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Maternal Ethnicity and Preeclampsia in New York City, 1995–2003

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Summary

Studies on ethnic differences in risk of preeclampsia are limited. We linked birth records for 902,460 singleton births for the period 1995–2003 in New York City with hospital discharge data to evaluate the association between ethnicity and the risk of preeclampsia and compare risks between US-born and foreign-born women. Logistic regression models adjusted for maternal age, maternal education, parity, self-reported prepregnancy maternal weight, smoking during pregnancy, and year of delivery, were used to estimate the adjusted odds ratios of preeclampsia and 95% confidence intervals, comparing each ethnic group to non-Hispanic white women. The prevalence of preeclampsia in this study population was 3.2%. Among the major ethnic groups considered in our study, East Asian women had the lowest risk of preeclampsia (1.4%) and Mexican women had the highest risk (5.0%). Compared to non-Hispanic white women, there was a slightly decreased risk for East Asian women (adjusted OR=0.8, 95% CI [0.7, 0.8]), similar risk for North African women (adjusted OR=1.1, 95% CI [0.9, 1.3]), and increased risk for all other major ethnic groups (adjusted ORs: 1.3–2.9), with the highest risk for Mexican women (adjusted OR=2.9, 95% CI [2.7, 3.1]). No difference in risks was observed for US versus foreign born women with the exception that foreign-born South-East Asian and Pacific Islanders had increased risk of preeclampsia (adjusted OR=1.8, 95% CI [1.0, 3.1]) relative to those born in the US. We concluded that there was ethnic heterogeneity in the development of preeclampsia among women in New York City and Asian subgroups should be examined separately in future studies on ethnicity. Our results should contribute to screening for preeclampsia taking ethnic variation into account and may help to suggest leads for study of etiology.

Keywords

Preeclampsia; ethnicity; New York City

Introduction

Preeclampsia is a leading cause of maternal and fetal morbidity and mortality, which affects 2–8 percent of pregnancies^{1–4}. It is defined by systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 in a woman who was normotensive prior to 20 weeks' gestation and has proteinuria after 20 weeks' gestation⁵. The etiology of preeclampsia is poorly understood. Predictors of preeclampsia include past obstetrical history of preeclampsia, nulliparity, family history of preeclampsia, obesity, pregestational diabetes, multiple gestation, preexisting hypertension and renal disease, and extremes of maternal age^{6–11}. Several studies have indicated that ethnicity may be associated with risk of preeclampsia^{12–17}, although studies on ethnic difference in risk are somewhat limited in the range and specificity of ethnic groups considered. Ethnicity reflects many potential influences on health, including socioeconomic status, lifestyle (e.g. diet and physical activity), medical care utilization, and genetic background associated with geographic origin. Examining the effects of ethnicity on preeclampsia could provide important information that may highlight ethnic subgroups which need to be monitored more actively and could help guide screening and treatment, particularly in light of the growing ethnic diversity of pregnancies in the US population.

New York City, with substantial ethnic diversity and a large number of births, is an ideal location for studies of ethnicity and health. For this study, we linked birth records in New York City with hospital discharge data as the source of preeclampsia diagnosis in order to evaluate the association between ethnicity and preeclampsia.

Methods

Birth records from the New York City Department of Health and Mental Hygiene on live births during the period 1995–2003 were linked to hospital discharge data from the Statewide Planning and Research Cooperative System (SPARCS) based on the matching algorithm which has been previously described in detail¹⁸. Our analysis was restricted to singleton births since birth records for multiple pregnancies were less likely to be successfully linked to hospital discharge records. Of 1,133,020 singleton births from vital records, 1,067,356 were successfully linked to a hospital discharge record.

In our study, preeclampsia were identified based on International Classification of Disease, Ninth Revision (ICD-9) codes from hospital discharge records, which has been found to correspond more closely to diagnoses based on medical record review than algorithms based solely or in part on the birth certificate checkbox¹⁹. Preexisting conditions, including diabetes, chronic renal disease, and chronic hypertension were identified as present when either the discharge diagnosis ICD-9 codes or birth record checklist indicated the condition was present¹⁹. Preeclampsia was defined based on assignment of ICD-9 codes 642.4–642.6. Gestational hypertension (ICD-9 code 642.3) were rarely diagnosed (prevalence of 1.0 %), suggesting substantial underreporting, so that we focused solely on preeclampsia in this analysis. We excluded women (n=64,040, 6.0%) with gestational ages of less than 20 weeks, preexisting chronic hypertension (ICD9 codes 401–405, 642.0–642.2, 642.7, and 642.9 on hospital discharge records, or chronic hypertension indicated on birth records), preexisting

diabetes (ICD9 codes 250.00–250.82, 362.01, and 648.01–648.02 on hospital discharge records, or diabetes indicated on birth records), and chronic renal disease (ICD9 codes 585.1–585.9 on hospital discharge records or renal disease indicated on birth records). Accurate identification of preeclampsia superimposed on preexisting hypertension, renal disease, and related chronic diseases can be problematic, so we focused on women who were free from such conditions prior to pregnancy. Pregestational diabetes is predictive of preeclampsia and too rare to adjust for statistically, so individuals with this condition were excluded.

The method of classification of ethnicity was described in our previous article¹⁸. Maternal ethnic ancestry was identified by self-report as recorded on the birth records. Since ancestry was listed as a country for most women, ethnic groups were generated for every country with 1000 or more births. These countries were grouped into geographical regions for analysis. The major groups are non-Hispanic white, North African, sub-Saharan African, East Asian, South-East Asian and Pacific Islanders, South Central Asian, non-Hispanic Caribbean, Hispanic Caribbean, Mexican, Central American, South American, other US-born Hispanic, and others. Variables from the birth records considered as potential confounders included maternal age (<20, 21–30, 31–40, ≥41 years), maternal education (<12, 12, ≥12 years), parity (0, 1, ≥2), self-reported prepregnancy maternal weight (quartiles), smoking during pregnancy (yes/no), and year of delivery. Because of the large study size, we included all covariates in models without performing tests for confounding.

Logistic regression models with non-Hispanic whites as the universal referent group were used to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the association between ethnicity and preeclampsia. Women with missing values on any of covariates were excluded from our analysis (n= 100,856, 9.4%). (ORs were recalculated including women with missing data on covariates without adjustment for those covariates, and the results did not change.) The same statistical models were also used to estimate the association of foreign-born status (yes/no) with preeclampsia within each regional ethnic group. This analysis was restricted to regional ethnic groups with at least 500 US-born women. All these analyses were performed using SAS 9.2 software (SAS institute, Cary, NC). This study was approved by the institutional review boards at Brown University, the New York City Department of Health and Mental Hygiene, and the SPARCS Data Protection Review Board of the New York State Department of Health.

Results

The risk of preeclampsia in this population (n=902,460) was 3.2%. Among the major ethnic groups considered in our study, East Asian women had the lowest risk of preeclampsia (1.4%) and Mexican women had the highest risk (5.0%) (Table 1). As compared to non-Hispanic white women, there was a slightly decreased risk for East Asian women (adjusted OR=0.8, 95% CI [0.7, 0.8]), similar risk for North African women (adjusted OR=1.1, 95% CI [0.9, 1.3]), and increased risk for other major ethnic groups (adjusted ORs: 1.3–2.9) (Table 1). Further, among these major ethnic groups considered, Mexican women had the highest risk of preeclampsia (adjusted OR=2.9, 95% CI [2.7, 3.1], and African-American women had second highest risk (adjusted OR=2.3, 95% CI [2.2, 2.3] as compared with non-

Hispanic white women. Within each major geographic region, the pattern of risk of preeclampsia was consistent except that South Central Asian women generally had higher risk of preeclampsia (adjusted OR=1.3, 95% CI [1.2, 1.3]) whereas Iranian women had lower risk (adjusted OR =0.3, 95% CI [0.2, 0.7]).

We observed variation in risk of preeclampsia among Asian women: compared to non-Hispanic white women, South East Asian women had higher risk and East Asian women had lower risk. More specifically, Filipina women had especially high risk of preeclampsia (adjusted OR =2.3, 95% CI [2.1, 2.6]), and Chinese (adjusted OR =0.8, 95% CI [0.7, 0.8]), Korean (adjusted OR =0.8, 95% CI [0.6, 0.9]) and Japanese (adjusted OR =0.6, 95% CI [0.4, 0.9]) women had lower risk of preeclampsia (Table 1).

In the comparison of risk of preeclampsia among women who were born outside the US to those of the same ancestry born within the US (limited to regional ethnic groups with more than 500 US-born women), no difference was observed with the exception that increased risk of preeclampsia for foreign born women was found for South-East Asian and Pacific Islanders (adjusted OR=1.8, 95% CI [1.0, 3.1]). Within this group, foreign born Philippine women had excess risk of preeclampsia compared to those born in US (adjusted OR=2.2, 95% CI [1.2, 4.0] (Table 2).

Discussion

In our study, we observed ethnic heterogeneity in the development of preeclampsia among women in New York City. With the exception of East Asian women (lower risk) and North African women (similar risk), all other major ethnic groups had elevated risk compared to non-Hispanic whites. Within each major ethnic group defined by geographic region of origin, the pattern of risk of preeclampsia was mostly consistent.

The definition of preeclampsia relied on ICD-9 discharge diagnosis codes, and both discharge diagnosis codes and the birth records were used to identify preexisting conditions such as diabetes, chronic renal disease, and chronic hypertension. We based this approach to assessment on research comparing both discharge diagnoses and birth records to full medical record review as the gold standard¹⁹. One study of the accuracy of ICD-9 codes for preeclampsia found a positive predictive value of 84.8% for severe preeclampsia and 45.3% for mild preeclampsia in a US population²⁰. Such misclassification of disease is not likely to depend on ethnicity so that resulting nondifferential misclassification would be likely to bias our study results towards the null. Further, the absolute risks of preeclampsia in our study are similar to those from other previous studies^{14, 15, 21, 22}. We recognize that the patterns of preeclampsia may vary in relation to severity and timing of onset, but such detailed information was not available for analysis. Because the prevalence of gestational hypertension (1.0%) in our study population was implausibly low (1% versus expected level of around 6%)²³, gestational hypertension was not evaluated as an outcome in our study.

It is not clear whether gestational hypertension and preeclampsia are distinct disorders with a similar symptom (hypertension) or if gestational hypertension is an early stage of preeclampsia in which proteinuria has yet to occur¹⁵. Diagnoses of preeclampsia are

dependent to some extent on receipt of prenatal care. To the extent that African Americans and Hispanics had lower rates of using prenatal care than non-Hispanic whites¹⁸, they would be susceptible to underdiagnosis and underestimation of the risk relative to non-Hispanic whites. Nonetheless, an increased risk was found in these socioeconomically deprived groups in New York City.

Previous studies on ethnic differences in risk of preeclampsia are limited. Some studies showed that African American women had higher risk of preeclampsia than non-Hispanic white women^{12–14, 16, 24}, but others showed no difference^{17, 25}. Some of these previous studies are small or relied on only the birth record, and others included women with chronic hypertension or did not adjust for potential confounders. The results among Hispanic women are discrepant, ranging from higher risk^{14, 15}, to similar risk²⁴, to lower risk^{13, 26}, relative to non-Hispanic white women. Studies among Asian women are also inconsistent, varying in showing lower¹⁶ or similar risks^{12, 13} relative to the non-Hispanic white women. Most studies among Hispanic and Asian women considered broad categorizations of ethnicity (e.g. non-Hispanic white, Hispanic, non-Hispanic black, Asian, other), which may obscure the association between ethnicity and hypertensive disorders of pregnancy within subgroups. Although we did not identify studies focused on the heterogeneity of preeclampsia risk among Hispanics, differences in hypertensive disorders of pregnancy among Asian subgroups have been noted^{27, 28}. For example, Rao et al. examined perinatal outcomes among Asian American/Pacific Islander women and found that Filipina women had the highest risk of preeclampsia while East Asian women such as Chinese, Japanese, and Korean women had lowest risk²⁷. Their results are in line with the variation we observed in risk of preeclampsia among Asian women.

Socioeconomic status was suggested by some studies to account for the ethnic differences in risk of preeclampsia^{29–31}. Although we adjusted for maternal education, which was used as a crude proxy for socioeconomic status in our models, we cannot exclude residual confounding from unmeasured factors related to socioeconomic status, such as access of prenatal care, nutrition, stress, and physical activity. Furthermore, education may have different meaning in the different ethnic groups studied. In addition, BMI has been confirmed by previous studies to be a risk factor for hypertensive disorders of pregnancy⁶. Due to lack of information on height in our data source, we utilized pre-pregnancy weight as a marker of BMI, which may result in residual confounding as well.

In our study, the study sample is large and has substantial diversity of maternal ethnicity. Our approach to categorizing maternal ethnicity by reported ancestral country and geographic region is based on maternal report³². Information from hospital discharge records was used to define preeclampsia, superior to birth certificate checkboxes. The linkage of birth records with hospital discharge data provided us with the opportunity, which is not easily achieved elsewhere, to assess risk of preeclampsia by detailed maternal ethnicity. Our study results suggested potentially important patterns of ethnic difference in preeclampsia risk. While these patterns need to be further confirmed in future studies, our results may help health practitioners formulate better guidelines for screening that take into account the variation in risk by ethnicity and suggest etiologic hypotheses for more rigorous evaluation.

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Table 1

Risk of preeclampsia by ethnicity, New York City Singleton Birth, 1995 – 2003 (n=902,460)

Ethnic group	Total births	Preeclampsia		
		Risk (%)	Unadjusted OR [95% CI]	Adjusted OR [95% CI]
Non-Hispanic white	264210	2.0	1.0	1.0
African-American	138818	4.6	2.4 [2.3, 2.5]	2.3 [2.2, 2.3]
North Africa	5108	2.2	1.1 [0.9, 1.3]	1.1 [0.9, 1.3]
Morocco	1279	1.5	0.7 [0.5, 1.2]	0.7 [0.4, 1.1]
Egypt	3190	2.2	1.1 [0.9, 1.4]	1.1 [0.9, 1.4]
Other North Africa	639	3.8	1.9 [1.3, 2.9]	1.9 [1.3, 2.9]
Sub-Saharan Africa	16344	3.5	1.8 [1.6, 2.0]	1.8 [1.6, 1.9]
Nigeria	3222	3.6	1.9 [1.5, 2.2]	1.8 [1.5, 2.2]
Ghana	2794	3.8	1.9 [1.6, 2.4]	1.8 [1.5, 2.2]
Guinea	1394	2.7	1.4 [1.0, 1.9]	1.5 [1.1, 2.1]
Senegal	1286	2.9	1.5 [1.1, 2.0]	1.5 [1.1, 2.0]
Gambia	1164	2.9	1.5 [1.1, 2.1]	1.9 [1.3, 2.6]
Ivory Coast	1001	4.2	2.2 [1.6, 2.9]	2.1 [1.6, 2.9]
Mali	1049	3.9	2.0 [1.5, 2.7]	2.0 [1.5, 2.8]
Other West Africa	1307	4.2	2.2 [1.7, 2.9]	2.2 [1.7, 2.9]
Central/East/Southern Africa	3127	3.3	1.7 [1.4, 2.1]	1.6 [1.3, 2.0]
East Asia	54458	1.4	0.7 [0.6, 0.7]	0.8 [0.7, 0.8]
China	40553	1.4	0.7 [0.6, 0.7]	0.8 [0.7, 0.8]
Hong Kong For Review Only	1100	1.2	0.6 [0.3, 1.0]	0.6 [0.4, 1.1]
Taiwan	1072	0.9	0.5 [0.2, 0.9]	0.5 [0.3, 0.9]
Korea	7769	1.4	0.7 [0.6, 0.8]	0.8 [0.6, 0.9]
Japan	2941	1.2	0.6 [0.4, 0.8]	0.6 [0.4, 0.9]
Other East Asia	1023	2.4	1.2 [0.8, 1.8]	1.3 [0.8, 1.9]
South-East Asia and Pacific Islands	11117	3.3	1.7 [1.5, 1.9]	1.8 [1.7, 2.1]
Vietnam	1748	1.7	0.8 [0.6, 1.2]	0.9 [0.6, 1.4]
Malaysia	742	1.9	0.9 [0.6, 1.6]	1.0 [0.6, 1.7]
Philippines	7249	4.0	2.1 [1.9, 2.4]	2.3 [2.1, 2.6]
Other South-East Asia	1378	1.9	0.9 [0.6, 1.4]	1.0 [0.7, 1.5]
South Central Asia	29966	2.2	1.1 [1.0, 1.2]	1.3 [1.2, 1.4]
India	12543	2.2	1.1 [1.0, 1.3]	1.2 [1.1, 1.4]
Bangladesh	6486	2.7	1.4 [1.2, 1.6]	1.6 [1.4, 1.9]
Pakistan	6899	2.5	1.3 [1.1, 1.5]	1.4 [1.2, 1.6]
Afghanistan	1182	1.4	0.7 [0.4, 1.1]	0.8 [0.5, 1.3]
Iran	1405	0.6	0.3 [0.2, 0.6]	0.3 [0.2, 0.7]
Other South Central Asia	1451	1.7	0.9 [0.6, 1.3]	1.0 [0.6, 1.4]
Non-Hispanic Caribbean	67023	4.2	2.2 [2.1, 2.3]	2.0 [1.9, 2.1]
Jamaica	24014	4.1	2.1 [2.0, 2.3]	2.0 [1.9, 2.2]
Haiti	14372	4.7	2.5 [2.3, 2.7]	2.2 [2.0, 2.4]

Ethnic group	Total births	Preeclampsia		
		Risk (%)	Unadjusted OR [95% CI]	Adjusted OR [95% CI]
Trinidad and Tobago	10999	3.9	2.0 [1.8, 2.2]	1.9 [1.7, 2.1]
Grenada	2256	3.9	2.0 [1.6, 2.5]	1.8 [1.5, 2.2]
Barbados	2129	4.2	2.2 [1.7, 2.7]	1.9 [1.5, 2.4]
St Vincent	1529	3.7	1.9 [1.5, 2.5]	1.7 [1.3, 2.2]
Antigua and Barbuda	1277	4.0	2.1 [1.6, 2.7]	1.9 [1.4, 2.5]
St Lucia	1019	4.0	2.1 [1.5, 2.8]	1.9 [1.4, 2.7]
Virgin Island	626	4.2	2.2 [1.5, 3.2]	2.1 [1.4, 3.2]
Other non-Hispanic Caribbean	8802	4.2	2.2 [2.0, 2.4]	2.1 [1.9, 2.4]
Hispanic Caribbean	170567	3.9	2.0 [1.9, 2.1]	2.0 [2.0, 2.1]
Dominican Republic	78856	4.2	2.2 [2.1, 2.3]	2.3 [2.2, 2.4]
Puerto Rico	89232	3.7	1.9 [1.8, 2.0]	1.9 [1.8, 2.0]
Cuba	2479	2.5	1.3 [1.0, 1.6]	1.2 [0.9, 1.5]
Mexico	42146	5.0	2.6 [2.4, 2.7]	2.9 [2.7, 3.1]
South America	60247	3.3	1.7 [1.6, 1.8]	1.8 [1.7, 1.9]
Guyana	42146	3.3	1.7 [1.5, 1.8]	1.8 [1.6, 2.0]
Ecuador	18125	3.4	1.8 [1.6, 1.9]	2.0 [1.8, 2.1]
Colombia	20765	3.4	1.7 [1.5, 1.9]	1.7 [1.5, 1.9]
Peru	10347	3.3	1.7 [1.4, 2.0]	1.7 [1.4, 2.0]
Brazil	3983	3.1	1.6 [1.2, 2.1]	1.5 [1.1, 2.0]
Argentina	1663	2.6	1.3 [0.9, 1.8]	1.3 [0.9, 1.8]
Venezuela	1446	3.3	1.7 [1.3, 2.3]	1.7 [1.2, 2.2]
Other South America	1326	2.8	1.4 [1.1, 1.8]	1.4 [1.1, 1.8]
Central America	21980	3.7	1.9 [1.8, 2.1]	2.0 [1.8, 2.1]
Honduras	6882	3.7	1.9 [1.7, 2.2]	2.0 [1.8, 2.3]
El Salvador	5873	3.3	1.7 [1.5, 2.0]	1.8 [1.5, 2.1]
Guatemala	3368	3.4	1.7 [1.4, 2.1]	1.9 [1.6, 2.3]
Panama	2763	4.5	2.3 [1.9, 2.8]	2.2 [1.8, 2.7]
Belize	1045	4.1	2.1 [1.6, 2.9]	2.1 [1.6, 2.9]
Nicaragua	1154	3.9	2.0 [1.5, 2.7]	2.1 [1.5, 2.8]
Other Central America	895	4.5	2.3 [1.7, 3.2]	2.3 [1.6, 3.1]
Other Hispanic	13930	3.4	1.7 [1.6, 1.9]	1.7 [1.6, 1.9]
Other ethnicity	6180	3.3	1.7 [1.5, 2.0]	1.6 [1.4, 1.9]

Note: Non-Hispanic white as the reference group; models were adjusted for maternal age (< 20, 21–30, 31–40, ≥ 41 years), maternal education (<12, 12, >12 years), parity (0, 1, ≥ 2), self-reported prepregnancy maternal weight in quartiles, smoking during pregnancy (yes/no), and year of delivery.

Table 2

Risk of preeclampsia by nativity among ethnic groups, New York City Singleton Births, 1995 – 2003 (n=902,460).

Ethnic group	Total births	Preeclampsia		
		Risk (%)	Unadjusted OR [95% CI]	Adjusted OR [95% CI]
North Africa				
US born	227	3.1	1.0	1.0
Foreign born	4881	2.2	0.7 [0.3, 1.5]	0.6 [0.3, 1.3]
Sub-Saharan Africa				
US born	278	3.6	1.0	1.0
Foreign born	16066	3.5	1.0 [0.5, 1.8]	1.0 [0.5, 1.9]
East Asia				
US born	3106	1.6	1.0	1.0
Foreign born	51352	1.3	0.8 [0.6, 1.1]	1.0 [0.8, 1.4]
China				
US born	2317	1.7	1.0	1.0
Foreign born	38236	1.3	0.8 [0.6, 1.1]	1.0 [0.7, 1.4]
South-East Asia and Pacific Islands				
US born	672	2.1	1.0	1.0
Foreign born	10445	3.3	1.6 [0.9, 2.8]	1.8 [1.0, 3.1]
Philippines				
US born	568	2.1	1.0	1.0
Foreign born	6681	4.2	2.0 [1.1, 3.7]	2.2 [1.2, 4.0]
South Central Asia				
US born	814	2.5	1.0	1.0
Foreign born	29966	2.2	0.9 [0.6, 1.4]	1.0 [0.7, 1.6]
India				
US born	532	2.8	1.0	1.0
Foreign born	12011	2.2	0.8 [0.4, 1.3]	0.9 [0.5, 1.5]
Non-Hispanic Caribbean				
US born	3549	4.4	1.0	1.0
Foreign born	63474	4.2	0.9 [0.8, 1.1]	1.0 [0.8, 1.2]
Jamaica				
US born	982	5.1	1.0	1.0
Foreign born	23032	4.1	0.8 [0.6, 1.1]	0.9 [0.6, 1.2]
Haiti				
US born	1186	4.6	1.0	1.0
Foreign born	13186	4.7	1.0 [0.8, 1.4]	1.1 [0.8, 1.4]
Hispanic Caribbean				
US born	81075	3.8	1.0	1.0
Foreign born	89492	4.0	1.0 [1.0, 1.1]	1.1 [1.0, 1.2]
Dominican Republic				

Ethnic group	Total births	Preeclampsia		
		Risk (%)	Unadjusted OR [95% CI]	Adjusted OR [95% CI]
US born	11525	4.4	1.0	1.0
Foreign born	67331	4.2	0.9 [0.9, 1.0]	1.1 [1.0, 1.2]
Puerto Rico				
US born	68046	3.7	1.0	1.0
Foreign born	21186	3.4	0.9 [0.8, 1.0]	1.0 [0.9, 1.1]
Cuba				
US born	1504	2.5	1.0	1.0
Foreign born	975	2.5	1.1 [0.6, 1.7]	1.0 [0.6, 1.7]
Mexico				
US born	1419	5.9	1.0	1.0
Foreign born	40727	5.0	0.8 [0.7, 1.0]	0.9 [0.7, 1.2]
South America				
US born	5250	3.6	1.0	1.0
Foreign born	54997	3.3	0.9 [0.8, 1.1]	1.0 [0.8, 1.1]
Ecuador				
US born	2200	3.6	1.0	1.0
Foreign born	18565	3.4	0.9 [0.7, 1.2]	1.0 [0.8, 1.3]
Colombia				
US born	1382	4.3	1.0	1.0
Foreign born	8965	3.2	0.7 [0.6, 1.0]	0.9 [0.6, 1.2]
Central America				
US born	2193	3.7	1.0	1.0
Foreign born	19787	3.7	1.0 [0.8, 1.2]	1.2 [0.9, 1.5]
Honduras				
US born	612	4.7	1.0	1.0
Foreign born	6270	3.6	0.7 [0.5, 1.1]	0.9 [0.6, 1.3]
Panama				
US born	582	3.3	1.0	1.0
Foreign born	21181	4.8	1.5 [0.9, 2.4]	1.6 [1.0, 2.7]

Note: Select country-specific ethnic groups with US-born women greater than 500; models were adjusted for maternal age (20, 21–30, 31–40, 41 years), maternal education (<12, 12, >12 years), parity (0, 1, 2), self-reported prepregnancy maternal weight in quartiles, smoking during pregnancy (yes/no), and year of delivery.