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Institute of Medicine Early Infant Feeding Recommendations for Childhood Obesity Prevention: Implementation by Immigrant Mothers from Central America

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Abstract

Purposes—Describe implementation of Institute of Medicine (IOM) early infant feeding recommendations for child obesity prevention by immigrant mothers from Central America; examine potential relationships with food insecurity and postpartum depressive symptoms.

Design and Methods—Using a cross-sectional, descriptive design, face-to-face interviews were conducted with 318 mothers of 2 month old infants at a large pediatric setting for low income families. Logistic regression models assessed feeding practices, food insecurity and postpartum depressive symptoms.

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Results—Exclusive breastfeeding rates were low (9.4%); most mothers (62.7%) both breastfed and bottle fed their infants. Mothers who bottle fed at moderate and high intensity were twice as likely to affirm that if you give a baby a bottle, you should always make sure s/he finishes it (OR = 2.30, 95% CI = 1.13, 4.69; OR = 2.29, 95% CI = 1.26, 4.14). Food insecurity was experienced by 57% of mothers but postpartum depressive symptoms were low (Possible range = 0–30; M = 2.96, SD = 3.6). However, for each increase in the postpartum depressive symptoms score, the likelihood of affirming a controlling feeding style increased by 11–13%.

Conclusions—Immigrant mothers from Central America were more likely to both breastfeed and bottle feed (*las dos cosas*) than implement exclusive breastfeeding. Bottle feeding intensity was associated with a controlling feeding style.

Practice Implications—Infant well visits provide the ideal context for promoting IOM recommendations for the prevention of obesity among children of immigrant mothers from Central America.

Keywords

infant; feeding style; immigrant; Central America; Institute of Medicine; childhood obesity

The Institute of Medicine (IOM, 2011) report *Early Childhood Obesity Prevention Policies* identifies early infancy as a critical time for obesity prevention and recommends that pediatric health care providers promote both exclusive breastfeeding and responsive infant feeding styles. The guideline for exclusive breastfeeding for the first six months of life is based on evidence from meta-analyses that have linked breastfeeding with a decreased risk for childhood overweight (Arnez, Rükerl, Koletzko, & vonKries, 2004; Harder, Bergmann, Kallischnigg, & Plagemann, 2005). This IOM recommendation is consistent with guidelines from the World Health Organization (WHO, 2011), the National Association of Pediatric Nurse Practitioners (NAPNAP, 2013), and the American Academy of Pediatrics (AAP, 2012). Despite these guidelines that promote exclusive breastfeeding for the first six months, Hispanic mothers living in the U.S. have been found to supplement with formula by 2 days of infant age at higher rates than any other racial/ethnic group (Chapman, & Pérez-Escamilla, 2012).

The IOM recommendation that health care providers also teach and promote responsive feeding styles during early infancy emerges from research findings that older children have the ability to regulate their food intake and that responsive feeding practices reinforce eating practices according to internal hunger and fullness cues (Black, & Aboud, 2011; Engle, Pelto, 2011). The IOM posits that this ability appears to be present in infancy (Fox, Devaney, Reidy, Razafindrakoto, & Ziegler, 2006) and that the potential for self-regulation should be tapped through a responsive, non-controlling feeding style that reflects sensitivity to infant cues of hunger and satiety. Worobey and colleagues (2009) found that decreased sensitivity to infant cues between 6–12 months of age was linked to excessive weight gain by one year, but the effect of feeding practices in early infancy has not been established. However, a subsequent systematic reviews of 30 prospective studies demonstrated an association between excessive weight gain in infancy and early childhood obesity, thus adding support

to the need for identification of factors that lead to excessive weight gain in the first year of life (Weng, Redsell, Swift, Yang, & Glazbrook, 2012).

One sector of the U.S. population at disproportionate risk for early childhood obesity but underrepresented in this area of research is Hispanic children. Using the benchmark of BMI 95th percentile, a recent national survey found obesity among Hispanic preschoolers (15.6%) exceeded that of black (10.4%), white (5.2%), and Asian (5.0%) children (Ogden et al., 2016). These estimates are alarming in light of a U.S. Census report that Hispanic children are now more than one-fourth of the population under 1 year of age (Passel, Livingston, & Cohn, 2012). Most mothers of these children were born outside the United States and many have come from Central America (Murphey, Guzman, & Torres, 2014). Over the past several years, migration from El Salvador, Honduras, Nicaragua and Guatemala has risen dramatically as families flee gang violence and poverty (Lesser & Batalova, 2017). Despite their growing presence in the United States, these families are underrepresented in studies related to early childhood obesity prevention.

To address this gap, we examined the implementation IOM-recommended early infant feeding practices by mothers who are immigrants from Central America. We also explored the potential relationships between these practices and maternal food insecurity and postpartum depressive symptoms, as both have been found to have associations with early infant feeding practices among mothers from diverse racial/ethnic and geographical backgrounds (Dennis & McQueen, 2009; Gross, Mendelsohn, Fierman, Racine, & Messito, 2012). We are not aware of studies that have examined these relationships among immigrant mothers from Central America

In its position statement concerning the promotion of food security in clinical practice and health policy, the AAP (2015) asserted that the food insecurity experienced by low income populations in the United States disproportionately places them at risk for childhood obesity. Gross and her colleagues (2012) examined the relationship between maternal food insecurity and obesogenic maternal infant feeding styles among low income families and found that maternal food insecurity was related to controlling feeding styles. Their research included infants up to 6 months of age, both Hispanic and non-Hispanic mothers as well as a combination of immigrant and U.S. born mothers. Building on their findings, we sought to examine whether a similar relationship would be found with mothers from our target population.

Prior research also has linked postpartum depressive symptoms with infant feeding practices. A systematic review of the relationship between breastfeeding practices and postpartum depressive symptoms that included 75 international studies found that women with postpartum depression symptoms were less likely to initiate breastfeeding or to do so exclusively (Dennis, McQueen, 2009). A U.S. population-based study using the Infant Feeding Practices Study II dataset found mothers with postpartum depressive symptoms were more likely to breastfeed at low intensity compared to those without depressive symptoms. A limitation of this study was the underrepresentation of Hispanic and low income mothers (Gaffney, Kitsantas, Brito, & Swamidoss, 2014). Hurley and her colleagues (2008) assessed non-responsive feeding styles among mothers of infants and found a

significant association between maternal postpartum depressive symptoms and a forceful infant feeding style. Most of the mothers in their study had completed high school and were non-Hispanic. The present study was focused on a group at high risk for early childhood obesity that has been underrepresented in research. The purposes of this study were to describe implementation of IOM early infant feeding recommendations for child obesity prevention by immigrant mothers from Central American and examine potential relationships between feeding practices and maternal food insecurity and postpartum depressive symptoms.

Methods

The study was conducted in a large pediatric primary care setting for low income families in Virginia. Study approval was obtained from clinical and university Institutional Review Boards. Mothers who met inclusion criteria were at least 18 years old, immigrants from Central America, gave birth to a baby who weighed at least 5 lbs., was delivered at 37 weeks gestation, without medical problems that would interfere with feeding or growth, and was currently being seen for the regularly scheduled well child check when their infants were 2 months old. The sample was comprised of 318 mothers-infant dyads.

Data Collection

Following informed consent, mothers responded to survey items during structured interviews with bilingual undergraduate Nursing and Global and Community Health students who were employed as research assistants. The students prepared for this task with role playing sessions with the research team prior to actual data collection. The face-to-face approach for data collection mirrors health histories conducted at the site, and thus, was familiar to mothers and reduced potential discomfort due to low literacy. This has been an effective strategy in prior research with Hispanic populations (Gibson-Davis, & Brooks-Gunn, 2006). Interviews lasted approximately 30 minutes. Data were collected between 2015 and 2017. Missing data for major study variables was 0.6%.

Measures

Infant Feeding Practices and Styles—The IOM feeding practice recommended for infants between birth and 6 months of age is exclusive breastfeeding. To assess implementation of this recommendation, we conducted a 24-hour recall of infant feeding for a typical day and categorized results as exclusive breastfeeding, mixed feeding (both breastfeeding and bottle feeding) and bottle feeding only. Since our preliminary findings indicated that most mothers were both breast and bottle feeding (62.3%) or bottle feeding only (28.3%), we constructed a bottle feeding intensity variable to better understand the proportion of feedings that were via bottle. As done in the Infant Feeding Practices Study II, this variable was the total number of bottle feedings divided by the total number of all feedings per typical day in the past week (Li, Magada, Fein, Grummer-Strawn, 2012). Bottle feeding intensity was categorized as low (<25%), moderate (25<50%) or high (≥50%).

The IOM recommendations also call for responsive feeding styles that are sensitive to infant cues of hunger and satiety and non-controlling. We measured responsive feeding styles using

eight items from the Child Feeding Questionnaire that have been tested with Hispanic mothers of infants in both English and Spanish forms in prior research (Birch et al., 2001; Gross, Mendelsohn, Fierman, & Messito, 2011; Taveras et al., 2011). Mothers were asked to respond to items based on a four-point Likert scale (strongly agree, agree, disagree and strongly disagree; Table 3). Consistent with prior research, these items were each analyzed separately and not as a scale (Gross et al., 2010). After reverse coding as appropriate, mothers' answers to these feeding style items were each categorized as responsive or non-responsive.

Food Insecurity—The two-item Food Insecurity Scale, developed from the Core Food Security Module (Harrison, Stormer, Herman, & Winham, 2003) was used to characterize mothers' experience with running out of money for food during the past 12 months. This widely used screening tool has been validated in Spanish and English with a reported sensitivity of 97% and a specificity of 83% and is now recommended for regular well child visits by the AAP (2015). Consistent with prior research and current clinical practice, we constructed a three-level classification: "none" (no food insecurity), "positive on one item" or "positive on two items" (Gross, Mendelsohn, Fierman, Racine, & Messito, 2012; Hager et al., 2010).

Postpartum Depressive Symptoms—Postpartum depressive symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS). Both Spanish and English versions of this measure have been validated with low income mothers, including Hispanic women living in the U.S. and have been used widely as a screening measure in community-based clinic settings (Gibson, McKenzie-McHarg, Shakespeare, Price, & Gray, 2009). The scale is comprised on 10 items with four-level Likert style response options and a possible range of scores from 0–30. Using the EPDS, mothers reported current experiences with depressive symptoms such as feeling "so unhappy that I have been crying" (Yes, most of the time, Yes, quite often, Not very often, or No, not at all). We calculated the postpartum depressive symptoms score as a continuous variable based on mothers' summative scores. In addition, we used the dichotomous category of ≤ 10 to identify mothers at risk for postpartum depression, as has been the recommended cutoff score for clinical practice with reported sensitivities of 0.59 to 0.81 and specificities of 0.77 to 0.88 for major and minor depression (Gaynes, Gavin, Meltzer-Brody, Lohr, Swinson, et al., 2005).

Demographic Characteristics—To describe our sample and compare findings with current research in the area of infant feeding practices, we also assessed several demographic characteristics. Mothers were identified as having high or low acculturation using the Short Acculturation Scale (SAS). This four-item Spanish language usage scale that has been used with Central American women and found to have good internal reliability (Cronbach's alpha: 0.81; Wallen, Feldman, & Anliker, 2002). Mothers responded to items such as "With friends, what language do you prefer to speak?" using a five-point Likert-type option (100% Spanish, 75% Spanish, 50% Spanish, 25% Spanish, 100% English). The potential range of total scores is 4 to 20, with higher scores signifying greater acculturation. Using a cutoff from prior research, scores ≥ 12 were used to indicate high levels of acculturation (Gibson, Diaz, Mainous, & Geesey, 2005), we categorized respondents as

having low or high acculturation. Additional characteristics were maternal age (25, 26–33, 34 years), education (<9 years, 9–12, 13 years), number of years living in the United States (3 years, 4–7, 8 years), parity (1, 2, 3 children), infant gender and birth weight.

Statistical Analysis

Descriptive statistics were used to assess the distribution of all study variables. Logistic regression models were built to examine predictors of infant feeding styles after controlling for maternal and infant characteristics. The infant feeding style items selected as outcome variables were those in which a non-responsive feeding style was endorsed by the majority of mothers in this sample.

Results

Table 1 displays characteristics of mothers in this study. Most mothers were less than 34 years of age (76%) with educational level of high school or less (92%). The country of origin for many mothers was El Salvador (54%) followed by Honduras (26%). More than half of the mothers (52%) of the mothers had lived in the United States less than 8 years and 95% had low language acculturation. A substantial proportion (57%) affirmed both food insecurity items while 28% reported that they had not experienced food insecurity in the past 12 months. EPDS scores were low with a mean score 2.96 (SD=3.6; possible range = 0–30). Few mothers (6%) had scores ≥10, the cutoff score for used to screen for postpartum depression in primary care settings. Of the infants in the study, 53% were female. Their average birth weight was 7.5 lbs. (SD=0.96). The most common feeding practice at 2 months infant age was mixed feeding, i.e., both breastfeeding and bottle feeding (62%) while 28% bottle fed only and 9 % were breastfeeding exclusively (Table 2). Bottle feeding intensity was moderate or high for 72% of the sample.

More than half of the mothers' answers reflected responsive feeding styles. Specifically, most mothers disagreed with the practice of feeding infants more when they appeared to have finished (68.9%) and agreed with statements about the meaning of infant behaviors such as turning head from bottle or nipple and sucking on hands (90.3% and 81.8%, respectively). They also agreed that a baby knows when s/he is full (88.4%).

However, as seen in Table 3, a non-responsive feeding style was indicated by more than half of the sample on four other items. Specifically, mothers agreed with the need to control the amount that their baby takes (52.5%) or ensure that, if given a bottle, s/he finishes it (70.3%). They also agreed that feeding is the best way to soothe a crying baby (51.9%) and that, if a baby cries, it is due to hunger (65.1%). Given the potential clinical implications of these four non-responsive feeding style findings, they became the focus of further analysis.

Adjusted odds ratios (95% confidence intervals) were calculated for each of these four items in which more than half of mothers affirmed a non-responsive feeding style in order to assess potential relationships with bottle feeding intensity, maternal food insecurity and postpartum depressive symptoms. As seen in Table 4, logistic regression models were adjusted for mothers' age, education, number of years living in the United States, language acculturation, number of living children, infant gender and birthweight.

Women who bottle fed at moderate or high levels of intensity were found to be over twice as likely (OR =2.30; 95% CI= 1.13, 4.69 and OR =2.29; 95% CI=1.26, 4.14, respectively) to agree that if you give a baby a bottle, you should always make sure that s/he finishes it, indicative of a non-responsive, controlling feeding style, but did not affirm the need to control the amount the baby takes. Conversely, those for whom bottle feeding intensity was categorized as high were more likely to disagree with the statement that feeding is the best way to soothe a crying baby (OR= 0.49; 95%, CI = 0.28, 0.87). In addition, mothers who were categorized as food insecure based on positive responses to both food insecurity items had a decreased odds of a non-responsive feeding style in regard to controlling the amount their baby takes (OR=0.44; 95% CI=0.25, 0.78). Additionally, for each increase in the postpartum depressive symptoms score reported, the likelihood of mothers affirming a non-responsive style by controlling the amount her baby takes or making sure that the baby finishes the bottle increased by 11–13% (OR=1.13;95%, CI=1.05,1.22, and OR=1.11;95%, CI=1.02–1.21, respectively).

Discussion

In addressing the implementation of the IOM early infant feeding recommendations by immigrant mothers from Central America, we found low rates of exclusive breastfeeding. Most mothers reported bottle feeding intensity at moderate or high levels. The finding that less than 10% of our sample was exclusively breastfeeding at 2 months infant age suggests both an obesogenic risk and a clinical challenge as *Healthy 2020* has set a goal that 46.2% of infants in the United States are exclusively breastfed through 3 months (CDC, 2016). In a population-based study of breastfeeding practices, Colombara and colleagues (2015) found rates of exclusive breastfeeding during the first six months of life substantially higher in El Salvador (59.2%), Guatemala (76.8%), Honduras (47.6%), and Nicaragua (60.0%) than the self-report findings in our study. One difference between the two studies is that participants of study conducted in Central American countries were responding to their breastfeeding practices based on infant ages that ranged from 0–5 months, while our inclusion criteria was for mothers of 2 month old infants. As a result, mothers who may have exclusively breastfed in the first few weeks after delivery in Central America, but began to supplement with formula before two months postpartum, may have contributed to the higher percentage values.

Nonetheless, it is important to consider why mothers in our study who had immigrated to the United States from these Central American countries reported low rates of exclusive breastfeeding. Besore (2014) proposed that one contributing factor may be that many women from Latin America hold the belief that breastfeeding is a practice of the poor who are not able to purchase formula. All mothers in our study were participants in WIC (Supplemental Nutrition Program for Women, Infants, and Children) and, therefore, had ready access to infant formula. In a systematic review of the literature, Cartagena and colleagues (2014) identified other potential barriers to exclusive breastfeeding for our target population, including a concern about insufficient breast milk supply, pressure from fathers and other family members to supplement with formula if babies were not perceived to be chubby (*gordito*), and the belief that “*las dos cosas*” or combined breastfeeding and bottle feeding

was preferred because it offered both the health benefits of breast milk and the additional vitamins and nutrients present in formula.

With respect to the IOM recommendation for a responsive feeding style that allows infants to self-regulate, we most mothers supported a responsive feeding style that is sensitive to infant hunger and satiety cues. However, a substantial proportion ascribed to a non-responsive style with respect to controlling the amount a baby should consume and using a feed-to-soothe strategy as the optimal way to handle infant crying. These disparate findings are similar to those in past research with low income, Hispanic families (Gross et al., 2010). A potential explanation is that many mothers may recognize feeding cues but are more responsive to the louder sounds of crying than to quieter signals such as head turning or finger sucking.

After adjusting for other maternal and infant characteristics, we found that mothers with moderate to high levels of bottle feeding intensity were more likely to affirm that if you give a baby a bottle you should make sure that s/he finishes it. However, a non-significant relationship was found between bottle feeding intensity and affirming the need to control the “amount my baby takes”. A potential explanation for these discordant findings is that ensuring that the baby finishes the bottle may be as wasting a valued commodity, namely the formula in the bottle, while controlling intake may be perceived less favorably in terms of the maternal-infant relationship.

We also found that mothers who provided more than half of their babies’ feedings via bottle were less likely to affirm that the best way to soothe a crying baby is to feed him/her. In considering this finding, we note that peak times for infant irritability and colic occur between 3 weeks and 3 months of age and that simultaneously infant formulas to treat infant crying and fussiness are widely available in the United States. It may be that 2 month old infants, such as those in the present study, have received formulas that effectively reduce crying, and subsequently mothers’ more responsive feeding styles come to the forefront while increasing the use of formulas that reduce crying. We are not aware of research that has examined this scenario. However, if confirmed, it might help explain the seemingly discordant findings regarding infant feeding styles of mothers in the current study.

We also examined non-responsive feeding styles in relation to mothers’ current experiences with food insecurity and postpartum depressive symptoms. Mothers who had experienced food insecurity over the past 12 months were found to be significantly less likely control the amount their baby takes compared to those who were food secure. By contrast, Gross and colleagues (2012) found that mothers reporting food insecurity were more likely to affirm controlling infant feeding styles than mothers who were food secure. Their study sample was comparable to the present one as 84% of the mothers were Hispanic and had lived in the U.S. approximately the same length of time. One difference was that their sample did not include mothers from Central America. A factor that may have specific influence for Central American mothers is their early life experiences in observing both high rates of infant malnutrition, stunted growth, and mortality along with an increasing prevalence of obesity among older children in their home countries. This paradox has been described as the “double burden” of malnutrition in Central America (CDC, 2017). Whether the unique

exposures of these mothers influence their pathway between food security and infant feeding styles needs further study before drawing conclusions about a potential trajectory toward early childhood obesity. One explanation is that these early life experiences with infant malnutrition and childhood obesity by mothers from Central America leads to a commonly held belief that a “chubby baby is a healthy baby” (Cartagena, et al., 2014).

In the current study, the proportion of mothers at clinical risk for postpartum depression was low (5.9%), compared the rate of 10% found in a prior study of mothers who also completed the EPDS at 2 months infant age (Radesky, et al., 2013). One difference between the studies was that the latter excluded participants who were non-English speaking. Further, in the current study, mothers’ average score on the EPDS was approximately three, compared to a possible total score range of 0–30. This finding compares to a study of black and Hispanic mothers that found similar EPDS average scores (Howell, et al., 2012). Separate findings for Hispanic mothers in this latter study were not reported. Despite the low EPDS scores in the current study, we did find that as scores increased mothers were more likely to use a controlling, non-responsive infant feeding style. This finding fits with studies that have found a relationship between depressive symptoms and forceful feeding styles that do not allow for infant self-regulation of intake (Dennis, & McQueen, 2009; Hurley, Black, Papas, & Caulfield, 2008; Watkins, Meltzer-Brody, Zolnoun, & Steube, 2011). The generalizability of earlier studies has been limited by an underrepresentation of Hispanic mothers.

There are several limitations to the present study. Participants were a convenience sample of immigrant mothers from Central America who were recruited from a single clinical setting. Therefore, findings may not be generalizable to other geographical areas, cultures, or populations. Although interviewers received training for nonjudgmental responses to mothers’ information, a social desirability response bias may have been present. Further, the study focused on the 24-hour dietary intake of the infant as reported by the mother and did not specify what proportion of bottle feeding was implemented by the mother herself versus feedings by other caregivers, including the baby’s father, grandmother, and/or other family members.

In addition to these limitations, the study offers several strengths. Interviewers were all native Spanish speakers with cultural and economic backgrounds similar to those of the mothers. Their participation in the research may have helped mothers feel at ease in sharing their feeding practices and experiences with food insecurity and postpartum depressive symptoms. Another strength of this study was the use of food insecurity and postpartum depressive measures that are currently used in clinical practice as screening measures during regularly scheduled 2-month infant well-visits. This was done to enhance the translation of research findings to current practice. Additionally, this study adds to the body of science concerning early predictors of childhood obesity by its focus on an underrepresented sector of the population, namely, mothers who have left poverty and violence in their Central American home countries and are now residents of the United States along with their US-born infants.

Practice Implications

Regularly scheduled well child visits, as proscribed in the *AAP Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents* (Hagan, Shaw, & Duncan, 2017) provide an ideal setting for anticipatory guidance regarding exclusive breastfeeding and responsive feeding styles as they use long-established, evidence-based techniques to provide mothers of infants with family-centered, culturally effective, and system-oriented care.

These visits may be used to address early feeding practices that lead to childhood obesity. The recognition of infant cues for hunger and satiety demonstrated by mothers in the current study was a positive finding that may be reinforced during the regularly scheduled well visits between birth and 4 months of age. In addition, study findings suggest a need for guidance about how mothers may respond to infant cues in ways that avoid overfeeding and that help infants self-regulate their intake. An additional message that is well-suited to early well visits is that infant crying does not always indicate hunger. Nurses and other healthcare providers can teach mothers and family caregivers that soothing strategies such as holding, swaddling, and rocking should be tried first, rather than using bottle feeding as a first response.

Research Implications

Replication and extension studies are needed to identify other life course experiences that may contribute to infant feeding practices for the current target population as well as those who are immigrants to the United States from other countries experiencing the “double burden” of infant malnutrition and growing rates of childhood obesity. The finding that mothers in the present study who had ready access to formula for their infants reported high rates of food insecurity for their households raises questions about potential trajectories between food availability for parents and infant feeding behaviors. Further study may lead to health policy recommendations regarding access to healthy foods for families at risk for early childhood obesity.

Conclusion

This study found that immigrant mothers from Central America were more likely to breastfeed and bottle feed in early infancy (*las dos cosas*) than practice exclusive breastfeeding. In addition, bottle feeding intensity was high and associated with a controlling feeding style. Further research is needed to inform clinical practices that support the implementation of IOM early infancy feeding recommendations for childhood obesity prevention for the infants of mothers who are immigrants to the United States from Central America.

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Highlights

Immigrant mothers from Central America were more likely to both breastfeed and bottle feed (*las dos cosas*) than practice exclusive breastfeeding in early infancy.

Mothers who bottle fed at moderate and high intensity were more likely to affirm a controlling infant feeding style.

With increasing postpartum depressive symptoms, the likelihood of affirming a controlling infant feeding style increased.

Table 1

Characteristics of Central American Immigrant Mothers (n=318)

	n (%)
Age (years)	
18–25	103 (32.4)
26–33	140 (44.0)
34	75 (23.6)
Education (years)	
<9	129 (40.7)
9–12	162 (51.1)
13	26 (8.2)
Country of Origin	
El Salvador	171 (53.8)
Guatemala	60 (18.9)
Honduras	83 (26.1)
Nicaragua	4 (1.3)
Living in US (years)	
3	92 (28.9)
4–7	74 (23.3)
8	152 (47.8)
Language Acculturation	
Low	302 (95.3)
High	15 (4.7)
Food Insecurity	
Never	90 (28.3)
Positive on one item only	48 (15.1)
Positive on 2 items	180 (56.6)
Postpartum Depressive Symptoms	
Low Risk <10	299(94.3)
High Risk 10	18(5.7)
Parity	
One child	99 (31.1)
Two children	93 (29.2)
Three children	126 (39.6)

Table 2

Infant Feeding Practices among Central American Immigrant Mothers with Infants at 2 Months of Age (n =318)

	n (%)
Infant Feeding Practices	
Breastfeeding only	30 (9.4)
Mixed feeding (Breastfeeding and Bottle feeding)	198 (62.3)
Bottle only	90 (28.3)
Bottle Feeding Intensity (proportion of daily feedings given by bottle)	
Low (< 25%)	89 (28.0)
Moderate (25<50%)	75 (23.6)
High (50%)	154 (48.4)

Table 3

Infant Feeding Styles among Central American Immigrant Mothers with Infants at 2 Months of Age (n=318)

Infant Feeding Style Statement	Non-Responsive Feeding Style n (%)
I have to control the amount my baby takes because if I did not s/he would take less than s/he needs. ¹	167 (52.5)
When my baby appears to have finished, I try to feed him/her a little more. ¹	99 (31.1)
If you give a baby a bottle, you should always make sure that s/he finishes it. ¹	223 (70.3)
A baby knows when s/he is full. ²	37 (11.6)
The best way to soothe a crying baby is to feed him/her. ¹	165 (51.9)
You know your baby is full when s/he turns his/her head away from the nipple or bottle. ²	31 (9.7)
If your baby is crying, s/he must be hungry. ¹	207 (65.1)
You know your baby is hungry when s/he sucks on his/her hands. ²	58 (18.2)

¹Non-responsive feeding style indicated by agreement with this statement.²Non-responsive feeding style indicated by disagreement with this statement.

Table 4

Adjusted Odds Ratios (95% CI) for Non-Responsive Feeding Styles among Central American Immigrant Mothers (n=318)

	I have to control the amount my baby takes, if I did not, s/he would take less than s/he needs.			If you give a baby a bottle, you should always make sure that s/he finishes it.		
	Non-Responsive Feeding = Agree with statement			Non-responsive Feeding = Agree with statement		
	Responsive	Non-Responsive	AOR [†] (95% CI) Non-Responsive	Responsive	Non-Responsive	AOR [†] (95% CI) Non-Responsive
Bottle feeding intensity %						
Low (<25%)	46.1	53.9	Reference	42.0	58.0	Reference
Moderate (25<50%)	45.3	54.7	1.11 (0.57, 2.23)	24.0	76.0	2.30 (1.13, 4.69)*
High (50%)	49.4	50.6	1.14 (0.64, 2.04)	25.3	74.7	2.29 (1.26, 4.14)*
Food insecurity %						
None	42.2	57.8	Reference	28.1	71.9	Reference
Positive on 1 item	27.1	72.9	1.68 (0.75, 3.80)	25	75	1.14 (0.48, 2.71)
Positive on 2 items	55.6	44.4	0.44 (0.25, 0.78)*	31.7	68.3	0.68 (0.37, 1.26)
Postpartum depressive symptoms score, Mean (SD)	2.51 (3.63)	3.38 (3.51)	1.13 (1.05, 1.22)*	2.25 (2.74)	3.26 (3.85)	1.11 (1.02, 1.21)*
	The best way to soothe a crying baby is to feed him/her.			If your baby is crying, s/he must be hungry.		
	Non-responsive Feeding= Agree with statement			Non-responsive Feeding = Agree with statement		
	Responsive	Non-Responsive	AOR [†] (95% CI) Non-Responsive	Responsive	Non-Responsive	AOR [†] (95% CI) Non-Responsive
Bottle feeding intensity %						
Low (<25%)	39.3	60.7	Reference	37.1	62.9	Reference
Moderate (25<50%)	46.7	53.3	0.60 (0.31, 1.17)	28.0	72.0	1.15 (0.56, 2.38)

	I have to control the amount my baby takes, if I did not, s/he would take less than s/he needs.				If you give a baby a bottle, you should always make sure that s/he finishes it.			
	Non-Responsive Feeding = Agree with statement				Non-responsive Feeding = Agree with statement			
	Responsive	Non-Responsive	AOR [†] (95% CI) Non-Responsive		Responsive	Non-Responsive	AOR [†] (95% CI) Non-Responsive	
High (50%)	53.9	46.1	0.49 (0.28, 0.87) *		37.0	63.0	1.07 (0.57, 1.95)	
Food insecurity %								
None	40.0	60.0	Reference		34.4	65.6	Reference	
Positive on 1 item	50.0	50.0	0.62 (0.28, 1.34)		41.7	58.3	0.69 (0.31, 1.54)	
Positive on 2 items	51.7	48.3	0.63 (0.36, 1.11)		33.3	66.7	0.96 (0.52, 1.76)	
Postpartum depressive symptoms score, Mean (SD)	3.11 (3.74)	2.83 (3.44)	0.99 (0.93, 1.05)		2.75 (3.41)	3.08 (3.67)	1.00 (0.93, 1.08)	

[†] AOR = adjusted odds ratio, 95% CI = 95% confidence intervals; logistic regression models were adjusted for mother's age, education, years in the US, language acculturation, number of living children, infant gender, and birthweight.

* P-value < 0.05.