Original Article

Correlates of Breastfeeding Initiation in Southeast Arkansas

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Objectives: Southeast Arkansas is a primarily rural, low-income area with low breastfeeding rates. Given the demonstrated positive impacts of breastfeeding on a variety of health indicators, it is important to understand and counteract this situation.

Methods: We reviewed the medical records of 1,260 women who delivered infants at the only major hospital in southeastern Arkansas between February 1997 and January 1998 to determine the rate of breastfeeding initiation and to assess associated factors.

Results: Only 18% of mothers initiated breastfeeding. Black mothers, unmarried mothers, and those with less than high school education were least likely to breastfeed. Participation in childbirth education classes was positively associated with breastfeeding, but participation in the Supplemental Food Program for Women, Infants, and Children, health care provider, and hospital variables were not predictive in multivariate models.

Conclusions: Breastfeeding promotion programs are clearly needed in this region, and health care providers and the Supplemental Food Program for Women, Infants, and Children can play significant roles.

Key Words: breastfeeding, initiation, predictors

The value of breastfeeding for infant and maternal health has been well established,[1] and national goals have been identified for increases in the rates for initiation and continuation of breastfeeding to 75% initiation and 50% continuation beyond 6 months and 25% beyond 1 year.[2] Numerous professional societies including the American Academy of Pediatrics, the American Dietetic Association, and the World Health Organization have been actively promoting breastfeeding.[3] In some regions of the United States, recognizable efforts have successfully increased the initiation rate and average duration of breastfeeding. Despite this progress, there are wide disparities among states and ethnic groups. In 1998, 68% of white women in the United States initiated breastfeeding compared with 45% of black women.[2] The southeast region of the country ranked last when compared with other regions, with an initiation rate of 51%.[4] Moreover, breastfeeding rates are lowest among low-income women. Social support,[5–7] knowledge,[8,9] self-confidence, and provider encouragement[6,10–12] have been identified as factors that encourage breastfeeding initiation, with intent to breastfeed during pregnancy being the strongest predictor of actual behavior.[13,14]

Key Points

- Improvement of breastfeeding rates in areas of low breastfeeding may improve infant health and reduce ethnic disparities in infant health.
- We documented low breastfeeding initiation (18%) among mothers delivering infants in the only large hospital in southeast Arkansas over a calendar year.
- Mothers least likely to breastfeed were black, young, unmarried, and had completed less than a high school education.
- Although two-thirds of mothers had participated in the Supplemental Food Program for Women, Infants, and Children (WIC) during pregnancy and all had attending physicians, neither WIC participation nor health care provider nor hospital variables predicted breastfeeding when controlled for maternal characteristics.
- Given the success of breastfeeding promotion programs through WIC and health care providers elsewhere, these professionals would seem to have a major opportunity to influence breastfeeding rates in southeast Arkansas.

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Studies of factors related to early termination of breastfeeding commonly point to aspects of the hospital environment, early introduction of formula,[14,15] perceived inadequacy of milk supply, sore nipples, and maternal and infant illnesses.[15,16]

Data on breastfeeding rates in Arkansas are inconsistent in detail but uniformly indicate low rates. The Centers for Disease Control state-based surveillance system for pregnancy-related variables indicated a breastfeeding initiation rate for Arkansas of 52.6% in 1997.[17] The Ross Laboratories Survey, based on a mailed questionnaire at intervals over time, reported that the rate of in-hospital breastfeeding in Arkansas rose from 38 to 56.8% between 1990 and 1998, and the 6-month breastfeeding rate increased from 11 to 25% during the same period.[18] An educational intervention study conducted in northwest Arkansas between 1991 and 1994 reported an increase in the initial rate of breastfeeding from 22 to 48%, with a continuation rate at 6 months of 20%.[19] Data from the Supplemental Food Program for Women, Infants, and Children (WIC) in Arkansas in the mid-1990s showed a higher prevalence of breastfeeding outside of the Mississippi Delta area (12%) than in the Delta region (7%), although both rates were low.[20] The variable estimates in these findings are likely due to methodologic variability in ascertainment of breastfeeding, data collection and sampling methods, and focus on different subpopulations. We are not aware of any studies conducted in southern Arkansas; the southeastern part of the state is predominantly rural, traditionally agricultural, poor, and medically underserved.[21] The goal of the present study was to assess the rate of breastfeeding initiation in the area and to identify correlates of infant feeding choices. Our aim was to generate the necessary data on which to build an effective breastfeeding promotion program for this population.

Materials and Methods

Medical records of all newborns and their mothers who delivered infants at Jefferson Regional Medical Center (JRMC; http://www.jrmc.org/us/index.html) in Pine Bluff from February 1, 1997, to January 31, 1998, were reviewed. The hospital is a private regional hospital, licensed for 471 beds by the Arkansas State Health Department, and is the only major hospital in the southeast part of the state, serving a population of approximately 280,000.

Medical staff at JRMC, two medical residents and a health educator, were trained to review and abstract data from maternal and infant medical records. We included only data from the close-ended standard hospital forms; no data were included from open-ended portions of the records to ensure quality control and to avoid inconsistency. Infant feeding information was obtained from the initial newborn profile form, where nurses check either breast, bottle, or mixed feeding. Data from the charts were compared with a report developed separately by the hospital health educator who was independently assessing breastfeeding rates during the same period; no conflict was detected between the two reports. A total of 1,260 records were included in the present analysis after excluding 42 records due to insufficient information on transferred newborns, deceased newborns, or deceased mothers. The University of Arkansas at Pine Bluff Human Subjects Committee approved the project.

Data were double entered for quality control; Windows 2000 Microsoft Excel (Microsoft Corp., Redmond, WA) was used for data entry and SPSS software (version 10.0 for Windows; SPSS, Inc., Chicago, IL) and Stata software (release 6.0; Stata Corp., College Station, TX) were used in the statistical analysis. Descriptive statistics used included unpaired Student's t test with statistical significance determined at $P < 0.05$ to compare characteristics of mothers who chose to breastfeed and mothers who chose to bottle-feed or mixed-feed their newborns. Unconditional logistic regression with maximum-likelihood estimate of parameter values was used to assess the risk for bottle-feeding versus breastfeeding, with a significance level of $P < 0.05$ as the criterion for retaining variables for multivariate models. Adjusted odds ratios and 95% confidence intervals for each variable were estimated from the logistic regression coefficients.

Results

Seventy percent of the mothers resided in Jefferson County, the largest semiurban county in the region. The study population was 58.6% black and 38.6% white, with 2.8% reporting "other" ethnic background or with the variable missing. Sixty-one percent had less than a high school education, and 44.4% were married. The age range was 18 to 45 years of age, with 22.4% of mothers being younger than 20 years of age. Two-thirds of the mothers reported having participated in the WIC program during their pregnancy, and 12% had attended childbirth education classes. Data on household income were not available, but the fact that two-thirds of mothers were WIC participants indicates the generally low-income nature of the population. Two hundred twenty-six mothers (18%) reported exclusively breastfeeding their newborns during their stay at JRMC, whereas 79% bottle-fed their infants exclusively, and 3% reported mixed feeding during their hospital stay. In this analysis, we have included the mixed-feeding group with bottle-feeding, because the proportion was small and mixed feeding during the first week interferes with establishing good breastfeeding performance.[14,16,22]

Table 1 shows univariate odds ratios for sociodemographic variables in relation to risk of noninitiation of breastfeeding. Black mothers were 5.2 times as likely to bottle-feed their infants as white mothers. The mother's education was also a significant factor associated with feeding choice, with mothers who had more than a high-school education more than twice as likely to breastfeed their infants. Age was systematically related to choice of feeding method, with the youngest mothers significantly more likely to choose bottle-

Table 1. Breastfeeding initiation (percent of mothers) by maternal characteristics[a]

	Percent breastfeeding	Univariate odds ratio (95% confidence interval)
Ethnicity		
White	32	1 Reference
Black[b]	8	5.2 (3.8–7.2)
Education		
>12 yr	26	1 Reference
≤12 yr[b]	13	2.3 (1.7–3.1)
Marital status		
Not married[b]	8	1 Reference
Married	30	0.19 (0.14–0.27)
WIC participation		
No	32	1 Reference
Yes[b]	11	3.8 (2.8–5.1)
Place of residence		
Jefferson County[b]	16	1 Reference
Other	24	1.7 (1.2–2.3)
Age (yr)		
<20[b]	9	3.1 (1.6–5.8)
20–24	16	1.6 (0.9–2.8)
25–29	27	0.8 (0.5–1.4)
30–34	21	1.1 (0.6–2.1)
>35	23	1 Reference
Birth class attendance		
No[b]	14	1 Reference
Yes	42	0.2 (0.2–0.3)

[a]*WIC, Supplemental Food Program For Women, Infants, and Children.*

[b]*Significant predictors for not breastfeeding,* $P < 0.05$.

feeding. Mothers participating in the WIC program were more likely than non-WIC participants to choose bottle-feeding, a finding that disappeared in subsequent multivariate analyses. The incidence of bottle-feeding was 5 times higher for unmarried mothers than married mothers. Birth class attendees were more likely to breastfeed than other mothers (odds ratio, 0.2; 95% confidence interval, 0.2–0.3). Gravidity, parity, and hospital and health care provider variables including method of delivery, type of anesthesia, rooming-in, and physician specialty were not associated with feeding choices. Mothers who chose to breastfeed had gained slightly more weight during pregnancy and had significantly higher hemoglobin values; their infants had slightly higher birthweight and better 1-minute Apgar scores. These variables, however, were not significant predictors for breastfeeding choice in multivariate analyses. The mean time of hospital stay was not different between feeding groups (2.2 ± 1 d), nor were any factors in the maternal medical history or infant health.

Maternal postpartum behavior indicated commitment and determination to breastfeed among those mothers who had made the choice to do so. Eighty-four percent of the breastfeeding mothers reported putting the infant to the breast within the first hour after delivery. Mothers who breast-fed their babies reported an average of 5.1 ± 1.7 attempts per day to breastfeed their babies after delivery. Moreover, the length of each attempt tended to be long (21.2 ± 6.6 minutes). Nipple soreness was reported by 3.5% of the mothers who breast-fed their babies.

Table 2 presents the multivariate model that includes all the significant factors related to breastfeeding versus bottle-feeding, adjusted for the mother's age. Only ethnic identification, education, marital status, and attendance at birth classes remain significant when controlled for other variables. The influence of ethnic background was considerably attenuated in the multivariate model compared with univariate results (black mothers were 2.6 times more likely to bottle-feed than white mothers). The association of WIC participation with bottle-feeding disappeared in the controlled models.

Discussion

Perinatal health status indicators are poor in Arkansas compared with the nation. Infant mortality in 1997 was 8.7 per 1,000 live births compared with 7.2 per 1,000 nationally; the low birth weight rate was 8.4% compared with 7.6% for the United States (http://healthyarkansas.com/stats/mchrpt%201997/MCH103.HTM#S2, http://healthyarkansas.com/stats/mchrpt%201997/MCH205.HTM#S2). Although both rates have declined recently, the proportional discrepancy between blacks and whites has remained largely unchanged. The low birth weight rate for white mothers was 6.5% in 1998 and 13% for black mothers.[2]

Breastfeeding initiation rates in Arkansas also lag behind the national average and no doubt contribute to some extent to poor infant health. The southeast portion of the state is

Table 2. Multivariate model predicting likelihood of bottle-feeding[a]

Predictor variable	OR (95% CI)
Place of residence urban (Jefferson County)	1.1 (0.7–1.6)
Mother's age (yr)	0.99 (0.96–1.03)
Black	2.6 (1.7–4.0)[b]
WIC participation	1.2 (0.8–1.8)
≤12 yr of education	1.6 (1.1–2.3)[c]
Childbirth education class	0.4 (0.3–0.7)[b]
Unmarried	0.4 (0.2–0.6)[b]

[a]*OR, odds ratio; CI, confidence interval; WIC, Supplemental Food Program For Women, Infants, and Children.*

[b]$P < 0.001$.

[c]$P < 0.05$.

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particularly at risk because of a high proportion of families living in poverty and a relatively high proportion of blacks in the population, for whom perinatal health indicators are uniformly poorer than for white women.[21] We found a low rate of breastfeeding initiation (18%) at the only major hospital in this region in the current study. These results are a bit higher than those previously reported within the WIC population (12% outside the Mississippi Delta area and 7% within the Delta area in the mid-1990s) but well below rates reported for northwest Arkansas and the state as a whole.[18,19]

We found the disparity in the decision to breastfeed between blacks and whites to be particularly extreme; black mothers were 2.5 times more likely to bottle-feed than white mothers, controlling for education, age, childbirth education, and other relevant variables. One cannot but speculate that an improvement in breastfeeding practices among black mothers, particularly among the poor, would contribute to narrowing the disparity in infant mortality between the racial groups. Nevertheless, 8% of black mothers and 32% of white women in our study did choose to breastfeed; on average they were older, more educated, more likely to be married, and more likely to have attended childbirth classes than other mothers. Other investigators[14,17,23–27] have reported similar findings, and these effects seem to hold in this population even though the breastfeeding rates are low.

We found no particular effects on infant feeding decisions of maternal or infant health/medical history variables, of variation in hospital experience, physician specialty, or WIC participation when sociodemographic variables were controlled. It is possible that the fact that our study population, drawn from one hospital, simply minimizes variation in some of these factors. Perinatal health care providers and WIC program staff in this area would seem to have tremendous opportunities to influence and support breastfeeding in this population, and it appears that at least to the extent that these data can allow us to ascertain, there is little effect of either.

There are several limitations to this study, including lack of longitudinal follow-up and lack of information not available in the medical record. Barriers to breastfeeding cannot be assessed from the present information; however, we are following with qualitative research designed to explore attitudes, perceptions, and knowledge about infant feeding practices in this population before design of a targeted intervention program. It is clear that the lack of association of decisions to breastfeed with WIC participation and with health care provider behavior, together with work in other populations establishing the efficacy of breastfeeding promotion through these routes, indicates major opportunities for these providers of care and services to influence breastfeeding rates.

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References

1. American Academy of Pediatrics Work Group on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics* 1997;100:1035–1039.
2. U.S. Department of Health and Human Services. *Healthy People 2010*. Bethesda, MD, U.S. Department of Health and Human Services, 2000, 2 vols. Available at: http://www.healthypeople.gov/Publications/. Accessed May 7, 2003.
3. Wright A, Schanler R. The resurgence of breastfeeding at the end of the second millennium. *J Nutr* 2001;131:421S–425S.
4. Ryan AS. The resurgence of breastfeeding in the United States. *Pediatrics* 1997;99(4):e12.
5. Di Martile Bolla C, De Joseph J, et al. Social support as road map and vehicle: An analysis of data from focus group interviews with a group of African American women. *Public Health Nurs* 1996;13:331–336.
6. Bentley ME, Caulfield LE, Gross SM, et al. Sources of influence on intention to breastfeed among African-American women at entry to WIC. *J Hum Lact* 1999;15:27–34.
7. Meyerink RO, Marquis GS. Breastfeeding initiation and duration among low-income women in Alabama: The importance of personal and familial experiences in making infant-feeding choices. *J Hum Lact* 2002;18: 38–45.
8. Fairbank L, O'Meara S, Sowden AJ, et al. Promoting the initiation of breast feeding. *Qual Health Care* 2001;10:123–127.
9. Wiles LS. The effect of prenatal breastfeeding education on breastfeeding success and maternal perception of the infant. *JOGN Nurs* 1984;13: 253–257.
10. Barton SJ. Infant feeding practices of low-income rural mothers. *MCN Am J Matern Child Nurs* 2001;26:93–97.
11. Pugh LC, Milligan RA, Frick KD, et al. Breastfeeding duration, costs, and benefits of a support program for low-income breastfeeding women. *Birth* 2002;29:95–100.
12. Lu MC, Lange L, Slusser W, et al. Provider encouragement of breastfeeding: Evidence from a national survey. *Obstet Gynecol* 2001;97:290–295.
13. Kloeblen AS, Thompson NJ, Miner KR. Predicting breast-feeding intention among low-income pregnant women: A comparison of two theoretical models. *Health Educ Behav* 1999;26:675–688.
14. Ertem IO, Votto N, Leventhal JM. The timing and predictors of the early termination of breastfeeding. *Pediatrics* 2001;107:543–548.
15. Duckett L, Henly SJ, Garvis M. Predicting breast-feeding duration during the postpartum hospitalization. *West J Nurs Res* 1993;15:177–198.
16. Mozingo JN, Davis MW, Droppleman PG, et al. "It wasn't working": Women's experiences with short-term breastfeeding. *MCN Am J Matern Child Nurs* 2000;25:120–126.
17. Colley Gilbert BJ, Johnson CH, Morrow B, et al. Prevalence of selected maternal and infant characteristics: Pregnancy Risk Assessment Monitoring System (PRAMS), 1997. *MMWR CDC Surveill Summ* 1999;48(5): 1–37.
18. Abbott Laboratories. *Breastfeeding Trend through 1999: Mothers Survey*. Abbott Park, IL, Ross Products Division, Abbott Laboratories, 1999.
19. Albey M, Rickard S, Skaug W. Breastfeeding in Arkansas: Trends in the northeast region and physician self assessment quiz. *J Ark Med Soc* 1996;93:181–184.
20. Bogle ML, Smith J, Scholle SH. Health and nutritional status of infants, children, and adolescents, in Harrison GG (ed): *Nutrition and Health Status in the Lower Mississippi Delta of Arkansas, Louisiana, and Mississippi: A Review of Existing Data*. Rockville, MD, Westat, Inc., 1997, pp 71–72.

21. Thornton A. Demographic, social and economic characteristics, in Harrison GG (ed): *Nutrition and Health Status in the Lower Mississippi Delta of Arkansas, Louisiana, and Mississippi: A Review of Existing Data*. Rockville, MD, Westat, Inc., 1997, pp 9–23.
22. Howard C, Howard F, Lawrence R, et al. Office prenatal formula advertising and its effect on breast-feeding patterns. *Obstet Gynecol* 2000; 95:296–303.
23. Kuan LW, Britto M, Decolongon J, et al. Health system factors contributing to breastfeeding success. *Pediatrics* 1999;104(3):e28.
24. Lizarraga JL, Maehr JC, Wingard DL, et al. Psychosocial and economic factors associated with infant feeding intentions of adolescent mothers. *J Adolesc Health* 1992;13:676–681.
25. Cooper PJ, Murray L, Stein A. Psychosocial factors associated with the early termination of breast-feeding. *J Psychosom Res* 1993;37:171–176.
26. Ahluwalia IB, Tessaro I, Grummer-Strawn LM, et al. Georgia's breastfeeding promotion program for low-income women. *Pediatrics* 2000; 105(6):e85.
27. Shepherd CK, Power KG, Carter H. Examining the correspondence of breastfeeding and bottle-feeding couples' infant feeding attitudes. *J Adv Nurs* 2000;31:651–660.

Children have never been very good at listening to their elders, but they have never failed to imitate them.

—James Baldwin

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