

Health System Factors Contributing to Breastfeeding Success

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ABSTRACT. *Objective.* To identify and characterize health care system factors that contribute to successful breastfeeding in the early postpartum period.

Study Design. A prospective 8-week cohort study of 522 women at five area hospitals who had a vaginal delivery of a healthy, full-term single child and who intended to breastfeed. Mothers and infants had free access to each other for breastfeeding during the hospital stay. Data were obtained through chart review and surveys. In-person postpartum interviews in the hospital and 4- and 8-week telephone interviews were used to determine participants' perceptions of breastfeeding support by hospital personnel, home visit nurses, and family and friends. The hospital in-person interview with each mother was conducted before discharge to confirm maternal interest and intent to breastfeed. Questions were asked regarding breastfeeding information and support provided by medical and nursing personnel. Mothers were asked to rate the quality of information, as well as the degree of support they received for breastfeeding. Mothers also were asked to rate their hospital breastfeeding experience. A second interview was conducted by telephone 4 weeks after birth. The focus of this interview was to ascertain the rating of their breastfeeding experience, the quality of their interactions with health care professionals, and whether supplemental formula was being provided to the infant. If supplemental formula was being provided, the mothers were asked to quantify the volume and frequency of supplementation. A final telephone interview was conducted when the infants were 8 weeks of age. This interview determined the continuance or cessation of breastfeeding and information about formula supplementation, as in the 4-week interview. Mothers were given a journal and asked to note all telephone calls, clinic visits, and home nurse visits that related to breastfeeding issues and concerns. Demographic data examined included maternal age, marital status, highest level of education reached, race, employment, insurance coverage, and length of stay in the hospital. Pregnancy characteristics included prenatal care, parity, and gravity. Infant characteristics included gestational age and birth weight. Other factors examined included maternal rating of the support received from the infant's father for the decision to breastfeed, the time

the infant spent in the mother's hospital room, and whether the infant was breastfed in the delivery room.

Results. The women were mostly white (90%), educated (82% had some college education), married, older (mean maternal age of 29.3 years), and insured (92% commercial). The primary outcome of interest was success at breastfeeding. Success was determined based on each mother's initial estimate of the planned duration of breastfeeding. Of the participants, 76% breastfed successfully for at least as long as they had initially planned. Seventeen percent of the mothers had stopped breastfeeding at the time of the 4-week interview, and 29% had stopped by the 8-week interview. Of the infants' fathers, 97% were reported by the mothers to be supportive of the decision to breastfeed. Once discharged, 98% of mothers expected to have help with the household chores. Eighty percent rated their hospital breastfeeding experience as good or very good. However, only 56% rated hospital breastfeeding support as good or very good, and only 44% spoke with a lactation consultant while in the hospital. Of those who spoke with the lactation consultant, 85% felt more confident afterward. Hospital nurses talked with 82% of women, and 97% of these found this helpful. Seventy-four percent reported receiving a home nursing visit after discharge, and of these, 82% found it helpful. Successful mothers were significantly more likely to report that the visiting nurse watched them breastfeed and asked how it was going. Mothers were more likely to call or visit family and friends with concerns about breastfeeding than other possible sources of support. Calls to family or friends to discuss breastfeeding problems were made by 181 mothers (34.7%). Other calls were to the lactation consultant (16.5%), pediatrician (8.8%), obstetrician or midwife (8.2%), breastfeeding support group (5.9%), and birth hospital (2.5%). Factors significantly associated with breastfeeding success were maternal graduate education (OR: 3.20), appraisal of the breastfeeding experience while in the hospital (OR: 1.49), and age (OR: 1.06). When only mothers who had a home nurse visit were included in the model, maternal graduate education (OR: 3.66), appraisal of hospital breastfeeding experience (OR: 1.42), and maternal rating of the home nurse visit (OR: 1.71) were significantly associated with successful breastfeeding.

Conclusion. Health system support of breastfeeding women during their hospital stay and early postdischarge period is an important factor in their success. Hospitals should monitor closely the actual quality and quantity of care provided by clinical support personnel and measure their impact on the outcomes on an ongoing basis. *Pediatrics* 1999;104(3). URL: <http://www.pediatrics.org/cgi/content/full/104/3/e28>; *breastfeeding, lactation consultant, home visit, health system factors.*

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Human milk is the recommended food for healthy, full-term newborns.¹ It provides optimal nutrition, contains phagocytic and immunocompetent cells, and promotes intestinal mucosal maturation.² A 1994 report by the US Department of Health and Human Services indicated that in 1993, ~55% of mothers initiated breastfeeding but <25% continued to 6 months. The USDHHS goal by the year 2000 is to have 75% of infants breastfed during the early weeks of life, with a continuance of 50% at 5 to 6 months.³

Health professionals who care for both mothers and infants have long been strong advocates of breastfeeding. However, changes in duration of hospital stay may affect the breastfeeding success of these women and infants because of reduced opportunities for education, observation, and practical instruction of correct breastfeeding technique.^{4,5} Significant decreases in nurse staffing as a method of controlling hospital costs may exacerbate these conditions further.^{6,7} Although many hospitals have specialized support services for breastfeeding, such as lactation consultants, actual interaction with and support of new mothers may fall considerably short of expectations because of staffing patterns and shorter lengths of stay.

Several recent studies have suggested an increase in rehospitalization rates of newborns for breastfeeding-related conditions such as hypernatremia, dehydration, and malnourishment temporally associated with decreasing postpartum lengths of stay.^{4,8-10} However, other studies from the early 1960s and from Europe have presented evidence suggesting that prompt discharge to home may allow earlier establishment of an adequate milk supply and less supplementation.¹¹⁻¹⁴

Factors that affect breastfeeding success have been examined extensively, primarily in the nursing literature.^{5,15-17} However, the impact of the health care delivery system, both in the hospital and after discharge, on breastfeeding success has been less well documented. Finally, although there have been several studies of hospital-based resource use, total resource use for nonhospital-based services has not been quantified. In the era of early discharge home after childbirth, this resource use may have been underestimated.

The purpose of this study was to identify and characterize sources of information and support that contribute to successful breastfeeding in the early postpartum period. We hypothesized that the health system support for breastfeeding in the hospital, as well as after discharge, would have a significant impact on breastfeeding success.

METHODS

Study Design

This was a nonrandomized, prospective, cohort study. Women were recruited at five large level II and level III hospitals. Greater than 80% of area infants are born at one of these facilities. Institutional review board approval was received at each hospital.

Subjects

Women were eligible for the study if they had delivered a single, healthy infant of >37 weeks' gestation by the vaginal route

and had indicated a desire to breastfeed for at least 4 weeks. Mothers and infants had free access to each other for breastfeeding during the hospital stay.

Mothers of infants with significant congenital defects, with conditions in which breastfeeding is contraindicated or not encouraged, or with clinical problems during the first 24 hours of life requiring admission to a neonatal unit beyond brief transitional care were excluded.

Instrument Development

Exploratory groups were conducted at a single hospital with two groups of 6 to 8 breastfeeding women whose infants ranged in age from 6 weeks to 4 months. General questions were asked about breastfeeding experience and in-hospital and posthospital factors contributing to success. The focus group discussions were taped and transcribed and used to develop the survey instruments. The in-hospital, 4-week, and 8-week questionnaires consisted of 17 open-ended questions, 71 multiple choice questions, and 9 Likert-style questions. The survey instruments underwent face validity and content validity testing using a convenience sample of women who had breastfed, as well as lactation specialists, nurses, and physicians. Pilot survey data were collected from 25 women, and final modifications were made to the survey based on the responses. The survey instrument is available on request.

Data Collection

A face-to-face interview with each mother was conducted before discharge to confirm maternal interest and intent to breastfeed. Questions were asked regarding breastfeeding information and support provided by medical and nursing personnel. Mothers were asked to rate the quality of information as well as the degree of support they received for breastfeeding. Mothers also were asked to rate their hospital breastfeeding experience.

A second interview was conducted by telephone 4 weeks after the birth. The focus of this interview was to ascertain the rating of the mothers' breastfeeding experience, the quality of their interactions with health care professionals, and whether supplemental formula was being provided to the infant. If supplemental formula was being provided, the mothers were asked to quantify the volume and frequency of supplementation.

A final telephone interview was conducted when the infants were 8 weeks of age. This brief dialogue determined the continuance or cessation of breastfeeding and information about formula supplementation, as in the 4-week interview.

To document resource utilization after discharge, mothers were given a journal and asked to make note of all telephone calls, clinic visits, and home nurse visits that related to breastfeeding issues and concerns. The journal facilitated recording of both the number of phone calls and the reasons for the calls. All visits to the emergency department or pediatrician's office and home visits by a nurse made specifically for evaluation of the newborn also were recorded, along with the reason for the visits. The number of calls and visits to or from friends, family, and lactation experts specifically for issues related to breastfeeding were also tabulated.

Data Analysis

Demographic data examined included maternal age, marital status, highest level of education reached, race, employment, insurance coverage, and length of stay in the hospital. Pregnancy characteristics included prenatal care, parity, and gravity. Infant characteristics included gestational age and birth weight. Other factors examined included maternal rating of the support received from the infant's father for the decision to breastfeed; the time the infant spent in the mother's hospital room; and whether the infant was breastfed in the delivery room.

The primary outcome of interest was success at breastfeeding. Success was determined based on each mother's initial estimate of the planned duration of breastfeeding. For mothers who planned to breastfeed for 1 or 2 months, success was defined as breastfeeding for >4 weeks. Because the survey was completed at 8 weeks, for mothers who planned to breastfeed for >8 weeks, success was defined as continuing breastfeeding until the time of the final survey. Women who were uncertain about their planned duration of breastfeeding were classified as successful if they breastfed a minimum of four weeks.

The influence of health systems on breastfeeding success was

determined by maternal assessment of information and support provided by sources both in the hospital and after discharge, such as hospital personnel, physicians, nurses, and lactation consultants. The hospital environment was measured by a series of questions focusing on the quality and impact of breastfeeding support and the maternal assessment of the value of information received in the hospital from a nurse or lactation consultant. The results of 10 of these questions were dichotomized and then summed to create an overall hospital support variable. In addition, a single question rated the mothers' breastfeeding experience. The presence and quality of home visit support were also determined from mothers who received a nurse visit at home after discharge. Three questions concerning the home-nursing visit were dichotomized and then summed to create an overall home visit support variable.

The mothers were also asked whom they contacted when questions or concerns about breastfeeding arose after hospital discharge. The type of contact was classified as telephone calls or visits to medical sources or nonmedical sources such as family and friends.

Mantel-Haenszel χ^2 tests were used for analysis of trend in categorical variables, and Student's *t* tests were performed for continuous variables. Bivariate analyses were performed to compare characteristics of mothers successful with breastfeeding to those not successful. These variables were then entered into the multivariate model. A multivariate analysis, performed by logistic regression, was conducted to adjust for potential confounding variables. To explore the maternal rating of the home visit, a second model was created including only those mothers who had a home nurse visit. ORs and associated 95% CIs were calculated from the results of the regressions. Statistical analyses were performed using PC-SAS software (Release 6.12, SAS Institute Inc, Cary, NC).

RESULTS

A total of 589 new mothers were approached October 1996 to June 1997 regarding participation in this study. Twenty-nine refused and 560 consented. During the course of the study, 38 of the 560 mothers were eliminated because of the mother's inability to initiate breastfeeding successfully before hospital discharge or because of loss to follow-up after discharge. Complete data were available for a total of 522 subjects (89% of eligible mothers). The 29 women who declined participation were racially similar to the study subjects. Other data on these women were not available. The 38 mothers who were eliminated from the study because of incomplete data were similar to those who remained in regard to age, race, gravity, parity, onset of prenatal care, and education. They were significantly more likely to be single ($P < .0021$).

Demographic Characteristics

The characteristics of the study population are listed in Table 1. Nearly 90% were white, with 7.5% African-American and 3.6% Asian or Pacific Islander. The mean maternal age was 29.3 years. Forty percent were primiparous. The mean gestational age at which prenatal care was initiated was 9.2 weeks. Of the population, 87% were married, 92% were covered by a commercial insurance plan, and 82% reported having some college education. Seventy-three percent of mothers worked outside of the home, and 60% said they planned to return to work outside the home.

Length of Stay

The mean length of stay for all infants was 40.0 \pm 11.5 hours (median: 40 hours). Ten percent of

TABLE 1. Maternal Characteristics

Total population, N	522
Race, %	
White	88.9
Black	7.5
Asian/Pacific Islander	3.6
Mean maternal age, y	29.3 \pm 5.2 (range: 16–43)
Primiparous, %	39.8
Mean gravity	2.4 \pm 1.6 (median: 2; range: 0–20)
Mean onset of prenatal care, wk	9.2 \pm 5.6
Marital status, %	
Single	11.7
Married	87.0
Divorced	1.3
Baby's father supportive of decision to breastfeed, %	97.2
Education, %	
<High school degree	3.4
High school degree/GED	14.5
Some college	26.2
Bachelor's degree	42.3
Graduate degree	13.4
Unknown	0.2
Insurance, %	
Commercial	91.8
Medicaid	3.8
None/self-pay	4.0
Unknown	0.4
Occupation, %	
Homemaker	22.6
Student	4.4
Work outside the home	73.0
Planned to return to work	60.2

infants were discharge <25 hours after birth, and 21% were discharged <30 hours after birth.

Breastfeeding Success

During the in-hospital interview, the mothers were asked how long they planned to breastfeed. Seventy mothers (13.4%) estimated the duration of breastfeeding to be 1 to 2 months, 79 (15.1%) estimated 3 months, 155 (29.6%) estimated 4 to 6 months, 115 (22.0%) estimated 7 to 12 months, and 34 (6.5%) estimated >12 months; 13.4% of the mothers ($n = 70$) were unsure of their plans.

Of the 522 participants, 399 (76.4%) were successful in breastfeeding, that is, they breastfeed for at least as long as they had planned initially. Table 2 shows the success rates for the various subgroups. There was a statistically significant trend toward

TABLE 2. Duration of Successful Breastfeeding

Number of Mothers (N = 522)	Months Expected to Breastfeed	% Successful*
43/70	1–2	61.4**
44/79	3	55.7
123/155	4–6	79.4
102/115	7–12	88.7
33/34	>12	97.1
54/69	Uncertain	78.3

* Success for mothers who planned to breastfeed for 1 to 2 months was defined as breastfeeding for >3 weeks. For mothers who planned to breastfeed for >8 weeks, success was defined as breastfeeding for >8 weeks. Women who were uncertain about their planned duration of breastfeeding were classified as successful if they breastfed a minimum of 4 weeks.

** Significant trend, $P < .001$.

TABLE 3. Primary Reasons for Discontinuing Breastfeeding Within 4 and 8 Weeks of Birth

	4 Weeks After Birth (n = 89)	8 Weeks After Birth (n = 150)
Mothers no longer breastfeeding, %	17.0	28.7
Reasons given for no longer breastfeeding, %		
Baby not latching on or sucking	29.2	17.3
Painful breasts or nipples	18.0	11.3
Mother going back to work or school	5.6	14.0
Baby seemed always hungry	10.1	8.03
Not enough milk	6.7	10.0
Too tired	9.0	10.1
Baby not gaining weight	9.0	8.0
Mother sick or taking medication	1.1	4.7
Baby colicky	0	2.3
Baby weaned itself	0	1.3

greater success at breastfeeding the longer the initial planned duration ($P < .001$).

Discontinuation of Breastfeeding

Seventeen percent of the mothers had stopped breastfeeding at the time of the 4-week interview and 29% had stopped by the 8-week interview. The most common reasons for weaning reported by the study participants are listed in Table 3.

Hospital Support

During the in-person interview, the mothers were asked to evaluate the breastfeeding information and support they had received while in the hospital (Table 4). Seventy-eight percent reported receiving information about breastfeeding while in the hospital; 81% of these believed it was consistent with information they had received before their infant's birth. Although all of the hospitals involved in the study had a lactation consultant, only 44% of the mothers reported having had contact with a consultant while in the hospital. Fifty-six percent of those who saw a lactation consultant reported that they received new information, whereas 85% expressed that they felt more confident about breastfeeding after meeting with the consultant.

Hospital nurses talked with 82% of the mothers about breastfeeding; 81% of these found the nurses to be encouraging about breastfeeding, and 97% reported that the nurses were helpful in this regard. Using the overall hospital rating, only 22% of the mothers reported that hospital support of breastfeeding was very good, whereas 34% thought it was good. Breastfeeding experience while in the hospital was reported as very good (41%), good (39%), fair (16%) or poor or very poor (3.2%).

Visiting Home Nurse Support

Seventy-four percent of mothers in the study reported receiving a home health nurse visit after discharge. Of this group, 97% noted that the nurse asked how the breastfeeding was going, and 55% reported that the nurse watched them breastfeed. Eight-two percent of the women who received a home visit found the nurse very or somewhat en-

couraging, and 69% found the nurse visit very or somewhat helpful with regard to breastfeeding.

Other Postdischarge Support

During the in-hospital interview, 97% of mothers reported that the infant's father was supportive of their decision to breastfeed. Once discharged, 98% of mothers expected to have help with the household chores. The length of time help was available was not significantly different for successful and unsuccessful mothers. Sixty-nine percent of the new mothers expected to receive guidance for breastfeeding once they went home. Ninety-seven percent expected a friend or family member to provide this guidance. The proportion of successful mothers who received guidance was not significantly different from the proportion of unsuccessful mothers.

Calls to family or friends to discuss breastfeeding problems (Table 5) were made by 181 mothers (34.7%). Each of the 181 mothers made an average of 4.0 phone calls. Eighty-six mothers (16.5%) made calls to a lactation consultant, with a mean of 1.7 calls each. The mothers also sought support from their pediatrician (8.8%), obstetrician or midwife (8.2%), breastfeeding support group (5.9%), and the birth hospital (2.5%).

Forty-six mothers (8.8%) reported visiting family or friends during their first 4 weeks home to discuss breastfeeding problems. Each of the 46 mothers reported making a mean of 4.1 visits for issues related to breastfeeding. Other sources of support visited included a lactation consultant (7.1%), pediatrician (2.3%), obstetrician or midwife (2.1%), breastfeeding

TABLE 4. Evaluation of Hospital Support for Breastfeeding

	Percent (n = 522)
Hospital practice	
Received breastfeeding information while in hospital	78
Breastfeeding information from hospital will be helpful	85
Breastfeeding information from hospital consistent with prior breastfeeding information received	81
Lactation consultation	
Spoke with lactation consultant while in hospital	44
Lactation consultant gave breastfeeding information that mother did not already have	56
More confident about breastfeeding after meeting with lactation consultation	85
Nursing	
Talked with nurses about breastfeeding	82
Nurses encouraged breastfeeding	81
Nurses have been helpful with breastfeeding	97
Overall hospital breastfeeding support*	
Poor	29
Fair	15
Good	34
Very good	22
Overall hospital breastfeeding experience	
Poor or very poor	3.2
Fair	16
Good	39
Very good	41

* A combination of 10 survey questions.

TABLE 5. Resources for Breastfeeding Advice, (*n* = 522)

	Number of Mothers (%)	Average per Mother
Calls to family and friends	181 (34.7)	4.0
Calls to a lactation consultant	86 (16.5)	1.7
Call to pediatrician	46 (8.8)	1.5
Calls to obstetrician/midwife	43 (8.2)	1.4
Calls to breastfeeding support group	31 (5.9)	2.0
Calls to birth hospital	13 (2.5)	1.4
Visits to family and friends	46 (8.8)	4.1
Visits to a lactation consultant	37 (7.1)	1.3
Visits to pediatrician	12 (2.3)	1.2
Visits to obstetrician/midwife	11 (2.1)	1.1
Visits to breastfeeding support group	6 (1.1)	1.8
Visits to emergency department	5 (1.0)	1.0

* During first 4 weeks after birth of child.

support group (1.1%), and hospital emergency department (1.0%).

Mothers who called friends and family to discuss breastfeeding problems were more likely to also contact other sources of support. These women were significantly more likely to call a lactation consultant, breastfeeding support group, or health care professional than were mothers who did not call family and friends with breastfeeding questions ($P < .001$).

Bivariate Analysis of Successful Versus Unsuccessful Breastfeeding

There was no statistically significant difference in mean length of stay between mothers able to breastfeed for as long as they had initially planned (39.7 hours) and those who were not successful (40.9 hours). Similarly, the proportion of infants discharged <25 hours or <30 hours after birth did not differ significantly (Table 6).

Successful mothers were likely to be significantly older than were unsuccessful mothers (29.9 years vs 27.6 years; $P < .0001$), to be married (90% vs 81%; $P < .05$), to have been educated beyond high school (84% vs 66%; $P < .05$), to report a good or very good hospital breastfeeding experience (85% vs 66%; $P < .001$), to have breastfed in the delivery room (85% vs 73%; $P = .001$), and to report that the fathers of their infants were very supportive of the breastfeeding decision (96% vs 88%; $P < .01$).

TABLE 6. Bivariate Analysis of Successful Versus Unsuccessful Mothers (*n* = 522)

	Successful	Unsuccessful	<i>P</i> Value
Mean maternal age, y	29.9	27.6	<.0001
% Married	90	81	<.05
% Father very supportive of the breastfeeding decision	96	88	<.01
% Maternal education beyond high school	84	75	<.05
% Worked outside of the home before birth	74	84	<.05
% Multiparous	64	47	.001
% Good or very good hospital breastfeeding experience	85	66	<.001
% Breastfed in the delivery room	86	73	.001
Mean gestational age, wk	39.4	39.3	NS
Mean birth weight, g	3527	3441	NS
% White race	89	88	NS
% With commercial insurance	92	89	NS
% With baby in room most of the day	90	93	NS
% Home visited by nurse	75	71	NS
Mean length of stay, hospital, h	39.7	40.9	NS
% Of infant discharged <25 h after birth	10.5	8.1	NS
% Of infants discharged <30 h after birth	21.6	17.9	NS

Of the mothers successful at breastfeeding, 99% reported that the visiting nurse asked them how the breastfeeding was going (Table 7), compared with 92% of unsuccessful mothers ($P < .01$). A significantly higher percentage of successful mothers, 58%, reported that the visiting nurse watched them breastfeeding, compared with 44% of the unsuccessful mothers ($P < .05$). Eighty-four percent of successful mothers reported that the nurse visit was encouraging with regard to breastfeeding, compared with 76% of the unsuccessful mothers (not statistically significant). Similar percentages of mothers found the home nursing visits helpful with regard to breastfeeding (69% of the successful mothers vs 70% of the unsuccessful mothers; not statistically significant).

Successful mothers were significantly less likely to have worked outside the home before the infant was born (74% vs 85%; $P < .05$) and were more likely to be multiparous (64% vs 47%; $P = .001$). White race, commercial health insurance, and the amount of time the infant spent in the mother's room were not statistically significant factors in breastfeeding success. Differences in length of stay, mean gestational age, birth weight, and/or the presence of a nurse home visit also were not statistically significant.

Multivariate Analysis

The first model included all patients (Table 8). When adjusted for other covariates, the factors that remained significantly associated with successful breastfeeding were maternal graduate education (OR: 3.15), reports of the breastfeeding experience while in the hospital (OR: 1.44), and age (OR: 1.06). The father's support, marital status, parity, race, insurance status, breastfeeding in the delivery room, length of time the infant spent in the room with the mother, work outside the home before the infant's birth, quality of hospital support, gestational age, birth weight, and length of stay in the hospital were not statistically significant factors for breastfeeding success.

When only mothers who had a home nurse visit were included in the model, maternal graduate education (OR: 3.66), report of hospital breastfeeding experience (OR: 1.42), and maternal rating of the

TABLE 7. Evaluation of Home Visits Nurse Support for Breastfeeding

Question	% Successful (n = 399)	% Unsuccessful (n = 123)	P Value
Nurse asked how breastfeeding was going	99	92	<.01
Nurse watched breastfeeding	58	44	<.05
Nurse visit helpful with regard to breastfeeding			
No	31	30	NS
Somewhat	25	31	NS
Very	44	39	NS
Nurse visit encouraging with regard to breastfeeding	84	76	NS

home nurse visit (OR: 1.71) were significantly associated with successful breastfeeding.

DISCUSSION

The American Academy of Pediatrics and other organizations endorse breastfeeding as the preferred source of infant nutrition for infants younger than 6 months because of its proven benefits to infants and mothers.¹ Several factors contribute to the decision to initiate and continue breastfeeding and have been reviewed extensively elsewhere.^{18–20} The role of the hospital and postdischarge support also have been described.^{7,21,22} This study examines the impact of health system factors, in the era of shorter lengths of stay, on the continued breastfeeding experience of women, who by their planning and attendance at prenatal breastfeeding classes, had demonstrated a high degree of interest in breastfeeding their infant.

This study of breastfeeding success in a select population of motivated women with high likelihood of success highlights the current issues of implementing a program that supports initiation and successful establishment of breastfeeding in an era of cost containment and shorter hospitalization. Our results suggest the importance of improving and closely monitoring support programs that are part of a health system or health plan. The importance of health systems in support of breastfeeding may be even more specific for other populations of less educated or less motivated women.

Breastfeeding success and the demographic factors that influence it, such as parity, maternal education, and support by the spouse, all have been identified previously.^{16,17,23,24} Our bivariate analysis results also found these demographic factors to be important. However, probably because this was a highly educated and motivated group of women with strong support at home, the multivariate analysis did not show the usual demographic variables to be statistically significant. The rate of breastfeeding success in this selected group

of women at 4 and 8 weeks after discharge was relatively high at 83% and 71%, respectively, and was similar to that reported by Rentschler.¹⁵ The European literature, however, has often reported lower rates.^{25–27}

After adjusting for demographic variables in this study, the only health system factors that proved to be significant were maternal age, graduate education, and quality of the hospital breastfeeding experience. For mothers who had a home nurse visit, the quality of that visit was also significant. It is possible that the age and educational experience of our mothers affected their rating of the hospital and home visit quality as well as the hospital breastfeeding experience. Although not surprising, these results highlight the need to monitor closely the performance of breastfeeding support programs. However, this may become a challenge because hospitals have made significant cuts in staff to meet cost-reduction demands. Just increasing length of stay without addressing the quality of services in the hospital and after discharge remains a significant concern. Our study did not show differences in breastfeeding success related to length of stay, although this has been a concern suggested by others.^{5,28,29} There have been studies that suggested that breastfeeding success was increased in women discharged earlier with optimal support.^{11–14} The selective population of this study, as well as the fact that >70% of the women received a home visit, may explain some of the differences between our study and others.

Previous studies have suggested that lactation consultants or other personnel focused primarily on breastfeeding support have a significant role in breastfeeding success.^{24,30–33} Bloom and colleagues studied the effect of intensive support after discharge and concluded that for primiparous women, weekly telephone calls by a nurse increased the duration of breastfeeding.²⁴ In a study reported by Houston and associates,³⁴ a program of structured visits by one person, and based on an appointment system, produced a breastfeeding success rate of 100% at 12 weeks, compared with 75% for a control group. One of the surprising results from our study was that <50% of the mothers had seen a lactation consultant for breastfeeding support, although all of the institutions studied had such a service available. Although Grossman et al³⁴ reported that intensive support had no effect on the duration of breastfeeding, the maternal rating of the support and confidence provided by the interaction with hospital staff in our study suggests this is an area with potential for impact and opportunity for improvement.

TABLE 8. Adjusted Factors Associated With Breastfeeding Success*

	OR	95% CI
Maternal graduate education	3.15	1.17, 8.5
Breastfeeding experience while in hospital	1.44	1.13, 1.84
Maternal age	1.06	1.00, 1.12

* The father's support, marital status, parity, race, insurance status, breastfeeding in the delivery room, amount of time the infant spent in the room with the mother, home nurse visit, work outside the home before the baby's birth, quality of hospital support, gestational age, birth weight, and length of stay in the hospital were not significant factors for breastfeeding success.

In the era of early discharge, many hospitals and health care professionals have moved to more extensive use of home-visiting services, especially to support first-time breastfeeding mothers. Others have extended the length of hospital stay for breastfeeding mothers, either as a matter of policy or because they have been encouraged to do so by recently enacted state laws. Both of these scenarios make assumptions about the underlying quality of the services that may not be warranted. The American Academy of Pediatrics guideline³⁵ about discharge of newborns and provision of home visits does not make any specific statements regarding the quality of the home visits, and we are not aware of any national standards regarding training in breastfeeding support. Our results suggest that support during initiation of breastfeeding and intensive and ongoing support during the early stages of establishing breast milk may be two areas that could increase the likelihood of reaching the goals targeted in the Healthy People 2000 report.

CONCLUSION

In summary, health system support of breastfeeding is an important factor for success, even for highly motivated mothers. This support may include consistent, high-quality information on breastfeeding and access to a lactation consultant for all interested mothers. It is important that hospitals develop breastfeeding promotion and support programs and closely monitor outcomes from these services on an ongoing basis.

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