



Disentangling the Effects of Acculturation and Duration in the United States on Latina Immigrant Maternal Overweight and Macrosomia

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Abstract

A significant body of research on minority health shows that while Latina immigrants experience unexpectedly favorable outcomes in maternal and infant health in the United States, this advantage deteriorates with increased duration of residency. This study assesses the relationship between excessively high birth weight (macrosomia), maternal weight, and length of residency in the United States. A sample of Mexican immigrant women living in two Midwestern communities in the United States is used to analyze the effects of duration in the United States, acculturation on birth outcomes, and maternal overweight once controlling for social, behavioral, and environmental mediators of health status. Results show a significant and positive association between macrosomia and length of residence: the longer duration in the United States, the higher the risk of macrosomia. This study provides evidence the association can be explained by the simultaneous increase in pre-pregnancy maternal weight with increased duration of residence.

Keywords

Latino health; acculturation; macrosomia; maternal health; infant health; obesity

Cover Page Footnote

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ABSTRACT

A significant body of research on minority health shows that while Latina immigrants experience unexpectedly favorable outcomes in maternal and infant health in the United States, this advantage deteriorates with increased duration of residency. This study assesses the relationship between excessively high birth weight (macrosomia), maternal weight, and length of residency in the United States. A sample of Mexican immigrant women living in two Midwestern communities in the United States is used to analyze the effects of duration in the United States, acculturation on birth outcomes, and maternal overweight once controlling for social, behavioral, and environmental mediators of health status. Results show a significant and positive association between macrosomia and length of residence: the longer duration in the United States, the higher the risk of macrosomia. This study provides evidence the association can be explained by the simultaneous increase in pre-pregnancy maternal weight with increased duration of residence.

Keywords: Latino health; acculturation; macrosomia; maternal health, infant health, obesity

INTRODUCTION

Previous research on minority health shows that Latinos experience an advantage in maternal and infant health outcomes in the United States. Birth outcomes of infants born to Latina immigrants are nearly equal to, or better than, birth outcomes of infants born to non-Latina US-born White women (Albrecht, Clarke, Miller, & Farmer, 1996; Becerra, Hogue, Atrash, & Perez, 1991; Franzini, Ribble, & Keddie, 2001; Markides & Coreil, 1986). However, this health advantage conceals the fact that many health disparities are experienced by the Latino population.

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In particular, the health advantage of uncommonly low birth weight among Latinos appears to deteriorate with each subsequent generation of residence in the United States (Acevedo-Garcia, Soobader, & Berkman, 2007; de la Rosa, 2002), and even within a generation (Ceballos, 2011; Ceballos & Palloni, 2010). Additionally, Latinos have experienced higher rates of mothers who are overweight and deliver macrosomic babies, infants born weighing over 4,000 grams or roughly 8.8 pounds (Bowers et al., 2013; Chu, Kim, & Bish, 2009; Flegal, Ogden, & Carroll, 2004; Nichaman & Garcia, 1991; Wojcicki, Hessol, Heyman, & Fuentes-Afflick, 2008; Branum et al 2016).

There are several reasons why it is important to investigate macrosomia. In 2016, 7.1% of all infants born to Latinas in the United States had a birth weight of 4,000 grams or more, which is referred to as macrosomia (Martin et al. 2018). Furthermore, macrosomia is associated with many adverse outcomes for both the mother and child, such as injury, hemorrhage, extended hospitalization (Weissmann-Brenner et al. 2012). Preexisting maternal obesity, excessive weight gain during pregnancy, maternal pre-pregnancy diabetes, previous macrosomic births, and gestational diabetes mellitus are strong contributors to fetal macrosomia (Gaudet et al. 2014). Other important predictors of excessive fetal growth and weight gain include, poor blood glucose control, older maternal age and gestational duration (Hedderson et al., 2006; Kapadia et al., 2015; Kieffer et al., 2006; Liu, Whitaker, Yu, Chao, & Lu, 2016; Lutsiv, Mah, Beyene, & McDonald, 2015; Wojcicki, Hessol, Heyman, & Fuentes-Afflick, 2008; Van Wootten & Turner, 2002).

The proximal contributors to excessive fetal growth and weight gain such as blood glucose control, maternal weight gain during pregnancy, pre-pregnancy weight, older maternal age, and gestational duration (Hedderson et al., 2006; Kapadia et al., 2015; Kieffer et al., 2006; Liu, Whitaker, Yu, Chao, & Lu, 2016; Lutsiv, Mah, Beyene, & McDonald, 2015; Wojcicki, Hessol, Heyman, & Fuentes-Afflick, 2008; Van Wootten & Turner, 2002). Many of these, as well as other risk factors of macrosomia, are found among Latina mothers, including: older maternal age, gestational diabetes mellitus, higher gravidity, grandmultiparity (parity five or above), previous history of macrosomic births, pre-pregnancy overweight, excessive weight gain during pregnancy, and type 2 diabetes (Hardy, 1999; Kieffer et al., 2006; Steinfeld et al., 2000; Wojcicki et al., 2008; Yasmeen, Danielsen, Moshesh, & Gilbert, 2005).

Overall, previous studies of Latino immigrants have found immigrants to experience higher rates of being overweight with the longer the duration in the United States, even after controlling for behaviors and characteristics associated with an increase in overweight. Some of the behaviors and characteristics previous research has examined are diet, physical activity, smoking, functional limitations, access to health services and sociodemographic characteristics (Akresh, 2008; Isasi et al. 2015; Kaplan, Hugué, Newsom, & McFarland, 2004; Sanchez-Vaznaugh, Kawachi, Subramanian, Sanchez, & Acevedo-García, 2008). One study found higher rates of child obesity among Latino children with increased duration in the U.S. (García-Pérez et al. 2016). The principal hypothesis explaining this phenomenon is called the acculturation paradox, of which posits that acculturative behaviors adopted by immigrants living in the United States have negative effects on their health. Some studies have found acculturation, as measured by language, duration in the United States, and nativity, to be associated with higher levels of overweight (Barcenas et al., 2007; Evenson, Sarmiento, & Ayala, 2004; Fuentes-Afflick & Hessol, 2008; Gordon-Larsen, Harris, Ward, & Popkin, 2003; Hubert, Snider, & Winkleby, 2005; Park, Neckerman, Quinn, Weiss, & Rundle, 2008), while other studies have not (Khan, Sobal, & Martorell, 1997; Wolin,

Colangelo, Chiu, & Gapstur, 2009). Few studies have examined the relationship between macrosomia and length of residence among recent Latino immigrants (Steinfeld et al., 2000; Wojcicki et al., 2008). Studies have shown that among Latinos there to be an association between diet and acculturation. Less acculturated Latinas have been found to have healthier diets as compared to more highly acculturated Latinas, in terms of consumption levels of fat, fiber, fruits and vegetables (Cobas, Balcazar, Benin, Keith, & Chong. 1996; Dixon, Sundquist & Winkleby 2000; Guendelman and Abrams 1995, Neuhouser, Thompson, Coronado, and Solomon 2004). Latinos with This study fills an important gap in the research on the acculturation hypotheses by assessing the effects of duration in the United States and maternal weight on the likelihood of a macrosomic birth for Latina mothers.

The aim of this study is to explore the effect of length of residence and acculturation on excessively high birth weight and maternal overweight in the United States for first generation Latina immigrants. Moreover, the present study uses logistic regression to examine the effects of immigrant duration and acculturation on the risk of macrosomia and pre-pregnancy maternal weight after controlling for maternal, behavioral, social, and environmental mediators of health status.

METHODS

The present study draws on data from a random sample of Mexican women living in two large Midwestern communities that are predominantly Mexican-origin. A survey was administered by trained staff members at the two clinic locations. There were a total of 545 women drawn from the rosters of two prenatal clinics between 1999 and 2001 that participated in the study. The study included only those women who were pregnant at the time of the interview or had just completed a pregnancy immediately prior to the interview.

The sample analyzed for this study is limited to Mexican-origin women living in the United States who were born in Mexico and who had complete information on all relevant variables. The clinics were chosen because they were well-established and had local health providers that offered comprehensive medical services to large and growing Spanish-speaking communities.

The survey included information on infant and maternal health before women were pregnant, during pregnancy, and birth outcomes after the pregnancy. Additionally, there were a range of questions pertaining to maternal behavioral, social, economic and demographic characteristics. Medical records providing information about the outcomes of the completed current pregnancy were also included for each woman. The response rate was high, with only eight respondents, apart from the 545, choosing not to participate in the study. We only included mothers who completed the pregnancy and had birth outcomes made available from the hospital record or interview in this analysis.

Measures

Two dependent variables are used in this analysis. The first variable is macrosomia, defined as birth weight over 4,000 grams or 8.8 pounds. The second variable is pre-pregnancy maternal weight that is above a BMI of 25 as a measure of being overweight. This analysis is restricted to those mothers who have reached at least 37 months of gestation. We excluded mothers who had preterm births because it would be unlikely they gave birth to high weight infants.

The main independent variables of interest include the number of years lived in the United States and acculturation. Duration is based on when the respondents reported arriving to the United

States. In this sample the average duration in the United States was six and one-half years. The acculturation variable is a scale based on 13 items measuring language usage, proficiency, and fluency (Spanish only, English and Spanish, English only) in various interpersonal settings (at home, at work, in the marketplace, doctor's office), and the respondent's ethnic identification (Mexican, Mexican American, Chicano, Latino, or Hispanic). The items of the scale are standardized with a Cronbach alpha reliability score of .94. While the ability to explain most of the variance of acculturation is a strength of language-based scales, its limitation must also be acknowledged due to the complexity and multi-dimensionality of the concept (Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005; Marin, 1992; Marin & Gamba, 1996).

Maternal and infant characteristics in the model include gestational age, sex of infant (1=male, 0=female), and maternal parity. Behavioral, social, and environmental determinants include diet, maternal health, prenatal care, social support, stress, demographic, socioeconomic status, and community variables. We use changes in diet as a proxy for acculturative change from a healthy to a less healthy diet, by constructing a dichotomous variable that proxies for a decrease in a traditional Mexican diet since arriving to the United States: consumption of beans, tortillas, and rice (1=decreased consumption of a traditional diet, 0=otherwise). Social support measures included whether or not the respondent receives help with childcare and housework from her spouse or partner and/or her parents (1=yes, 0=otherwise). Maternal health variables included the respondent's own health assessment (1=health is excellent to very good, 0=otherwise), maternal age, prenatal care based on the Kotelchuck Adequacy of Initiation of Prenatal Care scale (Kotelchuck, 1994) (1=a level of adequate prenatal care and 0=otherwise), and maternal stress (1=feelings of isolation or loneliness, and 0=otherwise).

Demographic and socioeconomic variables included marital status (1=married, 2=otherwise), years of schooling, employment status (1=employed, 0=otherwise), and income (income greater or equal to 150% of the poverty level=1, 0=otherwise). Finally, a variable representing community effects measures the ethnic make-up of the neighborhood (1=predominantly Latino residents, 0=otherwise).

RESULTS

This study included a total of 545 women who are relatively recent arrivals to the United States and of lower socioeconomic backgrounds. Table 1 describes the variables that were analyzed. The average age of the women was 26.4 years and 62% identified as married. In this sample the average length of time living in the United States was 6.6 years, 86% of the women lived below 150% of the poverty level, 51% were employed, and the average years of schooling was 9 years.

Table 1. Descriptive statistics

<i>Variable</i>	<i>Obs.</i>	<i>Mean</i>	<i>S.D.</i>	<i>Min</i>	<i>Max</i>
Macrosomia outcome (>4000 gms)	408	0.16		0	1
Years lived in US	407	6.6	5.4	0	28
Acculturation scale	407	-0.06	0.73	-0.52	3.1
Gestational age (weeks)	381	39.64	1.22	37	43
Sex of infant (male = 1)	407	0.48		0	1
Parity	408	1.25	1.18	0	6
BMI >25	329	0.54		0	1
Decrease traditional diet	388	0.2		0	1
Mother's health	399	0.44		0	1
Mother's age	408	26.36	5.66	15	45
Prenatal care	408	0.87		0	1
Social support	406	0.15		0	1
Stress	407	0.37		0	1
Marital status (married = 1)	407	0.62		0	1
Mother employed	408	0.51		0	1
Schooling (years)	408	9.09	3.22	0	20
Predominantly Latino community	405	0.64		0	1
Income (\geq 150% of poverty level)	408	0.14		0	1

The analyses proceeded in two different models described below. The first corresponds to the models estimating the effects of length of residence in the United States and acculturation on macrosomic birth outcomes and pre-pregnancy maternal BMI above 25. The second model estimates the effects of duration and acculturation directly on maternal BMI. Table 2 displays estimates of effects (and associated standard errors and confidence intervals) from alternative logistic regression models with the macrosomia variable as the dependent variable. We test the expected mediating effects of maternal health and social and cultural determinants through which duration and acculturation affect infant and maternal health. In all cases the dependent variable is one for a macrosomic birth outcome and zero is for otherwise. Thus, odds ratios greater than one indicate the contribution to unfavorable health outcomes.

Model 1 tests the effects of duration and acculturation on birth outcomes. The length of residency in the United States is positive and significantly associated with a macrosomic birth (O.R.: 1.10, $p < .05$; C.I.: 1.02, 1.18). With each additional year of residence in the United States, there is a 10% increase in the odds of the mother having a macrosomic birth. This follows the acculturation paradox hypothesis that states the increased length of residence is associated with poor birth outcomes. However, the correlation for acculturation is negative and not significantly associated with a macrosomic birth. Model 2 controls for proximate determinants of macrosomia that include gestational age, sex of infant, and parity. Gestational age and sex of the infant are both positive and statistically significant. Each additional week of gestation beyond 37 weeks increases the odds of a macrosomic birth by 81% (O.R.: 1.81, $p < .001$; C.I.: 1.41, 2.33) and the odds of a macrosomic birth is over two and a quarter times greater for a male infant than a female infant

(O.R.: 2.29, $p < .01$; C.I.: 1.26, 4.15). Parity is positively associated with a macrosomic birth, but not statistically significant. The effects of duration and acculturation remain virtually unchanged.

Model 3 controls for maternal characteristics and socioeconomic and demographic determinants such as maternal diet, health, and age, prenatal care, social support, stress, marital status, mother's employment status and schooling, household income, and ethnicity of the community (results of control variables are not shown). Each of the control variables were not statistically significant. The duration variable remains positive, slightly higher, and statistically significant (O.R.: 1.13, $p < .05$; C.I.: 1.03, 1.25). Acculturation remains not significant in relation to a macrosomic birth. Both the effects of gestational age and sex of the infant increase and remain statistically significant (O.R.: 1.84, $p < .001$; C.I.: 1.40, 2.43, and O.R.: 2.72, $p < .01$; C.I.: 1.41, 5.25, respectively). Parity also remains not statistically significant. Thus far, these results suggest that acculturation, the maternal and infant characteristics, and socioeconomic and demographic determinants have little, if any, effect on the relationship between length of stay in the United States and a macrosomic birth outcome.

Model 4 adds the variable measuring pre-pregnancy maternal BMI greater than 25. The effect of maternal BMI on macrosomia is positive and statistically significant (O.R.: 5.93, $p < .001$; C.I.: 2.23, 15.72). Importantly, the effect of the duration on macrosomia becomes nonsignificant, suggesting that it is maternal BMI that explains the association of duration and the risk of macrosomia. In addition, in this model, the effects of gestational age and sex of infant experience small decreases though they remain statistically significant. All other covariates remain unchanged and are not statistically significant. In sum, these models suggest that the higher rate of macrosomia for Latina immigrants with longer duration in the United States is due to pre-pregnancy maternal overweight and that acculturation is unrelated to macrosomia. Maternal overweight was found to have a significant effect on macrosomia for Latinas.

Table 2. Logistic regression odds ratio estimates of macrosomia on duration, acculturation, and behavioral, social, and environmental determinants of the sample data

<i>Variable</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
Years in the U.S.	1.10 * (.04) [1.02, 1.18]	1.11 * (.05) [1.02, 1.21]	1.13 * (.06) [1.03, 1.25]	1.08 (.06) [.97, 1.21]
Acculturation scale	0.79 (0.17) [0.53, 1.20]	0.80 (0.19) [0.51, 1.26]	0.77 (0.21) [0.44, 1.33]	0.81 (0.25) [.44, 1.48]
Gestational age (weeks)		1.81 *** (.23) [1.41, 2.33]	1.84 *** (.26) [1.40, 2.43]	1.77 *** (.28) [1.30, 2.41]
Sex of infant (male = 1)		2.29 ** (.69) [1.26, 4.15]	2.72 ** (.91) [1.41, 5.25]	2.24 * (.85) [1.06, 4.72]
Parity		1.24 (.16) [0.96, 1.59]	1.09 (.19) [0.78, 1.53]	1.03 (.22) [0.67, 1.58]
BMI > 25				5.93 *** (2.95) [2.23, 15.72]
Constant	0.10 *** (.03) [0.00, 0.06]	0.00 *** (.00) [0.00, 0.00]	0.00 *** (.00) [0.00, 0.00]	0.00 *** (.00) [0.00, 0.00]
N	406	379	346	278
Log likelihood	-176.8	-149.5	-128.5	-98.7
Likelihood Ratio Chi-square	6.75 *	41.91 ***	42.77 ***	48.78 ***
Degrees of freedom	2	5	16	17
Pseudo-R2	0.02	0.12	0.14	0.20

standard errors in parentheses; 95% confidence intervals in brackets

† p<.10; * p<.05; ** p<.01; *** p<.001.

Models 3 and 4 control for the variables: maternal diet, health, and age, prenatal care, social support, stress, marital status, mother's employment status, schooling, income, and ethnicity of the community (results available upon request).

Because the effect of duration on birth outcomes appears to be mediated through pre-pregnancy maternal weight, we now turn to the relationship of pre-pregnancy maternal BMI and duration in Table 3. Model 1 shows that duration the United States is positively related to a pre-pregnancy maternal BMI greater than 25 (O.R.: 1.15, p<.001; C.I.: 1.09, 1.22). However, acculturation is negatively associated and significant (O.R.: .65, p<.05; C.I.: 0.47, 0.90), which suggests the more highly acculturated mothers are more likely to have lower pre-pregnancy

maternal BMI. This finding is contrary to the acculturation paradox hypotheses yet it has been found in other studies (Chrisman, Chow, and Zhao 2017). Model 2 controls for all maternal and social determinants of maternal health, including parity, maternal diet, health, and age, stress, marital status, mother’s employment status, schooling, income, and ethnicity of the community (results not shown here). The model shows slight changes to duration, although it remains statistically significant (O.R.: 1.11, $p < .01$; C.I.: 1.03, 1.19) and acculturation remain unchanged. The covariates, years of education and living in a predominantly Latino community, are positive and statistically significant (O.R.: 1.08, $p < .05$; C.I.: 1.00, 1.16, and O.R.: 1.71, $p < .01$; C.I.: 1.08, 2.71, respectively). The remaining covariates are not statistically significant.

Table 3. Logistic regression odds ratio estimates of maternal BMI > 25 on duration, acculturation, and behavioral, social, and environmental determinants of the sample data

<i>Variable</i>	<i>Model 1</i>	<i>Model 2</i>
Years in the U.S.	1.15 *** (.03) [1.09, 1.22]	1.11 ** (.04) [1.03, 1.19]
Acculturation scale	0.65 * (0.11) [0.47, .90]	0.65 * (0.13) [0.45, .95]
Constant	0.51 ** (.10) [0.34, 0.76]	0.09 ** (.06) [0.02, 0.36]
N	404	376
Log likelihood	-265.2	-232.7
Likelihood Ratio Chi-square	25.66 ***	52.36 ***
Degrees of freedom	2	12
Pseudo-R2	0.05	0.10

standard errors in parentheses; 95% confidence intervals in brackets

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Model 2 controls for the variables: parity, maternal diet, health, and age, stress, marital status, mother’s employment status, schooling, income, and ethnicity of the community (results available upon request).

Hence, these results indicate that maternal pre-pregnancy weight increases the longer the duration in the United States, which provides support for the positive association between macrosomic birth outcomes and length of residency for immigrant women.

DISCUSSION

We extend previous research by assessing the hypotheses explaining the deterioration of health experienced by Latino immigrants in the United States through an examination of changes in birth outcomes during the first generation. In particular, we investigate the effects of length of time residing in the U.S. and acculturation on macrosomic birth outcomes and pre-pregnancy maternal overweight.

Our results find a positive association between macrosomia and duration of stay in the United States. First, the odds of Latina immigrant mothers having a macrosomic birth increases by 10% each year of residence in the United States. Second, after controlling for acculturation and other maternal, behavioral, social, and environmental characteristics, only pre-pregnancy maternal BMI eliminated the effect of duration on a macrosomic birth. We also find a positive and significant association between maternal BMI over 25 and duration in the United States. Our results find with each additional year of residence in the United States there is a 15% increase in the odds of the Latina immigrant mother being overweight. This finding is consistent with research showing there is an increased risk of obesity among Latinos with longer duration in the United States (Akresh, 2008; Isasi et al. 2015; Kaplan, Huguét, Newsom, & McFarland, 2004; Sanchez-Vaznaugh, Kawachi, Subramanian, Sanchez, & Acevedo-Garcia, 2008). Interestingly, acculturation was found to be negatively related to pre-pregnancy maternal overweight, which suggests the less acculturated mothers were more likely to have a pre-pregnancy BMI over 25. Similar results have also been found in a study that showed language acculturation to be negatively associated with BMI of Mexican immigrant women (Chrisman, Chow, and Zhao 2017).

There are several important limitations that should be noted. First, the data was collected at a time when immigration flows were significantly higher than under current policies effecting immigrants and immigration. Given the highly restrictive policies and the increased anti-immigrant sentiment, this may have an effect on the health of immigrants as well as the selection effect of the immigrant who arrives and remains in the United States. In this respect, this cross-sectional data limits our ability to test for potential effect of a selective return migration, which may explain the association of duration and maternal overweight. If migrants of normal levels of weight are on average more likely to return migrate than those who remain, the average weight among those who stay would appear to increase over time. Such a return migration effect may also explain the positive effect of duration without an expected increase in acculturation, as predicted by the acculturation paradox.

Second, the effect of acculturation cannot be entirely ruled out. Although the effect of acculturation is absent, it may be due to inadequately measured or omitted variables. For example, language and ethnic identity-based acculturation measure may inadequately capture the full complexity and multi-dimensionality of the concept. In addition, this analysis does not include some proximate determinant variables that are related to macrosomia, such as maternal pre-pregnancy diabetes, previous macrosomic births, and gestational diabetes mellitus. Future studies that include such maternal outcomes and conditions are needed for a more robust understanding of the effects on length of residence and maternal health.

Despite these limitations this study contributes to the existing literature by providing evidence that increasing macrosomia among Mexican immigrant mothers may be due to increases in maternal overweight with longer duration of residence in the United States. While any recent studies have shown the association of duration and overweight and obesity among Latinos, few have shown this may have consequences for birth outcomes of pregnant mothers. In particular, very few, if any, recent studies assess the possible effects on macrosomic birth outcomes for Latino immigrants. The implications from this study with data that is nearly 20 years old highlights the necessity for current data that can examine the relationship between duration in the U.S. and macrosomic birth outcomes among Latina immigrant mothers and the degree in which it can be explained by maternal overweight. Further knowledge of duration and macrosomic birth outcomes

can only help to improve overall maternal and birth outcomes for immigrant mothers and their children.

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Appendix (Analysis containing all covariate coefficients)

Table 2. Logistic regression odds ratio estimates of macrosomia on duration, acculturation, and behavioral, social, and environmental determinants of the sample data

<i>Variable</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
Years in the U.S.	1.10 * (.04) [1.02, 1.18]	1.11 * (.05) [1.02, 1.21]	1.13 * (.06) [1.03, 1.25]	1.08 (.06) [.97, 1.21]
Acculturation scale	0.79 (0.17) [0.53, 1.20]	0.80 (0.19) [0.51, 1.26]	0.77 (0.21) [0.44, 1.33]	0.81 (0.25) [.44, 1.48]
Gestational age (weeks)		1.81 *** (.23) [1.41, 2.33]	1.84 *** (.26) [1.40, 2.43]	1.77 *** (.28) [1.30, 2.41]
Sex of infant (male = 1)		2.29 ** (.69) [1.26, 4.15]	2.72 ** (.91) [1.41, 5.25]	2.24 * (.85) [1.06, 4.72]
Parity		1.24 (.16) [0.96, 1.59]	1.09 (.19) [0.78, 1.53]	1.03 (.22) [0.67, 1.58]
BMI > 25				5.93 *** (2.95) [2.23, 15.72]
Decrease traditional diet			1.25 (.48) [0.59, 2.67]	1.37 (.60) [0.59, 2.67]
Mother's health			0.77 (.26) [0.39, 1.48]	0.93 (.34) [0.39, 1.48]
Mother's age			1.01 (.04) [0.94, 1.08]	0.98 (.04) [0.94, 1.08]
Prenatal care			1.03 (.49) [0.41, 2.57]	1.07 (.64) [0.41, 2.57]
Social Support			1.69 (.74) [0.71, 4.00]	2.09 (1.05) [0.71, 4.00]
Stress			1.25	1.15

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<i>Variable</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
			(.43)	(.45)
			[0.63, 2.45]	[0.63, 2.45]
Marital status (married = 1)			1.06	1.05
			(.38)	(.44)
			[0.52, 2.16]	[0.52, 2.16]
Mother employed			0.96	0.98
			(.33)	(.40)
			[0.48, 1.90]	[0.48, 1.90]
Schooling			1.02	1.02
			(.05)	(.06)
			[0.92, 1.14]	[0.92, 1.14]
Predominantly Latino community			1.72	1.41
			(.61)	(.58)
			[0.86, 3.46]	[0.86, 3.46]
Income (\geq 150% of poverty level)			0.82	0.70
			(.42)	(.40)
			[0.30, 2.26]	[0.30, 2.26]
Constant	0.10 ***	0.00 ***	0.00 ***	0.00 ***
	(.03)	(.00)	(.00)	(.00)
	[0.00, 0.06]	[0.00, 0.00]	[0.00, 0.00]	[0.00, 0.00]
N	406	379	346	278
Log likelihood	-176.8	-149.5	-128.5	-98.7
Likelihood Ratio Chi-square	6.75 *	41.91 ***	42.77 ***	48.78 ***
Degrees of freedom	2	5	16	17
Pseudo-R2	0.02	0.12	0.14	0.20

standard errors in parentheses; 95% confidence intervals in brackets

† p<.10; * p<.05; ** p<.01; *** p<.001.

Table 3. Logistic regression odds ratio estimates of maternal BMI > 25 on duration, acculturation, and behavioral, social, and environmental determinants of the sample data

<i>Variable</i>	<i>Model 1</i>	<i>Model 2</i>
Years in the U.S.	1.15 *** (.03) [1.09, 1.22]	1.11 ** (.04) [1.03, 1.19]
Acculturation scale	0.65 * (0.11) [0.47, .90]	0.65 * (0.13) [0.45, .95]
Decrease traditional diet		0.87 (.25) [0.50, 1.51]
Mother's health		0.92 (.21) [0.59, 1.46]
Mother's age		1.02 (.03) [0.97, 1.07]
Stress		1.18 (.28) [0.74, 1.86]
Marital status (married = 1)		1.02 (.25) [0.63, 1.63]
Mother employed		0.86 (.20) [0.54, 1.37]
Schooling		1.08 † (.04) [1.00, 1.16]
Predominantly Latino community		1.71 * (.40) [1.08, 2.71]
Income (≥ 150% of poverty level)		1.14 (.38) [0.59, 2.20]
Constant	0.51 ** (.10) [0.34, 0.76]	0.09 ** (.06) [0.02, 0.36]
N	404	376
Log likelihood	-265.2	-232.7
Likelihood Ratio Chi-square	25.66 ***	52.36 ***

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Degrees of freedom	2	12
Pseudo-R2	0.05	0.10

standard errors in parentheses; 95% confidence intervals in brackets

† p<.10; * p<.05; ** p<.01; *** p<.001.