Influence of Nativity Status on Breast Cancer Risk Among U.S. Black Women

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ABSTRACT *Black women are at increased risk for breast cancer mortality. The black category is assumed to be homogeneous, an assumption that may be misleading. This study aims to examine the relationship between nativity and breast cancer risk factors among women identified as black. A sample of 236 black women over 18 years of age in Brooklyn, New York, was recruited. Data were collected on race/ethnicity, breast cancer risk factors, and other sociodemographic, behavioral, and early life experience factors. Logistic regression analyses were used to estimate prevalence ratios for association between nativity and breast cancer risk factors. U.S.-born blacks were more likely to be unemployed, smoke, not breastfeed, and breastfeed for a shorter duration than foreign-born blacks (all $p \leq 0.01$). Foreign-born blacks were more likely to have parents who achieved at least a high school education ($p < 0.05$). After adjustment for smoking, employment, and parental education, U.S.-born blacks were twice as likely to never breastfeed (PR 2.2, 95% CI: 1.1, 4.46) compared to foreign-born blacks. Among women who breastfed, U.S.-born blacks were also less likely to breastfeed for 6–11 months or more than 12 months, but these associations were not statistically significant. Because lactation reduces breast cancer risk and is a leading modifiable risk factor, understanding its variation within black women will help physicians and public health practitioners to target patient counseling and education of breast cancer risk.*

KEYWORDS *African American, Black, Breast cancer, Immigrant health, Risk factors, Urban health, Women.*

INTRODUCTION

Breast cancer is the most common type of cancer and is the second leading cause of death among women.¹ In the United States (U.S.), Caucasian women are more likely to be diagnosed with breast cancer, whereas black and Hispanic women are more likely to die from breast cancer.^{2,3} Although several factors such as family history of breast cancer, age at menarche, premenopausal status, late and low parity and lack of screening have been associated with an increased breast cancer risk, these factors have failed to explain the observed racial differences.⁴

Reports of racial and ethnic associations with breast cancer risk have been extensively documented^{3,5}; however, these studies implicitly assumed that those classified under the black category are a homogeneous group. The homogeneity

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assumption could be misleading in that it does not account for differences in an array of social and lifecourse exposures and experiences. In fact, the few studies addressing the homogeneity assumption have called attention to the importance of maternal ethnicity in birth outcomes among blacks.⁶⁻⁹ These studies found that foreign-born black women had better birth outcomes than did their U.S.-born counterparts. Therefore, assessing the intra-racial heterogeneities of disease risk in blacks may provide greater insight into our understanding of the racial/ethnic disparities in health between blacks and whites. As such, this study acknowledges the diversity of the black category and includes people from different backgrounds (i.e., foreign versus U.S.-born) and geographic locations (i.e., Africans and Caribbeans).

Because socioeconomic status (SES) and ethnicity are strongly associated, access to a relatively socioeconomically homogeneous community affords the opportunity to examine whether risk factors for breast cancer (e.g., family history of breast cancer, age at menarche, parity, age at first birth, breastfeeding, and adult body mass index) differed between U.S.-born blacks and other black ethnic groups (defined as those of Caribbean, Latin America and continental African-birthplace). Furthermore, this study aims to examine whether early life experiences such as childhood SES (e.g., parental education, income and occupation) and birth weight contribute to differences in the prevalence of risk factors for breast cancer among black women living in Brooklyn.

MATERIALS AND METHODS

Participants

A convenience sample of 236 women aged 18 and older were recruited from different venues throughout Bedford-Stuyvesant, Brooklyn, NY, such as beauty parlors, check cashing centers, supermarkets, and churches between June 1, 2003 and October 31, 2003. We choose this neighborhood because we expected that the SES of the residents would be relatively homogeneous and that there would be variability in black ethnic groups. According to the U.S. census, Bedford-Stuyvesant is the largest African American neighborhood in New York City, and an increasing proportion of the neighborhood's composition include immigrants from the Caribbean and Continental Africa.¹⁰ Among the 236 women sampled, 59% were U.S.-born black/African American ($N = 141$), 28% were foreign-born black ($N = 67$), and 11% did not provide sufficient information to be classified ($N = 28$). After participants were recruited, written informed consent was obtained and data were collected through a 40-minute self-administered questionnaire. Trained interviewers were available for assistance.

Data Collection Instrument

The questionnaire collected information on the following domains: race/ethnicity, ancestry or ethnic background, place of birth, relevance of ethnicity in everyday life, duration of time in the U.S., parental place of birth, other socio-demographic factors, personal health history, family history, health access and utilization, body size, physical activity, caffeine and alcohol consumption, smoking history, and reproductive history. This instrument was a modification of a validated questionnaire developed for the Columbia Presbyterian Medical Center cohort of the National Collaborative Perinatal Project (NCPP). The instrument was pilot tested for clarity of language in a sub-sample of 20 subjects. We did not find any major difference in the responses of the entire sample and the pilot subsample, and therefore, the pilot subsample was included in the analyses.

Study Variables

Outcomes The outcome variables for the study include the prevalence of breast cancer risk factors such as family history of breast cancer, age at menarche, body mass index (BMI, dichotomized as BMI ≥ 30 vs. <30 kg/m²), history of physical activity during high school, hormone replacement therapy use among postmenopausal women and reproductive history (pregnancy and breast feeding behavior). Presence or absence of each risk factor was defined according to classifications from previous studies. Briefly, individuals were classified as having a family history of breast cancer if any first degree relative had been previously diagnosed.¹¹ Age at menarche was dichotomized by the median age of 12 years.^{12,13} History of first pregnancy was dichotomized as yes if women reported that they had ever been pregnant, and no otherwise.¹⁴ Similarly, breastfeeding was dichotomized according to whether parous women reported ever breastfeeding or not ($N = 198$).¹² Lifetime duration of breastfeeding among women who had ever breastfed was categorized into three levels, women who reported breastfeeding their children for less than 6 months, those who breastfed from 6 to 11 months, and those who breastfed for 12 months or greater cumulatively.

Exposures The main predictor variable, nativity, was defined as “U.S.-born black” if women reported that they were born in the contiguous U.S., Hawaii, or born outside of the country but reported African American ancestry and “foreign-born black” for women who were born in the English-speaking Caribbean, Latin America, or continental Africa, or reported ancestry from any of these geographic regions. These classifications were based on the questions, “What is your ancestry or ethnic background?” and “In what country or state were you born?”

Covariates Covariates included in the analyses were age (examined as a continuous variable and dichotomized by median age of the sample), education, income, employment, menopausal status, alcohol, caffeine (both dichotomized as ever vs. never in the past 6 months) and smoking consumption (defined as current, former and never smoker), and highest level of parent(s) education. The definition of menopause used in this analysis is a slightly modified from the algorithm described by Eng et al.¹⁵ In brief, menopausal women were defined as women who self-reported that their last menstrual period stopped more than 6 months ago, reported that the reason for their menstrual period stopping was “natural menopause,” had had a hysterectomy with bilateral oophorectomy (simultaneously or sequentially), or were in the 90th percentile of the sample age distribution according to smoking status. Parental education was categorized according to the highest education level of the parent(s) or caregiver that the respondent lived with during their first 13 years of life.

Data Analysis

Descriptive statistics were performed for categorical and continuous variables by ethnicity. To determine significant differences, chi-square (categorical variables) and Wilcoxon signed rank (non-normally distributed variables) were used. Non-normally distributed variables were dichotomized using the median of the data distribution. We estimated the crude and adjusted prevalence ratios (PR) and 95% confidence intervals (CI) for the association between nativity (U.S. vs foreign-born)

and the breast cancer risk factors (family history of breast cancer, age at menarche, age at first pregnancy, history of breastfeeding and duration of breastfeeding) by fitting logistic regression using PROC GENMOD.¹⁶ Multivariable regression models were built using potentially confounding variables reported by previous studies^{11–13,17} and with variables that fulfilled the criteria of confounding in our data (i.e., associated with the exposure and outcome). The association between nativity and established breast cancer risk factors was estimated after controlling for the potential confounding effects of smoking, employment and parental education. A sensitivity analysis was conducted to assess the impact of missing data for ethnicity [12% ($N = 28$)], missing coded as black American (MABA), and missing coded as other blacks (MAOB). All analyses were carried out using SAS version 9 (SAS Institute, Cary, NC, USA).¹⁸

RESULTS

Table 1 shows the distribution in the sample of demographic, behavioral, and early life experience variables by ethnicity. Among foreign-born women, the majority were from the English-speaking Caribbean (77%), followed by Latin and Central America (18%), and a small proportion were born in continental Africa (3%) and Asia (2%). Among those who were born in the English-speaking Caribbean, the women reported being born in Jamaica, Trinidad and Tobago, Barbados, St. Vincent, Grenada, and St. Lucia. U.S.-born blacks were more likely to report that they were unemployed than foreign-born blacks (46% versus 18%). Moreover, foreign-born blacks were more likely to report that they were employed full-time than U.S.-born blacks (61% versus 42%). U.S.-born blacks were also more likely to report being current smokers (29%) than foreign-born blacks (9%).

The distribution of breast cancer risk factors by U.S.- and foreign-born status are shown in Table 2. U.S.- and foreign-born parous respondents had the most striking differences in their lactation practices. Approximately 65% of U.S.-born blacks reported that they had never breastfed their child, compared to 29% of foreign-born blacks. Among those who breastfed, U.S.-born blacks breastfed for shorter duration with 50% reporting breastfeeding for less than 6 months, whereas 51% of foreign-born blacks reported breastfeeding for more than 12 months.

Table 3 shows crude and adjusted prevalence ratios between nativity status and breastfeeding. U.S.-born blacks were 2.3 times (95% CI: 1.45–3.65) more likely to never breastfed than foreign-born blacks. This association remains nearly identical after adjusting for parental education, smoking and employment status. Although there was an inverse association between nativity status and lifetime duration of breastfeeding, this association disappears in the fully adjusted model (Model 4). The sensitivity analyses of missing data on ethnicity (MABA and MAOB) demonstrated that the associations between ethnicity and breast cancer risk factors did not change the direction or magnitude of the parameter estimates (data not shown).

DISCUSSION

In this study, breastfeeding practices were the only breast cancer risk factors that differed significantly between U.S.-born blacks and their foreign-born counterparts. U.S.-born blacks were twice as likely to have never breastfed. Furthermore, U.S.-born blacks were less likely to breastfeed for longer periods. Even after adjusting for

TABLE 1. Distribution of demographic, behavioral, early life experiences and levels of acculturation characteristics of the sample (N = 236)

Characteristic	U.S. black (N = 141)		Foreign black (N = 67)		χ^2 p values
	N	(%)	N	(%)	
Age, median years (range)	137	41 (19.69)	66	42 (23.67)	0.92*
Sociodemographic					
Education					0.68
<High school	39	27.6	15	22.4	
High school	36	25.5	15	22.4	
Some college	40	28.4	24	35.8	
≥College	26	18.4	13	19.4	
Marital status					0.87
Married	90	65.2	41	64.1	
Non-married	48	34.8	23	35.9	
Employment					0.002
Full time	52	41.6	34	61.8	
Part time	15	12.0	11	20.0	
Unemployed	58	46.4	10	18.2	
Annual household income					0.10
<\$20,000	65	54.2	24	45.3	
\$20,000–\$34,999	17	14.2	16	30.2	
\$35,000–\$49,999	15	12.5	5	9.4	
≥\$50,000	23	19.2	8	15.1	
Parental place of birth					<0.0001
U.S. born	118	92.2	3	4.6	
Foreign born	10	7.8	63	95.5	
Behavioral					
Consume caffeine [†]					0.08
Yes	117	83.0	48	72.7	
No	24	17.0	18	27.3	
Alcohol consumption [‡]					0.41
Ever	88	72.1	39	66.1	
Never	34	27.9	20	33.9	
Smoking status					<0.0001
Current	39	29.3	6	9.4	
Former	34	25.6	2	3.1	
Never	60	45.1	56	87.5	
Early life experience					
Parental education					0.53
No education	2	2.2	0	0.0	
Less than high school	47	50.5	25	60.9	
High school	23	24.7	7	17.1	
More than high school	21	22.6	9	21.9	
Birth weight					0.78
<5.5 lbs	8	9.2	3	7.7	
≥5.5 lbs	79	90.8	36	92.3	

Frequencies less than 236 due to missing values.
*Median and ranges were used for variables non-normally distributed (KS p value = 0.01) and p value based on Wilcoxon rank. Age was calculated as of date June 6, 2003.
[†]Caffeine consumption during the last 6 months.
[‡]Alcohol consumption in the past 6 months.

TABLE 2. Distribution of known and potential risk factors for breast cancer (N = 236)

	U.S.-black		Foreign-blacks		χ^2 <i>p</i> values
	<i>N</i>	Median (range) (%)	<i>N</i>	Median (range) (%)	
Breast cancer risk factors					
Age at first menarche (<i>N</i> = 231)	139	12 (11.17)	66	12 (11.16)	0.51*
Age at first pregnancy (<i>N</i> = 66)	40	19 (17.22)	24	21 (18.28)	0.37*
Parity					0.48
1–2	46	37.4	20	33.9	
3–6	63	51.2	35	59.3	
>6	14	11.4	4	6.8	
Breast feeding first child					<0.0001
Ever	40	34.2	35	71.4	
Never	77	65.8	14	28.6	
Lifetime duration of breastfeeding [†]					0.01
<6 months	20	50.0	8	22.9	
6–11 months	11	27.5	9	25.7	
>12 months	9	22.5	18	51.4	
Breast cancer diagnosis					0.11
Yes	5	3.9	0	0.0	
No	131	96.3	66	100.0	
Family history of breast cancer					0.63
Yes	11	7.8	4	6.0	
No	130	92.2	63	94.3	
Presence of non-cancerous cysts					0.51
Yes	18	13.9	7	10.6	
No	112	86.1	59	89.4	
Menopausal status					0.07
Pre-menopausal	87	64.0	47	77.1	
Post menopausal	49	36.0	14	22.9	
Ever pregnant					0.75
Yes	122	86.5	59	88.1	
No	19	13.5	8	11.9	
Current oral contraceptive use					0.18
Yes	90	64.3	36	54.6	
No	50	35.7	30	45.5	
Hormone replacement therapy use					0.96
Yes	7	14.9	2	15.4	
No	40	85.1	11	84.6	
BMI (kg/cm ²)					0.95
≥30 kg/m ²	83	60.1	40	59.7	
<30 kg/m ²	55	39.9	27	40.3	
History of mammogram					0.16
Yes	70	55.1	42	65.6	
No	57	44.9	22	34.4	
Perform breast self-examination					0.53
Never/rarely	36	26.5	13	19.4	
2–3 times/annually	24	17.7	16	23.9	
Every 2 or 3 months	20	14.7	7	10.5	
Monthly	34	25.0	21	31.3	
>Monthly	22	16.2	10	14.9	

TABLE 2. Continued

	U.S.-black		Foreign-blacks		χ^2 <i>p</i> values
	<i>N</i>	Median (range) (%)	<i>N</i>	Median (range) (%)	
Physician breast examination					0.32
Yes	99	78.6	55	84.6	
No	27	21.4	10	15.4	

*Wilcoxon rank sum.
†Lifetime duration of breastfeeding among women who reported ever breastfeeding.

the effect of potentially confounding variables, smoking, employment and parental education, the statistically significant difference in breastfeeding practices between U.S.-born blacks and foreign-born blacks persisted for history of breastfeeding, but not lifetime duration of breastfeeding.

Previous studies suggest that among black women, the risk of breast cancer was determined among those who had never been pregnant, with later age at first birth, and higher BMI were at increased risk for breast cancer.^{19,20} However, these studies did not focus on nativity status. In contrast, the impact of nativity on breast cancer incidence and mortality also has been explored.^{3,21–25} Specifically, studies focusing on nativity and incidence of breast cancer concluded that U.S.-blacks have higher incidence rates compared to foreign blacks.²³ Moreover, breast cancer mortality studies indicated that foreign-born blacks fair better than U.S.-born blacks, and that foreign-born blacks have similar mortality rates as whites.²⁶ However, neither of these studies explored the role of breast cancer risk factors on the observed difference in incidence and mortality according to nativity status. To the best of our knowledge, this is the first study to explore the variation in breast cancer risk factors between U.S.-born blacks and other blacks. Our study suggests that there was a difference in the lactation practices between U.S.-born and foreign-born blacks, with U.S.-born women being less likely to ever breastfeed.

In our study, the finding of lower prevalence of breast cancer risk factors among foreign-born blacks is consistent with patterns of breast cancer risk observed in previous studies.^{23,26} The lower incidence in breast cancer among immigrant

TABLE 3. Crude and adjusted prevalence ratios and 95% confidence intervals for nativity status on known risk factors for breast cancer

Model	Never breastfed PR (95% CI)		Duration of breastfeeding* Ref- <6 months PR (95% CI)			
	PR	(95% CI)	PR 6–11 vs. <6 months	(95% CI)	PR ≥12 vs. <6 months	(95% CI)
Model 1	2.3	(1.45, 3.65)	0.68	(0.39, 1.17)	0.44	(0.25, 0.82)
Model 2	2.2	(1.28, 3.87)	0.65	(0.30, 1.43)	0.83	(0.63, 1.10)
Model 3	2.6	(1.34, 5.15)	0.62	(0.27, 1.41)	0.40	(0.20, 0.78)
Model 4	2.2	(1.1, 4.46)	0.93	(0.58, 1.49)	0.65	(0.14, 2.96)

Models: 1) Unadjusted estimate for nativity; 2) adjusted for smoking and employment; 3) adjusted for parental education; and 4) adjusted for parental education, smoking and employment.
*Lifetime duration of breastfeeding among women who reported ever breastfed.

women is not unique to black women. Studies involving Asian immigrant women have reported increased incidence of breast cancer with westernization, each new generation that is born in the U.S. These studies point to environmental risks for breast cancer typically attributed to dietary factors.²⁷ It is possible that changes in behavioral patterns such as breastfeeding and duration of breastfeeding may also influence the increased risk of breast cancer as immigrants become more westernized. For instance, foreign-born blacks who adopt breastfeeding patterns that are similar to their U.S.-born black counterparts may also exhibit elevated risk for breast cancer. Given the incidence-mortality paradox observed between black and white women for breast cancer, it is imperative to understand breast cancer risk within black women. This paradox of low incidence and high mortality among black as compared to white women in the U.S. has provoked investigations of genetic predisposition and cross-national comparisons of the breast cancer risks in U.S. blacks and Sub-Saharan Africans, South Africa in particular.²⁸ For example, Fregene et al.²⁸ hypothesized that the increased breast cancer risk observed in blacks in the U.S. and Sub-Saharan Africa, particularly South Africa, points to a biologic etiology. However, numerous external factors, such as socioeconomic status, access to care, quality of care, were not explored. It is possible that these factors may explain the observed black-white differences in the U.S. as well as in South Africa.

Extant evidence supports the hypothesis that breastfeeding reduces breast cancer risk.^{29–32} Moreover, a review of more than 50,000 breast cancer cases and 97,000 controls suggested that breastfeeding may account for as much as 2/3 of the estimated reduction in breast cancer risk.³³ Furthermore, other studies have demonstrated a dose-response between breastfeeding and breast cancer risk.³⁴ The decreased breast cancer risk is thought to result from the decrease in ovulatory cycles that is associated with reproductive patterns and lactation. Although the biological pathway is still unclear, the protective impact of lactation/breastfeeding appears to be consistent across populations in developed and developing countries and across strata of age, race, parity, and menopausal status.^{30,33,35} Our study found that lactation differs between U.S.- and foreign-born black women. However, the cross-sectional nature of the data precludes us from making causal inferences. Another drawback of this research study is the potential bias of self-reporting. Possibly, the prevalence of risk factors may have been over- or under-reported. However, we do not expect that reporting would differ by nativity status. Consequently, the reported estimates would be an underestimation of the true prevalence ratios. Another limitation was the convenience nature of our sample, which precludes us from generalizing our findings to the general population. An additional shortcoming is the heterogeneity of the women in each group. Specifically, foreign-born women were ethnically heterogeneous because they were from very different countries throughout Latin America, the Caribbean, and West Africa. Similarly, U.S.-blacks were also a heterogeneous group comprising women from the northeast, south, midwest and western regions of the U.S. Lumping together women from different regions in the U.S. as U.S.-black could produce some mixing of effects because other studies have demonstrated regional differences in the breast cancer incidence and mortality.³⁶ Finally, the study was underpowered to detect interaction effect between ethnicity and menopausal status due to the small sample size.

Our findings of differences in lactation patterns among black women according to nativity status warrants further investigation since the protection conferred from

breastfeeding appears to be substantial, and longer duration of lactation further reduces breast cancer risk. Pregnancy and breastfeeding are two of the leading modifiable risk factors for breast cancer. Breastfeeding in particular seems to provide many health benefits. It is hypothesized that women with a familial risk can modify their breast cancer risk by breastfeeding and possibly that breastfeeding even after a primary breast cancer diagnosis could also reduce risk of breast cancer recurrence.^{33,37} There are several methodological and policy implications for the heterogeneity in breastfeeding practices observed among the women in this study who would be classified conventionally as black. First, the risk of breast cancer for U.S.-born black women may be even higher than previously reported. Secondly, mechanisms other than breastfeeding for breast cancer in foreign-born black women should be explored. Thirdly, because of the heterogeneity in breastfeeding patterns between U.S.- and foreign-born blacks, using the black category to aggregate all people self-identified as black may hide important patterns of disease risk. Understanding the variation in breast cancer risk factors within blacks is important in helping physicians and public health practitioners to better target patient counseling and education of breast cancer risk.

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