Published in final edited form as:

Am J Obstet Gynecol. 2002 November ; 187(5): 1329–1336.

The postpartum visit: Risk factors for nonuse and association with breast-feeding

Michael C. Lu, MD, MPH^{a,b,c} and Julia Prentice, MSPH^b

^aDepartment of Obstetrics and Gynecology, University of California, Los Angeles, School of Medicine

^bDepartment of Community Health Sciences University of California, Los Angeles, School of Public Health

^cThe Center for Healthier Children, University of California, Los Angeles, School of Public Health

Abstract

Objective—Our purpose was (1) to describe use of the postpartum visit among US women of different social and ethnic backgrounds and to identify risk factors for nonuse and (2) to determine the association between postpartum care and breast-feeding duration.

Study Design—The responses of a nationally representative sample of 9953 women who had a live birth in 1988 surveyed by the National Maternal and Infant Health Survey were included for our secondary analysis. Risk factors for nonuse of the postpartum visit, and its relationship with breast-feeding duration, were evaluated with use of multivariate regression analyses.

Results—Fifteen percent of respondents had not made a postpartum visit within 6 months after delivery. Having no prenatal care was associated with increased likelihood of nonuse of postpartum care (adjusted relative risk 3.39, CI 1.98–5.81). The postpartum visit was not significantly associated with breast-feeding duration.

Conclusion—Further research is needed to reevaluate the timing, content, and delivery of postpartum care.

Keywords

Postpartum visit; prenatal care; breast-feeding

Traditionally, women have been advised to receive a checkup 4 to 6 weeks after childbirth, and sooner after a cesarean delivery or a complicated gestation.^{1,2} This postpartum visit is believed to offer an important opportunity to assess the physical and psychosocial well-being of the mother, counsel her about breast-feeding and family planning, initiate preconception care for the next pregnancy, and address nascent problems within the family.³ This visit may be particularly important for many women whose access to the health care system becomes limited after termination of their Medicaid coverage at 60 days' post

partum. For these reasons, increasing the proportion of women who receive a postpartum visit 4 to 6 weeks after delivery has been identified as a Healthy People 2010 objective.³

Despite increasing recognition of its importance, little is currently known about this postpartum visit. Our literature search (using key words “postpartum,” “postpartum visit,” and “postnatal visit” through MEDLINE, PubMed, and MD Consult databases over the past 20 years) yielded no published national data on the utilization of the postpartum visit and only a few studies^{4,5} that have demonstrated its benefits. The two major objectives of this article are (1) to describe utilization of the postpartum visit among American women of different social and ethnic backgrounds and identify risk factors for nonuse and (2) to determine the association between postpartum visit and breast-feeding, which has been purported as one of the most important benefits of the visit.¹⁻³

Material and methods

The 1988 National Maternal and Infant Health Survey (NMIHS) was conducted by the National Center for Health Statistics (NCHS) (Washington, DC) to study maternal and infant health. The NMIHS is a follow-back survey using a stratified random sample design consisting of three groups: women who had a live birth, a fetal death, or an infant death in 1988. The sample was drawn from the 1988 vital records of 48 states and the District of Columbia (South Dakota and Montana were not included) and was designed to be nationally representative with oversampling of African American women and women with low-birth-weight infants. A more complete description of the NMIHS design has been published elsewhere.⁶

A mixed mode method was used to collect information from respondents. Women were initially mailed a questionnaire and a brochure describing the survey. A second questionnaire and then a postcard reminder were mailed to nonrespondents within a month. Respondents who did not return a mailed survey were then contacted by telephone or in person. The mean intervals between delivery and interview were 17 months for women with live births. Each response was assigned a final weight based on the probability of selection, other sampling adjustments, a nonresponse adjustment, and a poststratification adjustment.⁴

A claim of exemption from review by the Institutional Review Board of the University of California, Los Angeles, was obtained before the our secondary analysis was conducted. Because our primary outcome variable was breast-feeding duration, we excluded from our analysis women who had a fetal or infant death. Our primary study variable was the postpartum visit. All respondents were asked, “During the first 6 months after your delivery, how many outpatient visits concerning your own physical or mental health did you make to a doctor and/or clinic?” Respondents were instructed not to include overnight hospital stays. The survey question did not specify the purpose, content, or timing of the postpartum visit. We dichotomized the responses to none versus one or more visits. Because women who made multiple postpartum visits may have done so to receive care for postpartum complications or other problems, we conducted a subset analysis excluding women with multiple visits.

The primary outcome variable was breast-feeding duration. All women with live-born infants were asked, “How old was the baby when you stopped breast-feeding?” We dichotomized their responses to breast-feeding duration of less than 6 months versus 6 months or longer. Because the postpartum visit could influence breast-feeding for a shorter duration, we conducted additional multivariate analyses examining breast-feeding durations of at least 2 and 3 months.

We analyzed the data with use of Stata (Stata Corp, College Station, Tex) statistical software packages. To accomplish our first objective, we first conducted univariate and bivariate analyses to describe utilization of the postpartum visit by maternal characteristics. Weighted logistic regression analysis was then performed to identify risk factors associated with nonuse. Covariates were chosen a priori from variables known to be associated with inadequate prenatal care utilization, including age, parity, marital status, race and ethnicity, education, household income, region of the country, pregnancy intendedness, cigarette, alcohol and substance use during pregnancy, and the type of insurance coverage for prenatal care.⁷⁻⁹ Marital status and household income were imputed for approximately 10% of respondents by researchers at the NCHS. We also included timing of prenatal care initiation, attendance of childbirth classes, low birth weight, preterm delivery, and preterm labor interventions as covariates. Tests for multicollinearity did not find the covariates to be collinear. All covariates were entered as a single block.

To accomplish our second objective, univariate and bivariate analyses were performed to identify factors associated with breast-feeding duration of 6 months or greater. Multivariate analyses were then conducted to examine the association between the postpartum visit and breastfeeding duration. We used the aforementioned list of covariates, most of which have been shown to be associated with breast-feeding.^{9,10} Tests for multicollinearity did not find the covariates to be collinear. All covariates were entered as a single block. Because postpartum care may benefit some women more than others, we conducted separate subset analyses using the same logistic regression model in 18 different strata (5 age categories, 3 income categories, 4 education categories, 4 racial-ethnic categories, and 2 marital status categories). All analyses were weighted to account for the survey design and to be nationally representative.

Results

A total of 18,594 women completed the survey. The responses of 9953 women with live births were included in the analysis. The response rate among women with live births was 74%. Women were more likely to respond if they were >30 years old, white, married, and had at least a high school education. Characteristics of the study population are described in Table I.

Fifteen percent of women did not make a postpartum visit, 45% made one visit, and 40% made more than one visit within 6 months of delivery. Table II presents the characteristics of women who made one or more postpartum visits. Although 86% of women who initiated prenatal care in the first trimester made a postpartum visit, only 54% of women who had no prenatal care made a postpartum visit.

In our logistic regression model, the adjusted odds ratio for receiving no postpartum care was 3.39 (CI = 1.98-5.81) for women who had no prenatal care (Table III). Having less than a high school education, a household income of <\$20,000, or no preterm labor interventions were also associated with increased risk for nonuse of postpartum care (Table III). The results changed minimally when women with multiple postpartum visits were excluded (data not shown).

Our second objective was to determine the association between postpartum visit and breast-feeding duration. Table IV presents the characteristics of women who breast-fed for 6 months or longer. Thirty-five percent of women who made one or more postpartum visits, and 29% of women who did not obtain postpartum care, breast-fed their infants for 6 months or longer ($P = .05$). However, after covariates were controlled for, postpartum care was not found to be significantly associated with breast-feeding duration of 6 months or greater in our multivariate analysis (data not shown). Neither did we find a significant difference in breast-feeding durations of 2 months and 3 months between those who made and did not make a postpartum visit (data not shown).

In stratified analyses, postpartum care was associated with increased likelihood of breast-feeding at 6 months only among women with a household income less than \$20,000 or women aged 25 to 29 years, but not among those in the other 16 strata (data not shown). When women with multiple visits were excluded from the analyses, postpartum visit was still not significantly associated with breast-feeding duration (data not shown).

Comment

Our study found that most (85%) American women had obtained outpatient care for physical or mental health within 6 months post partum. To our knowledge, this is the first published report on postpartum care utilization based on a nationally representative sample. The National Committee on Quality Assurance (NCQA) collects data on the postpartum visit through the Health Plan Employer Data and Information Set (HEDIS), but its respondents are limited to participating managed health care plans. The NCQA reported that, in 1999, 72% of enrollees who had a live birth made a postpartum visit between 21 and 56 days after delivery.¹¹

There are several important differences between our study and the National Committee for Quality Assurance (NCQA) report that may account for the discrepancy in the reported utilization rates. First, the NCQA used a more restricted and standard time frame (3 weeks to 8 weeks post partum) than the NMIHS (6 months) during which an ambulatory visit could be counted as a postpartum checkup visit. Second, the NMIHS relied on self-reports, whereas the NCQA used data based on a review of medical claims and records. Self-reports may be particularly vulnerable to recall error and reporting bias,¹² although studies have shown that long-term maternal recall of perinatal events is fairly accurate and reproducible.¹³ Third, a nonresponse bias may occur if women who responded to the NMIHS were also more likely to make a postpartum visit than nonresponders, thereby overinflating the actual utilization rate. Fourth, the NMIHS reported data collected from the 1988 birth cohort, whereas the NCQA reported on the 1999 cohort. The financing, delivery,

and utilization of prenatal care have changed significantly in the past decade, which could have an impact on postpartum care utilization as well. The observed trend, however, is toward increasing utilization of prenatal¹⁴ and postpartum care,¹¹ which could not account for the discrepancy.

Most important, the NMIHS asked a question about the postpartum visit that did not specify the purpose or content of the visit. Women may have made one or more visits to a physician or clinic for different purposes, and they may not have received standard postpartum care during that visit. The imprecise wording of the question may have overinflated the utilization rate. In our subset analysis, we excluded women with multiple visits because they may have done so for reasons other than to receive standard postpartum care. However, women who made only one visit may have also done so for other reasons as well. We found only one other published study that has examined utilization of the postpartum visit in a small cohort of indigent adolescents.¹⁵

These limitations notwithstanding, we were particularly interested in the 15% of women who did not make a postpartum visit. A major objective of the study was to identify risk factors for nonuse. Several characteristics emerged as significant risk factors: having no prenatal care, less than high school education, household income of less than \$20,000, and no preterm labor interventions (Table III). Compared with those who had prenatal care, women who had no prenatal care were more than three times as likely to have had no postpartum care. This group of women may particularly benefit from home visitation or other types of outreach programs in the postpartum period.

Although differences by other maternal characteristics in the utilization of postpartum care were statistically significant in bivariate analyses because of the large sample size, these differences were generally small and disappeared after other confounders were controlled. Notably some factors that have been traditionally linked to late entry into or inadequate utilization of prenatal care,⁷⁻⁹ such as race and ethnicity, marital status, education, maternal age, wantedness of pregnancy, substance use during pregnancy, and having private insurance coverage for prenatal care, were not found to be significant predictors of nonuse of postpartum care. Although this may be partly attributed to the aforementioned methodologic limitations, it may also suggest that pregnancy and delivery had opened a portal of entry to access the health care system for many women with limited access. The postpartum visit serves as a window of opportunity to provide further health care and education to these women. It further suggests possible missed opportunities to continue to improve the health of women and their families when the window of opportunity closes so soon after termination of pregnancy because many women lose their pregnancy-related Medicaid coverage at 60 days post partum.

We were also interested in examining the benefits of this postpartum visit. We chose breast-feeding duration as the primary outcome variable because it is often touted as an important benefit of the postpartum visit.¹⁻³ Our findings suggest that the postpartum visit does not appear to be significantly associated with breast-feeding duration in the study population as a whole, or in any particular subgroup of women, with a few notable exceptions. Low-income women appeared more likely to breast-feed for longer duration if they had made a

postpartum visit, but a direct causal relationship between postpartum visit and breast-feeding among low-income women cannot be established in our study.

Our failure to demonstrate one of the most commonly touted benefits of postpartum care should be interpreted with caution. First, the imprecise wording of both dependent (breast-feeding duration) and independent (postpartum visit) variables calls into question the validity of our findings. For example, women who have problems breast-feeding may be more likely to seek postpartum care to address these problems. This could lead to an underestimation of the association between postpartum care and breast-feeding. Second, although we attempted to control for confounding through our multivariate analyses, we were not able to control for factors that were not assessed in the NMIHS, such as prenatal attitude toward or past success or failure with breast-feeding. Also, postpartum care may benefit other aspects of maternal and family health that were not measured by the survey. Berenson and Wiemann⁴ found that among a group of 462 adolescent mothers attendance at postpartum visit nearly doubles the likelihood of contraceptive use at 6 months post partum. The CI of the adjusted odds ratio, however, borders on 1.0. Stevens-Simon et al⁵ found late return for postpartum care among 150 adolescent mothers to be significantly associated with incomplete immunization of their infants in the bivariate analysis, but not in the multivariable regression model that accounted for potential confounders. We were not able to examine contraceptive use or immunization in our study. The postpartum visit, analogous to a postoperative visit, may also provide an opportunity for the obstetrician to evaluate a woman's postpartum recovery from the delivery, such as assessing for involution of the uterus or intactness of the perineal wound repair. The benefit of a routine pelvic examination during the postpartum visit, however, has also been questioned.^{16,17} Future research needs to examine the impact of postpartum care on other important aspects of maternal and family health, such as maternal depression or family planning.

The aforementioned methodologic limitations notwithstanding, there are several possible explanations why the postpartum visit may have less influence over breast-feeding than is purported. First, the timing of the visit may be too late to address breast-feeding problems. One in five mothers (19%) who initiated breast-feeding discontinued nursing at less than 1 month, a decision that may be difficult to reverse at the 6-week postpartum visit. It is unclear whether an earlier postpartum visit could have better supported breast-feeding. Gunn et al¹⁸ reported no significant difference in breast-feeding duration between women randomized to receiving early (1-week) and standard (6-week) postpartum visits.

Second, the content and quality of the postpartum care may vary significantly among providers. We have no information by which to evaluate the content of the postpartum visit. However, on the basis of the 1988 NMIHS, Kogan et al¹⁹ found significant variations in the content and quality of prenatal care.¹⁹ It is possible that not all women who made a postpartum visit received adequate counseling about breast-feeding and other recommended components of health education and services.

Last, the postpartum visit may not be sufficiently equipped to address the multitude of psychologic and social factors that influence maternal health and behavior. Similar concerns have been expressed regarding prenatal care,²⁰ which may, in part, explain the lack of

conclusive evidence demonstrating the effectiveness of prenatal care.²¹ Women's decisions about breast-feeding often involve a complex calculus of burdens and benefits,²² such as the inconvenience of continued nursing on return to work, which postpartum care providers may be ill prepared to address. To expect postpartum care, in a single, short visit, to change health behaviors that may have been patterned by a multitude of psychologic and social factors, may be expecting too much of the postpartum visit.

Our study should be viewed as an initial attempt to examine the utilization and benefits of postpartum care from a national database. We caution against overinterpretation of our findings as evidence for rejecting the value of and denying coverage for the postpartum visit. Rather, we join the small but growing ranks of authors^{23,24} calling for further research and reevaluation of the timing, content, and delivery of the postpartum visit.

References

1. American Academy of Pediatrics, American College of Obstetricians and Gynecologists. Guidelines for perinatal care. 4th. Elk Grove Village (IL): American Academy of Pediatrics; 1997.
2. Browne, FJ. Antenatal and postnatal care. London: J & A Churchill; 1937.
3. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy people 2010. 2nd. Washington (DC): US Government Printing Office; 2000.
4. Berenson AB, Wiemann CM. Contraceptive use among adolescent mothers at 6 months postpartum. *Obstet Gynecol.* 1997; 89:999–1005. [PubMed: 9170481]
5. Stevens-Simon C, Kelly LS, Singer D. Pattern of prenatal care and infant immunization status in a comprehensive adolescent-oriented maternity program. *Arch Pediatr Adolesc Med.* 1996; 150:829–33. [PubMed: 8704889]
6. Sanderson M, Placek PJ, Keppel KG. The 1988 National Maternal and Infant Health Survey: design, content, and data availability. *Birth.* 1991; 18:26–32. [PubMed: 2006958]
7. Brown, SS., editor. Prenatal care: reaching mothers, reaching infants. Washington (DC): National Academy Press; 1988.
8. Expert Panel on the Content of Prenatal Care. Caring for our future: the content of prenatal care. Washington (DC): Public Health Service; 1989.
9. Brown, SS.; Eisenberg, L., editors. The best intentions: unintended pregnancy and the well-being of children and families. Washington (DC): National Academy of Sciences; 1995.
10. Lu MC, Lange L, Slusser W, Hamilton J, Halfon N. Provider encouragement of breast-feeding: evidence from a national survey. *Obstet Gynecol.* 2001; 97:290–5. [PubMed: 11165597]
11. National Committee for Quality Assurance. [Accessed on September 6, 2000] State of managed care quality 2000. Available at: www.ncqa.org
12. Aday, LA. Designing and conducting health surveys: a comprehensive guide. 2nd. San Francisco: Jossey-Bass; 1996.
13. Tomeo CA, Rich-Edwards JW, Michels KB, Berkey CS, Hunter DJ, Frazier AL, et al. Reproducibility and validity of maternal recall of pregnancy-related events. *Epidemiology.* 1999; 10:774–7. [PubMed: 10535796]
14. Ventura SJ, Martin JA, Curtin SC, Menacker F, Hamilton BE. Births: final data for 1999. *Natl Vital Stat Rep.* 2001; 49:13.
15. Stevens-Simon C, O'Connor P, Bassford K. Incentives enhance postpartum compliance among adolescent prenatal patients. *J Adolesc Health.* 1994; 15:396–9. [PubMed: 7947854]
16. Sherif K, Clarke P, Whittle M. Routine six-week postnatal vaginal examination: to do or not to do? *J Obstet Gynaecol.* 1993; 13:251–2.
17. Noble T. The routine six week postnatal vaginal examination [editorial]. *BMJ.* 1993; 307:698. [PubMed: 8401090]

18. Gunn J, Lumley J, Chondros P, Young D. Does an early postnatal check-up improve maternal health: results from a randomised trial in Australian general practice. *Br J Obstet Gynaecol.* 1998; 105:991–7. [PubMed: 9763051]
19. Kogan MD, Alexander GR, Kotelchuck M, Nagey DA. Relation of the content of prenatal care to the risk of low birth weight. *JAMA.* 1994; 271:1340–5. [PubMed: 8158819]
20. Korenbrot, CC.; Moss, NE. Preconception, prenatal, perinatal and postnatal influences on health. In: Smedley, BD.; Syme, SL., editors. *Promoting health: intervention strategies from social and behavioral research.* Washington (DC): National Academy Press; 2000. p. 37-80.
21. Fiscella K. Does prenatal care improve birth outcomes? A critical review. *Obstet Gynecol.* 1995; 85:468–79. [PubMed: 7862395]
22. Kennedy KI, Visness CM. A comparison of two US surveys of infant feeding. *J Hum Lact.* 1997; 13:39–43. [PubMed: 9233184]
23. Mabray CR. Postpartum examination; a re-evaluation. *S Med J.* 1979; 72:1433–5.
24. Glazener CMA, MacArthur C, Garcia J. Postnatal care: a time for change. *Contemp Rev Obstet Gynaecol.* 1993; 5:130–6.

Table I
Characteristics of study population (respondents with live births in 1988, n = 9953)

Characteristics*	Percent of all live births [†]
Age (y) (n = 9628)	
<20 (n = 1576)	12
20-24 (n = 2779)	27
25-29 (n = 2756)	32
30-34 (n = 1808)	21
35+ (n = 709)	8
Parity (n = 9716)	
Primiparous (n = 4352)	46
Multiparous (n = 5364)	54
Marital status (n = 9953)	
Married (n = 5869)	74
Unmarried (n = 4084)	26
Race/ethnicity (n = 9953)	
African American (n = 4791)	16
White (n = 3966)	67
Hispanic (n = 890)	13
Other (n = 306) [‡]	4
Education (n = 9953)	
Less than high school (n = 2308)	19
High school graduate (n = 4020)	39
Some college (n = 2289)	24
College graduate (n = 1336) [‡]	18
Household income (n = 9953)	
<\$20,000 (n = 5506)	43
\$20,000-\$39,999 (n = 2698)	33
\$40,000 (n = 1749)	24
Region (n = 9953)	
South (n = 4376)	36
Northeast (n = 1735)	18
North central (n = 2328)	25
West (n = 1514)	21
Postpartum visit (n = 9953)	
No visits (n = 1505)	15
1 visit (n = 4047)	45
>1 visit (n = 4401)	40
Breast-feeding (n = 8840)	
Did not initiate (n = 5541)	49
Breast-fed <6 mo (n = 2291)	34
Breast-fed ≥6 mo (n = 1008)	18

* n = unweighted number of responses.

† All percentages are weighted.

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Table II
Characteristics of respondents with live births who made one or more postpartum visits,
1988 (n = 9953)

Characteristics*	1 postpartum visits [†]	P value [‡]
Age (y) (n = 9628)		<.001
<20 (n = 1576)	81	
20-24 (n = 2779)	83	
25-29 (n = 2756)	85	
30-34 (n = 1808)	88	
35+ (n = 709)	88	
Parity (n = 9716)		NS
Primiparous (n = 4352)	85	
Multiparous (n = 5364)	85	
Marital status (n = 9953)		.003
Married (n = 5869)	86	
Unmarried (n = 4084)	82	
Race/ethnicity (n = 9953)		.023
African American (n = 4791)	84	
White (n = 3966)	86	
Hispanic (n = 890)	81	
Other (n = 306) [†]	83	
Education (n = 9953)		<.001
Less than high school (n = 2308)	80	
High school graduate (n = 4020)	84	
Some college (n = 2289)	86	
College graduate+ (n = 1336)	90	
Household income (n = 9953)		<.001
<\$20,000 (n = 5506)	81	
\$20,000-\$39,999 (n = 2698)	87	
\$40,000 (n = 1749)	89	
Region (n = 9953)		NS
Northeast (n = 1735)	86	
North central (n = 2328)	84	
South (n = 4376)	84	
West (n = 1514)	85	
Wantedness of pregnancy (n = 9953)		<.001
Yes (n = 4771)	86	
No (n = 5182)	83	
Initiation of prenatal care (n = 9953)		<.001
None (n = 314)	54	
After first trimester (n = 1784)	82	
First trimester (n = 7855)	86	

Characteristics*	1 postpartum visits [†]	P value [‡]
Preterm labor interventions (n = 9953)		<.001
Yes (n = 3385)	87	
No (n = 6568)	84	
Private insurance coverage for prenatal care (n = 9639)		<.001
Yes (n = 4579)	87	
No (n = 5060)	83	
Government insurance coverage for prenatal care (n = 9639)		.001
Yes (n = 3675)	83	
No (n = 5964)	86	
Self-paid (own income or relative's income) for prenatal care (n = 9639)		NS
Yes (n = 2812)	86	
No (n = 6827)	85	
Other sources (eg, Indian, military) paid for prenatal care (n = 9639)		NS
Yes (n = 487)	86	
No (n = 9152)	85	
Childbirth classes (n = 9953)		<.001
Yes (n = 4464)	87	
No (n = 5489)	82	
Cigarette smoking during pregnancy (n = 9953)		.004
Yes (n = 2326)	82	
No (n = 7627)	86	
Alcohol use during pregnancy (n = 9953)		NS
Yes (n = 1738)	86	
No (n = 8215)	84	
Drug use during pregnancy (n = 9953)		NS
Yes (n = 319)	85	
No (n = 9634)	85	
Birth weight (n = 9946)		NS
<2500 g (n = 3044)	85	
2500 g (n = 6902)	85	
Gestational age (n = 9452)		.059
<37 wk (n = 2552)	82	
Completed 37 wk (n = 6900)	85	
Breast-feeding at 6 mo (n = 3299) [§]		.050
Yes (n = 1008)	89	
No (n = 2291)	85	

NS, Not significant.

* n = unweighted number of responses.

[†] All percentages are weighted.

[‡] P value derived from comparisons made across all strata for each characteristic.

[§]Only women who initiated breast-feeding are included in this analysis.

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Table III
Risk factors for nonuse of postpartum care: findings from multivariate analysis* (n = 8992)

Maternal characteristics	Adjusted odds ratio (95% CI)
Maternal age (cf, 35+ y)	
<20 y	1.05 (0.69-1.60)
20-24 y	1.06 (0.73-1.53)
25-29 y	1.15 (0.81-1.63)
30-34 y	0.95 (0.66-1.38)
Multiparous (cf, primiparous)	1.00 (0.84-1.20)
Unmarried (cf, married)	0.93 (0.73-1.18)
Race/ethnicity (cf, non-Hispanic white)	
African American	0.84 (0.69-1.02)
Hispanic	1.11 (0.84-1.47)
Other [†]	1.20 (0.76-1.89)
Education (cf, college graduate)	
Less than high school	1.57 (1.10-2.24)
High school graduate	1.32 (0.97-1.80)
Some college education	1.28 (0.95-1.74)
Household income (cf, \$40,000)	
<\$20,000	1.51 (1.13-2.01)
\$20,000-\$39,999	1.01 (0.77-1.32)
Region (cf, Northeast)	
South	1.09 (0.85-1.39)
North central	1.20 (0.93-1.56)
West	1.01 (0.76-1.34)
Unwanted pregnancy (cf, wanted pregnancy)	1.10 (0.92-1.31)
Prenatal care initiation (cf, during first trimester)	
No prenatal care	3.39 (1.98-5.81)
After first trimester	1.07 (0.86-1.34)
No preterm labor interventions (cf, received preterm labor interventions) [‡]	1.31 (1.08-1.59)
No childbirth class (cf, attended childbirth class)	1.12 (0.92-1.36)
Cigarette smoking during pregnancy (cf, did not smoke)	1.13 (0.91-1.39)
Alcohol use during pregnancy (cf, did not use alcohol)	0.95 (0.76-1.20)
Drug use during pregnancy (cf, did not use drugs)	0.86 (0.51-1.44)
No private insurance coverage for prenatal care (cf, used private insurance)	1.22 (0.92-1.62)
Used government program/insurance for prenatal care (cf, did not use government insurance)	0.76 (0.54-1.06)
Did not self-pay (own income or other relatives income) for prenatal care (cf, self-paid)	1.13 (0.90-1.42)
Did not use other (eg, military, Indian) source to pay for prenatal care (cf, used other source)	1.38 (0.88-2.17)
Low birth weight (cf, normal birth weight)	0.83 (0.65-1.05)
Preterm delivery (cf, delivery at term)	1.25 (0.95-1.65)

* Logistic regression model includes all variables listed in the table. All covariates were entered as a single block. n = 8992 after exclusion of missing data for all covariates.

[†] Asian or Pacific Islander, Eskimo, Aleut, or American Indian.

[‡] Preterm labor interventions included tocolytic therapy, cerclage, bed rest, hospitalization, or restricted sexual or physical activities.

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Table IV
Characteristics of respondents with live births who breast-fed for 6 months or longer (n = 3299)

Characteristics*	Breast-fed 6 mo (%) [†]	P value [‡]
Age (y) (n = 3226)		<.001
<20 (n = 276)	20	
20-24 (n = 756)	23	
25-29 (n = 1095)	35	
30-34 (n = 785)	46	
35+ (n = 314)	44	
Parity (n = 3251)		<.001
Primiparous (n = 1505)	28	
Multiparous (n = 1746)	40	
Marital status (n = 3299)		<.001
Married (n = 2582)	37	
Unmarried (n = 717)	22	
Race/ethnicity (n = 3299)		<.001
African American (n = 902)	24	
White (n = 1852)	37	
Hispanic (n = 383)	26	
Other [†] (n = 162)	28	
Education (n = 3299)		<.001
Less than high school (n = 426)	24	
High school graduate (n = 1088)	31	
Some college (n = 976)	32	
College graduate+ (n = 809)	46	
Household income (n = 3299)		<.001
<\$20,000 (n = 1258)	29	
\$20,000-\$39,999 (n = 1098)	34	
\$40,000 (n = 943)	41	
Region (n = 3299)		<.001
Northeast (n = 656)	40	
North central (n = 756)	30	
South (n = 1054)	30	
West (n = 833)	38	
Wantedness of pregnancy (n = 3299)		NS
Yes (n = 1956)	36	
No (n = 1343)	32	
Initiation of prenatal care (n = 3299)		NS
None (n = 29)	22	
After first trimester (n = 417)	30	
First trimester (n = 2853)	35	

Characteristics*	Breast-fed 6 mo (%) [†]	P value [‡]
Preterm labor interventions (n = 3299)		.001
Yes (n = 1030)	29	
No (n = 2269)	36	
Private insurance coverage for prenatal care (n = 3270)		.008
Yes (n = 2054)	36	
No (n = 1216)	31	
Government insurance or program used for prenatal care (n = 3270)		<.001
Yes (n = 693)	24	
No (n = 2577)	36	
Self-paid (own income or relative's income) for prenatal care (n = 3270)		NS
Yes (n = 1182)	35	
No (n = 2088)	34	
Other source (eg, Indian, military) paid for prenatal care (n = 3270)		.07
Yes (n = 180)	42	
No (n = 3090)	34	
Childbirth classes (n = 3299)		<.001
Yes (n = 2180)	38	
No (n = 1119)	25	
Cigarette smoking during pregnancy (n = 3299)		<.001
Yes (n = 554)	22	
No (n = 2745)	37	
Alcohol use during pregnancy (n = 3299)		.055
Yes (n = 684)	38	
No (n = 2615)	33	
Drug use during pregnancy (n = 3299)		NS
Yes (n = 72)	29	
No (n = 3227)	35	
Birth weight (g) (n = 3297)		<.001
<2500 (n = 611)	21	
2500 (n = 2686)	35	
Gestational age (wk) (n = 3188)		<.001
<37 (n = 502)	23	
Completed 37 (n = 2686)	35	
Postpartum visit (n = 3299)		.050
Yes (n = 2866)	35	
No (n = 433)	29	

n = unweighted number of responses. NS, Not significant.

* Analyses exclude women who did not initiate breast-feeding.

[†] All percentages are weighted.

[‡] P value derived from comparisons made across all strata for each characteristic.