The Effect of Work Status on Initiation and Duration of Breast-Feeding

Sara B. Fein, PhD, and Brian Roe, PhD

A B S T R A C T

Objectives. In this study, longitudinal data are used to examine the effect of work status on breast-feeding initiation and duration.

Methods. Mothers from a mail panel completed questionnaires during late pregnancy and 10 times in the infant's first year. Mother's work status was categorized for initiation by hours she expected, before delivery, to work and for duration by hours she worked at month 3. Covariates were demographics; parity; medical, delivery, and hospital experiences; social support; embarrassment; and health promotion.

Results. Expecting to work part-time neither decreased nor increased the probability of breast-feeding relative to expecting not to work (odds ratios [ORs] = .83 and .89, $P > .50$), but expecting to work full-time decreased the probability of breast-feeding (OR = .47, $P < .01$). Working full-time at 3 months postpartum decreased breast-feeding duration by an average of 8.6 weeks ($P < .001$) relative to not working, but part-time work of 4 or fewer hours per day did not affect duration, and part-time work of more than 4 hours per day decreased duration less than full-time work.

Conclusion. Part-time work is an effective strategy to help mothers combine breast-feeding and employment. (*Am J Public Health.* 1998;88:1042–1046)

Introduction

For 20 years, the public health community has called for employment policies that will enable employed mothers to breast-feed,[1–4] but the effectiveness of specific strategies is uncertain.[3] Work status (part-time or full-time employment) is one characteristic likely to affect breast-feeding. Two studies found that mothers working part-time or full-time had higher initiation rates than mothers who were not employed,[5,6] but these studies measured mother's work status at infant age 6 months or later. If initiation is more affected by events occurring shortly after birth than by events occurring many months later, late measurement will hinder identification of the true relationship. Other findings suggest that when employment is measured near the time of breast-feeding initiation, expecting to work does not increase breast-feeding but does not decrease it either.[7,8] The literature consistently shows that full-time employment decreases breast-feeding duration,[7–10] and an appropriately adjusted analysis shows that mothers employed part-time have durations between those of nonworking and full-time–employed mothers.[6]

All studies cited have limitations in terms of the retrospective character of the data, lack of detailed information about other possibly relevant covariates, or both. Variables from several domains have been found to affect breast-feeding initiation or duration and may confound the relationship between breast-feeding and work status. These include demographic and economic variables[5,11–20]; parity[12,17,20,21]; medical, delivery, and some early breast-feeding and hospital experiences[11,12,19,20,22,23]; social context variables, such as having friends who breast-feed[13–15,19,20,22–26]; positive feelings toward the act of breast-feeding[19,20,25,27]; and ability to follow health recommendations.[11–13,19,20,25,27] Receiving formula in a gift pack is thought to decrease duration, but US studies have found no effect.[11,17,28]

In the analysis described here we used variables from the above domains as controls to clarify the effect of part-time employment on breast-feeding initiation and duration.

Methods

Sample

The Infant Feeding Practices Study followed mother-infant pairs from late pregnancy through the infant's first year. The sample was drawn from a consumer mail panel designed to maintain balance (relative to the US census) on 5 characteristics: geographic region, income, population density, household size, and age. However, mail panels require stable, literate members and underrepresent disadvantaged subpopulations.

Each month from February through July 1993, each mail panel member who had reached the third trimester of pregnancy was asked to participate. Intake (prenatal) questionnaires were sent to 3155 women; 2615 (83%) were considered eligible. Respondents were considered ineligible if they indicated that no household member was pregnant or that the due date was more than 3 months away. After the prenatal questionnaire, respondents could be considered ineligible for any of several medical reasons (see Scariati et al.[29]).

Postnatal questionnaires were administered twice during the first month and then

The authors are with the Center for Food Safety and Applied Nutrition, US Food and Drug Administration, Washington, DC.

Requests for reprints should be sent to Sara Fein, PhD, Center for Food Safety and Applied Nutrition, HFS-727, 200 C St SW, Washington, DC 20204 (e-mail: sbf@cfsan.fda.gov).

This paper was accepted January 1, 1998.

once per month in months 2, 3, 4, 5, 6, 7, 9, and 12. To be listed as respondents, panel members had to complete the first 2 questionnaires and at least one of the second 2 questionnaires. Most sample loss resulted from failure to return the first questionnaire. The overall response rate was 69% (1803/2615). The analysis is based on 1488 mothers (83% of the study respondents) who had complete data for the variables used.

We compared our sample with a nationally representative population of mothers who responded to the National Maternal and Infant Health Survey. Our sample was less likely to be from lower income and lower education groups and more likely to be White, older, and married. We also compared respondents with and without complete data on the variables used here. Those lost to missing data were more likely to be non-White, unmarried, from lower education groups, younger, enrolled in WIC (the Special Supplemental Food Program for Women, Infants, and Children), and primiparous, and to consume alcohol during pregnancy. No differences existed between breast-feeding initiation rates or durations.

Data Collection and Variables

The Infant Feeding Practices Study consisted of 11 questionnaires, but for this analysis we used primarily demographic information and data collected prenatally and at month 1. We also included data on mother's work status when the infant was 3 months old and breast-feeding duration, which was determined from the questionnaire on which the mother said she had stopped breast-feeding. In contrast to many of the studies reviewed above, the longitudinal nature of the data collection enabled us to measure the dependent variables contemporaneously.

We used two dependent variables, breast-feeding initiation and breast-feeding duration. A mother initiated breast-feeding if she ever breast-fed her infant. Duration was the infant's age in weeks when the mother completely stopped breast-feeding and was set to 52 for mothers who said they were breast-feeding on the 12-month questionnaire.

We analyzed several employment variables. For the breast-feeding initiation analysis, we examined hours per week the mother worked prenatally, hours per week she expected to work postpartum, and total leave (paid plus unpaid) available. For breast-feeding duration, we examined hours per week the mother was working at the month 3 questionnaire and unused leave. We also examined hours per day the mother was working at month 3, although we used a separate model because the 2 measures were highly correlated.

We used 4 work status categories: not working, less than 20 hours, 20 to 34 hours, and 35 or more hours. We also used 4 leave categories: none, 6 weeks or less, more than 6 weeks, and not working. We evaluated variables from the domains mentioned above that might confound the relationship between work status and breast-feeding.

Analysis

We estimated the effect of work status on breast-feeding initiation and duration via SAS's Logistic and LIFEREG procedures, respectively (SAS Institute, Inc, Cary, NC). LIFEREG adjusts for censored values caused by ending data collection at infant age 12 months. The literature search yielded too many variables that may affect breast-feeding initiation or duration to include in the models. To cull variables, we first evaluated them for collinearity. If 2 or more variables were highly correlated, we ran models separately for each of the collinear variables and selected the model that had the strongest relation with the breast-feeding measures. Second, using a backward elimination process, we deleted variables that were not significantly related to either breast-feeding measure.

Results

Mean values for the variables used in the models are shown in Table 1. We wanted to pursue the effects of 2 collinear variables, previous breast-feeding and parity, because we, like previous researchers, found that parity was negatively related to initiation and positively related to duration. We included an interaction term that crossed parity with previous breast-feeding.

Several variables suggested by the literature were evaluated but found not to be related to initiation or duration after we controlled for other variables in the model. Some variables might have shown no effect because they varied little across our sample: marital status, race, and father's support. Others varied sufficiently but still showed no effect: prenatal work status, father's education, WIC participation, region, type of delivery, minutes from birth to first breast-feeding, receiving formula in a gift pack, mother's chronic health problems, prenatal class, caffeine consumption during pregnancy, vitamin use before pregnancy, and amount of weight mother thought she should gain.

Breast-Feeding Initiation

In our sample, 76% of mothers initiated breast-feeding. The model for expected work status and breast-feeding initiation, controlling for demographic, economic, medical, social, attitudinal, and health promotion characteristics, appears in Table 1. The practical effect of expected work status is shown by the percentage who initiated breast-feeding in each work status category, adjusted for the other variables in the full model. Mothers who expected to work full-time had an adjusted initiation rate 14.3 percentage points lower than that of mothers who did not expect to work (67.2 vs 81.5; $P < .05$). Those who expected to work part-time had an initiation rate equivalent to that of mothers who did not expect to work (79.7 for work 1–19 h/wk, 78.5 for work 20–34 h/wk; $P > .05$).

Leave also affected initiation. Mothers with more than 6 weeks of leave were more likely to initiate breast-feeding than nonworking mothers, although the other 2 leave categories were not related to initiation.

The analysis confirmed most relationships reported in the literature between the covariates and breast-feeding initiation. Positively related were mother's education, mother's age, having friends who had breast-fed, mother and father having been breast-fed as infants, and complications during pregnancy. Several negative relationships were found: expectation of embarrassment about nursing, time until mother held the infant, having a physician (vs a midwife) as birth attendant, and number of cigarettes smoked daily during pregnancy. Consistent with previous research, mothers who spent more nights in the hospital were less likely to breast-feed in our sample of infants and mothers with no significant complications. In contrast to other studies, household income had a negative relationship with breast-feeding initiation.

Parity was negatively related to initiation in a model that included only demographic variables (not shown), as previous research has demonstrated. This relationship is illuminated in the full model by the parity × previous breast-feeding variables (see Table 1). Parity negatively affected initiation, but past breast-feeding had a positive and stronger effect. Mothers with 1 or more other children who had not previously breast-fed were much less likely than new mothers to initiate breast-feeding, and among mothers who had not previously breast-fed, those with 1 other child were more likely to initiate than those with more children ($t = 2.32$; $P = .02$). Among mothers who had previously breast-fed, those with 1 other child were as likely as new mothers to

TABLE 1—Mean Values of Variables, Adjusted Odds Ratios (ORs) or Elasticity for Breast-Feeding Initiation, and Adjusted Coefficients for Breast-Feeding Duration

Variable	Sample Mean or % of Sample	Initiation Model OR or Elasticity[a]	Initiation Model P	Duration Model Coefficient	Duration Model P
Initiation of breast-feeding, %	76				
No. of weeks of breast-feeding, mean (median)	24.11 (19.0)				
Prenatal expectation of postpartum work status, %					
Expect to work ≥ 35 h	36	0.47	.01	...	
Expect to work 20–34 h	16	0.83	.51	...	
Expect to work 1–19 h	10	0.89	.72	...	
Expect not to work	38	...		...	
Work status in month 3 postpartum					
≥ 35 h	23	...		−8.54	.001
20–34 h	8	...		−2.59	.28
1–19 h	10	...		−0.70	.75
Not working	59	...		...	
Maternity leave available, %					
No leave	22	1.10	.70	0.70	.70
≤ 6 wk	20	1.27	.42	−4.95	.02
> 6 wk	29	1.74	.06	−4.16	.04
Not working	29	...		...	
Demographics					
Mother's education, %					
≤ High school	32	...		...	
Some college	36	1.45	.05	5.87	<.001
College graduate	32	2.60	<.001	8.71	<.001
Mother's age, y	28.58	0.32[a]	<.001	0.93	<.001
Household income, $000	39.58	−0.04[a]	.07	−0.03	.32
Parity × previous breast-feeding experience, %					
No children	36	...		...	
1 child, no previous breast-feeding	11	0.13	<.001	−4.00	.18
≥ 2 children, no previous breast-feeding	5	0.05	<.001	−5.98	.23
1 child, previous breast-feeding	27	0.98	.95	1.48	.36
≥ 2 children, previous breast-feeding	21	0.64	.10	5.99	<.01
Medical and health variables					
Minutes before mother held baby	83.41 (median = 3.5)	−0.004[a]	.07	0.003	.29
No. of nights in hospital	2.73	−0.19[a]	<.001	−3.00	<.01
Physician as birth attendant, %	95	0.44	.07	−3.77	.17
Pregnancy complications, %	52	1.34	.07	1.11	.38
No. of cigarettes per day during pregnancy	0.18	−0.01[a]	<.01	−3.63	<.01
Baby fed on schedule, %	7	...		...	
Baby fed on demand, %	63	...		2.60	<.01
Baby fed sometimes on demand, sometimes on schedule, %	30	...		3.43	.18
Social support for breast-feeding					
No. of friends who breast-fed	1.88	0.05[a]	.04	1.73	.01
Mother was breast-fed, %	29	2.01	<.001	2.23	.10
Father was breast-fed, %	28	1.50	.04	−0.17	.90
Embarrassment about breast-feeding (1–5; 1 is low)	2.34	−0.21[a]	<.001	−1.96	<.001
No. of observations		1488		1105	
% correct predictions[b]		87.4			
Covariate χ^2 [c]		565.52	<.001	281.17	<.001

Note. Ellipses indicate that the variable was not included in the model.
[a]Elasticity is the percentage change in the probability of initiating breast-feeding due to a 1% increase in the continuous explanatory variable when all explanatory variables are evaluated at mean values (e.g., a 1% increase in mother's age increases the probability of initiating breast-feeding by 0.32%). Unlike the odds ratio, negative relationships are indicated by negative values.
[b]The percentage of sample members for whom the estimated logistic initiation model correctly predicted whether or not they initiated breast-feeding; a higher percentage implies a better statistical fit by the model.
[c]Test statistic for the null hypothesis that all explanatory variables equal zero; smaller *P* values imply a better statistical fit by the model.

initiate and those with more children were less likely than new mothers to initiate, but the difference between mothers with 1 and mothers with more than 1 other child was not significant ($t = 1.59$; $P = .11$).

Breast-Feeding Duration

The average duration of breast-feeding was 24 weeks. The model of breast-feeding duration (see Table 1) indicated that working full-time by month 3 had a strong negative effect on duration relative to not working, but working part-time had no effect. The adjusted mean duration was 25.1 weeks for nonworking mothers, 24.4 weeks for those working 1 to 19 hours per week, and 22.5 weeks for those working 20 to 34 hours per week ($P > .05$). But full-time working mothers breast-fed an average of 16.5 weeks, which was 8.6 weeks less than nonworking mothers ($P < .05$). When hours worked per day were substituted for hours per week in an otherwise identical model, a similar pattern of results occurred.

The model showed a complex relationship between leave and breast-feeding duration. Mothers with no maternity leave breast-fed as long as those who did not work, but mothers with any amount of leave had a statistically significant shorter duration of breast-feeding than nonworking mothers.

Most covariates used in both models were related in the same direction to duration and initiation, consistent with the literature. However, several variables that were related to initiation were not related to duration: income, whether the father was breast-fed, minutes until mother held the infant, physician vs midwife as birth attendant, and complications of pregnancy. No characteristic affected duration unless it also affected initiation.

A comparison of the durations of the parity × previous breast-feeding categories showed that among mothers who had previously breast-fed, those with 1 other child had significantly shorter durations than those with 2 or more other children ($t = 2.58$; $P = .01$). Among mothers who had not previously breast-fed, duration was similar whether they had 1 or more than 1 other child ($t = .36$; $P = .72$).

Discussion

Part-time employment neither increases nor decreases breast-feeding initiation or duration relative to not working, and full-time employment decreases both. Although conclusions must be limited to the middle segment of the American population

covered by our sample, we have measures from virtually every domain known to affect breast-feeding, thereby minimizing the possibility that relationships were caused by correlated characteristics of mothers who made certain decisions. In addition, frequent, longitudinal collection of time-sensitive measures minimized the potential for recall bias.

Our findings on the effect of part-time vs full-time employment differ from results produced by nationally representative data, even when we controlled with the same variables. Unlike Lindberg,[6] who controlled for demographic variables only, we failed to find a statistically significant increase in initiation for part-time employed mothers relative to those who had no postpartum work plans, nor did we find a significant decrease in duration for part-time employed mothers relative to those not working. This discrepancy may be caused by the greater representativeness of Lindberg's sample or by our longitudinal measures of work status and breast-feeding duration. Our finding that an expectation of postpartum part-time employment does not increase breast-feeding initiation for White mothers is consistent with other findings.[7]

Our results and the literature agree that part-time employment does not decrease breast-feeding initiation. Disagreement occurs on whether part-time work has a negative effect on duration, relative to not working. However, all research, including our own, finds that part-time employment is more favorable to breast-feeding initiation and duration than full-time employment.

Conclusions from our finding that working part-time does not reduce initiation or duration should be tempered by other results from the Infant Feeding Practices Study. Roe et al. found that a third aspect of breast-feeding, intensity, is adversely affected even by part-time work; the more hours the mother works, the fewer times per day her infant receives breast milk (including expressed milk).[30] Intensity of breast-feeding is positively related to the health benefits an infant receives from breast-feeding.[29]

Although this finding is counterintuitive, mothers with maternity leave breast-fed for shorter times than mothers with no leave. A previous analysis[30] suggests one explanation: mothers with no leave available are less likely to return to work during the first year postpartum.

Our preliminary analysis showed that before other variables were included, income had a positive effect on both initiation and duration, as found in previous research.[5,16] However, after control for medical, social, attitudinal, and health promotion variables, household income had a negative effect on initiation and no effect on duration. This means that within each level of the other variables, mothers in higher-income households are less likely to initiate breast-feeding. Economics suggests that higher household incomes are correlated with higher wages for working mothers. A higher wage, proxied here by household income, makes missing work to breast-feed more costly.

Parity has a negative effect on initiation within each category of previous breast-feeding, and the effect is stronger among mothers who have not previously breast-fed. Among mothers who have not previously breast-fed, parity has no effect on duration; however, parity is positively related to duration for previous breast-feeders. Thus, the negative relationship between parity and initiation arises from mothers without previous breast-feeding experience and the positive relationship between parity and duration arises from mothers who have previously breast-fed.

Conclusions

We conclude that part-time work is an effective strategy to help mothers combine breast-feeding and employment. Expecting to work part-time does not significantly decrease the percentage of mothers who initiate breast-feeding, whereas expecting to work full-time does. Working full-time at 3 months postpartum decreases duration of breast-feeding, but working part-time for 4 or fewer hours per day does not affect duration, and working part-time for more than 4 hours per day decreases duration less than does working full-time. To facilitate breast-feeding, the reduction in work hours does not have to be large; like other researchers, we found a positive effect, relative to full-time work, when part-time work was defined as less than 35 hours per week, or a maximum of 7 hours per day. □

Acknowledgments

The authors thank Mario Teisl, University of Maine, Bangor, for his helpful comments on this article; John Wallingford, Office of Special Nutritionals, and Alan Levy, Office of Scientific Analysis and Support, Center for Food Safety and Applied Nutrition, for their participation in the design and implementation of the study; Jan Hodes and Jean McClaughry of Market Facts, Chicago, Ill, and Washington, DC, for their meticulous attention to detail throughout the implementation, data collection, and database construction; and Karl Klontz for serving as medical expert for the study.

References

1. Committee on Nutrition. Commentary on breastfeeding and infant formulas, including proposed standards for formulas. *Pediatrics*. 1976;57:278–285.
2. *Infant Feeding Practices: Hearing before the Subcommittee on Domestic Marketing, Consumer Relations, and Nutrition*, House of Representatives, 97th Cong, 1st Sess (1981).
3. Spisak S, Susan SG. *Second Followup Report: The Surgeon General's Workshop on Breast Feeding and Human Lactation*. Washington, DC: National Center for Education in Maternal and Child Health; 1991.
4. *Report of the Surgeon General's Workshop on Breastfeeding and Human Lactation*. Washington, DC: Health Resources and Services Administration, Division of Maternal and Child Health; 1984.
5. Ross Products Division. *Updated Breast-Feeding Trend: 1987–1995*. Available from: Ross Laboratories, 625 Cleveland Ave, Columbus, OH 43216.
6. Lindberg LD. Women's decisions about breast-feeding and maternal employment. *J Marriage Fam*. 1996;58:239–251.
7. Kurinij N, Shiono PH, Ezrine SF, Rhoads GG. Does maternal employment affect breast-feeding? *Am J Public Health*. 1989;79:1247–1250.
8. Gielen AC, Faden RR, O'Campo P, Brown H, Paige DM. Maternal employment during the early postpartum period: effects on initiation and continuation of breast-feeding. *Pediatrics*. 1991;87:298–305.
9. Auerbach KG, Guss E. Maternal employment and breastfeeding: a study of 567 women's experiences. *Am J Dis Child*. 1984;138:958–960.
10. Hills-Bonczyk SG, Avery MD, Savik K, Potter S, Duckett LJ. Women's experiences with combining breast-feeding and employment. *J Nurse Midwifery*. 1993;38:257–266.
11. Feinstein JM, Berkelhamer JE, Gruszka ME, Wong CA, Carey AE. Factors related to early termination of breast-feeding in an urban population. *Pediatrics*. 1986;78:210–215.
12. Ford K, Labbok M. Who is breast-feeding? Implications of associated social and biomedical variables for research on the consequences of method of infant feeding. *Am J Clin Nutr*. 1990;52:451–456.
13. Gabriel AK, Gabriel R, Lawrence RA. Cultural values and biomedical knowledge: choices in infant feeding, analysis of a survey. *Soc Sci Med*. 1986;23:501–509.
14. Kurinij N, Shiono PH, Rhoads GG. Breast-feeding incidence and duration in black and white women. *Pediatrics*. 1988;81:365–371.
15. Littman H, Medendorp SV, Goldfarb J. The decision to breastfeed: the importance of fathers' approval. *Clin Pediatr*. 1994;33:214–219.
16. Ryan AS, Martinez GA. Breast-feeding and the working mother: a profile. *Pediatrics*. 1989;83:524–531.
17. Ryan AS, Wysong JL, Martinez GA, Simon SD. Duration of breast-feeding patterns established in the hospital, influencing factors. *Clin Pediatr*. 1990;February:99–107.
18. Ryan AS, Pratt WF, Wysong JL, Lewandowski G, McNally HW, Krieger FW. A comparison of breast-feeding data from the National Surveys of Family Growth and the Ross Laboratories

Mothers Surveys. *Am J Public Health*. 1991; 81:1049–1052.
19. Child Nutrition Committee on Medical Aspects of Food Policy. *Present Day Practice in Infant Feeding: Third Report*. London, England: Her Majesty's Stationery Office; 1988.
20. Hawthorne K. Intention and reality in infant feeding. *Mod Midwife*. 1994;4:25–28.
21. Lindberg LD. Trends in the relationship between breastfeeding and postpartum employment in the United States. *Soc Biol*. 1996;43:191–202.
22. Cole JP. Breastfeeding in the Boston suburbs in relation to personal-social factors. Are pediatricians thoughtlessly influencing the outcome in their postpartum care? *Clin Pediatr*. 1977;16: 352–356.
23. Hewat RJ, Ellis DJ. Similarities and differences between women who breastfeed for short and long duration. *Midwifery*. 1985;2:37–43.
24. Baranowski T, Bee DE, Rassin DK, et al. Social support, social influence, ethnicity, and the breastfeeding decision. *Soc Sci Med*. 1983;17:1599–1611.
25. Black RF, Blair JP, Jones VN, DuRant RH. Infant feeding decisions among pregnant women from a WIC population in Georgia. *J Am Diet Assoc*. 1990;90:255–259.
26. Bryant CA. The impact of kin, friend and neighbor networks on infant feeding practices: Cuban, Puerto Rican, and Anglo families in Florida. *Soc Sci Med*. 1982;16:1757–1765.
27. Duckett L. Maternal employment and breastfeeding. *NAACOGS Clin Issues Perinat Womens Health Nurs*. 1992;3:701–712.
28. Evans CJ, Lyons NB, Killien MG. The effect of infant formula samples on breast-feeding practice. *J Obstet Gynecol Neonatal Nurs*. 1986;15:401–405.
29. Scariati PD, Grummer-Strawn L, Fein SB. A longitudinal analysis of infant morbidity and the extent of breast-feeding in the United States. *Pediatrics*. 1997;99(6):e1–5.
30. Roe BE, Whittington LA, Fein SB, Teisl MF. The conflict between breast-feeding and maternal employment: expectations and realities. Paper presented at: Annual Meeting of the Population Association of America; May 10, 1996; New Orleans, La.