

Variation in Birth Outcomes by Mother's Country of Birth Among Hispanic Women in the United States, 2013

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Abstract

Objectives: Despite knowledge that the Hispanic population is growing in the United States and that birth outcomes may vary by maternal country of birth, data on birth outcomes by maternal country of birth among Hispanic women are scant. We compared the rates of 3 birth outcomes for infants born in the United States—preterm birth, low birth weight, and small for gestational age—between foreign-born Hispanic women and US-born Hispanic women, and then we examined these birth outcomes by mother's country of birth for foreign-born Hispanic women.

Methods: Using the 2013 natality file from the National Vital Statistics System of the National Center for Health Statistics, we examined data on the 3 birth outcomes and maternal characteristics by maternal country of birth. We used log binomial models to calculate unadjusted and adjusted relative risks for preterm birth, low birth weight, and small for gestational age for US-born Hispanic women compared with foreign-born Hispanic women. We also compared the relative risk of each adverse birth outcome for foreign-born Hispanic women by country of birth.

Results: US-born Hispanic women had higher rates of the 3 birth outcomes than did foreign-born Hispanic women (preterm birth: 8.0% vs 7.0%; low birth weight: 6.1% vs 5.2%; small for gestational age: 9.2% vs 7.9%). These higher rates persisted after adjusting for maternal characteristics. The rates for these 3 birth outcomes varied significantly by country of birth for foreign-born Hispanic women, with Puerto Rican women consistently having the poorest birth outcomes.

Conclusions: Our results demonstrated heterogeneity in rates of adverse birth outcomes by country of birth for foreign-born Hispanic women. Presenting rates for foreign-born mothers as a group masks differences by country. To understand possible changes in data on birth outcomes, states should stratify data by maternal country of birth.

Keywords

immigrants, Hispanic or Latino, Latino health issues, maternal and child health, epidemiology, perinatal

Hispanic people are one of the largest and fastest-growing ethnic groups in the United States, accounting for nearly 23% of US births in 2013.^{1,2} However, Hispanic people are also very diverse, with roots in 21 countries where Spanish is the official language. The US Office of Management and Budget defines Hispanic as “a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.”³

Hispanic women have slightly higher rates of preterm birth and low birth weight than those of non-Hispanic white women. For example, in 2013, the rate of preterm birth was 10.2% among non-Hispanic white women and 11.3% among Hispanic women, whereas the rate of low birth weight was 7.0% among non-Hispanic white women and 7.1% among Hispanic women.² These rates vary among Hispanic origins recorded on birth certificates. For example, in 2013, the rates of preterm birth among Hispanic women ranged from 10.8%

among Mexicans to 14.2% among Cubans, whereas the rates of low birth weight among Hispanic women ranged from 6.6% among Mexicans to 9.4% among Puerto Ricans.²

All of these rates, however, do not account for the mother's country of birth, a topic of interest in the literature.⁴⁻⁸ Most studies show that Mexican-born women have better birth outcomes than do US-born women of Mexican

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descent.⁵⁻⁸ This finding is paradoxical, given that foreign-born women are usually of lower socioeconomic status, less educated, and less likely to have private health insurance than are US-born women.^{7,8}

Elo et al⁴ found variation in birth outcomes by mother's country of birth among non-Hispanic black women in the United States. However, no published studies have examined population-based birth outcomes by mother's country of birth among Hispanic women. The purpose of this study was to describe differences in the rates of 3 birth outcomes for infants born in the United States—preterm birth, low birth weight, and small for gestational age—between foreign-born Hispanic women (by the mother's country of birth) and US-born Hispanic women. We examined data for Hispanic women who delivered live births in the United States in 2013.

Methods

We used 2013 natality data from the National Vital Statistics System of the National Center for Health Statistics for this analysis.⁹ Because we were interested in the mother's country of birth, which was not collected on the 1989 revision of the birth certificate but is included in the 2003 revision, we excluded data from the 10 states that had not implemented the 2003 revision of the birth certificate by January 1, 2013 (Alabama, Arizona, Arkansas, Connecticut, Hawaii, Maine, Mississippi, New Jersey, Rhode Island, and West Virginia).² We received approval from the National Association for Public Health Statistics and Information Systems to use the mother's country of birth from the restricted-use data set.

We restricted our analysis to singleton births to Hispanic women who were born in the following countries: Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Spain, Uruguay, Venezuela, and the United States (N = 795 658). We separated women who were born in Puerto Rico from women born in the 50 states and Washington, DC. We refer to women born in Puerto Rico as foreign-born because, although Puerto Ricans are US citizens, we hypothesized that the experiences of the women born in Puerto Rico differ from those of women born in the 50 states and Washington, DC. Puerto Ricans have unique patterns of migration, culture, and history from other Hispanic people. As US citizens, when they move to the continental United States, they are internal migrants and their migration experience differs from that of other Latinas.¹⁰

We excluded 1761 (0.2%) birth records with an unknown gestational age or birth weight, gestations <20 or >44 weeks, and suspect combinations of gestational age and birth weight.¹¹ Finally, we excluded 68 508 (8.6%) birth records from the sample because of missing data on covariates of interest. Our final analytic sample included 725 389 US-born and foreign-born Hispanic women. The institutional review board of the University of Illinois at Chicago concluded that

this study did not constitute human subjects research and was exempt from review.

Birth Outcomes

We examined 3 birth outcomes that have overlapping yet distinct etiologies.^{12,13} We defined preterm birth as gestational age <37 weeks based on the obstetric estimate of gestation. We defined low birth weight as birth weight <2500 g. We considered births to be small for gestational age if the newborn weighed <10th percentile of the birth weight distribution for a given gestational week, based on the infant's sex.¹¹

Mother's Place of Birth

We compared rates of the 3 birth outcomes between US-born Hispanic women and foreign-born Hispanic women. In addition, we examined if these 3 birth outcomes differed by country of birth for foreign-born Hispanic women. Because of the small sample size (<350 births in 2013), we grouped together women born in Paraguay and Uruguay as "other South America." We included women born in Equatorial Guinea with all foreign-born Hispanic women, but because of a small sample size (<20 births in 2013), we did not include their country-specific estimate. When we removed women from Equatorial Guinea from the foreign-born group, our results did not change. Therefore, we kept women born in Equatorial Guinea in the foreign-born group.

Maternal Characteristics

We categorized maternal education as <high school diploma or general educational development, a high school diploma or general educational development, some college or an associate's degree, and \geq bachelor's degree. We categorized maternal age as <18, 18-24, 25-34, and \geq 35. We categorized marital status as married or unmarried. We categorized the number of previous live births as 0, 1 or 2, and \geq 3. We used the Kotelchuck index to calculate the adequacy of prenatal care use, which categorizes prenatal care as none or inadequate, intermediate or adequate, and adequate plus.¹⁴ We categorized principal payment source for delivery as Medicaid, private insurance, self-pay, and other. We categorized maternal smoking as yes or no. We considered women to have a chronic disease if they had chronic or pregnancy-induced hypertension and/or diabetes.

Statistical Analysis

We examined data on the 3 birth outcomes and the maternal characteristics of interest by whether women were US-born or foreign-born. We then examined data on birth outcomes and maternal characteristics of interest by maternal country of birth for foreign-born women. We used the Pearson χ^2 test to assess differences among groups, with $P < .05$ considered significant.

Table 1. Characteristics of Hispanic women by place of birth, United States, 2013^a

Characteristics	US-Born Hispanic Women (n = 362 031), No. (%)	Foreign-Born ^b Hispanic Women (n = 363 358), No. (%)	P Value ^c
Preterm birth	28 787 (8.0)	25 589 (7.0)	<.001
Low birth weight	22 038 (6.1)	18 717 (5.2)	<.001
Small for gestational age	33 242 (9.2)	28 650 (7.9)	<.001
Maternal education			
<High school diploma/GED	76 746 (21.2)	172 153 (47.4)	<.001
High school diploma/GED	119 175 (32.9)	102 727 (28.3)	
Some college/associate's degree	120 143 (33.2)	54 282 (14.9)	
≥Bachelor's degree	45 967 (12.7)	34 196 (9.4)	
Maternal age, y			<.001
<18	18 440 (5.1)	6 667 (1.8)	
18-24	158 295 (43.7)	86 381 (23.8)	
25-34	154 876 (42.8)	199 041 (54.8)	
≥35	30 420 (8.4)	71 269 (19.6)	
Married (vs not married)	156 225 (43.2)	186 565 (51.3)	<.001
No. of previous live births			<.001
0	152 478 (42.1)	99 281 (27.3)	
1 or 2	166 660 (46.0)	194 656 (53.6)	
≥3	42 893 (11.8)	69 421 (19.1)	
Prenatal care			<.001
None or inadequate	64 860 (17.9)	76 492 (21.1)	
Intermediate or adequate	179 529 (49.6)	173 100 (47.6)	
Adequate plus	117 642 (32.5)	113 766 (31.3)	
Principal payment source for delivery			<.001
Medicaid	214 943 (59.4)	226 320 (62.3)	
Private	120 007 (33.1)	62 855 (17.3)	
Self-pay	7 864 (2.2)	48 468 (13.3)	
Other	19 217 (5.3)	25 715 (7.1)	
Maternal smoking ^d	12 412 (3.4)	1 551 (0.4)	<.001
Chronic disease ^e	33 653 (9.3)	40 018 (11.0)	<.001

Abbreviation: GED, general educational development.

^aData source: National Center for Health Statistics.⁹

^bIncludes the following countries: Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Spain, Uruguay, and Venezuela.

^cPearson χ^2 test. $P < .05$ was considered significant.

^dCategorized as yes or no.

^eWomen were considered to have a chronic disease if they had chronic or pregnancy-induced hypertension and/or diabetes.

We used log binomial models to calculate unadjusted and adjusted relative risks (RRs) and 95% confidence intervals (CIs) for the 3 birth outcomes. Adjusted models included all maternal characteristics of interest (maternal education, age, marital status, number of previous live births, prenatal care, principal payment source for delivery, smoking, and chronic disease). We first compared the risk of each birth outcome between US-born and foreign-born Hispanic women. Then we compared the risk of each birth outcome by country of birth (using Mexico as the comparator) for foreign-born Hispanic women. We chose Mexico as the reference category because two-thirds of the foreign-born Hispanic women in our sample were from Mexico. We conducted all analyses using SAS version 9.4.¹⁵

Results

Foreign-born Hispanic women had significantly lower rates of the 3 birth outcomes than those of US-born Hispanic

women (Table 1). Compared with US-born Hispanic women, foreign-born Hispanic women were less educated, older, more likely to be married, more likely to have had previous live births, more likely to have had no prenatal care or inadequate prenatal care, less likely to have private health insurance, less likely to smoke, and more likely to have a chronic disease ($P < .001$ for all).

The rates of preterm birth, low birth weight, and small for gestational age among foreign-born Hispanic women varied significantly by country of birth, with Puerto Rican women consistently having the worst outcomes (Table 2). The rates of preterm birth ranged from 4.3% among Costa Ricans to 8.8% among Puerto Ricans. The rates of low birth weight ranged from 3.4% among Spaniards to 7.1% among Puerto Ricans. The rates of small for gestational age ranged from 3.9% among Bolivians to 9.7% among Puerto Ricans. Maternal characteristics also varied significantly by country of birth. Guatemalans were the most likely to have <high school education, whereas Spaniards were the most likely to have

Table 2. Characteristics of foreign-born Hispanic women by country of birth (in alphabetical order), in a study of birth outcomes, United States, 2013^{ab}

Characteristic	Argentina (n = 1712)	Bolivia (n = 896)	Chile (n = 796)	Colombia (n = 6848)	Costa Rica (n = 795)	Cuba (n = 8118)	Dominican Republic (n = 13 647)
Preterm birth	101 (5.9)	56 (6.3)	53 (6.7)	449 (6.6)	34 (4.3)	551 (6.8)	12 711 (6.9)
Low birth weight	65 (3.8)	33 (3.7)	37 (4.7)	332 (4.9)	38 (4.8)	408 (5.0)	794 (5.8)
Small for gestational age	124 (7.2)	35 (3.9)	51 (6.4)	523 (7.6)	63 (7.9)	561 (6.9)	1 302 (9.5)
Maternal education							
<High school diploma/GED	122 (7.1)	107 (11.9)	28 (3.5)	406 (5.9)	98 (12.3)	846 (10.4)	3 245 (23.8)
High school diploma/GED	396 (23.1)	203 (22.7)	128 (16.1)	1 411 (20.6)	211 (26.5)	3 865 (47.6)	3 734 (27.4)
Some college/associate's degree	464 (27.1)	287 (32.0)	247 (31.0)	2 192 (32.0)	252 (31.7)	2 168 (26.7)	4 370 (32.0)
≥Bachelor's degree	730 (42.6)	299 (33.4)	393 (49.4)	2 839 (41.5)	234 (29.4)	1 239 (15.3)	2 298 (16.8)
Maternal age, y							
<18	10 (0.6)	7 (0.8)	4 (0.5)	48 (0.7)	7 (0.9)	55 (0.7)	226 (1.7)
18-24	175 (10.2)	93 (10.4)	95 (11.9)	893 (13.0)	124 (15.6)	2 072 (25.5)	3 857 (28.3)
25-34	824 (48.1)	511 (57.0)	447 (56.2)	3 881 (56.7)	489 (61.5)	4 404 (54.3)	7 252 (53.1)
≥35	703 (41.1)	285 (31.8)	250 (31.4)	2 026 (29.6)	175 (22.0)	1 587 (19.6)	2 312 (16.9)
Married (vs not married)	1 340 (78.3)	623 (69.5)	634 (79.7)	4 975 (72.7)	560 (70.4)	3 363 (41.4)	6 005 (44.0)
No. of previous live births							
0	707 (41.3)	321 (35.8)	336 (42.2)	3 210 (46.9)	344 (43.3)	4 049 (49.9)	5 405 (39.6)
1 or 2	886 (51.8)	500 (55.8)	418 (52.5)	3 378 (49.3)	390 (49.1)	3 852 (47.5)	7 175 (52.6)
≥3	119 (7.0)	75 (8.4)	42 (5.3)	260 (3.8)	61 (7.7)	217 (2.7)	1 067 (7.8)
Prenatal care							
None or inadequate	180 (10.5)	169 (18.9)	90 (11.3)	882 (12.9)	110 (13.8)	800 (9.9)	2 682 (19.7)
Intermediate or adequate	883 (51.6)	414 (46.2)	436 (54.8)	3 534 (51.6)	424 (53.3)	3 729 (45.9)	6 959 (51.0)
Adequate plus	649 (37.9)	313 (34.9)	270 (33.9)	2 432 (35.5)	261 (32.8)	3 589 (44.2)	4 006 (29.4)
Principal payment source for delivery							
Medicaid	522 (30.5)	393 (43.9)	216 (27.1)	2 466 (36.0)	294 (37.0)	5 986 (73.7)	9 498 (69.6)
Private	993 (58.0)	414 (46.2)	496 (62.3)	3 505 (51.2)	366 (46.0)	1 747 (21.5)	3 037 (22.3)
Self-pay	153 (8.9)	67 (7.5)	51 (6.4)	586 (8.6)	96 (12.1)	272 (3.4)	552 (4.0)
Other	44 (2.6)	22 (2.5)	33 (4.2)	291 (4.3)	39 (4.9)	113 (1.4)	560 (4.1)
Maternal smoking ^c	11 (0.6)	0	12 (1.5)	28 (0.4)	6 (0.8)	67 (0.8)	55 (0.4)
Chronic disease ^d	132 (7.7)	71 (7.9)	69 (8.7)	507 (7.4)	73 (9.2)	855 (10.5)	1 324 (9.7)

(continued)

Table 2. (continued)

Characteristic	Ecuador (n = 5838)	El Salvador (n = 24564)	Guatemala (n = 18688)	Honduras (n = 13590)	Mexico (n = 241569)	Nicaragua (n = 3327)
Preterm birth	343 (5.9)	1949 (7.9)	1368 (7.3)	977 (7.2)	16752 (6.9)	260 (7.8)
Low birth weight	269 (4.6)	1460 (5.9)	1041 (5.6)	732 (5.4)	11980 (5.0)	188 (5.7)
Small for gestational age	448 (7.7)	2180 (8.9)	1688 (9.0)	1142 (8.4)	18370 (7.6)	254 (7.6)
Maternal education						
<High school diploma/GED	2196 (37.6)	13704 (55.8)	13103 (70.1)	7895 (58.1)	126063 (52.2)	674 (20.3)
High school diploma/GED	1406 (24.1)	6600 (26.9)	3231 (17.3)	3469 (25.5)	71260 (29.5)	992 (29.8)
Some college/associate's degree	1286 (22.0)	2913 (11.9)	1637 (8.8)	1462 (10.8)	29156 (12.1)	985 (29.6)
≥Bachelor's degree	950 (16.3)	1347 (5.5)	717 (3.8)	764 (5.6)	15090 (6.3)	676 (20.3)
Maternal age, y						
<18	65 (1.1)	394 (1.6)	246 (1.3)	280 (2.1)	4849 (2.0)	20 (0.6)
18-24	1097 (18.8)	5414 (22.0)	4236 (22.7)	3175 (23.4)	59063 (24.5)	414 (12.4)
25-34	3269 (56.0)	13753 (56.0)	11244 (60.2)	7663 (56.4)	131559 (54.5)	2124 (63.8)
≥35	1407 (24.1)	5003 (20.4)	2962 (15.9)	2472 (18.2)	46098 (19.1)	769 (23.1)
Married (vs not married)	3184 (54.5)	10332 (42.1)	7778 (41.6)	4879 (35.9)	128164 (53.1)	1943 (58.4)
No. of previous live births						
0	1860 (31.9)	6763 (27.5)	4384 (23.5)	3536 (26.0)	58204 (24.1)	1078 (32.4)
1 or 2	3255 (55.8)	13703 (55.8)	10345 (55.4)	7306 (53.8)	129934 (53.8)	1823 (54.8)
≥3	723 (12.4)	4098 (16.7)	3959 (21.2)	2748 (20.2)	53431 (22.1)	426 (12.8)
Prenatal care						
None or inadequate	980 (16.8)	5077 (20.7)	5173 (27.7)	3650 (26.9)	52895 (21.9)	460 (13.8)
Intermediate or adequate	2817 (48.3)	11987 (48.8)	8486 (45.4)	6272 (46.2)	113726 (47.1)	1676 (50.4)
Adequate plus	2041 (35.0)	7500 (30.5)	5029 (26.9)	3668 (27.0)	74948 (31.0)	1191 (35.8)
Principal payment source for delivery						
Medicaid	4056 (69.5)	15608 (63.5)	12810 (68.6)	8011 (59.0)	153545 (63.6)	1567 (47.1)
Private	1329 (22.8)	4340 (17.7)	2065 (11.1)	1543 (11.4)	32841 (13.6)	1166 (35.1)
Self-pay	256 (4.4)	2709 (11.0)	2687 (14.4)	2616 (19.3)	36651 (15.2)	416 (12.5)
Other	197 (3.4)	1907 (7.8)	1126 (6.0)	1420 (10.5)	18532 (7.7)	178 (5.4)
Maternal smoking ^c	8 (0.1)	31 (0.1)	27 (0.1)	37 (0.3)	713 (0.3)	12 (0.4)
Chronic disease ^d	371 (6.4)	2720 (11.1)	1965 (10.5)	1497 (11.0)	27864 (11.5)	354 (10.6)

(continued)

Table 2. (continued)

Characteristic	Panama (n = 896)	Peru (n = 4645)	Puerto Rico (n = 12 823)	Spain (n = 678)	Venezuela (n = 3366)	Other South America^e (n = 557)
Preterm birth	74 (8.3)	4352 (6.3)	1133 (8.8)	32 (4.7)	187 (5.6)	41 (7.4)
Low birth weight	59 (6.6)	164 (3.5)	908 (7.1)	23 (3.4)	156 (4.6)	29 (5.2)
Small for gestational age	64 (7.1)	240 (5.2)	1241 (9.7)	49 (7.2)	268 (8.0)	46 (8.3)
Maternal education						
<High school diploma/GED	48 (5.4)	409 (8.8)	2988 (23.3)	18 (2.7)	110 (3.3)	93 (16.7)
High school diploma/GED	204 (22.8)	1141 (24.6)	3730 (29.1)	72 (10.6)	503 (14.9)	169 (30.3)
Some college/associate's degree	328 (36.6)	1651 (35.5)	3720 (29.0)	120 (17.7)	893 (26.5)	148 (26.6)
≥Bachelor's degree	316 (35.3)	1444 (31.1)	2385 (18.6)	468 (69.0)	1860 (55.3)	147 (26.4)
Maternal age, y						
<18	3 (0.3)	20 (0.4)	413 (3.2)	1 (0.2)	13 (0.4)	6 (1.1)
18-24	156 (17.4)	544 (11.7)	4529 (35.3)	51 (7.5)	299 (8.9)	92 (16.5)
25-34	459 (51.2)	2499 (53.8)	6039 (47.1)	312 (46.0)	2003 (59.5)	307 (55.1)
≥35	278 (31.0)	1582 (34.1)	1842 (14.4)	314 (46.3)	1051 (31.2)	152 (29.3)
Married (vs not married)	597 (66.6)	3104 (66.8)	5457 (42.6)	578 (85.3)	2697 (80.1)	350 (62.8)
No. of previous live births						
0	360 (40.2)	1924 (41.4)	4660 (36.3)	358 (52.8)	1554 (46.2)	226 (40.6)
1 or 2	452 (50.5)	2442 (52.6)	6552 (51.1)	270 (39.8)	1679 (49.9)	295 (53.0)
≥3	84 (9.4)	279 (6.0)	1611 (12.6)	50 (7.4)	133 (4.0)	36 (6.5)
Prenatal care						
None or inadequate	123 (13.7)	646 (13.9)	1937 (15.1)	77 (11.4)	477 (14.2)	82 (14.7)
Intermediate or adequate	464 (51.8)	2411 (51.9)	6479 (50.5)	364 (53.7)	1745 (51.8)	292 (52.4)
Adequate plus	309 (34.5)	1588 (34.2)	4407 (34.4)	237 (35.0)	1144 (34.0)	183 (32.9)
Principal payment source for delivery						
Medicaid	300 (33.5)	1972 (42.5)	7851 (61.2)	104 (15.3)	879 (26.1)	240 (43.1)
Private	439 (49.0)	2134 (45.9)	3996 (31.2)	502 (74.0)	1708 (50.7)	233 (41.4)
Self-pay	63 (7.0)	319 (6.9)	211 (1.7)	36 (5.3)	665 (19.8)	60 (10.8)
Other	94 (10.5)	220 (4.7)	765 (6.0)	36 (5.3)	114 (3.4)	24 (4.3)
Maternal smoking ^c	14 (1.6)	14 (0.3)	483 (3.8)	15 (2.2)	13 (0.4)	5 (0.9)
Chronic disease ^d	102 (11.4)	319 (6.9)	1456 (11.4)	49 (7.2)	228 (6.8)	62 (11.1)

Abbreviation: GED, general educational development.

^aData source: National Center for Health Statistics.⁹ All data are number (%).

^bp < .001 for all variables using Pearson χ^2 test. Differences were measured across all 18 countries plus "other South America."

^cCategorized as yes or no.

^dWomen were considered to have a chronic disease if they had chronic or pregnancy-induced hypertension and/or diabetes.

^eRefers to women born in Paraguay and Uruguay.

≥bachelor's degree. Puerto Rican mothers were the most likely to be aged <18, whereas Spaniards were the most likely to be aged ≥35. The rates of being married ranged from 35.9% among Hondurans to 85.3% among Spaniards. Maternal smoking ranged from 0% among Bolivians to 3.8% among Puerto Ricans. The rate of chronic disease ranged from 6.4% among Ecuadorians to 11.5% among Mexicans.

After adjusting for the maternal characteristics of interest, US-born Hispanic women had a significantly greater risk of the 3 birth outcomes than foreign-born Hispanic women (Table 3). In the adjusted model, compared with Hispanic women born in Mexico, Hispanic women born in Costa Rica, Cuba, and Ecuador had a significantly lower risk of preterm birth, whereas Hispanic women born in the Dominican Republic, El Salvador, Guatemala, Nicaragua, Panama, and Puerto Rico had a significantly higher risk of preterm birth. In the adjusted model, compared with Hispanic women born in Mexico, women born in Argentina, Cuba, and Peru had a significantly lower risk of low birth weight, whereas women born in the Dominican Republic, El Salvador, Guatemala, Honduras, Panama, and Puerto Rico had a significantly higher risk of low birth weight. Compared with Hispanic women born in Mexico, women born in Bolivia, Cuba, and Peru had a significantly lower risk of small for gestational age, whereas women born in the Dominican Republic, El Salvador, Guatemala, Honduras, and Puerto Rico had a significantly higher risk of small for gestational age.

Discussion

To our knowledge, our study is the first to calculate rates of preterm birth, low birth weight, and small for gestational age among foreign-born Hispanic women by the mother's country of birth. We found that US-born Hispanic women had a significantly greater risk of these 3 birth outcomes than did foreign-born Hispanic women, after adjusting for maternal characteristics available on the birth certificate. These results are similar to those of previous studies.^{5-8,16,17} Our study adds to the literature by demonstrating substantial variation in the rates of preterm birth, low birth weight, and small for gestational age among foreign-born Hispanic women by country of birth. This variation remained after adjusting for maternal characteristics.

The healthy migrant hypothesis is often used to explain why foreign-born people have better health outcomes than do people born in the United States. This theory suggests that healthy people are more mobile and able to migrate more easily than unhealthy people.⁵ The better birth outcomes observed in our study among foreign-born Hispanic women compared with US-born Hispanic women are consistent with such a hypothesis. However, studies testing the healthy migrant hypothesis have found mixed results.^{5,18-20}

Research on immigrant health has demonstrated that the foreign-born health advantage diminishes with increasing duration of residence, as immigrants acculturate to the United States.²¹⁻²³ Immigrants often have different health

behaviors than those of people born in the United States because of the cultural norms and values they bring with them from their countries of birth.^{4,24} One such Hispanic norm is the strong role of family, or *familialismo*, which has been hypothesized to provide social support and a buffer against negative influences and stresses.²⁵ However, as immigrants spend more time in the United States, they may adopt behaviors that are more typical of US culture and become less resilient to negative influences, including racism or discrimination, which may in turn diminish their health advantage.^{22,26,27}

During the past several years, migration to the United States from El Salvador, Guatemala, and Honduras has increased, especially as violence in these countries has escalated and economic conditions worsened.²⁸ It is likely that exposure to violence and poverty plays an important role in birth outcomes, as has been demonstrated in other populations.²⁹ Data suggest that women born in these countries who migrate to the United States have better birth outcomes than those of women who do not migrate to the United States. For example, in Honduras, 9.4% of infants in the 2011-2012 Demographic Health Survey were born with a low birth weight (compared with 5.4% with a low birth weight in our study); in Guatemala, 14.6% of infants in the 2014-2015 Demographic Health Survey were born with a low birth weight (compared with 5.6% with a low birth weight in our study).^{30,31} Furthermore, in 2011, the World Bank estimated that 8.7% of infants born in El Salvador had a low birth weight, compared with 5.9% in our study.³² In our analysis, Hispanic women from El Salvador, Guatemala, and Honduras had higher risks of preterm birth, low birth weight, and small for gestational age than did Hispanic women from Mexico, even after adjusting for maternal characteristics. Although survey data and vital statistics data have important differences (eg, participant selection and inclusion), these migrants may be healthier than are those who remain in their birth countries.

We hypothesized that women born in Puerto Rico would differ from women born in the 50 states and Washington, DC. Women born in Puerto Rico had the highest rates of preterm birth, low birth weight, and small for gestational age in our analysis. Compared with US-born and foreign-born women overall, women born in Puerto Rico were also more likely to smoke and to have a chronic disease. In 2015, the rate of preterm birth among births in Puerto Rico was 11.4%, compared with 8.8% in our study.³³ Other studies found that Puerto Rican women have higher rates of adverse birth outcomes than do other Hispanic or Latina women, which is not fully accounted for by their relatively low socioeconomic status.³⁴

Similar to women born in Puerto Rico, women born in the Dominican Republic had higher risks of all 3 birth outcomes than did women born in Mexico, even after adjusting for maternal characteristics. Also similar to Puerto Rican women, Dominican-born women who gave birth in the United States had better birth outcomes than did women who

Table 3. Unadjusted and adjusted^a relative risks for 3 birth outcomes—preterm birth, low birth weight, and small for gestational age—among foreign-born Hispanic women by country of birth, United States, 2013^{b,c}

Country of Birth	Preterm Birth			Low Birth Weight			Small for Gestational Age		
	RR (95% CI; P Value)	aRR (95% CI; P Value)	RR (95% CI; P Value)	aRR (95% CI; P Value)	RR (95% CI; P Value)	aRR (95% CI; P Value)	RR (95% CI; P Value)	aRR (95% CI; P Value)	
US-born (vs foreign-born)	1.13 (1.11-1.15; <.001)	1.21 (1.19-1.24; <.001)	1.18 (1.16-1.20; <.001)	1.21 (1.18-1.23; <.001)	1.16 (1.15-1.18; <.001)	1.10 (1.08-1.12; <.001)			
By country for foreign-born (vs born in Mexico)									
Argentina	0.85 (0.70-1.03; .10)	0.89 (0.74-1.07; .22)	0.77 (0.60-0.97; .029)	0.75 (0.59-0.96; .021)	0.95 (0.80-1.13; .58)	0.92 (0.77-1.09; .33)			
Bolivia	0.90 (0.70-1.16; .42)	0.95 (0.74-1.22; .67)	0.74 (0.53-1.04; .08)	0.75 (0.54-1.05; .09)	0.51 (0.37-0.71; <.001)	0.51 (0.37-0.70; <.001)			
Chile	0.96 (0.74-1.25; .76)	1.09 (0.84-1.40; .52)	0.94 (0.68-1.28; .69)	0.98 (0.72-1.34; .91)	0.84 (0.65-1.10; .21)	0.81 (0.62-1.06; .12)			
Colombia	0.95 (0.86-1.04; .23)	1.03 (0.94-1.12; .56)	0.98 (0.88-1.09; .68)	0.99 (0.89-1.10; .86)	1.00 (0.92-1.09; .92)	0.95 (0.87-1.03; .20)			
Costa Rica	0.62 (0.44-0.86; .004)	0.67 (0.48-0.93; .015)	0.96 (0.70-1.31; .81)	1.00 (0.73-1.36; .99)	1.04 (0.82-1.32; .73)	1.00 (0.79-1.26; .99)			
Cuba	0.98 (0.90-1.06; .61)	0.90 (0.83-0.97; .009)	1.01 (0.92-1.11; .79)	0.87 (0.79-0.95; .004)	0.91 (0.84-0.99; .021)	0.80 (0.74-0.87; <.001)			
Dominican Republic	0.99 (0.93-1.05; .73)	1.09 (1.02-1.16; .009)	1.18 (1.10-1.26; <.001)	1.20 (1.12-1.29; <.001)	1.25 (1.19-1.32; <.001)	1.17 (1.11-1.24; <.001)			
Ecuador	0.85 (0.76-0.94; .002)	0.89 (0.80-0.99; .026)	0.93 (0.82-1.04; .22)	0.95 (0.85-1.07; .41)	1.01 (0.92-1.10; .84)	1.00 (0.92-1.10; .98)			
El Salvador	1.14 (1.09-1.20; <.001)	1.15 (1.10-1.20; <.001)	1.20 (1.14-1.27; <.001)	1.19 (1.13-1.25; <.001)	1.17 (1.12-1.22; <.001)	1.15 (1.10-1.20; <.001)			
Guatemala	1.06 (1.00-1.11; .046)	1.10 (1.04-1.15; <.001)	1.13 (1.06-1.20; <.001)	1.15 (1.08-1.22; <.001)	1.19 (1.13-1.25; <.001)	1.18 (1.13-1.24; <.001)			
Honduras	1.04 (0.97-1.10; .26)	1.06 (1.00-1.12; .07)	1.09 (1.01-1.17; .026)	1.10 (1.02-1.18; .012)	1.11 (1.04-1.17; <.001)	1.08 (1.02-1.14; .008)			
Nicaragua	1.13 (1.00-1.27; .046)	1.14 (1.01-1.27; .029)	1.14 (0.99-1.31; .07)	1.13 (0.98-1.30; .09)	1.00 (0.89-1.13; .95)	1.00 (0.89-1.12; .98)			
Other South America ^d	1.06 (0.79-1.43; .69)	1.13 (0.85-1.51; .39)	1.05 (0.74-1.50; .79)	1.05 (0.74-1.49; .79)	1.08 (0.82-1.43; .56)	1.03 (0.78-1.36; .83)			
Panama	1.19 (0.96-1.48; .12)	1.24 (1.00-1.53; .046)	1.33 (1.04-1.70; .025)	1.31 (1.03-1.67; .029)	0.94 (0.74-1.19; .60)	0.90 (0.71-1.14; .38)			
Peru	0.91 (0.81-1.02; .10)	0.98 (0.88-1.10; .76)	0.71 (0.61-0.83; <.001)	0.72 (0.62-0.84; <.001)	0.68 (0.60-0.77; <.001)	0.66 (0.58-0.74; <.001)			
Puerto Rico	1.27 (1.20-1.35; <.001)	1.28 (1.21-1.36; <.001)	1.43 (1.34-1.52; <.001)	1.36 (1.28-1.46; <.001)	1.27 (1.21-1.34; <.001)	1.19 (1.12-1.26; <.001)			
Spain	0.68 (0.49-0.95; .026)	0.76 (0.54-1.06; .10)	0.68 (0.46-1.02; .06)	0.68 (0.46-1.01; .059)	0.95 (0.73-1.25; .71)	0.87 (0.66-1.14; .31)			
Venezuela	0.80 (0.70-0.92; .002)	0.91 (1.79-1.04; .17)	0.93 (0.80-1.09; .39)	0.98 (0.84-1.14; .80)	1.05 (0.93-1.18; .44)	0.99 (0.88-1.11; .82)			

Abbreviations: aRR, adjusted relative risk; RR, relative risk.

^aAdjusted for maternal education, maternal age, marital status, number of previous live births, adequacy of prenatal care, insurance provider, maternal smoking, and chronic disease.

^bData source: National Center for Health Statistics.⁹

^cWald χ^2 test. $P < .05$ was considered significant.

^dIncludes women born in Paraguay and Uruguay.

gave birth in the Dominican Republic; 14.3% of infants in the 2013 Demographic Health Survey were born with a low birth weight compared with 5.8% in our study.³⁵

The pattern of better birth outcomes among women who migrated from the Dominican Republic, El Salvador, Guatemala, Honduras, and Puerto Rico, as compared with the pattern of birth outcomes in those countries, is consistent with the healthy migrant hypothesis. Furthermore, data from the World Bank and Demographic Health Survey showed higher rates of low birth weight among women in Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico, Nicaragua, Panama, Peru, Spain, and Venezuela than among women from these countries who gave birth in the United States in 2013.^{32,36-38} These findings strengthen the argument for the healthy migrant hypothesis. However, our study did not have data on the year in which foreign-born women moved to the United States or their reasons for migrating. Therefore, further research is needed to understand the role of the healthy migrant hypothesis in our results.

Despite poor birth outcomes for other women born on Caribbean islands, women born in Cuba had lower risks of all 3 birth outcomes than did women from Mexico, even after adjusting for maternal characteristics. In 2010, the rate of preterm birth in Cuba was 6.4%, which was lower than the rate of preterm birth in our analysis (6.8%).³⁹ Cubans have a unique US migration experience compared with nationals of other countries because of special humanitarian provisions in US immigration law that began in the 1960s and have allowed for expedited permanent residence and citizenship.⁴⁰ It is unclear how these factors may contribute to better birth outcomes for Cuban women compared with those of other foreign-born Hispanic women, especially in light of their relatively high rates of smoking and chronic disease. However, this advantage may disappear for US-born women of Cuban heritage; women who reported Cuban origin on their infants' birth certificates in the United States in 2013 had the highest rates of preterm birth among any racial/ethnic groups.² The latter does not account for maternal place of birth; however, given the patterns of Cuban migration to the United States, it is likely that most of these women were born in the United States.⁴⁰

The United States routinely reports the rates of preterm birth and low birth weight from the birth certificate by 5 categories of Hispanic ethnicity: Cuban, Central or South American, Mexican, Puerto Rican, and other and unknown Hispanic.² In our analysis, we found that outcomes varied by maternal country of birth. For example, among women who identified Cuban origin on their infants' birth records, 8.0% were small for gestational age. However, when we stratified women by country of birth, 9.1% of US-born Cuban-American women had small-for-gestational age infants, compared with 6.9% of foreign-born Cubans.

Over time, the United States can expect a growing proportion of Hispanic births to be among US-born women. As such, the rates of adverse birth outcomes among Hispanic women may also increase over time. To understand possible

changes in data on birth outcomes and to anticipate the increasing burdens that adverse birth outcomes could impose on the health care system, we recommend that states stratify data by maternal country of birth whenever possible. Our results demonstrate that rates of adverse birth outcomes vary by country of birth among foreign-born Hispanic women. Mexico was the country of birth for two-thirds of the foreign-born Hispanic women in our study; any calculation of rates for foreign-born Hispanic women as a single group would have been skewed toward rates for Mexican women, and differences by country would have been masked. If combining groups of countries is advantageous for research purposes, researchers could group countries that have similar demographic characteristics and outcomes. For example, based on our results, grouping together El Salvador, Guatemala, and Honduras might be appropriate, but combining all Central American countries might not be appropriate.

Limitations

This study had several limitations. First, the 2003 revision of the birth certificate had not been implemented in 10 states as of January 2013, thereby eliminating 10% of all 2013 US births from this analysis,² and an additional 9% of births were excluded because of missing data. Therefore, our results may not be generalizable to the entire United States. Second, limited data on socioeconomic status, health behaviors, and other risk factors available on the birth certificate prevented a comprehensive analysis of variables responsible for the observed differences we found. Third, we used the obstetric estimate for gestational age, which could have affected our results on preterm birth and small for gestational age.⁴¹ Nevertheless, we have no reason to suspect that missing data or estimates of gestational age are related to maternal country of birth. Finally, we could not account for the length of time the mother was in the United States before giving birth, which may have confounded our results.

Conclusion

Our study found that US-born Hispanic women had a significantly greater risk of preterm birth, low birth weight, and small for gestational age than that of foreign-born Hispanic women. However, we also found substantial variation in the rates of adverse birth outcomes among foreign-born women by country of birth, which remained after adjusting for maternal characteristics. Our results have implications for maternal and infant health surveillance. Future studies are needed to learn more about the role of the healthy migrant hypothesis, acculturation, and other individual- and neighborhood-level factors that might explain these findings.

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