Adverse Childhood Experiences and Prenatal Depression in the Maternal and Development Risks from Environmental and Social Stressors Pregnancy Cohort

Karina Corona, PhD[1], **Thomas Chavez, MS**[1], **Kennedy Stewart**[2], **Claudia M. Toledo-Corral, PhD, MPH**[1,2], **Shohreh F. Farzan, PhD**[1], **Rima Habre, ScD**[1], **Brendan Grubbs, MD**[3], **Laila Al-Marayati, MD**[3], **Nathana Lurvey, MD**[4], **Deborah Lerner, MD**[4], **Sandrah P. Eckel, PhD**[1], **Isabel Lagomasino, MD**[5], **Carrie V. Breton, ScD**[1], **Theresa M. Bastain, PhD, MPH**[1]

[1]Department of Population and Public Health Sciences, University of Southern California

[2]Department of Health Sciences, California State University, Northridge

[3]Department of Obstetrics and Gynecology, University of Southern California

[4]Eisner Health

[5]Department of Psychiatry and Behavioral Sciences, University of Southern California

Abstract

The aim of this study was to examine the association between adverse childhood experiences (ACEs) and risk for depression among 480 predominantly low-income Hispanic/Latina women in the Maternal and Development Risks from Environmental and Social Stressors pregnancy cohort. Models were fitted to evaluate associations between ACEs and prenatal probable depression measured by the Center for Epidemiologic Studies-Depression Scale adjusting for recruitment site, age, income, race/ethnicity, marital status, and parity. The ACEs questionnaire parameterized experiences as counts (0–10), categories (0, 1–3, and 4+ ACEs), and domains. Participants had a significantly higher likelihood of prenatal probable depression per unit increase in ACEs count or if they reported 4+ ACEs relative to 0 ACEs. Higher likelihood of probable depression was also associated with higher counts of each ACEs domains: abuse, neglect, and household dysfunction. Findings suggest systematic screening for depressive symptoms in those with a history of childhood adversities may be important in prenatal care practice.

Keywords

prenatal depression; adverse childhood experiences; abuse; neglect; household dysfunction; Hispanic/Latinas

Corresponding author: Karina Corona, PhD, Department of Population and Public Health Sciences, University of Southern California, karinaco@usc.edu.

Introduction

Prenatal depression is a major public health concern. The prevalence of prenatal depression among U.S. women 18 years or older is between 10% and 15% (Gavin et al., 2005). Experiencing depression during pregnancy has been associated with adverse maternal, as well as child mental and physical health outcomes. Mothers who experience prenatal depression are considered at higher risk for anxiety, postpartum depression, and even suicide (Howard & Khalifeh, 2020; Norhayati et al., 2015). The children of mothers who experience prenatal depression are placed at a higher risk for negative cognitive, emotional, and physical consequences (Benatar et al., 2020; Bergman et al., 2007; Field, 2011).

There are several factors associated with the risk of prenatal depression including maternal anxiety, life stress, insurance status, socioeconomic status, race/ethnicity, and cohabitation status (Lancaster et al., 2010). Emerging studies indicate that adverse childhood experiences (ACEs) may maintain or increase the predisposition to antenatal depression (Angerud et al., 2018; Atzl et al., 2019; Racine et al., 2021; Wajid et al., 2020; Young-Wolff et al., 2019). ACEs are defined as stressful and/or traumatic events that occurred during the first 18 years of one's life. Traumatic or adverse events include experiencing violence, neglect, emotional and physical abuse, as well as being exposed to parental psychopathology, parental incarceration, or parental separation during childhood (Anda et al., 2006; Racine et al., 2021).

A meta-analysis consisting of 12 studies of majority U.S. samples found a significant association between ACEs and prenatal depression (Racine et al., 2021). Given that the extant literature examining the association between ACEs and prenatal depression has mostly focused on White samples in high-income regions; there is a need for studies in minority samples that include underrepresented racial/ethnic groups and immigrant communities (Angerud et al., 2018; Menke et al., 2019; Racine et al., 2021; Racine et al., 2020; Wajid et al., 2020). Research suggests that racial/ethnic inequities in prenatal depression may be exasperated by antenatal stressors such as adverse childhood experiences (Gavin et al., 2011).

Although prenatal depressive symptoms are prevalent among racial and ethnic minority samples with approximately one-third of Hispanic/Latinas reporting depressive symptoms (Lara et al., 2009), research determining whether the association between ACEs and prenatal depression varies by nativity is scarce. There is some evidence indicating that prenatal depression significantly increases as generations progressed (Ruiz et al., 2012). Extant studies, which have solely focused on non-pregnant Hispanic/Latina samples, indicate that prevalence of childhood maltreatment experiences may vary by nativity status (Caballero et al., 2017; Vaughn et al., 2017). Warner et al. (2012) found that non-pregnant U.S. born Hispanic/Latinas reported witnessing more childhood violence and sexual assault than foreign-born Hispanic/Latinas; however, there was no indication that nativity status influenced the association between maltreatment experience and depression (Warner et al., 2012). Given the gaps in the literature among pregnant Hispanic/Latinas, the association between ACES and prenatal depression needs to be disaggregated by nativity status.

The study aims are to (1) examine the associations between ACEs and prenatal depression among women in the Maternal and Developmental Risks from Environmental and Social Stressors (MADRES) pregnancy cohort and (2) explore the associations between ACEs and prenatal depression by nativity status amongst Hispanic/Latinas only. We hypothesized that a higher number of ACEs (i.e., count, categories, domains) would be associated with probable prenatal depression.

Materials and Methods

Participants included in this study were enrolled in the MADRES ongoing pregnancy cohort (Bastain et al., 2019). The cohort participants were recruited from four prenatal care providers in urban Los Angeles beginning in November 2015. The majority of the participating recruitment sites serve predominantly lower-income populations. The MADRES study and protocol have been described previously (Bastain et al., 2019). To be eligible to participate in the pregnancy cohort, the women must be less than 30 weeks pregnant, at least 18 years old, and speak fluent English or Spanish. Exclusion criteria for the study included: (1) multiple gestations; (2) current incarceration; (3) having a physical, mental, or cognitive disability that would prevent participation or ability to provide consent; and (4) a positive human immunodeficiency virus status. All participants provided informed consent at study entry; the study was approved by the University of Southern California's Institutional Review Board HS-15–00498.

As of April 1st, 2021, 665 women had entered the study before 20 weeks' gestation. The sample size for this study was 480 women after excluding 185 women who were missing the ACEs measure or did not have at least one prenatal depression assessment (Center for Epidemiological Studies-Depression, CES-D). The sample size for the analyses with Hispanic/Latina women only was 382. Participants completed the interviewer-administered questionnaires orally in English or Spanish. Maternal adverse childhood experiences were retrospectively collected using the 10-item ACEs questionnaire during the second or third trimester (see Table S1) (Felitti et al., 1998). Prenatal depression was measured using the 20-item CES-D scale at each pregnancy trimester (see Table S2) (Radloff, 1977). The analyses were not trimester-specific; the presence of at least one CES-D score   16 across trimesters was coded as probable depression during pregnancy (Radloff, 1977). We identified covariates for inclusion in our models using Directed Acyclic Graphs (DAGs) (Ferguson et al., 2020). Covariate variables included the mother's age at recruitment, recruitment site, race/ethnicity, annual household income, marital/cohabitation status, and parity. Language preference was not hypothesized to confound the relationship between exposure and outcome.

Frequencies were calculated for categorical variables and mean and standard deviations for continuous variables. Chi-square and ANOVA tests were used to determine differences within groups. We used logistic regressions to model the univariate relationship between covariates and probable prenatal depression. Five separate logistic regressions were used to model the association between prenatal depression and ACEs count, category of ACEs (0, 1–3, and 4+ ACEs), and ACEs domains (abuse, neglect, household dysfunction), adjusting

for recruitment site, race/ethnicity, age at study entry, household income, parity, and marital status.

To test the relationship between ACEs and prenatal depression among foreign-born and U.S-born Hispanic/Latinas, we created an interaction term to be included in each respective model (ACEs count*nativity, ACEs category*nativity, or ACEs domain for abuse*nativity, ACEs domain for neglect*nativity, and ACEs domain for household dysfunction*nativity). Given that U.S. nativity may be a risk factor for depression, we also analyzed the associations in U.S.-born Hispanic/Latinas and foreign-born-Hispanic/Latinas, separately (Fleuriet & Sunil, 2014; Toledo-Corral et al., 2021). The models were adjusted for recruitment site, age, income, parity, and marital status and were restricted to only Hispanic/Latina participants. All statistical analyses were conducted using the SAS statistical package (Version 9.4).

Results

Summary statistics for all sociodemographic characteristics are reported in Table 1. Most of the sample self-identified as Hispanic/Latina (79.6%) and smaller sub-samples self-identified as Black (9.8%) or other (3.8%). Chi-squares, ANOVAs, and the unadjusted odds ratios for the univariate analysis with sociodemographic characteristics with probable prenatal depression are also presented in Table 1. Across the three trimesters, 36% percent of all participants (n = 175) reported at least one score of 16 or higher on the CES-D scale indicating probable prenatal depression. The median, range, mean, and standard deviation of ACEs by sociodemographic characteristics are presented in Table 2. Frequency data indicated that ACEs were non-normally distributed with 37% of the mothers (n = 180) reported having zero ACEs, 43% (n = 206) reported between one to three ACEs, and 20% of participants (n = 94) reported four or more ACEs.

Among participants that identified as Hispanic/Latina, 39.2% of the participants (n = 150) reported having zero ACEs, 42% (n = 161) reported between one to three ACEs, and 18.6% of participants (n = 71) reported four or more ACEs. Across the three trimesters, 35% percent of Hispanic/Latina participants (n = 133) reported at least one score of 16 or higher on the CES-D scale.

Table 3 presents results from multiple logistic regression models assessing the relationship between ACEs and probable prenatal depression. For each increase in ACEs count there was a 28% increased odds of probable depression (OR = 1.28; 95% CI = 1.16, 1.41) after adjusting for recruitment site, ethnicity/race, age, income, parity, and marital status.

In the model with ACEs as a categorical variable, we found that participants with 1–3 ACEs had 1.58 times the odds of prenatal depression (95% CI: 0.98, 2.54) and 4-fold increased odds of prenatal depression with 4 or more ACEs (OR = 3.95; 95% CI = 2.20, 7.09) compared to participants with no ACEs.

The relationships between each domain of adverse childhood experiences and probable depression were examined in three separate models. Correlation coefficients reveal moderate correlations; higher levels of abuse domain were associated with higher levels of neglect

domain ($r = 0.66$, $p < .0001$) and higher levels of household dysfunction domain ($r = 0.47$, $p < .0001$). Higher levels of neglect domain were also associated with higher levels of household dysfunction domain ($r = 0.54$, $p < .0001$).

Logistic regressions indicated that for every additional childhood experience reported in the abuse domain, the odds of probable depression increased by 2.01 times (95% CI = 1.41, 2.86). For every additional childhood experience in the neglect domain, the odds of probable depression increased by 1.79 times (95% CI = 1.36, 2.36). For every additional childhood experience in the household dysfunction domain, the odds of probable depression increased by 1.40 times (95% CI = 1.17, 1.68).

Similar patterns emerged when examining the relationship between ACEs and prenatal depression among foreign-born and U.S.-born Hispanic/Latinas. The interactions between ACEs and Hispanic/Latina nativity were not statistically significant (see Table S3). There were suggestive interaction effects for ACEs category and nativity, $p = 0.08$, therefore; we conducted a stratified analysis to further examine the relationship between ACEs and probable depression in the foreign-born and U.S.-born Hispanic/Latina samples independently.

Among the foreign-born Hispanic/Latina sample, results indicated a significant association between increasing number of ACEs reported and probable depression (OR = 1.20; 95% CI = 1.03, 1.41). The odds of probable depression were significantly increased for mothers in the 4+ ACEs category relative to those with 0 ACEs (OR = 2.60; 95% CI = 1.04, 6.55). The odds of probable depression increased for mothers as ACEs counts increased across all ACEs domains: abuse (OR = 1.96; 95% CI = 1.16, 3.31), neglect (OR = 1.51, 95% CI = 0.99. 2.30), and dysfunction (OR = 1.31; 95% CI = 0.96, 1.77); however, this was only statistically significant for the abuse domain.

Among the U.S.-born Hispanic/Latina sample, there was also a significant association between increasing ACEs count and probable depression (OR = 1.36; 95% CI = 1.14, 1.62). Among mothers with an ACE score of 1–3 relative to those with 0 ACEs, the odds of having probable depression were 3.81 times higher compared to those with 0 ACEs (95% CI = 1.54, 9.45). Among the mothers with an ACE score of 4+ relative to those with 0 ACEs, the odds of having probable depression were 9.65 times higher (95% CI = 3.15, 29.58). In the U.S.-born Hispanic/Latina mothers, the odds of probable depression significantly increased as ACEs counts increased across all three ACEs domains (abuse OR = 2.40, 95% CI = 1.25, 4.60; neglect OR = 2.15; 95% CI = 1.31, 3.53; and household dysfunction OR = 1.44, 95% CI = 1.08, 1.93).

Discussion

Exposure to adverse childhood experiences can have long-lasting mental health impacts including increased risks for anxiety and depression (Anda et al., 2006; Young-Wolff et al., 2019). We found that among our sample, the higher number of ACEs was associated with a higher the likelihood of probable prenatal depression. Specifically, the association between ACEs and prenatal depression was particularly pronounced among those who experienced

four or more ACEs. Each of the domains of abuse, neglect, and household dysfunction was significantly associated with a higher likelihood of depression as well. These patterns did not significantly differ among the foreign-born versus U.S.-born Hispanic/Latina women, although the associations were stronger among U.S.-born Hispanic/Latina women.

While there is extensive research investigating the influence of ACEs on depression, it is not well examined in women during the pregnancy period. The effects of ACEs during pregnancy are of public health interest since ACEs may have implications for mothers' mental health. Pregnancy may serve as a period of reflection of one's childhood and, in turn, potentially contribute to mental health disturbances. According to Narayan et al. (2020), the recollection of childhood adversity experiences can exacerbate stressors experienced during pregnancy. Racine et al. (2021) showed among a predominantly White sample (n = 1994) recruited in Canada, approximately 60% of pregnant women reported at least one childhood adversity, while 15% reported experiencing four or more ACEs. Consistent with the meta-analysis, over 60% of our pregnancy sample reported at least one adverse childhood experience while 20% of the mothers reported four or more ACEs (Racine et al., 2021).

It is important for clinicians to routinely screen for anxiety and depressive symptoms during pregnancy as an adverse, psychological environment may impact both women and children. Although research indicates that depression screenings increase recognition of depression and current recommendations include screening all women for prenatal depression, only 65% of physicians routinely screen pregnant women (Sidebottom et al., 2021). Moreover, there is very little research on routine screening for ACEs in prenatal care even though preliminary data indicates that both health care providers and patients view ACEs screening as valuable (Olsen, 2018).

Most studies examining the relationship between ACEs and probable prenatal depression assess the total number of ACEs or categorize the number of experiences reported (Chung et al., 2008; Fredriksen et al., 2017; Howell et al., 2020; Racine et al., 2020; Young-Wolff et al., 2019). For example, Wajid et al. (2020) found that the women that reported a count score of four or more ACEs were two and a half times more likely to experience prenatal depression than women with fewer ACEs. Few studies have explored the association between ACEs and probable prenatal depression using the CDC-defined domains: abuse, neglect, and household dysfunction (Atzl et al., 2019; Narayan et al., 2018). Atzl et al. (2019) examined the association using similar domains: household dysfunction and childhood maltreatment-- a collapsed domain including both abuse and neglect. Our results were partially consistent with Atzl et al. (2019) in which the domain of childhood maltreatment, but not household dysfunction, significantly predicted depressive symptoms during pregnancy.

To address gaps in the literature, our study examined the relationship between ACEs and probable depression in a potentially high exposure group; Hispanic/Latinas are more likely to experience ACEs as well as depressive symptoms (Llabre et al., 2017; Mukherjee et al., 2016). Hispanic/Latinas may be at a higher risk for experiencing ACES and/or depressive symptoms given systemic inequalities; these challenges may include discrimination,

socioeconomic status, immigration, and lack of access to mental health resources (LaBrenz et al., 2020; Lara et al., 2009). A previous study showed that the prevalence of one or more ACEs was higher in a Hispanic/Latina sample (77.8%) compared to a predominantly White sample (65.5%) (Llabre et al., 2017). Chung et al. (2008) found that among low-income women (71% African American, 17% Hispanic/Latina), 70% reported at least one ACE, and higher ACEs were associated with depressive symptoms. Generally, racial/ethnic minority groups, compared to non- Hispanic/Latina Whites, have higher rates of depressive symptoms (Blackwell & Villaroel, 2018; Mukherjee et al., 2016). Hispanic/Latina women are disproportionately exposed to financial, cultural, and health stressors that puts them at an elevated risk for prenatal distress. Furthermore, the vulnerability to antenatal depression may be explained by exposure to traumatic events including perceived stress and racism (Le et al., 2010; Mukherjee et al., 2016). Whereas a meta-analysis estimates that depression affects approximately 10% to 15% of U.S. pregnant women, a Hispanic/Latina exclusive study found that the prevalence of antenatal depressive symptoms was 32.4% (Gavin et al., 2005; Lara et al., 2009). Similarly, approximately 36% percent of our sample reported at least one score of 16 or higher on the CES-D scale indicating probable prenatal depression.

It should be noted that although research indicates no statistical differences between the depression diagnosis rates among Latino/Hispanic, non-Hispanic/Latina Whites, and non-Hispanic/Latina Black adults (Brody et al., 2018), there is a discrepancy between depression diagnoses and reported depressive symptoms. Studies have found that self-reported depressive symptom rates for Hispanic/Latina women ranged from 15% and 53% during pregnancy (Rich-Edwards et al., 2006; Zayas et al., 2003). In our sample, 35% of Hispanic/Latinas self-reported scores that indicated probable prenatal depression. According to the American Psychiatric Association, the discrepancy between diagnoses and reported symptoms in the Latino population may be explained by the underutilization of mental health resources (Mental health disparities: Hispanics and Latinos, 2017).

Given that prenatal depression varies by nativity, our study explored whether nativity posed an additional risk factor for the association between ACEs and prenatal depression. According to Ruiz et al. (2012), more time in the U.S. was associated with higher prenatal depression among Hispanic/Latinas. While there is no empirical data, researchers hypothesize risk factors for maternal depression may vary by additional cultural factors such as immigrant status. We did not find a statistically significant interaction between ACEs and nativity; however, there was some evidence for a stronger relationship between ACEs and depression among U.S.-born Hispanic/Latinas in stratified models. The interaction models were most likely underpowered to detect significant effects. While experiencing four or more ACEs relative to no ACEs was associated with greater odds of probable depression among both groups, the odds ratio was three times greater in the U.S. versus the foreign-born participants. Our sample size did not allow for further examination of whether characteristics such as years living in the U.S. played a role in the relationship for U.S.-born Hispanic/Latina samples. Future research should also focus on whether the association between ACEs and prenatal depression may be exacerbated by immigration status or immigration experiences.

A strength of the study was the inclusion of racial/ethnic minority samples that are often understudied and excluded in public health research. Our sample was a high adversity exposure group, characterized by their lower-income and racial/ethnic minority background. Future studies should continue to study historically marginalized populations as well as the social and structural barriers to mental health that influence the relationship between ACEs and depression. Patient level barriers include but are not limited to access to transportation, cost of insurance, and familial obligations. Ultimately, this work should lead to achieving health equity among those that are currently underdiagnosed and undertreated.

The limitations of our study should be noted. First, ACEs may have been underreported as women were asked to respond to sensitive questions and provide retrospective self-reports from childhood. Second, we were limited with the type of data we had to examine associations in Hispanic/Latina women; we could not address acculturation because we used proxies (i.e., nativity) and did not measure it directly. Third, we could not test for interaction across race or country of birth due to sample size.

Evidence indicates that prenatal depression is linked to offspring's slower fetal growth, lower birth weight, and preterm birth (Accortt et al., 2015; Bansil et al., 2010; Benatar et al., 2020). Prenatal depression is also associated with developmental delays, emotional, and behavioral problems in children as well as postpartum depression in women (Field, 2011; Norhayati et al., 2015). Future research should build on these studies to understand the longitudinal effects of ACEs and prenatal depression on offspring and maternal health. Future studies should also continue to use the three parameterizations of ACE exposures (total count, categorical, and domain). Understanding whether ACE domains have significantly different contributions to maternal prenatal depression is an important future direction.

Conclusion

Research should continue to focus on the effects of ACEs in communities that have been historically excluded in perinatal mental health services such as pregnant women from racial and ethnic minority groups. Specifically, research should focus on examining the effects of ACEs by the subdomains of abuse, neglect, and household dysfunction. Overall, this study showed that ACEs were common and were associated with a higher likelihood of probable depression during pregnancy in a predominantly Hispanic/Latina population. Given the high rate of ACEs in this population, it is important for clinicians to routinely screen for mental health during pregnancy as an adverse, psychological environment may impact both women and children. These findings suggest a need for improvement in surveillance and an increase in systematic screening for depressive symptoms in those with a history of childhood adverse experiences.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Impact Statement

• What is already known on this subject?

Experiencing depression during pregnancy has been associated with later adverse maternal mental and physical health outcomes. Emerging studies indicate that adverse childhood experiences (ACEs) may maintain or increase the predisposition to prenatal depression.

• What do the results of this study add?

Although prenatal depressive symptoms are prevalent among racial/ethnic minority samples including Hispanic/Latinas, research determining whether the association between ACEs and prenatal depression varies by nativity is scarce. Overall, ACEs were common among MADRES participants and were associated with a higher likelihood of probable depression during pregnancy. These patterns did not significantly differ among the foreign-born versus U.S.-born Hispanic/Latina women, although the associations were stronger among U.S.-born Hispanic/Latina women.

• What are the implications of these findings for clinical practice and/or further research?

Research should continue to focus on the effects of ACEs in communities that have been historically excluded in perinatal mental health services such as pregnant women from racial and ethnic minority groups. It may be important for clinicians to routinely screen for mental health during pregnancy as an adverse, psychological environment may impact both women and children. These findings suggest a need for improvement in systematic screening for depressive symptoms in those with a history of childhood adversities.

Table 1

Physical and Sociodemographic Characteristics and Unadjusted Odds Ratios for Probable Prenatal Depression (CES-D Score ≥ 16)

Characteristic	n, mean±sd, or n (%)	X^2 or F value	p-value	Any CES-D 16+ OR (95% CI)
Covariates				
Age at Recruitment (Years)	480, 28.63±6.03	1.12	0.48	0.98 (0.95–1.01)
Maternal Race/Ethnicity				
Hispanic	382 (79.6)	7.64	0.05	REF
Black, non-Hispanic	47 (9.8)			2.32 (1.26–4.28)
White, non-Hispanic	26 (5.4)			0.99 (0.43–2.28)
Multiracial & Other, non-Hispanic	18 (3.8)			1.19 (0.45–3.15)
Missing	7 (1.5)			
Earliest Ascertained Income				
Less than $15,000	106 (22.1)	6.39	0.27	REF
$15,000 to $29,999	118 (24.6)			0.75 (0.44–1.27)
$30,000 to $49,999	54 (11.3)			0.56 (0.28–0.11)
$50,000 to $99,999	26 (5.4)			0.89 (0.37–2.11)
$100,000 or more	26 (5.4)			0.45 (0.17–1.15)
Don't Know	143 (29.8)			0.59 (0.35–0.99)
Missing	7 (1.5)			
Maternal Marital Status				
Married/living together	324 (67.5)	6.16	0.05	REF
Never married	101 (21.0)			1.18 (0.74–1.86)
Divorced	13 (2.7)			4.03 (1.22–13.39)
Missing/decline	42 (8.9)			
Parity				
Nulliparous	158 (32.9)	0.05	0.83	REF
Primiparity/multiparity	295 (61.5)			0.96 (0.64–1.43)
Missing	27 (5.6)			
Maternal Ethnicity by Birthplace				
US-Born Hispanic	167 (35.0)	4.38	0.22	REF
Foreign-Born Hispanic, < 20 years in the US	152 (31.8)			0.95 (0.60–1.51)
Foreign Born Hispanic, > 20 years in the US	44 (9.2)			1.27 (0.64–2.50)
Non-Hispanic	91 (19.0)			1.57 (0.93–2.64)
Missing	24 (5.0)			
Language Preference				
English	315 (65.6)	2.65	0.10	REF
Spanish	165 (34.4)			0.72 (0.48–1.07)
Maternal Education Status				
<12th Grade	114 (23.8)	5.06	0.28	REF
Completed 12th Grade	147 (30.6)			0.86 (0.52–1.45)
Some College or Tech School	134 (27.9)			1.44 (0.87–2.41)

Characteristic	n, mean±sd, or n (%)	X^2 or F value	p-value	Any CES-D 16+ OR (95% CI)
Completed College	50 (10.4)			0.92 (0.46–1.85)
Some Grad Training	27 (5.6)			0.89 (0.37–2.16)
Missing	8 (1.7)			

Table 2

Average Adverse Childhood Experiences (ACEs) Scores by Participant Characteristics

	n	Median ACEs	Range	Mean	SD
Covariates					
Age at Recruitment (Years)					
18–25	157	1.0	0–8	1.38	1.69
26–35	247	1.0	0–10	1.89	2.32
>36	76	1.0	0–10	2.13	2.50
Maternal Race/Ethnicity					
Hispanic	382	1.0	0–10	1.70	2.19
Black, non-Hispanic	47	1.0	0–6	1.66	1.51
Multiracial & Other, non-Hispanic	18	1.5	0–9	2.44	2.77
White, non-Hispanic	26	3.0	0–9	2.81	2.55
Earliest Ascertained Income					
Less than $15,000	106	1.0	0–8	1.97	2.47
$15,000 to $29,999	118	1.0	0–10	1.84	2.08
$30,000 to $49,999	54	1.0	0–10	2.46	2.81
$50,000 to $99,999	26	1.0	0–5	1.81	1.92
$100,000 or more	26	1.0	0–9	1.88	2.45
Don't Know	143	1.0	0–8	1.32	1.67
Maternal Marital Status					
Married/living together	324	1.0	0–10	1.80	2.27
Never married	101	1.0	0–7	1.55	1.80
Divorced	13	2.0	0–8	2.54	2.67
Parity					
Nulliparous	158	1.0	0–9	1.69	1.91
Primiparity/multiparity	295	1.0	0–10	1.78	2.27

Table 3

Association of Adverse Childhood Experiences (ACEs) with Probable Prenatal Depression (CES-D Score 16)

	Unadjusted OR (95% CI)	Adjusted[a] OR (95% CI)
Adverse Childhood Experiences		
Count	**1.24 (1.13–1.35)**	**1.28 (1.16–1.41)**
Categorical		
0 Aces	REF	REF
1–3 Aces	**1.65 (1.07–2.56)**	1.58 (0.98–2.54)
4+ Aces	**3.50 (2.07–5.92)**	**3.95 (2.20–7.09)**
Domain		
Abuse Count	**1.81 (1.32–2.47)**	**2.01 (1.41–2.86)**
Neglect Count	**1.62 (1.28–2.06)**	**1.79 (1.36–2.36)**
Dysfunction Count	**1.39 (1.19–1.63)**	**1.40 (1.17–1.68)**

[a] Adjusted for study recruitment site, ethnicity/race, age, income, parity, and marital status

Bold text indicates significant variables, where confidence intervals do not include 1.