between January and July of 2002 and received primary care from HVMA. In low-risk mother-newborn pairs, the infant was a singleton newborn with a gestational age of ≥ 36 weeks, with a birth weight of ≥ 2500 g, and had 5- and 10-minute Apgar scores of ≥ 5 ; the mother had no specific medical problems that would necessitate a prolonged hospital stay. Mother-newborn pairs were ineligible if it was determined during the preinterview screening that the mother could not be interviewed in English, the newborn had spent any time in the neonatal intensive care unit, or the newborn did not receive preventive care from HVMA. Obstetric and pediatric clinicians included HVMA doctors, nurse practitioners, and nurse midwives who routinely saw patients for preventive outpatient visits. Clinicians who saw patients mainly for urgent care visits were excluded ($n = 11$). At the time of this study, there were no continuing educational sessions on breastfeeding in HVMA, although extensive training had been provided previously to clinicians. Several nurses certified as lactation consultants were available to HVMA clinicians and mothers, and breastfeeding classes were offered to mothers for a small copayment as part of HVMA's obstetric prenatal practices.

In general, the 2 hospitals in which mothers in this study delivered had highly experienced nurses to observe breastfeeding in the first 24 hours and address related problems. Nursing mothers routinely received a phone call after discharge, and a visit for a weight check was scheduled on an as-needed basis. Approximately half of the nursing infants were seen within the first 3 to 7 days for breastfeeding questions/concerns or for other reasons.

Data Collection

Each mother was mailed an introductory letter at 2 to 3 weeks postpartum inviting them to participate in a research study of how mothers feed their infants. The letter explained that, during the telephone interviews, mothers would be asked questions about their infant, themselves, and the care the mother and her infant received. It also included a toll-free number they could call to decline participation. Those who did not decline to be contacted were telephoned at 4 weeks and invited to participate. We defined

mothers as "passively declined" if they were called at least 3 times on the weekend, 3 times during daytime hours, and 3 times during evening hours and either 1) did not answer the telephone or b) someone answered but repeatedly said to call back another time. The 4-week interview took an average of 20 minutes; mothers who were breastfeeding at this interview were asked to participate in a 10-minute follow-up interview at 12 weeks. The interviews consisted of closed-ended questions about who and what had influenced the mothers' decisions about how to feed their infants, problems experienced with feeding, and supports, barriers, and services related to breastfeeding.

The clinician surveys, which consisted of 15 closed-ended questions, were mailed to all obstetric and pediatric HVMA staff clinicians in 2 waves separated by 3 weeks; the first mailing included a pen as a token of appreciation. The clinician surveys asked about management practices, opinions about breastfeeding, and health care system-level supports and barriers to promoting breastfeeding. Management practices included clinicians' recommendations for exclusive breastfeeding and formula supplementation. To measure supports and barriers, clinicians were asked to rate 1) the importance of potential barriers to giving advice to parents about infant feeding and 2) their own level of confidence in managing breastfeeding problems.

We linked each mother-newborn pair with both the mother's obstetric clinician and the infant's pediatric clinician via HVMA's computerized medical record system. The infant's pediatric clinician was defined as the one who saw the infant at the 2-week preventive visit.

Definitions of Breastfeeding

For exclusive breastfeeding, we used the World Health Organization definition of "no supplemental liquids or solid foods other than medications or vitamins."¹² Mixed breastfeeding included mothers who were feeding their infants breast milk but were also providing formula, water, or solid food. Weaning was defined as completely discontinuing breastfeeding after initiating it. The "not exclusively breastfeeding" category, defined at 12 weeks, included both the mixed breastfeeding and weaned groups.

Statistical Analysis

Only mother-newborn pairs who were breastfeeding at 4 weeks were included in the analyses. The primary outcome of interest was the presence or absence of exclusive breastfeeding at 12 weeks postpartum. χ^2 analyses for categorical variables and the Wilcoxon rank-sum test for ordinal or continuous variables were used to identify maternal and clinician predictors of exclusive breastfeeding at 12 weeks.

Some clinicians in the study saw several mothers and infants who were also participating in the study. To account for correlated values among mothers' and clinicians' responses, we used logistic regression with generalized estimating equations in our multivariate analyses to assess the independent effects of these predictors on discontinuation of exclusive breastfeeding.¹³

Predictor variables associated with the outcome at $P \leq .10$ in bivariate analyses were eligible for entry in preliminary multivariate models. Each preliminary model included all eligible sociodemographic predictors and 1 of the other maternal- or clinician-level predictors of interest in a forced-entry logistic regression with generalized estimating equations. Because we were interested in independent maternal- and clinician-level predictors of not exclusively breastfeeding, our 2 final multivariate-adjusted models adjust for maternal sociodemographic variables associated with discontinuation of exclusive breastfeeding at $P \leq .05$ in preliminary modeling plus maternal- or clinician-level predictors also associated with the outcome at $P \leq .05$ in preliminary modeling.

Because several of the clinician-level predictors were highly collinear, we sequentially added each to the model and eliminated those that inflated the standard error by $\geq 10\%$. The fit of the final logistic models was assessed as adequate based on the Hosmer-Lemeshow test. All data analyses were performed by using SAS Proc Genmod and SAS 8.2 (Cary, NC).

RESULTS

Study Population

From the computerized data, we identified an initial sample of 1036 low-risk mother-newborn pairs. Of these, 24 mothers (2%) called the toll-free number to decline participation. Of the remaining 1012 mothers, we completed contact with 652 mothers and did not complete contact with 41. Another 227 mothers actively declined to be interviewed, and 92 passively declined. Among the group with completed contact, 223 (34%) were ineligible because there was a language barrier ($n = 17$), the newborn did not receive preventive care from HVMA ($n = 164$), the newborn spent time in the neonatal intensive care unit ($n = 40$), or other reasons ($n = 2$). Thus, we completed 4-week interviews with 429 mothers.

To calculate the denominator for the completion rate, the American Association for Public Opinion Research recommends subtracting the number of ineligible from the initial sample.¹⁴ The number of ineligible among the groups who opted out before contact attempts ($n = 24$), actively ($n = 227$) or passively ($n = 92$) declined to be interviewed, or had incomplete contact ($n = 41$) was estimated at 131 by multiplying the number in these groups by the proportion ineligible among the group with completed contact (34%). The estimated number of mothers eligible for interview was 682 (1036 – 223 ineligible on the basis of screening questions – 131 estimated ineligible among mothers with incomplete contact). The completion rate was 63% (429 of 682).

Among the 429 eligible mother-newborn pairs, 319 (74%) mothers were either breastfeeding exclusively ($n = 210$) or engaged in mixed breastfeeding ($n = 109$) at 4 weeks. We attempted to interview these 319 mothers 12 weeks postpartum and completed interviews with 288 (90%) of the them; these 288 mothers compose the study group. Of the 210 mothers who were exclusively breastfeeding at 4 weeks, 144 (69%) were exclusively breastfeeding at 12 weeks, 48 (23%) were engaged in mixed feeding, 7 (3%) had weaned, and 11 (5%) were lost to follow-up. Of the 109 mothers who were engaged in mixed feeding at 4 weeks, 12 (11%) were exclusively breastfeeding at 12 weeks, 50 (46%) were still engaged in mixed feeding, 27 (25%) had weaned, and 20 (18%) were lost to follow-up. Thus, of the 288 mothers interviewed 12 weeks postpartum, 152 (53%) were exclusively breastfeeding, 102 (35%) were engaged in mixed feeding, and 34 (12%) had weaned.

The study group (Table 1) was 62% white, 13% black, 11% Hispanic, 7% Asian, and 7% multiracial or other, with a mean age of 33 years. Thirty-nine percent of mothers were primiparas. The educational and income levels of the study group were relatively high, and the father was present in >9 of 10 households. Rates of exclusive breastfeeding at 12 weeks were higher among mother-newborn pairs with higher household income or who had the father of the infant in the household (Table 1). The 2 main reasons that mothers introduced formula were their perception of not having enough breast milk or believing that formula feeding was more convenient.

TABLE 1. Demographic Characteristics of Mothers by Exclusive Breastfeeding Status at 12 Weeks (Among Mothers Who Were Breastfeeding at 4 Weeks)

Characteristic	All ($n = 288$)	Exclusively Breastfeeding ($n = 152$)	Not Exclusively Breastfeeding† ($n = 136$)	P ‡
Mean maternal age, y (\pm SD)	33 (4)	33 (4)	33 (5)	.90
Race/ethnicity, %				.01
White	62	70	53	
Black	13	7	20	
Hispanic	11	9	13	
Asian	7	7	8	
Multiracial or other	7	7	6	
Parity, %				.90
0	39	39	38	
≥ 1	61	61	62	
Education				.08
High school graduate or less	6	5	7	
Some college or college graduate	50	45	56	
Postgraduate	44	50	37	
Income				.01
\leq \$40 000	12	6	18	
\$40 001–\$75 000	25	25	25	
\$75 001–\$100 000	23	24	22	
$>$ \$100 001	40	45	35	
Father of infant lives in household				.005
Yes	94	98	90	
No	6	2	10	
Returned to work or school				.20
Yes	30	27	34	
No	70	73	66	

† Includes mothers who were engaged in mixed breastfeeding ($n = 102$) and mothers who had weaned by 12 weeks ($n = 34$).

‡ P values are from the χ^2 or Fisher's exact test for categorical variables, the Wilcoxon rank-sum test for ordinal or continuous variables.

Opinions and Practices of Clinicians

We identified 161 clinicians who routinely saw patients for preventive outpatient visits. A total of 132 (82%) returned the survey (completely filled out in all cases), of whom 11 (8%) were ineligible. Applying this proportion of eligibles to those clinicians who did not return the survey gave us a response rate of 82%. The sample included 25 obstetrician/gynecologists, 15 nurse midwives, 47 pediatricians, and 34 nurse practitioners (20 in pediatrics and 14 in obstetrics/gynecology). Most clinicians were white (87%) and had ≥ 1 children (76%). Among those with ≥ 1 children, 90% reported that their children had been breastfed. The mean number of years since completion of postgraduate training was 17.2 (± 8).

Fifty obstetric (93%) and 59 pediatric (88%) clinicians reported that they encouraged mothers who were uncertain of whether to breastfeed or formula feed during the first month of life to breastfeed exclusively. Even so, most obstetric (54%) and pediatric (61%) clinicians agreed with the statement: "Exclusive breastfeeding for the first 6 months of life is unrealistic for many mothers I see." Furthermore, most obstetric (92%) and pediatric (76%) providers rated their advice to breastfeeding mothers on how many weeks to breastfeed as not very important.

Clinicians' reports about barriers to supporting breastfeeding and their confidence in their own skills in this area are summarized in Table 2. Limited time during preventive visits to give routine advice on feeding and to address breastfeeding problems were rated most frequently as very important. Obstetric providers were least confident in resolving problems

of not producing enough breast milk, and pediatric providers were least confident in resolving problems with breast pain or tenderness or cracked or painful nipples.

Before multivariate analysis, we attempted to link interview data from each mother-newborn pair with survey data from the mother's primary obstetric clinician and the infant's primary pediatric clinician; 75% of the pairs were linked to data from their pediatric clinicians and 65% to data from their obstetric clinicians. All multivariate models include mothers and clinicians who could be linked.

Multivariate Models of Predictors of Not Exclusively Breastfeeding

Maternal Predictors

In the multivariate model of sociodemographic and maternal-level factors reported during the 4-week interview (Table 3), mothers who experienced problems with their infant latching on or sucking (odds ratio [OR]: 3.8; 95% confidence interval [CI]: 1.5–9.7; $P = .006$) or reported that a health care provider recommended formula supplementation (OR: 2.3; 95% CI: 1.1–5.0; $P = .04$) were at higher risk for not exclusively breastfeeding at 12 weeks. Mothers who received breastfeeding advice from books and other print media were less likely to have discontinued exclusive breastfeeding at 12 weeks (OR: 0.5; 95% CI: 0.2, 0.96; $P = .04$). Women who reported that they made the decision to breastfeed their infant either during or after pregnancy were more likely than those who made the decision before pregnancy not to be exclusively breastfeeding at 12 weeks, but

TABLE 2. Clinicians' Ratings of Barriers to Providing Infant Feeding Advice and Their Own Confidence in Breastfeeding Skills

Potential Barriers	Obstetrics*	Pediatrics†
	Potential Barrier Is Very Important, <i>n</i> (%)	
Limited time during preventive visits to give routine advice on feeding	28 (52)	26 (39)
Limited time during preventive visits to address breastfeeding problems	36 (67)	32 (48)
Limited availability of lactation consultants	28 (52)	24 (36)
Limited availability of breastfeeding support services such as classes	16 (30)	19 (29)
Limited skills of my own for counseling mothers about breastfeeding	11 (21)	11 (17)
	Not Very Confident in Particular Skill, <i>n</i> (%)	
Breastfeeding Skills		
Evaluating whether latching on by a breastfeeding infant is successful	20 (38)	33 (49)
Teaching new mothers basic breastfeeding techniques such as positioning	16 (30)	29 (43)
Resolving problems with breast pain or tenderness or cracked or painful nipples	21 (39)	45 (67)
Resolving problems with mothers not producing enough breast milk	29 (55)	37 (56)
Advising mothers who plan to return to work how to continue breastfeeding	21 (39)	21 (31)
Knowing what referral services exist for breastfeeding support	14 (26)	34 (51)

* Includes obstetrician/gynecologists ($n = 25$), nurse midwives ($n = 15$), and obstetrician/gynecologist nurse practitioners ($n = 14$).

† Includes pediatricians ($n = 47$) and pediatric nurse practitioners ($n = 20$).

TABLE 3. Maternal Predictors of Not Exclusively Breastfeeding at 12 Weeks (Among Mothers Who Were Breastfeeding at 4 Weeks)

	Adjusted OR (95% CI) of Not Exclusively Breastfeeding	P
Maternal demographic characteristic		
Race/ethnicity		
Non-Hispanic white	—	
Non-Hispanic black	2.9 (0.9–9.6)	.08
Hispanic	1.3 (0.2–7.1)	.78
Asian	0.7 (0.2–2.3)	.61
Multiracial/other	0.6 (0.1–2.7)	.50
Income		
≤\$40 000	—	
\$40 000–\$100 000	0.2 (0.04–0.7)	.009
>\$100 001	0.1 (0.03–0.4)	.0005
Father living in household	0.4 (0.1–2.3)	.31
Maternal factor		
Experienced problems with infant latching on/sucking†	3.8 (1.5–9.7)	.006
Feeding decision made during or after pregnancy‡	2.1 (0.96–4.4)	.06
Did not discuss breastfeeding duration with pediatrician	1.6 (0.6–4.2)	.40
Health care provider recommended formula supplementation	2.3 (1.1–5.0)	.04
Received advice from books/pamphlets about breastfeeding§	0.5 (0.2–0.96)	.04
Needed advice on how to breastfeed after returning to work	1.8 (0.7–4.2)	.21

Adjusted for maternal sociodemographic characteristics and all maternal-level factors significant ($P = .10$) in bivariate analyses.

† Referent: mothers who did not experience breastfeeding problems.

‡ Referent: feeding decision made before pregnancy.

§ Referent: mothers who did not receive breastfeeding advice from books/pamphlets.

|| Referent: mothers who did not need advice on how to breastfeed after returning to work.

the difference just failed to reach significance (OR: 2.1; 95% CI: 0.96–4.4; $P = .06$).

Opinions and Practices of Clinicians

In the final multivariate model, which adjusted for maternal demographic characteristics, black mothers were significantly more likely to discontinue exclusive breastfeeding by 12 weeks ($P = .009$).

In addition, 2 features of pediatric clinicians were associated with the likelihood of exclusive breastfeeding at 12 weeks (Table 4). There were no specific features of obstetric clinicians associated with the likelihood of exclusive breastfeeding at 12 weeks in the final multivariate model. Mother-newborn pairs

whose pediatricians recommended formula supplementation if an infant was not gaining enough weight (OR: 3.2; 95% CI: 1.04, 9.7; $P = .04$) were at higher risk for not exclusively breastfeeding. In addition, mother-infant pairs whose pediatrician rated their advice to mothers on breastfeeding duration as not very important (OR: 2.2; 95% CI: 1.2–3.9; $P = .01$) were more likely not to be exclusively breastfeeding at 12 weeks. Several opinions and practices of clinicians were not associated with the likelihood of exclusive breastfeeding. Included were clinicians 1) recommending exclusive breastfeeding during the first month of life, 2) recommending formula supplementation if an infant seems hungry between feeds,

TABLE 4. Predictors of Not Exclusively Breastfeeding at 12 Weeks, From Final Multivariate Models (Among Mothers Who Were Breastfeeding at 4 Weeks)

Predictor	Adjusted OR (95% CI) of Not Exclusively Breastfeeding	P
Maternal demographic characteristic		
Race/ethnicity		
Non-Hispanic white	—	
Non-Hispanic black	3.7 (1.4–9.7)	.009
Hispanic	0.98 (0.4–2.4)	.97
Asian	1.8 (0.5–6.5)	.34
Multiracial/other	1.0 (0.3–3.3)	.99
Income		
≤\$40 000	—	
\$40,000–\$100 000	0.6 (0.2–2.0)	.43
>\$100 001	0.6 (0.2–1.8)	.35
Father living in household	0.5 (0.1–1.4)	.17
Pediatric clinician factor†		
Recommend formula supplementation if infant is not gaining enough weight	3.2 (1.04–9.7)	.04
Reported advice to mothers on breastfeeding duration is not very important	2.2 (1.2–3.9)	.01
Does not recommend exclusive breastfeeding during the first month of life	2.1 (0.95–4.7)	.07

Adjusted for maternal sociodemographic characteristics and all obstetric and pediatric clinician variables significant ($P = .10$) in bivariate analyses.

† In the final multivariate model, no variables specific to obstetric clinicians were found to be significant.

3) having limited time during preventive visits to address breastfeeding problems, and 4) having a greater level of confidence in advising mothers on how to breastfeed after returning to work.

DISCUSSION

Major Findings

This study of a large multispecialty group practice in the Boston area provides information that may help clinicians and health care organizations in the United States and elsewhere to promote exclusive breastfeeding among mothers in the first 6 months of life. We found that specific practices and opinions of pediatricians and nurse practitioners were associated with the likelihood of continuation of exclusive breastfeeding among their patients. Clinicians who recommended formula supplementation or who do not think their advice about how long to breastfeed is very important may be sending signals that exclusive breastfeeding is not something that mothers should value highly. In addition, our results indicate that many clinicians do not feel confident in their skills to support breastfeeding and may have limited time to address the issue during preventive visits. As for mothers, experiencing problems with the infant latching on or sucking seems to be a risk factor for not exclusively breastfeeding. The picture that emerges is the need for greater support of clinicians in terms of providing them with time to educate and counsel about breastfeeding and its importance and of mothers in assisting them when they confront difficulties.

Comparison With Other Studies

The strongest evidence that clinical interventions can improve breastfeeding rates comes from randomized trials of structured counseling and behavioral interventions.^{15–18} Most randomized trials of such interventions, however, have had time-intensive interventions that occurred as adjuncts to routine preventive visits rather than within them. Little information is available on whether pediatricians or other clinicians can affect breastfeeding rates via specific advice or practices during routine preventive visits.

The current study is unique in that 1) the maternal correlates of continuation of exclusive breastfeeding were examined by using a prospective cohort and 2) the self-reported practices and opinions of clinicians were linked with the breastfeeding outcomes of their patients under real-life conditions. Previous studies of clinician practices and breastfeeding rates have found that encouragement from health care providers is associated with breastfeeding initiation¹⁹ and continuation.²⁰ These studies, however, relied on mothers' recall of health care provider encouragement 12 weeks to 3 years after childbirth, and they could not pinpoint which clinicians' recommendations were important or how the encouragement was provided.^{19,20} In the current study, which included both obstetric and pediatric providers, we identified specific recommendations provided by clinicians during routine preventive visits that were associated with exclusive breastfeeding.

Our finding that mothers whose pediatricians recommended formula supplementation for a healthy infant not gaining enough weight were more likely to discontinue exclusive breastfeeding is consistent with previous studies that have found that attitudes of health care providers influence a woman's choice of feeding methods.^{21,22} Recommending supplementary feedings with formula to a breastfeeding mother may impede successful breastfeeding and might be unnecessary.^{23,24} Several studies, however, have found that pediatricians, obstetricians, and family practitioners may not know that supplementing during the first few weeks of life can cause breastfeeding failure.^{10,25–27} For healthy breastfed infants who have slow weight gain, recognized therapeutic approaches include increasing the frequency and duration of breastfeeding or of expressing breast milk.^{28,29} Greater dissemination of the AAP guidelines for breastfeeding practices⁵ could help fill the gap in existing knowledge about formula supplementation. Furthermore, lactation consultants could aid clinicians in assessing breastfeeding problems and can be important adjuncts in the promotion of successful breastfeeding.

Our results are in accord with previous studies that have found that encountering problems in breastfeeding is associated with its discontinuation.^{20,30} Although mothers in our study reported several common problems, only problems with their infants sucking or latching on were independently associated with not exclusively breastfeeding at 12 weeks. Support with breastfeeding problems and promotion of exclusive breastfeeding through existing primary health care services seems to be feasible and effective in increasing the length of time that women exclusively breastfeed.^{15,31} These studies also demonstrate the importance of lay support and community-based efforts in promoting exclusive breastfeeding.

The relation to breastfeeding of demographic variables such as maternal age, education, income, and race/ethnicity has been studied extensively.^{32,33} Our findings are consistent with previous studies that document higher discontinuation rates among low-income mothers and mothers of black race.^{7,8,34} Correspondingly, public health efforts are needed to improve the rate of exclusive breastfeeding among non-Hispanic blacks and socioeconomically disadvantaged groups.⁷ We also found that mothers who received advice from mass print media were less likely to discontinue exclusive breastfeeding. The mass print media may provide an opportunity to promote breastfeeding,³⁵ but content analyses of such media have identified themes that may not be beneficial, such as emphasis on lack of control in a woman's life and the negative impact childbirth has on marital relationships and career.³⁶ The print media aimed at women could play a better public health role by presenting positive messages including the health benefits to women and infants.

Limitations

Interpretation of our study should consider several limitations. First, it focused on a medically low-risk

population of mother-newborn pairs in an integrated multispecialty group practice. The mothers in the study had diverse racial/ethnic backgrounds, but their educational and income levels were relatively high. Although our population was ethnically diverse, our results may not be generalizable to more socioeconomically disadvantaged populations or to families who receive care in less-integrated settings. Our results also may not be generalizable to mothers or newborns with medical complications. Additional research involving such populations and settings is needed.

We relied on clinicians' self-report of their opinions and practices toward breastfeeding and only collected information on their overall advice in general and not to the particular women in this study. In addition, the observed association between clinicians' opinions and practices and breastfeeding continuation could have stemmed from selection bias: clinicians who were more likely to encourage breastfeeding may attract patients who breastfeed to their practice and may be more likely to respond to a breastfeeding survey. Information bias and nondifferential misclassification could have occurred if clinicians chose responses that seemed "correct" or more socially desirable. Even if such misclassification took place, we believe it would not be related to women's breastfeeding practices at 12 weeks. For nondifferential misclassification, the study results would be biased toward the null hypothesis. Furthermore, although our outcome, "not exclusively breastfeeding," may imply that formula is always undesirable, clinicians sometimes recommend formula supplementation as a temporary adjunct when there is actual failure of the nursing dyad. We were unable to examine whether this was the reason why supplementation was recommended to exclusively breastfeeding mothers in this study.

Finally, the associations found in this study cannot be interpreted as causal relationships; either self-selection bias or confounding could have caused the observed associations. For example, women who had more commitment to breastfeeding may have been more likely to read or recall written materials about the subject, or mothers who were likely to discontinue exclusive breastfeeding might have self-selected providers who recommended formula supplementation for slow weight gain. Conversely, mothers more likely to continue exclusive breastfeeding could have chosen providers less likely to recommend formula for slow weight gain or who had other characteristics we found associated with breastfeeding outcome. An unmeasured confounder such as maternal depression conceivably might have caused both discontinuation of exclusive breastfeeding and the provider recommendations associated with it, but this seems less plausible.

CONCLUSIONS

We found that clinicians' practices regarding formula supplementation of healthy infants and their opinions about the importance of their breastfeeding advice are associated with the likelihood that moth-

ers will continue exclusive breastfeeding. These results reinforce the recent recommendations from the US Preventive Services Task Force for health care organizations to develop structured education and behaviorally oriented counseling programs to promote breastfeeding in their practices.³⁷

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REFERENCES

1. Scariati PD, Grummer-Strawn LM, Fein SB. A longitudinal analysis of infant morbidity and the extent of breastfeeding in the United States. *Pediatrics*. 1997;99(6). Available at: www.pediatrics.org/cgi/content/full/99/6/e5
2. Dewey KG, Heinig MJ, Nommsen-Rivers LA. Differences in morbidity between breast-fed and formula-fed infants. *J Pediatr*. 1995;126:696-702
3. Howie PW. Protective effect of breastfeeding against infection in the first and second six months of life. *Adv Exp Med Biol*. 2002;503:141-147
4. Dermer A. Breastfeeding and women's health. *J Womens Health*. 1998;7:427-433
5. American Academy of Pediatrics, Work Group on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics*. 1997;100:1035-1039
6. Kramer MS, Kakuma R. *The Optimal Duration of Exclusive Breastfeeding*. Geneva, Switzerland: World Health Organization; 2001
7. Li R, Ogden C, Ballew C, Gillespie C, Grummer-Strawn L. Prevalence of exclusive breastfeeding among US infants: the Third National Health and Nutrition Examination Survey (Phase II, 1991-1994). *Am J Public Health*. 2002;92:1107-1110
8. Li R, Zhao Z, Mokdad A, Barker L, Grummer-Strawn L. Prevalence of breastfeeding in the United States: the 2001 National Immunization Survey. *Pediatrics*. 2003;111:1198-1201
9. American Academy of Pediatrics, Committee on Fetus and Newborn, American College of Obstetricians and Gynecologists. *Guidelines for Perinatal Care*. 4th ed. Washington, DC: American College of Obstetricians and Gynecologists, American Academy of Pediatrics; 1997
10. Freed GL, Clark SJ, Sorenson J, Lohr JA, Cefalo R, Curtis P. National assessment of physicians' breast-feeding knowledge, attitudes, training, and experience. *JAMA*. 1995;273:472-476
11. Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians' practices and attitudes regarding breastfeeding promotion. *Pediatrics*. 1999;103(3). Available at: www.pediatrics.org/cgi/content/full/103/3/e35
12. World Health Organization. *Indicators for Assessing Breast-feeding Practices*. Geneva, Switzerland: World Health Organization; 1991
13. Zeger SL, Liang KY. Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*. 1986;42:121-130
14. American Association for Public Opinion Research. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. Ann Arbor, MI: American Association for Public Opinion Research; 2000
15. Sikorski J, Renfrew MJ, Pindoria S, Wade A. Support for breastfeeding mothers. *Cochrane Database Syst Rev*. 2002;(1):CD001141
16. Kramer MS, Chalmers B, Hodnett ED, et al. Promotion of Breastfeeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. *JAMA*. 2001;285:413-420
17. Sciacca JP, Dube DA, Phipps BL, Ratliff MI. A breast feeding education and promotion program: effects on knowledge, attitudes, and support for breast feeding. *J Community Health*. 1995;20:473-490
18. Brent NB, Redd B, Dworetz A, D'Amico F, Greenberg JJ. Breast-feeding

- in a low-income population. Program to increase incidence and duration. *Arch Pediatr Adolesc Med.* 1995;149:798–803
19. Lu MC, Lange L, Slusser W, Hamilton J, Halfon N. Provider encouragement of breast-feeding: evidence from a national survey. *Obstet Gynecol.* 2001;97:290–295
 20. Taveras EM, Capra AM, Braveman PA, Jensvold NG, Escobar GJ, Lieu TA. Clinician support and psychosocial risk factors associated with breastfeeding discontinuation. *Pediatrics.* 2003;112:108–115
 21. Lawrence RA. The pediatrician's role in infant feeding decision-making. *Pediatr Rev.* 1993;14:265–272
 22. Simopoulos AP, Grave GD. Factors associated with the choice and duration of infant-feeding practice. *Pediatrics.* 1984;74:603–614
 23. Wright A, Rice S, Wells S. Changing hospital practices to increase the duration of breastfeeding. *Pediatrics.* 1996;97:669–675
 24. Powers NG, Naylor AJ, Wester RA. Hospital policies: crucial to breastfeeding success. *Semin Perinatol.* 1994;18:517–524
 25. Freed GL, Clark SJ, Cefalo RC, Sorenson JR. Breast-feeding education of obstetrics-gynecology residents and practitioners. *Am J Obstet Gynecol.* 1995;173:1607–1613
 26. Freed GL, Clark SJ, Curtis P, Sorenson JR. Breast-feeding education and practice in family medicine. *J Fam Pract.* 1995;40:263–269
 27. Freed GL, Clark SJ, Lohr JA, Sorenson JR. Pediatrician involvement in breast-feeding promotion: a national study of residents and practitioners. *Pediatrics.* 1995;96:490–449
 28. Powers NG. How to assess slow growth in the breastfed infant. Birth to 3 months. *Pediatr Clin North Am.* 2001;48:345–363
 29. Powers NG. Slow weight gain and low milk supply in the breastfeeding dyad. *Clin Perinatol.* 1999;26:399–430
 30. Ertem IO, Votto N, Leventhal JM. The timing and predictors of the early termination of breastfeeding. *Pediatrics.* 2001;107:543–548
 31. Bhandari N, Bahl R, Mazumdar S, et al. Effect of community-based promotion of exclusive breastfeeding on diarrhoeal illness and growth: a cluster randomised controlled trial. *Lancet.* 2003;361:1418–143
 32. Serdula MK, Cairns KA, Williamson DF, Fuller M, Brown JE. Correlates of breast-feeding in a low-income population of whites, blacks, and Southeast Asians. *J Am Diet Assoc.* 1991;91:41–45
 33. Losch M, Dungy CI, Russell D, Dusdieker LB. Impact of attitudes on maternal decisions regarding infant feeding. *J Pediatr.* 1995;126:507–514
 34. Li R, Grummer-Strawn L. Racial and ethnic disparities in breastfeeding among United States infants: Third National Health and Nutrition Examination Survey, 1988–1994. *Birth.* 2002;29:251–257
 35. Mannien J, van den Brandhof WE, McIntyre E, Hiller JE. Breastfeeding articles in the Australian press: 1996–1999. *Breastfeed Rev.* 2002;10:5–10
 36. Handfield B, Bell R. What are popular magazines telling young women about pregnancy, birth, breastfeeding and parenting? *Aust Coll Midwives Inc J.* 1996;9:10–14
 37. US Preventive Services Task Force. *Behavioral Interventions to Promote Breastfeeding: Recommendations and Rationale.* Rockville, MD: Agency for Healthcare Research and Quality; 2003

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