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Racial and Ethnic Disparities in Breastfeeding Continuation Among U.S. Hispanic Mothers: Identification of Mechanisms

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Abstract

Objective: We examined the extent to which social, maternal, and infant factors and Theory of Planned Behavior (TPB) domains—attitudes, perceived control, and subjective norms—mediate the relationship between maternal race and ethnicity and birth country, and breastfeeding continuation.

Materials and Methods: A nationally representative cohort of 2,810 mothers with self-reported race, ethnicity, and birth country was used. Main outcomes included any and exclusive breastfeeding at 2–6 months of infant age. A conceptual framework with the aforementioned mediators of interest was developed. Logistic regression was used to examine main associations, and structural equation modeling was used to identify the extent to which proposed mediators explained the relationship between independent and dependent variables.

Results: One thousand two hundred twenty-one mothers were U.S.-born non-Hispanic white (NHW), 432 U.S.-born Hispanic, 329 Mexico-born Hispanic, 107 Central- or South America-born Hispanic, 33 Caribbean-born Hispanic, and 688 U.S.-born non-Hispanic black (NHB). No differences in breastfeeding continuation among U.S.-born NHW and U.S.-born Hispanic mothers were found. In contrast, compared with U.S.-born NHW mothers, Mexico-born (odds ratio [OR] 1.99, 95% confidence interval [CI] 1.46–2.72) and Central- or South America-born (OR 3.42, 95% CI 1.89–6.17) Hispanic mothers had higher odds, and Caribbean-born Hispanic mothers had lower odds (OR 0.45, 95% CI 0.26–0.76) of any breastfeeding. These relationships were mediated by attitudes and subjective norms.

Conclusions: Breastfeeding continuation among U.S. Hispanic mothers varied by birth country, highlighting the heterogeneity of breastfeeding populations of Hispanic mothers in the United States. Tailored interventions should strengthen policies supportive of positive attitudes toward and subjective norms around breastfeeding.

Keywords: health equity, breastfeeding continuation, ethnic disparities, Hispanic mothers

Introduction

A 2022 AMERICAN ACADEMY of Pediatrics policy statement supports continued breastfeeding alongside complementary foods introduced around 6 months of infant age, for ~2 years.¹ U.S. population-level studies have

shown that Hispanic mothers initiate breastfeeding at similar rates of non-Hispanic white (NHW) mothers, but have higher rates of mixed breast and formula feeding at 6 and 12 months,^{2,3} highlighting the need to understand reasons for decision making to continue breastfeeding in this population.

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Breastfeeding research typically places Hispanic mothers into a single category, using a “one size fits all” approach in epidemiologic and interventional studies. This occurs even though Hispanic mothers represent widely heterogeneous populations differing in social norms, languages spoken, birth countries, and other factors related to culture that are associated with breastfeeding. To better understand drivers of breastfeeding—defined as *any* or *exclusive* breastfeeding at 2–6 months of infant age—among U.S. Hispanic populations, a more nuanced examination of the extent to which these factors influence breastfeeding practices among U.S. Hispanic mothers is needed.

Additional factors to consider include social factors, such as income and education; maternal factors, such as age and parity; infant factors, such as birthweight; and the domains of the Theory of Planned Behavior (TPB).⁴ The TPB is a framework used to assess health behaviors. TPB domains include *attitudes*, one’s own perceptions about a behavior; *perceived control*, the extent to which people believe they can perform the behavior; and *subjective norms*, the way people believe others view their behavior. The extent to which birth country may work in tandem with social, maternal, and infant factors, as well as attitudes, perceived control, and subjective norms among the U.S. Hispanic population is unclear.

While breastfeeding exclusivity is lower among U.S. Hispanic mothers relative to U.S. NHW mothers, rates of breastfeeding initiation and continuation are much higher among U.S. Hispanic mothers relative to U.S. non-Hispanic black (NHB) mothers.² This finding has been described in the context of the “Hispanic Paradox,”⁵ a concept described by scholars stating that health outcomes of Hispanic individuals align more with those of NHW individuals compared with NHB individuals, despite Hispanic individuals’ historically similar socioeconomic status (SES)—a major contributor of health outcomes*—to NHB individuals.

Etiologies regarding increased breastfeeding initiation and continuation among the Hispanic compared with NHB population may include aspects of Hispanic culture, including attitudes, perceived control, and subjective norms regarding breastfeeding, but these have not been well studied. A richer understanding of the mechanisms that may explain the Hispanic Paradox in the context of breastfeeding continuation is needed to inform future interventions that promote racial/ethnic breastfeeding equity.

In light of these research gaps, the study objectives were to examine the extent to which social factors, maternal factors, infant factors, and TPB domains mediate (i.e., explain) the relationship between maternal race and ethnicity and birth country, and breastfeeding continuation at 2–6 months of infant age. Hispanic mothers of different birth countries and U.S.-born NHW and NHB mothers were compared.

Materials and Methods

This study draws upon data from the Study of Attitudes and Factors Effecting Infant Care Practices (SAFE); a survey of 3,279 mothers of infants ages 2–6 months was obtained

between 2011 and 2014 regarding maternal behaviors and infant care practices, including breastfeeding, as was done in previous SAFE studies.^{6,7} Using a stratified, two-stage clustered design to recruit a sample of mother–infant dyads representative of national estimates, mothers[†] were recruited from 32 hospitals with ~100 births annually. Mothers living in the United States who spoke English or Spanish at the time of recruitment and who self-identified as Hispanic[‡] or NHB[§] were oversampled to enable a sample size sufficient for comparison and to adjust for national prevalence at the time of the study.

Mothers were approached during the postpartum hospital stay, and provided written consent to complete an enrollment survey at hospital discharge before participating in a longer phone- or web-based survey 2–6 months after birth. As the objective of the study was to compare breastfeeding continuation among Hispanic mothers of different birth countries as well as among NHB and NHW mothers, several participants among the 3,279 mothers who completed the survey were excluded from the analysis: 1 participant who did not identify her race/ethnicity; 7 who did not identify birth country; 139 who reported being foreign born and of Black race/ethnicity; 50 who reported being foreign born and of white race/ethnicity; 280 reporting “Other” race/ethnicity; 2 who reported Hispanic ethnicity and “Other” birth country (1 from Philippines, 1 from Canada); and 8 who did not report breastfeeding practices (main outcome). This yielded a final sample of 2,810 mothers. All institutional review boards approved this study.

Main exposure variables

Mothers self-identified their race, ethnicity, and birth country in the enrollment survey. Race/ethnicity was categorized as Hispanic of any race, NHW, and NHB. Among Hispanic mothers, birth country was categorized into four groups clustered by geographic region, similar to the Centers for Disease Control and Prevention’s examination of health behaviors and mortality among Hispanic populations⁶ and prior SAFE analyses.⁸ These four groups included U.S.-born, Mexico-born, Central- or South America-born, and Caribbean-born mothers. The Central/South America-born group included mothers reporting having been born in Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru, or Venezuela; the Caribbean group included mothers born in Cuba, the Dominican Republic, Jamaica, Puerto Rico, and Trinidad.

[†]In this article, breastfeeding people are referred to as mothers; however, it should be acknowledged that people who breastfeed may be of any gender. Information reported is intended to include people of all genders. The term “birthing people” is used by various organizations, agencies, and governments to acknowledge that people capable of giving birth may identify as any gender, including transgender and nonbinary individuals. Moreover, the term “chestfeeding” is frequently used instead of “breastfeeding.” “Breastfeeding” is used throughout this article.

[‡]Mothers identifying as either Hispanic or Latinx are referred to as Hispanic throughout this article.

[§]U.S.-born, Non-Hispanic white are referred to as “U.S.-born NHW”; U.S.-born, Non-Hispanic Black are referred to as “U.S.-born NHB” throughout this article.

*On the contrary, other indicators related to chronic diseases such as diabetes, reflect relative disadvantages of Hispanic, compared with NHW, individuals.

Main outcome measures: any and exclusive breastfeeding at 2–6 months

Mothers were included in this analysis if they reported measures of breastfeeding at 2–6 months of infant age, as defined by answering the question: “Over the LAST two weeks, what has your baby been drinking?” Response options included only breast milk, mostly breast milk, equally breast milk and formula, mostly formula, and only formula. The first response option was categorized as “exclusive breastfeeding,” the second three were categorized as “any” breastfeeding, and the last was categorized as no breastfeeding.

Main mediators of interest

Social factors included primary caretaker status; employment outside the home before giving birth; marital status; maternal education; household income; Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) enrollment; pregnancy smoking status (any versus none); use of books for infant care information; and use of Internet for infant care information.

Mothers were considered the primary caretaker if they reported that they and their partners cared for the baby the most or second most (i.e., the mother or partner could have been the primary or secondary caretaker). Maternal age and parity were categorized as maternal factors, and infant age, sex, and birthweight were considered infant factors (Table 1). Except for use of books or Internet as sources of information—which were obtained at the 2- to 6-month survey—the aforementioned data were obtained from the enrollment survey.

Data comprising the three TPB domains were collected in three 2- to 6-month survey questions with Likert scale response options ranging from 1 (Strongly disagree) to 7 (Strongly agree). First, attitudes were evaluated with responses to the statement: “I think breastfeeding would ...” Responses included (1) be healthy for my baby; (2) be healthy for me; (3) be pleasant for my baby; (4) be pleasant for me; (5) be good for my baby; (6) be good for me; (7) make my baby safer; (8) make my baby more comfortable; and (9) keep my baby from choking.

The mean of the responses was calculated, with a mean ≤ 4 considered “negative attitudes” and >4 as “positive attitudes.” Second, perceived control was assessed by responses to the statement: “Choosing to breastfeed my baby is mostly up to me.” Responses ≤ 4 were considered “negative control,” and responses >4 as “positive control.” Third, subjective norms were assessed with the following response: “The people who are most important to me think I should breastfeed my baby.” Responses ≤ 4 were considered “negative norms,” and responses >4 as “positive norms.”

Analytic approach

A stratified, two-stage clustered sampling design was used. Data were weighted to account for attrition, and to reflect the national distribution of maternal age and race. Descriptive statistics were calculated for social, maternal, and infant factors, and TPB domains by race/ethnicity, birth country, and breastfeeding continuation. Logistic regression was utilized to assess associations between the independent

(maternal race/ethnicity and birth country) and dependent (any/exclusive breastfeeding at 2–6 months) variables of interest, and determine total and direct relationships.

Finally, to inform the mediation analysis, a conceptual framework was developed to depict the hypothesized relationship, including possible mediating variables, between maternal race/ethnicity, birth country, and breastfeeding continuation (Fig. 1), based on the extant literature on the associations between race/ethnicity; social, maternal, and infant factors; TPB domains; and measures of breastfeeding.^{9–12} When significant relationships between maternal race and ethnicity and birth country were found in the logistic regression models, structural equation modeling (SEM) was used to examine mediation. SEM is an analytic approach combining factor and multiple regression analysis, permitting the inclusion of several mediators into a single model.^{13,14}

Mother–infant dyad characteristics representing mediators in SEM analyses are shown in Table 1. The respective variables of maternal age (<25 versus ≥ 25 years), education (some college or less versus college or more), and marital status (married versus not) were collapsed into binary variables in SEM analyses for ease of interpretation. Models were fit including all direct and indirect paths. As time after birth influences breastfeeding duration, all models were adjusted for infant age at the time of the survey.

Three groups of analyses were performed. First, to understand the extent to which NHW and the heterogeneous Hispanic populations differ in any and exclusive breastfeeding, U.S.-born NHW, and (1) U.S.-born and (2) foreign-born Hispanic mothers (Mexico-born, Central- or South America-born, and Caribbean-born) were compared. Second, to ascertain differences in any and exclusive breastfeeding *within* the various populations of U.S. Hispanic mothers, outcomes were compared among U.S.-born Hispanic and foreign-born Hispanic mothers. Finally, to examine the Hispanic Paradox as it relates to breastfeeding continuation, the outcomes were compared among U.S.-born NHB and U.S.-born Hispanic mothers.

Primary language—defined as language participants chose to take the survey—was not included in the models as $\sim 100\%$ of U.S.-born mothers answered the survey in English and 63.9% of foreign-born Hispanic mothers answered in Spanish, indicating collinearity of birth country and primary language. All analyses were conducted with SAS V9.4 and MPlus V7.31 statistical software packages.

Results

Characteristics of study sample

The sample of 2,810 mothers was comprised of 1,221 (58.1%) U.S.-born NHW, 432 (14.7%) U.S.-born Hispanic, 329 (11.0%) Mexico-born Hispanic, 107 (3.0%) Central- or South America-born Hispanic, 33 (1.0%) Caribbean-born Hispanic, and 688 (12.2%) U.S.-born NHB. Social, maternal, and infant factors are presented according to maternal race/ethnicity and birth country in Table 1. U.S.-born Hispanic mothers were less often employed outside the home before giving birth; less often married; achieved lower levels of education; and had lower incomes than U.S.-born NHW mothers. Rates of all three TPB domains—positive attitudes, perceived control, and subjective norms—were

TABLE 1. MOTHER-INFANT DYAD CHARACTERISTICS ACCORDING TO MATERNAL RACE/ETHNICITY AND BIRTH COUNTRY (WEIGHTED %)

Characteristic	Overall (N=2,810)	U.S.-born NHW (N=1,221)	U.S.-born Hispanic (N=432)	Mexico-born Hispanic (N=329)	Central/South America- born Hispanic (N=107)	Caribbean-born Hispanic (N=33)	U.S.-born NHB (N=688)
Overall	2,810	1,221 (58.1%)	432 (14.7%)	329 (11.0%)	107 (3.0%)	33 (1.0%)	688 (12.2%)
Social factors							
Mother is a primary caretaker	2,146 (80.8%)	1,092 (89.8%)	306 (71.5%)	230 (70.8%)	65 (65.0%)	17 (52.5%)	436 (64.5%)
Mother employed outside the home before giving birth	1,604 (58.6%)	806 (64.9%)	217 (51.4%)	129 (38.9%)	47 (43.6%)	20 (61.4%)	385 (58.5%)
Marital status							
Married	1,382 (55.5%)	827 (67.9%)	179 (40.6%)	176 (51.4%)	49 (52.0%)	9 (21.0%)	142 (21.6%)
Never married	1,265 (38.8%)	336 (27.4%)	224 (52.3%)	128 (40.6%)	48 (37.4%)	22 (73.5%)	507 (73.0%)
Sep./Div./Widowed	152 (5.7%)	57 (4.7%)	27 (7.1%)	21 (8.0%)	9 (10.6%)	2 (5.4%)	36 (5.3%)
Maternal education							
Less than high school	429 (13.5%)	72 (6.2%)	71 (16.8%)	136 (38.3%)	55 (45.9%)	10 (28.2%)	85 (12.6%)
High school or GED	723 (24.3%)	225 (19.0%)	136 (31.5%)	112 (36.7%)	19 (17.9%)	6 (19.1%)	225 (31.4%)
Some college	912 (31.9%)	398 (32.9%)	158 (36.1%)	53 (15.0%)	16 (14.6%)	11 (42.2%)	276 (40.6%)
College or more	733 (30.3%)	519 (41.8%)	67 (15.5%)	27 (9.9%)	17 (21.5%)	5 (10.5%)	98 (15.3%)
Household income (in US\$)							
<20,000	987 (29.6%)	250 (20.1%)	181 (41.8%)	129 (34.9%)	47 (38.9%)	18 (53.0%)	362 (51.4%)
20,000–49,999	740 (25.9%)	256 (21.7%)	118 (26.2%)	143 (46.9%)	37 (34.9%)	11 (32.3%)	175 (24.4%)
≥50,000	496 (19.9%)	292 (24.3%)	73 (18.0%)	32 (9.7%)	11 (11.6%)	1 (4.6%)	87 (13.8%)
Unknown	587 (24.5%)	423 (33.9%)	60 (14.0%)	25 (8.5%)	12 (14.6%)	3 (10.1%)	64 (10.5%)
Enrolled in WIC	1,662 (52.8%)	433 (36.2%)	310 (70.5%)	263 (78.4%)	77 (70.7%)	28 (86.1%)	551 (80.6%)
Any smoking during pregnancy	426 (16.6%)	259 (22.1%)	50 (11.6%)	4 (1.0%)	1 (1.9%)	2 (3.7%)	110 (15.2%)
Used books for infant care information	1,486 (57.0%)	784 (63.6%)	211 (50.7%)	142 (47.8%)	53 (51.5%)	12 (42.2%)	284 (43.5%)
Used Internet for infant care information	1,950 (73.8%)	982 (80.6%)	300 (71.6%)	192 (59.3%)	62 (62.3%)	16 (53.2%)	398 (60.2%)
Maternal factors							
Maternal age							
<20	238 (7.6%)	62 (5.2%)	59 (13.8%)	15 (5.4%)	5 (6.6%)	5 (18.1%)	92 (13.1%)
20–29	1,568 (54.0%)	653 (51.7%)	260 (61.8%)	147 (46.3%)	52 (52.1%)	15 (50.8%)	441 (63.1%)
≥30	1,004 (38.3%)	506 (43.1%)	113 (24.4%)	167 (48.2%)	50 (41.3%)	13 (31.1%)	155 (23.8%)
Parity							
1	1,021 (37.4%)	505 (40.8%)	151 (36.4%)	67 (21.7%)	28 (29.2%)	12 (41.4%)	258 (37.6%)
2	917 (33.3%)	423 (34.6%)	153 (36.5%)	92 (26.4%)	31 (32.5%)	8 (26.3%)	210 (30.5%)
3+	864 (29.3%)	292 (24.6%)	125 (27.1%)	169 (51.9%)	48 (38.3%)	13 (32.3%)	217 (31.9%)
Infant factors							
Infant age at survey (weeks)							
8–11	1,729 (63.1%)	864 (70.6%)	255 (58.0%)	165 (47.1%)	63 (60.7%)	13 (35.4%)	369 (51.3%)
12–15	480 (17.1%)	167 (13.7%)	95 (22.2%)	85 (27.5%)	19 (17.5%)	9 (29.3%)	105 (17.0%)
16–19	272 (9.1%)	85 (7.2%)	38 (8.6%)	41 (13.5%)	13 (12.8%)	7 (20.4%)	88 (12.7%)
20+	329 (10.7%)	105 (8.5%)	44 (11.2%)	38 (11.9%)	12 (9.0%)	4 (14.9%)	126 (19.0%)

(continued)

TABLE 1. (CONTINUED)

Characteristic	Overall (N = 2,810)	U.S.-born NHW (N = 1,221)	U.S.-born Hispanic (N = 432)	Mexico-born Hispanic (N = 329)	Central/South America- born Hispanic (N = 107)	Caribbean-born Hispanic (N = 33)	U.S.-born NHB (N = 688)
Sex							
Male	1,426 (50.4%)	612 (49.7%)	232 (53.4%)	151 (46.2%)	66 (60.6%)	18 (53.6%)	347 (51.1%)
Birthweight (grams)							
<2,500	172 (5.7%)	65 (5.0%)	23 (6.0%)	16 (5.1%)	1 (0.4%)	1 (2.4%)	66 (10.3%)
≥2,500	2,622 (94.3%)	1,153 (95.0%)	407 (94.0%)	307 (94.9%)	105 (99.6%)	32 (97.6%)	618 (89.7%)
Theory of Planned Behavior domains							
Attitudes							
Positive	2,566 (91.2%)	1,093 (89.3%)	401 (93.3%)	324 (98.8%)	105 (97.3%)	30 (90.3%)	613 (89.4%)
Perceived control							
Positive	2,602 (92.4%)	1,125 (92.4%)	389 (90.7%)	310 (93.3%)	103 (95.0%)	29 (80.8%)	646 (94.3%)
Subjective norms							
Positive	1,949 (68.8%)	778 (63.1%)	313 (73.8%)	307 (94.2%)	95 (88.0%)	25 (80.1%)	431 (61.5%)

U.S.-born NHW and U.S.-born NHB mothers reflect U.S.-born, non-Hispanic participants. GED, General Education Development; NHB, non-Hispanic black; NHW, non-Hispanic white; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.

highest among Mexico-born Hispanic mothers compared with other racial and ethnic groups included in the analysis.

Breastfeeding continuation: any and exclusive breastfeeding

Any and exclusive breastfeeding, respectively, were reported among 57.5% and 30.0% of all mothers; 57.3% and 35.1% of U.S.-born NHW mothers; 58.6% and 28.3% of U.S.-born Hispanic mothers; 72.7% and 26.5% of Mexico-born Hispanic mothers; 79.7% and 28.7% of Central/South America-born Hispanic mothers; 37.8% and 2.9% of Caribbean-born Hispanic mothers; and 40.0% and 13.3% of U.S.-born NHB mothers (Table 2).

We found no difference in any breastfeeding between U.S.-born NHW and U.S.-born Hispanic mothers (odds ratio [OR] 1.10, 95% confidence interval [CI] 0.83–1.46). Mexico-born Hispanic and Central/South America-born Hispanic mothers had higher odds (OR 2.21, 95% CI 1.67–2.94 and OR 3.14, 95% CI 1.68–5.86, respectively), and Caribbean-born Hispanic mothers had lower odds (OR 0.53, 95% CI 0.28–1.00) of any breastfeeding relative to U.S.-born NHW mothers. Compared with U.S.-born Hispanic mothers, Mexico-born (OR 2.01, 95% CI 1.55–2.62) and Central- or South America-born (OR 2.86, 95% CI 1.51–5.41) mothers had higher odds, and Caribbean-born mothers had lower odds (OR 0.48, 95% CI 0.28–0.82) of any breastfeeding. U.S.-born Hispanic mothers had higher odds of any breastfeeding relative to U.S.-born NHB mothers (OR 2.03, 95% CI 1.54–2.68) (Table 2).

In regard to exclusive breastfeeding, relative to U.S.-born NHW mothers, U.S.-born Hispanic (OR 0.77, 95% CI 0.59–1.00) and Caribbean-born Hispanic mothers (OR 0.06, 95% CI 0.02–0.27) had lower odds of exclusive breastfeeding. Caribbean-born Hispanic mothers had lower odds of exclusive breastfeeding compared with U.S.-born Hispanic mothers (OR 0.08, 95% CI 0.02–0.35). Finally, U.S.-born Hispanic mothers had 2.43 (95% CI 1.77–3.34) times higher odds of exclusive breastfeeding compared with U.S.-born NHB mothers (Table 2).

Mediation analysis

Mediation diagrams for significant relationships reflecting associations between variables of interest and any and exclusive breastfeeding are shown in Figs. 2 and 3, respectively. Regarding TPB domains, in several models, positive attitudes and subjective norms, but not perceived control, mediated relationships between maternal race/ethnicity and birth country, and increased breastfeeding continuation. In models examining any and exclusive breastfeeding among Mexico-born and Central- and South America-born Hispanic mothers, the magnitude of the positive associations with attitudes and subjective norms was more robust than the negative associations with social factors linked to breastfeeding continuation; this led to an overall “net positive” association between Mexico-born and Central- and South America-born mothers versus other reference groups and breastfeeding continuation.

Similar to Mexico-born and Central- and South America-born Hispanic mothers, Caribbean-born Hispanic mothers were also more likely to have negative associations with social factors linked to breastfeeding. However, this group

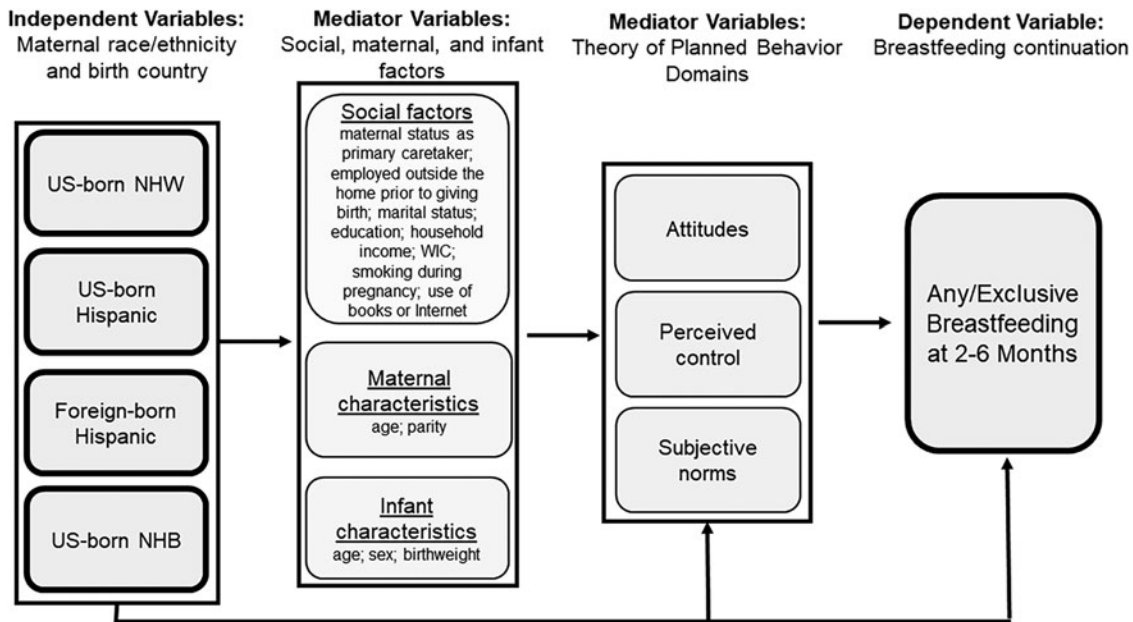


FIG. 1. Conceptual framework.

also lacked associations with positive breastfeeding attitudes, leading to a “net negative” association between Caribbean-born Hispanic mothers versus reference groups and breastfeeding continuation. Finally, the examination of the Hispanic Paradox showed that access to information from books and the Internet and positive breastfeeding attitudes and subjective norms drove breastfeeding continuation among U.S. Hispanic mothers relative to U.S.-born NHB mothers.

Discussion

Among a large, nationally representative cohort, differences in breastfeeding continuation among U.S.-born and foreign-born Hispanic mothers relative to other racial and ethnic groups were found. These results reflect the heterogeneity within populations of U.S. Hispanic mothers. While no difference in any breastfeeding was identified between U.S.-born Hispanic and U.S.-born NHB mothers, Mexico- and Central- and South America-born mothers were more likely and Caribbean-born Hispanic mothers were less likely to breastfeed at 2–6 months postpartum compared with U.S.-born NHB mothers.

These relationships were largely mediated by positive attitudes and subjective norms, even when social factors such as lower educational attainment and reduced access to information from books or the Internet were present. Examination of the mechanisms that may explain the Hispanic Paradox also revealed that positive attitudes and subjective norms were major contributors to higher rates of breastfeeding continuation among U.S.-born Hispanic compared with U.S.-born NHB mothers. Thus, TPB domains are key variables explaining breastfeeding continuation among Hispanic mothers, underscoring the need for promotion of positive attitudes and subjective norms in breastfeeding interventions.

This study identified significant heterogeneity in odds of breastfeeding continuation among U.S. Hispanic mothers

according to birth country. This is important new information, as many large, national-level databases do not account for birth country in their collection of data on Hispanic ethnicity and “lump together” this broad cultural group^{15,16}; other surveys do not collect data on ethnicity.¹⁷ Failure to acknowledge birth country when evaluating associations between sociodemographic characteristics and health behaviors such as breastfeeding may occlude important information lending insight into ways in which interventions may be tailored to meet the needs of subgroups, like U.S. Hispanic mothers, especially according to nativity.

This study highlights the role of positive attitudes and subjective norms as mediators of breastfeeding continuation, in contrast to the previous literature reporting negative attitudes toward breastfeeding and/or positive attitudes toward formula supplementation or exclusive formula feeding among U.S. Hispanic mothers. These previously reported attitudes include preferences among some Hispanic mothers for larger babies^{18,19}; concern about adequacy of breast milk supply or nutritional composition satiating or providing adequate nutrition for the baby, or sufficing while the mother is working²⁰; or an aversion to breastfeeding related to the perception that breastfeeding is a practice performed by low-income families due to an inability to purchase infant formula.²¹

Indeed, the concept of perceived insufficient breast milk has been documented among some Hispanic mothers, both in²² and outside the United States.²³ Furthermore, a recent systematic review²⁴ identified 120 studies published globally meeting inclusion criteria for research on self-reported insufficient milk or delayed onset of lactation. In addition to attitudes, a perceived lack of control²⁵ (i.e., “perceived control” domain of the TPB) over decisions to breastfeed, as well as the influence of family and cultural beliefs²⁵ (i.e., “subjective norms” domain of the TPB), are self-reported barriers to breastfeeding and/or reasons for complementary feeding among some Hispanic mothers. However, in contrast, this study found that *positive* attitudes toward breastfeeding—particularly among Hispanic mothers born in

TABLE 2. PREVALENCE AND ODDS RATIOS OF BREASTFEEDING CONTINUATION AT 2–6 MONTHS ACCORDING TO MATERNAL RACE/ETHNICITY AND BIRTH COUNTRY

	<i>No breastfeeding Weighted %</i>	<i>Any breastfeeding</i>		<i>Exclusive breastfeeding</i>	
		<i>Weighted %</i>		<i>Weighted %</i>	
Overall (<i>n</i> =2,810)	42.5	57.5		30.0	
U.S.-born NHW (<i>n</i> =1,221)	42.7	57.3		35.1	
U.S.-born Hispanic (<i>n</i> =432)	41.4	58.6		28.3	
Foreign-born Hispanic (<i>n</i> =469)					
Mexico born (<i>n</i> =329)	27.3	72.7		26.5	
Central/South America born (<i>n</i> =107)	20.3	79.7		28.7	
Caribbean born (<i>n</i> =33)	62.2	37.8		2.9	
U.S.-born NHB (<i>n</i> =688)	60.0	40.0		13.3	
		<i>Total effect</i>	<i>Direct effect (after mediation)</i>	<i>Total effect</i>	<i>Direct effect (after mediation)</i>
		<i>OR (95% CI)</i>		<i>OR (95% CI)</i>	
Hispanic versus U.S.-born NHW					
U.S.-born Hispanic versus U.S.-born NHW (Ref.)		1.10 (0.83–1.46)	n/a	0.77 (0.59–1.00)	1.15 (0.85–1.55)
Mexico-born Hispanic versus U.S.-born NHW (Ref.)		2.21 (1.67–2.94)	1.99 (1.46–2.72)	0.75 (0.50–1.12)	n/a
Central/South America- born Hispanic versus U.S.-born NHW (Ref.)		3.14 (1.68–5.86)	3.42 (1.89–6.17)	0.78 (0.47–1.30)	n/a
Caribbean-born Hispanic versus U.S.-born NHW (Ref.)		0.53 (0.28–1.00)	0.67 (0.40–1.13)	0.06 (0.02–0.27)	0.11 (0.02–0.50)
Foreign-born Hispanic versus U.S.-born Hispanic					
Mexico-born Hispanic versus U.S.-born Hispanic (Ref.)		2.01 (1.55–2.62)	1.33 (0.98–1.81)	0.97 (0.61–1.54)	n/a
Central/South America- born Hispanic versus U.S.-born Hispanic (Ref.)		2.86 (1.51–5.41)	2.28 (1.28–4.06)	1.02 (0.60–1.74)	n/a
Caribbean-born Hispanic versus U.S.-born Hispanic (Ref.)		0.48 (0.28–0.82)	0.45 (0.26–0.76)	0.08 (0.02–0.35)	0.10 (0.02–0.43)
U.S.-born Hispanic versus U.S.-born NHB (Ref.)		2.03 (1.54–2.68)	1.66 (1.23–2.24)	2.43 (1.77–3.34)	1.97 (1.43–2.71)

Values are controlled for sampling design and adjusted for infant age at survey. Boldface indicates *p*-value <0.05. CI, confidence interval; NHB, non-Hispanic black; NHW, non-Hispanic white; OR, odds ratio.

Mexico and Central and South America—partially explained their relatively high rates of breastfeeding continuation.

Acculturation, or the degree of assimilation into a different culture, often measured by language preference, duration of U.S. residency, and other factors,²⁶ may help explain the findings related to differences in breastfeeding continuation according to birth country among Hispanic mothers in the United States. Gibson-Davis and Brooks-Gunn showed that foreign-born status increased the odds of breastfeeding, while each additional year of U.S. residency was associated with decreased odds of breastfeeding among foreign-born parents (both Hispanic and non-Hispanic).²⁶

We speculate that longer duration of residency in the United States may be correlated with increased adoption of negative attitudes and subjective norms around breastfeed-

ing, which are more similar to those of U.S.-born NHW populations than those of their own ethnicity and birth country subgroups, leading to decreased breastfeeding continuation. This finding could help explain why our study identified no difference in breastfeeding among U.S.-born Hispanic and U.S.-born NHW mothers.

While we did not measure years of U.S. residency among study participants, these findings align with this extant research related to acculturation. However, multidimensional acculturation scales to measure the extent to which multinational mothers both adopt a new culture and retain their Hispanic heritage²⁷ are needed to address acculturation more thoroughly. Moreover, almost all U.S.-born mothers responded to the study survey in English, and almost two-thirds of foreign-born mothers answered in Spanish.

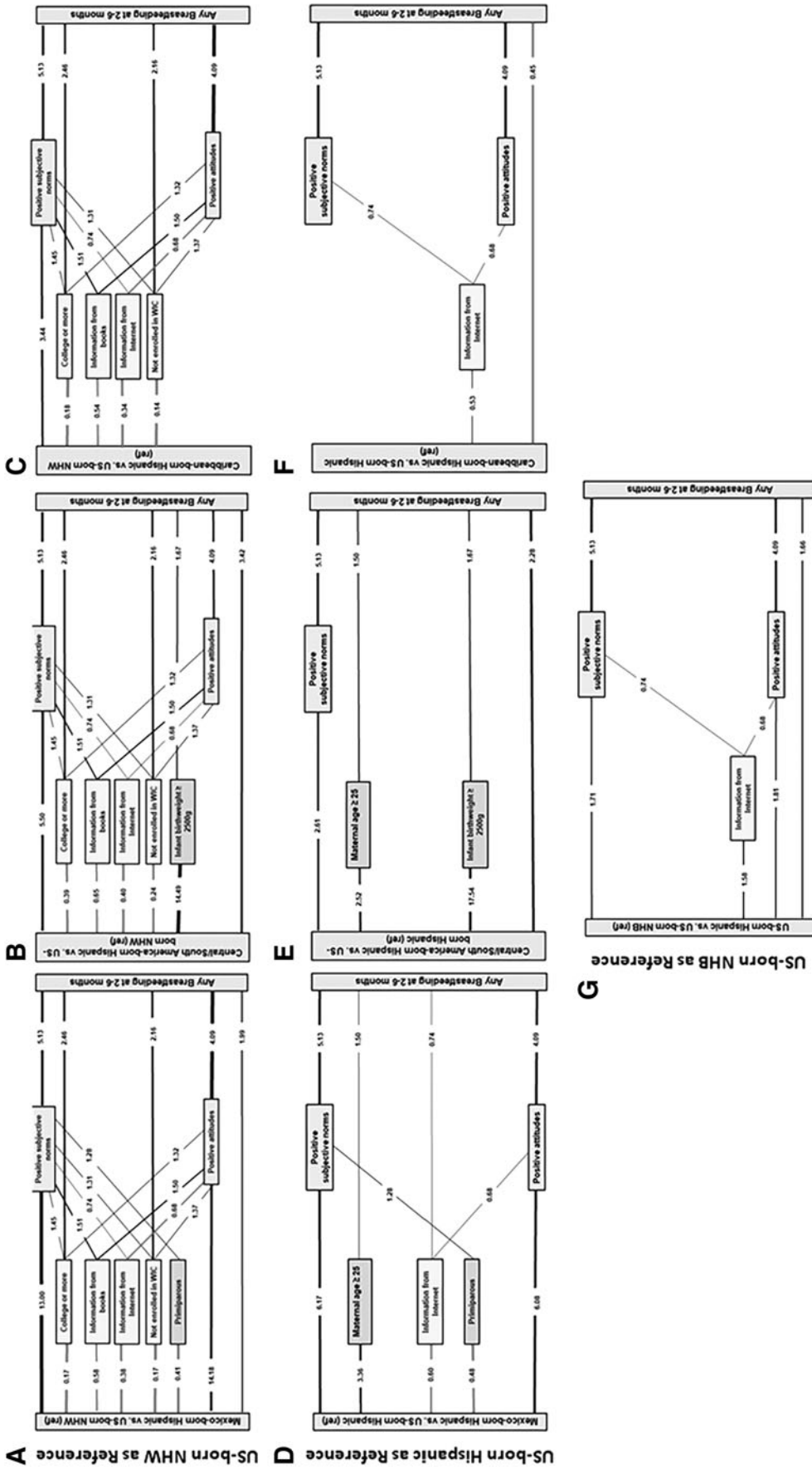


FIG. 2. Significant mediating paths: any breastfeeding. Significant associations between maternal race/ethnicity and birth country, and any breastfeeding at 2–6 months are shown. **(A)** Shows results of Mexico-born Hispanic versus U.S.-born NHW mothers. **(B)** Shows results of Central/South America-born Hispanic versus U.S.-born NHW mothers. **(C)** Shows results of Caribbean-born Hispanic versus U.S.-born NHW mothers. **(D)** Shows results of Mexico-born Hispanic versus U.S.-born NHW mothers. **(E)** Shows results of Central/South America-born Hispanic versus U.S.-born NHW mothers. **(F)** Shows results of Caribbean-born Hispanic versus U.S.-born NHW mothers. **(G)** Shows results of U.S.-born NHB mothers. **Dark grey lines** indicate positive and **light grey lines** indicate negative associations ($p < 0.05$). Thickness of line indicates strength of the association. ORs reflecting significant values in the relationships between both the predictor and mediator as well as mediator and outcome variables are presented. All models were adjusted for infant age at time of survey. NHB, non-Hispanic black; NHW, non-Hispanic white; OR, odds ratio; TPB, Theory of Planned Behavior.

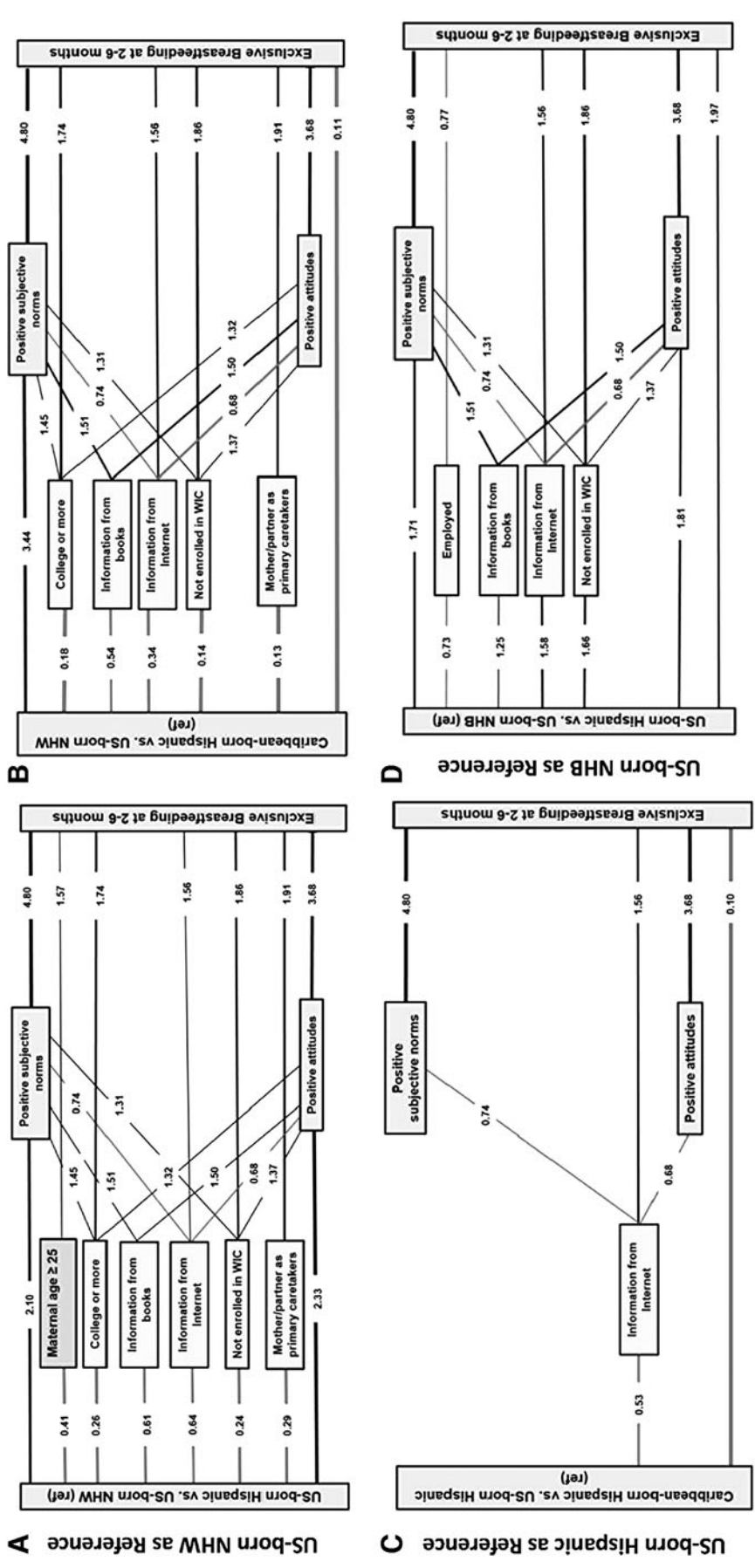


FIG. 3. Significant mediating paths: exclusive breastfeeding. Significant associations between maternal race/birth country and exclusive breastfeeding at 2–6 months are shown. (A) Shows results of U.S.-born Hispanic versus U.S.-born NHW mothers. (B) Shows results of Caribbean-born Hispanic versus U.S.-born NHW mothers. (C) Shows results of Caribbean-born Hispanic versus U.S.-born Hispanic mothers. (D) Shows results of U.S.-born Hispanic versus U.S.-born NHB mothers. **Dark grey lines** indicate positive and **light grey lines** indicate negative associations ($p < 0.05$). Thickness of line indicates strength of the association. ORs reflecting significant values in the relationships between both the predictor and mediator as well as mediator and outcome variables are presented. All models were adjusted for infant age at time of survey. NHB, non-Hispanic black; NHW, non-Hispanic white; OR, odds ratio; TPB, Theory of Planned Behavior.

Although the majority of participants decided to participate in English, miscommunication due to language may have precluded accurate responses among some foreign-born participants.

Finally, low SES has also been associated with low breastfeeding continuation rates in the United States. Factors associated with low SES that limit breastfeeding continuation include lack of ongoing lactation support, necessity to return to employment, and inflexible work schedules that preclude breastfeeding.²⁸ These represent examples of mechanisms that contribute to lower rates of breastfeeding continuation among NHB mothers. However, the results of this study corroborate the “Hispanic Paradox,” in that while there are higher proportions of NHB and Hispanic mothers with low SES in the study sample, Hispanic mothers had higher odds of breastfeeding continuation.

This study’s mediation analysis suggests that attitudes and subjective norms are stronger mediators than SES in explaining the Hispanic Paradox as it relates to breastfeeding continuation, reiterating the importance of breastfeeding support interventions such as lactation consultant services that can reinforce positive attitudes²⁹ and, perhaps, subjective norms. However, the Hispanic Paradox is not a comprehensive depiction of differences in breastfeeding; other multifactorial determinants must be considered. In fact, early supplementation of breast milk with infant formula has been documented as a strong risk factor for early breastfeeding discontinuation, and interventions that do not address this issue may be unlikely to be associated with improved exclusive breastfeeding rates among some Hispanic mothers.^{30–32}

The main strengths of this article include its nationally representative sample and the identification of multiple potential mediators through a robust SEM analysis. Limitations include lack of data on citizenship status and duration of U.S. residency among foreign-born Hispanic mothers, which are measures of acculturation that could be associated with breastfeeding continuation. Foreign-born Hispanic mothers were also grouped by world region, undoubtedly masking aforementioned heterogeneity of smaller racial and ethnic subgroups; examination of such subgroups was limited by sample size. Breastfeeding continuation was only examined at a single time point between 2 and 6 months postpartum. However, our results are comparable with other data from the same time.^{33,34} Finally, while many social factors were assessed, several other factors that influence breastfeeding continuation, such as breastfeeding intent, prior breastfeeding experience, workplace support for breastfeeding, breast pump access and use, access to lactation support during the delivery hospitalization and postdischarge, were not captured.

Conclusion

Breastfeeding among Hispanic mothers in the United States varies widely according to birth country, highlighting the need for tailored approaches for breastfeeding support. Attitudes toward and subjective norms around breastfeeding may serve as important intervention targets to promote breastfeeding. Making generalized conclusions about Hispanic mothers as a single group in public health surveillance reports and research focused on breastfeeding ignores the heterogeneity of cultures and mores. Future studies must

recognize the importance of heterogeneity of racial and ethnic groups; address the role of social determinants of health—including discrimination and structural racism—in explaining differential breastfeeding outcomes; and study policies supportive of breastfeeding.

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Authors’ Contributions

C.B.S. and M.G.P. made substantial contributions to the conception of the work, data interpretation, and cowrote the initial draft. T.H. and S.K. made substantial contributions to data analysis and data interpretation, and revised the article critically for important intellectual content. M.C. made substantial contributions to the conception of the work, data interpretation, and revised the article critically for important intellectual content. E.R.C., R.M., A.K., and F.R.H. made substantial contributions to data interpretations and revised the article critically for important intellectual content. All authors have approved the final draft of this article and agree to be accountable for all aspects of the work.

Disclosure Statement

M.G.P. serves on the research board of the Mother’s Milk Bank Northeast and is the education chairperson for the American Academy of Pediatrics Section on Breastfeeding. These are volunteer positions. A.K. is president of the Academy of Breastfeeding Medicine and on the executive committee of the American Academy of Pediatrics Section on Breastfeeding. These are volunteer positions. The authors have no potential, perceived, or real conflicts of interest to disclose.

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