ARTICLE

Immigration, Race/Ethnicity, and Social and Economic Factors as Predictors of Breastfeeding Initiation

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Objective: To determine the impact of immigration status as well as race/ethnicity and social and economic factors on breastfeeding initiation.

Design: Cohort.

Setting: Multisite group practice in eastern Massachusetts.

Participants: One thousand eight hundred twenty-nine pregnant women prospectively followed up in Project Viva.

Main Outcome Measure: Whether the participant breastfed her infant.

Results: The overall breastfeeding initiation rate was 83%. In multivariate models that included race/ethnicity and social, economic, and demographic factors, foreign-born women were more likely to initiate breastfeeding than US-born women (odds ratio [OR], 3.2 [95% confidence interval (CI), 2.0-5.2]). In models stratified by both race/ethnicity and immigration status, and further adjusted for whether the mother herself was breastfed as an infant and the mother’s parents’ immigration status, US-born and foreign-born black and Hispanic women initiated breastfeeding at rates at least as high as US-born white women (US-born black vs US-born white women, OR, 1.2 [95% CI, 0.8-1.9], US-born Hispanic vs US-born white women, OR, 1.1 [95% CI, 0.6-1.9], foreign-born black vs US-born white women, OR, 2.6 [95% CI, 1.1-6.0], and foreign-born Hispanic vs US-born white women, OR, 1.8 [95% CI, 0.7-4.8]). Calculations of predicted prevalences showed that, for example, the 2.6-fold increase in odds for the foreign-born black vs US-born white women translated to an increase in probability of approximately 1.4. Higher maternal education and household income also predicted higher initiation rates.

Conclusions: Immigration status was strongly associated with increased breastfeeding initiation in this cohort, implying that cultural factors are important in the decision to breastfeed. Immigrants of all races/ethnicities initiated breastfeeding more often than their US-born counterparts. In addition, US-born minority groups initiated breastfeeding at rates at least as high as their white counterparts, likely due in part to high levels of education and income as well as to access to a medical care system that explicitly supports breastfeeding.

women, respectively, from the Third National Health and Nutrition Examination Survey (1988-1994).13 65% initiation for white women and 30% for black women in the National Survey of Family Growth (1995),16 and 70% and 40% for white and black women, respectively, in the National Immunization Survey (2001).17 Fewer data are available on the prevalence of breastfeeding among various Hispanic groups. The Third National Health and Nutrition Examination Survey (1988-1994) reported that 56% of Mexican American women initiated breastfeeding,15 and the National Immunization Survey (2001) reported 72% of Hispanic women initiating breastfeeding.17

In the studies that have adjusted for maternal education and other socioeconomic variables, some of the racial/ethnic disparity in breastfeeding rates is reduced.16 However, it remains unclear to what extent racial/ethnic differences can be explained by such socioeconomic factors alone or by other cultural factors. For example, black or Hispanic women who are immigrants to the United States from parts of the world where breastfeeding is the norm may initiate breastfeeding at higher rates than women of these racial/ethnic groups who were born in the United States. Some evidence in the Mexican American population suggests that cultural assimilation is associated with lower breastfeeding initiation rates.18

The purpose of this study was to examine racial/ethnic disparities in breastfeeding initiation in a large multisite medical group practice and to determine the extent to which any differences were explained by the interplay of social, economic, and cultural factors. We were also interested to examine racial/ethnic differences among a group of women with good access to medical care and perinatal breastfeeding support.

METHODS

SUBJECTS AND SOURCE OF DATA

Subjects were pregnant women participating in Project Viva, a prospective cohort study of pregnant women and their children recruited from 8 offices of a multisite multispecialty group practice in eastern Massachusetts. We enrolled each participant at her initial obstetric visit. All women who met the inclusion criteria were approached for participation in the cohort provided that a research assistant was available at the time of the appointment. Participants delivered at 2 area hospitals; postpartum delivery interviews took place at these sites within 3 days of delivery. If a research assistant was unable to interview the participant in the hospital, she interviewed the participant by telephone within 1 month after delivery.

Exclusion criteria included multiple gestation, inability to answer questions in English, plans to move out of the area before delivery, and gestational age greater than 22 completed weeks at initial prenatal clinical appointment. We enrolled 2671 pregnant women (64% of those eligible) between April 22, 1999, and July 31, 2002, of whom 330 subsequently became ineligible because of multiple gestation (n=19), transferring obstetric care to a nonstudy site (n=115), or because they were no longer pregnant (n=196). Of the 2341 remaining participants, 195 (8%) withdrew and 18 (0.1%) were lost to follow-up, leaving 2128 who delivered a live infant. We excluded 227 women who were not white, black, or Hispanic (n=120 Asian; n=83 other race/ethnicity; n=24 missing race/ethnicity) because of sparse strata in these racial/ethnic groups. Of the 1901 white, black, or Hispanic mothers, we excluded 25 because of missing immigration status, 41 because of missing breastfeeding initiation data, and 6 with missing data for certain covariates. Thus, 1829 mothers form the study sample for this analysis.

The institutional review boards of Harvard Pilgrim Health Care, Brigham and Women’s Hospital, and Beth Israel Deaconess Medical Center, all in Boston, Mass, approved the study protocols.

MEASURES

Outcome

Our main outcome variable was breastfeeding initiation. The research assistants asked the following question at the delivery interview: “Have you breastfed your baby? By breastfeeding, we mean that you have put your baby to your breast, whether or not your baby actually received breast milk, or that you have fed your baby your breast milk.” If the subject responded yes to this question, we defined her as having initiated breastfeeding.

Predictors/Covariates

Race/Ethnicity. On the intake interview in early pregnancy, the research assistant asked the question, “Which of the following best describes your race or ethnicity?” The participant had a choice of 1 or more of the following racial/ethnic groups: Hispanic or Latina, white or Caucasian, black or African American, Asian or Pacific Islander, American Indian or Alaskan Native, and other (please specify). For the participants who chose the “other” race/ethnicity, we compared the specified responses to US census definitions for the other 5 race ethnicities and reclassified them where appropriate.19

Social and Economic Predictors. Social and economic predictors included the participant’s age at delivery, marital status, education level, household income level, and measures of financial security. Date of birth, education (in categories), and marital status were queried by the research assistant in an interview format, while income (in categories) was part of a self-administered questionnaire.

Cultural Predictors. At the intake interview, we asked the participant her country of origin, age at immigration, and country of origin of her parents. We also asked if the participant herself was breastfed as an infant.

ANALYSIS

We first examined rates of breastfeeding initiation within categories of race/ethnicity and immigration status, overall and by maternal characteristics. Our multivariate approach consisted of logistic regression models examining predictors of breastfeeding initiation. We first considered race/ethnicity as a predictor. In a second step, we added terms for the social, economic, and cultural covariates. In another set of models, we assessed effect modification by examining breastfeeding initiation rates within strata defined by both race/ethnicity and immigration status. We considered a covariate to be a confounder if adding it to the model changed the odds ratio (OR) by at least 10%.

Given the high prevalence of breastfeeding initiation, ORs are poor estimators of relative risks. Some authors have suggested methods to approximate relative risks in this situation,20 but these techniques do not adequately adjust for multiple covariates and may lead to implausible interpretations. In
and a hypothetical example, consider the fitted logistic regression:

$$\text{Pr}(Y = 1) = \frac{1}{1 + e^{-3.2 + 4}}$$

The predicted probability for an individual with an X value of 1 and a Z value of 2 would be obtained by

$$\text{Logit} \{\text{Pr}(Y = 1)\} = -4 + 3 \times X + 2 \times Z.$$

For all of our subsequent multivariate analyses, we examined breastfeeding initiation rates in strata of both race/ethnicity and immigration status (Table 2). Adjusting for age only (model 1), we found ORs close to 1 for the US-born black and Hispanic women compared with the US-born white women and ORs of 2 to 3 for the foreign-born white, black, and Hispanic women compared with US-born white women. Further adjustment for social and economic factors (model 2) did not alter the estimates for foreign-born white women but increased ORs for foreign-born black women to almost 6 and foreign-born Hispanic women to 3.6. Additional adjustment for cultural factors (model 3) attenuated the increased ORs for immigrant groups to 2.6 for immigrant black women and 1.8 for immigrant Hispanic women. The ORs stayed close to 1 for US-born black and Hispanic women. In these models, higher initiation rates were also predicted by higher maternal education, household income, and education level, both black and Hispanic women were more likely to initiate breastfeeding than their white counterparts (black women, OR, 1.9 [95% confidence interval (CI), 1.3-2.8]; Hispanic women, OR, 1.8 [95% CI, 1.1-2.9]). When we added the subject’s immigration status to the model, the OR for black women was attenuated to 1.4 (95% CI, 0.9-2.1) and for Hispanic women, to 1.3 (95% CI, 0.8-2.2). In this model, the OR for being foreign-born vs US-born was 3.2 (95% CI, 2.0-5.2).

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Since ORs are poor estimates of relative risks when the outcome is highly prevalent, we also calculated the predicted prevalences of breastfeeding initiation from the multivariate analyses, after adjustment for age, marital status, household income, and education level, both black and Hispanic women were more likely to initiate breastfeeding than their white counterparts (black women, OR, 1.9 [95% confidence interval (CI), 1.3-2.8]; Hispanic women, OR, 1.8 [95% CI, 1.1-2.9]). When we added the subject’s immigration status to the model, the OR for black women was attenuated to 1.4 (95% CI, 0.9-2.1) and for Hispanic women, to 1.3 (95% CI, 0.8-2.2). In this model, the OR for being foreign-born vs US-born was 3.2 (95% CI, 2.0-5.2).

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parameters in model 3. We present examples of these results in Table 3. Although most studies of breastfeeding prevalence have reported ORs, we feel these may be misleading to readers accustomed to equating OR with relative risk. For example, in Table 3, where the OR comparing immigrant black women with US-born white women is 2.6, the predicted breastfeeding initiation rate of black immigrants actually ranges from 1.1 to 1.7 times that of US-born white women (depending on maternal characteristics). The unwary reader might interpret the OR as indicating that black immigrants were 2.6 times more likely to breastfeed rather than the roughly 1.4-fold increase in likelihood that is revealed by the predicted prevalences.

Table 3 reveals that immigrants initiated breastfeeding at rates that were greater than their US-born counterparts, as we would expect from the reported ORs. It also shows the expected higher rates among women who were more educated or had higher household incomes. Predicted prevalences of breastfeeding initiation in US-born white, black, and Hispanic women who were aged 22 years, married, poor, and without a high school education were all lower than 40%. As maternal education rose, so did breastfeeding initiation (to roughly 65% with a college degree). Predicted initiation rates for the 28-year-old, college-educated, wealthy women were higher than 75%, regardless of immigrant status. Overall, the lowest initiation rates were among US-born women of lower socioeconomic position and the highest among foreign-born women of higher socioeconomic status.

**COMMENT**

Despite observing expected associations of lower education and income with reduced breastfeeding initiation rates, we found no material difference in initiation rates among US-born white, black, and Hispanic women.
The lack of racial/ethnic differences in breastfeeding initiation among these US-born women diverges from what has previously been described in the literature.\textsuperscript{16} In contrast, we found large differences in breastfeeding initiation within racial/ethnic groups, with immigrants breastfeeding at considerably higher rates than their US-born counterparts. Even poorer, less well-educated immigrants tended to have relatively high breastfeeding rates. Other cultural predictors of increased breastfeeding initiation rates in our analysis were participants’ parents’ immigration status and whether the participant was breastfed as an infant.

Limited previous work has addressed breastfeeding rates in immigrants to the United States. Results from the National Survey of Family Growth\textsuperscript{16} showed higher breastfeeding initiation rates in immigrants compared with native-born mothers, with an OR of 1.75. They reported no significant interaction between black and white race and immigration status with breastfeeding initiation, but effect estimates were not reported by these subgroups. Mexican immigrants have been reported to breastfeed at increased rates compared with US-born mothers in southern California\textsuperscript{22} and in Texas,\textsuperscript{18} where increasing acculturation was associated with decreasing breastfeeding rates. Other studies have shown that women who migrate from other countries tend not to breastfeed their subsequent US-born children as often,\textsuperscript{23,24} but these differences may be explained by discrepancies in socioeconomic status.\textsuperscript{24} In our study, we observed a strong effect of immigration after adjusting for socioeconomic factors.

In addition to observing higher breastfeeding initiation rates in immigrants, we found that US-born minority women in our study had higher breastfeeding initiation rates than those generally reported in the previous literature, though note our study lacked power to find differences between US-born white and minority women.\textsuperscript{12,13} Although our data did not directly address the motivations and supports for breastfeeding, we can speculate about the reasons for the high rate of breastfeeding among immigrants and minorities. One possibility for these observations is the potential support available in communities where immigrants live. Tightly knit immigrant minority communities may be a feature of Boston area neighborhoods. These immigrant communities may have closer ties to their homelands, where breastfeeding is the norm and may therefore have strong, informal community supports for breastfeeding, such as relatives, friends, and neighbors who breastfed their own children. In our analysis, minority women were more likely to have foreign-born parents and to have been breastfed themselves. Women with foreign-born parents were more likely to breastfeed than women with US-born parents. We attempted to examine these issues in our analysis by adjusting for the mother’s history of being breastfed herself and her parents’ immigration status. These factors explained roughly half of the immigrant breastfeeding advantage; other unmeasured cultural factors could explain the other half.

Overall, women in this cohort—especially minority women—were more likely to breastfeed than women across the nation, although they breastfed at rates typical of the 2 Boston hospitals at which they delivered.\textsuperscript{25} Nevertheless, one must interpret the observed overall initiation rate of more than 80% with some caution. Our question explicitly included any women who had put their baby to the breast for any length of time or who had fed their baby any breast milk. Other studies have not been so inclusive, possibly leading to overestimates in our results. Availability of health care support may explain the relatively high overall breastfeeding rates in this study. Our study participants were largely patients from capitalized health plans, and all received care in a large multispecialty medical group, Harvard Vanguard Medical Associates, Boston. Harvard Vanguard Medical Associates offers patients free breastfeeding classes and educational handouts and extensively trains health care professionals to provide prenatal breastfeeding support. Its computerized medical record prompts obstetric health care professionals to counsel about breastfeeding during routine prenatal visits. Also, lactation consultants are available at every health center, and lactation pumps are available to rent. Responses to a questionnaire at 6 months post partum among a subset of study participants suggested that they had received substantial support for breastfeeding from their obstetricians, midwives, and postpartum nurses and that minority participants had received as much of this support as their white counterparts (data not shown). Previous work has documented that education and support can increase breastfeeding initiation rates in immigrant and minority women.\textsuperscript{26} Health care professional encouragement can improve breastfeeding initiation across all racial/ethnic groups.\textsuperscript{27} Implementing the “baby-friendly initiatives” at a (non–Project Viva) Boston hospital resulted in high, sustained breastfeeding initiation rates in minority women.\textsuperscript{28,29}

Our study population is notable for the relatively large sample size, including adequate numbers of black and Hispanic immigrants. Although the average education and income levels were high, these averages were driven by the large proportion of US-born white participants. Income and education levels were more varied for the US-born black and Hispanic women (Table 1). Since much of the previous work examining race and breastfeeding was limited to lower income groups, this cohort provides an opportunity to investigate a broader spectrum of social and economic classes. Examining non–low income groups and women with health insurance remains important because national statistics for working and middle-class women indicate that breastfeeding rates still fall quite short of ideal.\textsuperscript{31} In addition, despite the high average socioeconomic status, we did observe relatively low breastfeeding initiation rates among subgroups of younger, less educated, and poorer women (Table 3).

The fact that we administered questionnaires and interviews only in English may have limited the generalizability of this study to more acculturated immigrants. On the other hand, given a more acculturated immigrant population, we might have expected to see lower breastfeeding rates among the immigrant groups.\textsuperscript{18,25} but we did not.

In summary, cultural factors, chiefly immigration status, were strongly associated with increased breastfeeding initiation in this cohort. Minority groups in our cohort initiated breastfeeding at rates at least as high as their
white counterparts, and rates of breastfeeding initiation exceeded the Healthy People 2010\textsuperscript{1} goal of 75\% in many subgroups. The high average rates of breastfeeding in our cohort most likely stemmed from relatively high levels of education and income, a substantial proportion of immigrants, and access to a medical care system that explicitly supports breastfeeding. It remains to be seen, however, whether such high rates of initiation, especially among minorities, translate into longer breastfeeding duration.

The results of this study imply that cultural factors are important in the decision to breastfeed. Much may be gained by investigating whether the factors that promote breastfeeding among immigrant women can be protected from degradation by acculturation or incorporated into interventions to increase breastfeeding rates among US-born women of lower socioeconomic position.

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