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Are Experiences of Racial Discrimination Associated with Postpartum Depressive Symptoms? A Multistate Analysis of Pregnancy Risk Assessment Monitoring System Data

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Abstract

Background: Postpartum depression (PPD) is a serious public health crisis disproportionately affecting women of color. We examine whether interpersonal racial discrimination is associated with higher odds of postpartum depressive symptoms (PPDS) among women of color and how it may vary by race/ethnicity and maternal educational attainment.

Materials and Methods: We present a secondary analysis of cross-sectional data from Pregnancy Risk Assessment Monitoring System (PRAMS) postnatal surveys conducted in nine jurisdictions between 2012 and 2015 that included a question about being upset by experiences of racial discrimination within 12 months before giving birth.

Results: Being upset by racial discrimination was associated with nearly three times higher odds of PPDS. Among women of color with at least some college education, the higher odds of PPDS

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Authors' Contributions

A.R., T.G., and F.W. conceived the research question. F.W. acquired the data and conducted the analysis. All authors contributed to interpretation of the results. T.G., F.W., and J.Z. drafted the article. All authors provided critical review and shaped the final version of the article.

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associated with racial discrimination were greater than threefold, and for women with less than a high school education were less than twofold.

Conclusion: Addressing risk factors for PPD, including racial discrimination, may inform strategies to reduce racial disparities in maternal mental health.

Keywords

postpartum depressive symptoms; racial discrimination; maternal mental health

Introduction

Postpartum depression (PPD) is any major depressive disorder occurring up to 1 year after delivery¹ and includes symptoms such as severe mood swings and feelings of worthlessness.² Importantly, PPD has adverse impacts on maternal health as well as children's cognitive development and physical health.^{1,3,4} Recent estimates suggest that ~13.2% of all new mothers reported experiencing postpartum depressive symptoms (PPDS) in 2018.⁵ As with other maternal health outcomes, there are significant racial/ethnic disparities in PPDS: mothers of color are more likely to experience PPDS relative to non-Hispanic (NH) white mothers, even after controlling for socioeconomic characteristics.⁶⁻⁸

One understudied factor that may contribute to racial/ethnic disparities in PPDS is experiences of racial/ethnic discrimination. Discrimination refers to unfair treatment arising from membership in a socially defined group (*i.e.*, race/ethnicity).⁹ Over the life course, racial/ethnic minorities are far more likely than NH whites to experience both interpersonal racism (race-based experiences with prejudice, exclusion, and harassment), and institutionalized racism (embedded in social institutions that creates inequitable distribution of social resources and life conditions by race).¹⁰ Interpersonal racism is also linked to poor mental health outcomes in the general population. For example, prospective studies find that increases in self-reported discrimination are associated with subsequent increases in depression among people of color.^{11,12}

Associations between discrimination and mental health may vary by education and other measures of socioeconomic status (SES), with self-reported discrimination being both more prevalent and more strongly associated with an increased risk of depression among NH black and Hispanic individuals with more education and income relative to their lower-SES counterparts.¹³⁻¹⁶

Investigations of the relationship between discrimination and mental health during pregnancy have found that self-reported discrimination is associated with elevated prenatal depressive symptoms, but the relationship is not uniform across racial and socioeconomic groups. Bennett et al. found that moderate levels of perceived discrimination of any kind were positively associated with depressive symptomology in a multiracial sample (NH white, NH black, and Hispanic) of low-income pregnant women; these associations did not differ by race/ethnicity.¹⁷ In a study of black and white women, Canady et al. found that while black women experienced more discrimination (racial/ethnic, gender, and

socioeconomic), only gender- and SES-related discrimination were associated with prenatal depressive symptoms.¹⁸

Ertel et al. examined the associations between racial discrimination and prenatal depressive symptoms in two cohorts of black women; while the more affluent cohort had a higher prevalence of self-reported racism, racial discrimination was only linked to elevated depressive symptoms in the disadvantaged cohort.¹⁹ Finally, findings by Walker et al. suggest that racial/ethnic discrimination is also predictive of prenatal depressive symptoms among Hispanic mothers.²⁰

Fewer studies have linked discrimination to depression during the postpartum period. Most of the existing research has been conducted outside of the United States, where both cultural and racial contexts differ markedly. Bécaries and Atatoa-Carr found that Maori, Pacific Islander, and Asian women in New Zealand who had experienced racial discrimination by a health care provider (or any racial discrimination during their lifetimes) were more likely to experience postnatal depression.²¹ Daoud et al. examined the associations between PPDS and multiple forms of discrimination (*i.e.*, ethnicity/nationality, gender, skin color, age, SES, and religion) among mothers in Israel. The authors found that ethnic discrimination was associated with PPDS among Jewish immigrant mothers, while discrimination based on skin color was associated with PPDS among Palestinian-Arab mothers.²²

Finally, in one of the studies to examine the discrimination-PPDS link by educational attainment, Stepanikova and Kukla showed that perceived discrimination (for any reason) was positively associated with PPDS in a sample of Czech mothers, but only among low-educated women (*i.e.*, highest degree completed was grade school or vocational school).²³

To our knowledge, no existing studies have examined the relationships between racial/ethnic discrimination and PPDS in the United States and now educational attainment moderates these relationships. The goal of this study is to address these gaps by examining the associations between self-reported racial discrimination and PPDS in a multistate sample of mothers of color with a recent live birth. Specifically, we assess whether the strength of these associations varies by race and ethnicity (NH black, Hispanic, and NH other race women) and by educational attainment (less than high school, high school completion, and at least some college).

While there is some evidence that the association between self-reported racial discrimination and health is similar between white and black individuals,²⁴ other studies have shown that the social patterning of self-reported racial discrimination is different between white and black populations,¹⁵ and leading race theorists argue that white claims of “reverse racism” and the white experience of “racial discrimination” are fundamentally different from that of people of color due to structural white privilege.²⁵ Therefore, we exclude them from the current analysis.

Materials and Methods

Data

This study used data from the Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based, state-administered survey given to persons that have given birth to a live infant within the previous 2–6 months. Details on the survey methodology have been described elsewhere.²⁶ We completed a secondary analysis of PRAMS data collected during Phase 7 of the questionnaire from 2012 to 2015, in the following jurisdictions: Iowa, Louisiana, Minnesota, New York City, North Carolina, Ohio, Utah, Virginia, and Wisconsin. These jurisdictions were chosen based on their inclusion of the standard PRAMS question asking about experiences of racial discrimination in the 12 months before their delivery, capturing our primary independent variable.

We received state data that met the yearly minimum weighted response rate threshold from CDC. We requested other years' data directly from states, with available requested years of data received from all states but one. A summary of data included in our analysis, by year and jurisdiction, can be found in Table 1.

After excluding NH white women ($n = 17,000$), our sample of eligible respondents consisted of 18,685 postnatal individuals. We further excluded observations with missing data on the main exposure variable (*i.e.*, self-reported racial discrimination; $n = 483$) or covariates, including maternal education ($n = 335$), smoking in the last 3 months of pregnancy ($n = 447$), maternal marital status ($n = 33$), parity ($n = 72$), prenatal care adequacy ($n = 486$), birth payer recorded on the birth record ($n = 921$), prepregnancy body mass index (BMI; $n = 1539$), and household poverty level ($n = 3946$), for a final study sample of 12,587. Due to the high level of missing data for household poverty, we completed robustness checks without this restriction ($n = 16,533$) and got substantively similar results.

Measures

The independent variable was measured by response to the question: “During the 12 months before your new baby was born, did you feel emotionally upset (for example, angry, sad, or frustrated) as a result of how you were treated based on your race? (Check yes or no).” This exposure is hereafter referred to as “recent racial discrimination.”

The main outcome variable, self-reported PPDS, was defined as responding “always” or “often/almost always” to either of the following questions: “Since your new baby was born, how often have you felt down, depressed, or hopeless?” or “Since your new baby was born, how often have you had little interest or little pleasure in doing things you usually enjoyed?”

Self-reported race and ethnicity were obtained from birth certificates. Racial/ethnic categories used in this article included Hispanic, NH black, and NH other race (excluding white women). The other race category consisted of (all NH) 49.8% Asian women, 8.4% American Indian women, 30.1% women of mixed race, with the remaining 11.7% women of other races.

We included maternal demographic characteristics derived from the birth certificate and that are known to be correlated with postpartum mental health in the published literature. These covariates included maternal age (<20, 20–24, 25–29, 30 years), maternal education (less than high school, high school graduate, more than high school), parity (first birth, second, or higher birth), marital status (married/other), and third trimester smoking status (yes/no). We also included a measure of expected payer for delivery (public payer: Medicaid or Indian Health Service), private payer (private health insurance), or other (including self-pay). Expected payer at delivery was missing for all Virginia births and was imputed using self-reported prenatal insurance from PRAMS survey responses, due to high concordance among these two measures when both are present.

Other covariates were derived from the PRAMS survey. These included household poverty measured using household income and composition measured at 12 months before delivery (< 100% Federal Poverty Level [FPL], 101%–200% FPL, >200% FPL). Prepregnancy BMI was calculated based on maternal self-reported height and weight before pregnancy and categorized as follows: underweight (BMI <18.5 kg/m²), normal weight (18.5 BMI <25 kg/m²), overweight (25 BMI <30 kg/m²), or obese (BMI ≥ 30 kg/m²). We included several indicators for stressful experiences (yes/no).

Following Liu et al.,⁸ we grouped stressors during the 12 months before delivery into three domains: relational stressors (separation or divorce, arguments at home, partner does not want pregnancy, and close friend or family with a substance use problem); financial stressors (moved to a new address, self or partner lost job or had a cut in hours or pay, and trouble paying bills); and physical stressors (death or illness of someone close to the respondent, incarceration of self or partner, and homelessness). We also included physical abuse by an intimate partner during pregnancy as a fourth potential stressor.

Analysis

We first compared PPDS and other characteristics by recent racial discrimination using Wald chi square tests. We then used multivariable logistic regression to examine the association between reported discrimination and the binary outcome of the presence of PPDS. We estimated the association(s) of interest, adjusting for covariates, first among the full sample of respondents of color, and then in separate models for each racial/ethnic subgroup (NH black, Hispanic, and NH other race), reported as adjusted odds ratios (AORs).

Finally, due to recent findings indicating differing magnitudes of the association between racism and PPD by maternal education,²³ we reran the regression models allowing for interaction between racial discrimination and maternal education. All analyses were carried out in SAS 9.4, accounting for the complex survey weights. This secondary analysis of de-identified data was determined not to be human subjects' research and did not require review by the University of Wisconsin Institutional Review Board (IRB).

Results

The overall prevalence of self-reported PPDS among non-white women was 14.7% (95% confidence interval [CI]: 13.8–15.6), compared with 10.7% (95% CI: 10.0–11.3) among

white women. The prevalence of reported racial discrimination was 12.2% (95% CI: 11.7–12.7) in the non-white population (Table 1). Of the three racial/ethnic groups in our analysis, black women reported the highest prevalence of discrimination (18.1%; 95% CI: 16.3–19.9) followed by Hispanic women (13.3%; 95% CI: 11.7–14.9). The overall prevalence of reported racial discrimination in the other race group was 11.1% (95% CI: 9.6–12.6); in this group, women who identified as American Indian or Alaska Native were most likely to report racial discrimination (19.5%; 95% CI: 11.8–27.3), followed by mixed race women (13.4%; 95% CI: 9.6–17.1) and Asian women (9.8%; 95% CI: 8.2–11.3).

Women who reported experiencing racial discrimination also reported a much higher prevalence of PPDS (32.3%; 95% CI: 29.1–35.6) compared with those who did not (11.7%; 95% CI: 10.8–12.6). Prenatal racial discrimination was significantly associated with several maternal characteristics, including maternal age, maternal race, and other stressors during the 12 months before delivery. The full characteristics of the sample are described in Table 2.

Table 3 presents the results of logistic regression analyses examining the associations between racial discrimination and PPDS. Each analysis includes controls for maternal characteristics and other stressors. In the full sample of women of color, racial discrimination was significantly associated with increased odds of PPDS (AOR 2.7; 95% CI: 2.2–3.4). In race-stratified regressions, the strength of the discrimination-PPDS association is strongest among NH black women (AOR 3.5; 95% CI: 2.6–4.8), but remained at least twofold higher among Hispanic (AOR 2.2; 95% CI: 1.4–3.4) and NH women of other races (AOR 2.2; 95% CI: 1.5–3.3).

Other maternal characteristics significantly associated with increased odds of PPDS in the adjusted model included being married, experiencing physical or relational stressors in the year before delivery, having household income less than or equal to 100% of the federal poverty guidelines, and physical abuse during pregnancy.

Table 4 presents regression results for the model examining whether the strength of the association between discrimination and PPDS varies by maternal educational attainment. The coefficient estimates for the full model, including all women of color, suggest that the association between racial discrimination and PPDS increases with higher levels of maternal education. However, these differences were only statistically significant when comparing women with some college education to those with less than a high school education. We found that the relationship between discrimination and PPDS by level of education varied across racial/ethnic groups.

Among NH black and Hispanic women, the relationship between racial discrimination and PPDS did not significantly vary by maternal education, but there was a consistent and strong association (AOR >3.0) for NH black women regardless of maternal education. However, among NH other race women, the association between discrimination and PPDS was highest among women with at least some college education and statistically different compared to women with less than a high school education.

Discussion

The goal of this study was to examine the relationships between self-reported racial discrimination and PPDS by race/ethnicity and educational attainment among women of color.

Two key findings emerged from our analysis. First, we found that being upset by racial discrimination was positively associated with higher levels of PPDS in the overall sample and among racial/ethnic subgroups. The association was strongest among NH black women. Second, we found evidence that the association between recent experiences of racial discrimination in the 12 months before delivery and PPDS may differ by maternal education, particularly among NH other race women; we did not find evidence that it differed by education for NH black or Hispanic women. To our knowledge, this study is one of the first to investigate these relationships in a multistate sample of women of color in the United States.

The finding that racial discrimination was associated with PPDS is consistent with other studies that have found racial discrimination to be associated with depression both in the general population^{12,13} and among women of color during pregnancy.^{18,20} While data limitations precluded us from directly examining potential mechanisms in the present study, previous research suggests that stress is the most likely pathway through which interpersonal discrimination impacts both physical and mental health.^{11,27}

Our study supports the theory that racism may be a particularly pernicious stressor: the magnitude of odds for PPDS when racial discrimination was reported was of a greater magnitude than the odds for other reported stressors, such as financial strains and physical abuse. These findings suggest that racial discrimination may be an important driver of the higher rates of PPD observed among women of color. Therefore, health promotion strategies could address or at least account for these experiences.

In our sample, the evidence that the discrimination-PPDS relationship varies by maternal educational attainment was mixed. In regression models allowing for interaction between discrimination and maternal education, overall, the magnitude of the relationship between discrimination and PPDS increased with increasing educational attainment (*i.e.*, when comparing women with some college education to those with less than high school education). This statistically significant finding appears to be driven by the NH other race subsample, as the strength of these associations did not significantly vary by maternal education among NH black and Hispanic women. Rather, the magnitude of the association was strong among NH black women regardless of their education level.

Our results are consistent with prior findings that self-reported discrimination was more strongly associated with depression in high SES (vs. low SES) nonchildbearing populations.¹⁴⁻¹⁶ Prior research has also shown that the relationship between discrimination and other birth outcomes, such as preterm birth and very low birthweight, is strongest among highly educated black women,²⁸ a pattern consistent with our results for the non-white population as a whole. However, we did not observe this educational gradient in PPDS among NH black women, although we used slightly different educational level groupings,

which may have obscured differences at the higher end of the education distribution. It is possible that educational attainment is a proxy for unmeasured factors that may be protective, such as being born outside the United States, which were unavailable in our data.

For example, past studies have indicated that foreign-born Hispanic women, who have lower levels of education on average, were less likely to have moderate/severe PPDS compared with later generation, US-born Latinas.²⁹ In this case, we might have observed an even stronger association between discrimination and PPDS if we had restricted to only women born in the United States.

It is also possible that higher levels of education expose women of color to more racial discrimination or to greater social isolation due to the disproportionate representation of white people in higher education and professional settings, which could augment the frequency, intensity, or harm of racial discrimination.¹⁵ Future research with larger samples of racial/ethnic subgroups and additional information on the contexts and frequency of experiences of racial discrimination could clarify these mechanisms.

The present study had several limitations. First, our data only included a subset of US states and New York City and may not be generalizable to the United States as a whole. Second, racial discrimination was measured by maternal self-report of “feeling emotionally upset” due to racial discrimination, which may not capture all experiences of racism that may be relevant to health. For example, racism also persists in institutional mechanisms such as residential segregation, which disproportionately concentrates economic deprivation in neighborhoods where people of color live.³⁰ However, given evidence that institutional discrimination increases exposure to both interpersonal racism and economic stressors,¹¹ our inclusion of financial and other stressors may partially capture the latter construct.

Moreover, our measure only captures experiences of discrimination during the 12 months before delivery, using a single item that cannot pick up variation in timing, severity, or impact. Previous research suggests that the cumulative effects of trauma and discrimination over the life course are critical determinants of subsequent maternal and infant health outcomes.³¹ This suggests that our findings likely underestimate the relationships between discrimination and PPDS.

A related concern is that because PRAMS is a cross sectional survey, data limitations, such as recall bias, preclude us from conclusively demonstrating that prenatal discrimination is associated with subsequent postpartum mental health. However, our findings are consistent with prior prospective studies that have linked discrimination to subsequent depression. Using longitudinal data, future research could investigate whether PPDS vary by the timing, frequency, and intensity of racial discrimination among new mothers.

It is also important to note that the main dependent variable (*i.e.*, the presence of PPDS) was measured with a validated two-item screening instrument with a high sensitivity (83%) and specificity (78%) for major depressive disorder,³² but it does not map directly to clinical criteria for PPD. While this measure is not a diagnostic test, it is also not dependent on access to and utilization of health care (as would be a question asking about having received a diagnosis of PPD).³³ Finally, we lacked sufficient sample sizes to conduct

separate analyses for other relevant racial/ethnic groups, such as American Indian/Alaska Native women, who also experience disproportionately high rates of PPD⁶ and racial discrimination.

In addition, the relatively small sample sizes for Hispanic and NH women of other races limited the precision of our estimates for the effect of discrimination on PPDS by education level. With a larger sample, we might expect the CIs to narrow; future research with larger subgroup samples could provide more clarity on the magnitude and strength of the moderating effect of education or related social factors, as well as whether the effect differs with more narrow categories of educational attainment (*e.g.*, college degree or higher vs. some college).

A major strength of this study is our use of a large, diverse, and multistate sample to investigate the relationship between experiences of racial discrimination and PPDS. Importantly, the rich contextual data allowed us to adjust for a wide range of potential confounders (*i.e.*, sociodemographic variables and major life stressors) that are not generally captured in administrative data or standard health records.

Conclusions

Our findings underscore that interpersonal discrimination is an understudied risk factor that public health systems might address to reduce racial/ethnic disparities in maternal and child health. PPD is linked to worsened mental and physical health-related quality of life for women and their offspring and is also likely related to some preventable and pregnancy-associated maternal deaths.^{34,35} Therefore, addressing risk factors for PPD, including stressful life experiences such as racial discrimination, may inform strategies to reduce racial disparities in maternal health outcomes. Translation of these findings to policy and practice could include developing protocols for screening; assuring access to mental health services; and promoting a diverse health care workforce.

Unfortunately, there is still a dearth of knowledge regarding culturally appropriate mental health resources and effective interventions for black, indigenous, and other women of color to process and cope with acute and ongoing experiences of racial discrimination.³⁵ Promising interventions are being developed to address this need, such as cognitive-behavioral skills building groups for racially and ethnically minoritized women aimed at providing social support and building resilience.³⁶

This study adds to the growing literature demonstrating that racism has negative impacts on population health and elucidates the salience of interpersonal racial discrimination for the mental health of women of multiple races and ethnicities. Future research could investigate experiences of racial discrimination specific to health care settings and potential interventions to decrease incidents of racial discrimination and promote healing and resilience among people of color.

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Table 1. Racial and Geographic Composition of Respondents of Color and Prevalence of Racial Discrimination Among Pregnancy Risk Assessment Monitoring System Jurisdictions That Measured Experiences of Racial Discrimination, 2012–2015

	Over-all	Iowa ^a	Louisiana ^b	Minnesota	North Carolina	Ohio	Utah	Virginia	Wisconsin	New York City
Year										
2012				X	X ^c	X	X	X ^c	X	X
2013		X		X	X ^c	X ^c	X	X ^c	X	X
2014		X		X ^c	X ^c	X	X	X ^c	X	X
2015		X	X	X ^c	X ^c	X	X	X	X	X
Total sample	18,472	2353	1280	913	1142	1625	1661	877	4620	4001
Race/ethnicity										
NH black	8416	1018	1141	214	545	1066	58	392	2798	1184
Hispanic	6165	1282	54	143	400	78	1279	272	844	1813
NH other	3891	53	85	556	197	481	324	213	978	1004
Racial discrimination										
n (Weighted %)	2807 (14.6)	349 (14.4)	165 (13.6)	151 (15.4)	152 (14.2)	298 (20.1)	255 (13.3)	116 (13.5)	793 (16.3)	528 (12.8)

^aIowa 2012 did not include a full year of data collection and is not available to the public.

^bLouisiana 2012–2014 data were requested from the state but not received within 12 months of the request.

^cDid not meet CDC response rate threshold.
NH, non-Hispanic.

Source: 2012–2015 Pregnancy Risk Assessment Monitoring System, author analysis.

Table 2. Characteristics of Women of Color (Survey-Weighted), Overall, and by Self-Reported Experiences of Racial Discrimination, Select Pregnancy Risk Assessment Monitoring System Jurisdictions, 2012–2015

	Total			Reported racial discrimination			Did not report racial discrimination			Chi square <i>p</i> -value
	N = 16,866			N = 678			N = 16,188			
	%	95% CI	%	95% CI	%	95% CI	%	95% CI		
PPD symptoms									<0.0001	
Yes	14.7	13.8–15.6	32.3	29.1–35.6	11.7	10.8–12.6				
No	85.3	84.4–86.2	67.7	64.4–70.9	88.3	87.4–89.2				
Maternal age (in years)									0.0324	
<20	6.9	6.3–7.6	8.6	6.7–10.5	6.7	6–7.3				
20–24	23.8	22.7–24.9	26.3	23.4–29.1	23.4	22.2–24.6				
25–29	29.2	28–30.3	27.7	24.7–30.7	29.4	28.2–30.7				
30	40.1	38.8–41.3	37.4	34.1–40.7	40.5	39.2–41.8				
Parity									0.5493	
First birth	38.5	37.2–39.7	37.5	34.4–40.7	38.6	37.3–39.9				
Second or later birth	61.5	60.3–62.8	62.5	59.3–65.6	61.4	60.1–62.7				
Education									0.0024	
Less than high school	24.0	22.9–25.1	27.3	24.1–30.4	23.5	22.3–24.6				
High school diploma/GED	27.3	26.1–28.4	29.6	26.5–32.8	26.9	25.6–28.1				
More than high school	48.7	47.4–50	43.1	39.8–46.4	49.7	48.3–51				
Marital status									<0.0001	
Married	44.9	43.6–46.1	34.8	31.7–37.9	46.6	45.2–47.9				
Other	55.1	53.9–56.4	65.2	62.1–68.3	53.4	52.1–54.8				
Birth payer									<0.0001	
Public	61.9	60.7–63.2	66.5	63.1–69.8	61.1	59.8–62.5				
Private	27.5	26.4–28.5	20.4	17.9–23	28.7	27.5–29.9				
Other	10.6	9.7–11.5	13.1	10.2–16	10.2	9.2–11.1				
Third trimester smoking									<0.0001	
No	93.9	93.3–94.6	90.3	88.5–92.2	94.5	93.9–95.2				
Yes	6.1	5.4–6.7	9.7	7.8–11.5	5.5	4.8–6.1				

	Total		Reported racial discrimination		Did not report racial discrimination		Chi square <i>p</i> -value
	N = 16,866	N = 678	N = 16,188				
	%	95% CI	%	95% CI	%	95% CI	
Prepregnancy BMI ^a							<0.0001
Normal	44.5	43.1–45.8	36.8	33.5–40.1	45.8	44.3–47.2	
Underweight	4.8	4.3–5.4	4.5	3.4–5.5	4.9	4.3–5.5	
Overweight	25.8	24.6–27	29.6	26.2–33	25.2	23.9–26.4	
Obese	24.9	23.7–26	29.1	25.8–32.3	24.2	22.9–25.4	
Household poverty level							<0.0001
100% FPL ^b	45.0	43.5–46.4	57.6	53.9–61.3	42.8	41.2–44.3	
101–200% FPL	23.8	22.5–25	23.9	20.7–27	23.8	22.4–25.1	
>200% FPL	31.2	29.8–32.5	18.5	15.7–21.2	33.5	31.9–34.9	
Relational stressors ^c in 12 months before delivery							<0.0001
No	66.1	64.9–67.3	42.1	38.8–45.5	70.2	68.9–71.4	
Yes	33.9	32.7–35.1	57.9	54.5–61.2	29.8	28.6–31.1	
Financial stressors ^d in 12 months before delivery							<0.0001
No	46.4	45.1–47.6	29.0	26–32.1	49.3	48–50.7	
Yes	53.6	52.4–54.9	71.0	67.9–74	50.7	49.3–52	
Physical stressors ^e in 12 months before delivery							<0.0001
No	69.2	68–70.4	54.1	50.7–57.4	71.7	70.5–73	
Yes	30.8	29.6–32	45.9	42.6–49.3	28.3	27–29.5	
Physical abuse during pregnancy							<0.0001
No	96.7	96.2–97.2	92.2	90.4–94	97.5	97–98	
Yes	3.3	2.8–3.8	7.8	6–9.6	2.5	2–3	
Race/ethnicity							<0.0001
NH Black	38.4	37.2–39.6	45.5	42.2–48.9	37.2	35.8–38.5	
Hispanic	36.9	35.7–38.1	34.5	31.2–37.7	37.3	36–38.6	
NH other ^f	24.7	23.7–25.8	20.0	17.6–22.5	25.5	24.4–26.7	

^a BMI; underweight: below 18.5; normal: 18.5–24.9; overweight: 25.0–29.9; obese: 30 and above.

^b Federal Poverty Guidelines.

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^cSeparation or divorce, arguments at home, partner does not want pregnancy, close friend or family with a substance use problem.

^dMoved to a new address, self or partner lost job or had a cut in hours or pay, trouble paying bills.

^eDeath or illness of someone close to the respondent, incarceration of self or partner, homelessness.

^fNH, 49.8% Asian women, 8.4% American Indian women, 30.1% women of mixed race, 11.7% women of other races.

BMI, body mass index; CI, confidence interval; FPL, Federal Poverty Level; PPD, postpartum depression.

Source: 2012–2015 Pregnancy Risk Assessment Monitoring System, author analysis.

Table 3.

Multivariable Logistic Regression Results: Adjusted Odds Ratios of Postpartum Depressive Symptoms and Experiences of Racial Discrimination Among All Women of Color and by Racial/Ethnic Subgroups, Select Pregnancy Risk Assessment Monitoring System Jurisdictions, 2012–2015

	Model 1: all women of color n = 12,587			Model 2: NH Black women n = 6097			Model 3: Hispanic women n = 3650			Model 4: other NH non-White women ^d n = 2802		
	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Unless specified, reference is “No”												
Racial discrimination	2.7*	2.2–3.4	3.5*	2.6–4.8	2.2*	1.4–3.4	2.2*	1.5–3.3				
Birth payer (Ref. = private insurance)												
Public insurance ^b	1.2*	1.0–1.6	1.1	0.7–1.6	0.7	0.4–1.1	2.2*	1.5–3.2				
Self-pay/other	1.2	0.9–1.6	1.2	0.7–2.0	1.3	0.5–2.9	2.2*	1.2–3.9				
Maternal age in years (Ref. = 30)												
<20	1.2	0.8–1.6	1.0	0.6–1.8	1.3	0.7–2.3	1.2	0.6–2.4				
20–24	1.3*	1–1.6	1.1	0.8–1.5	1.1	0.7–1.7	1.8*	1.2–2.8				
25–29	1.1	0.8–1.3	1.0	0.7–1.4	1.0	0.6–1.5	1.2	0.8–1.7				
Maternal education (Ref. = high school diploma/GED)												
Less than high-school	0.8	0.6–1.1	0.8	0.6–1.2	0.8	0.4–1.3	0.9	0.5–1.5				
At least some college	1.0	0.8–1.2	0.9	0.7–1.3	0.9	0.6–1.3	1.0	0.7–1.5				
Household poverty level (Ref. = >200% FPL)												
101–200% FPL ^c	1.2	0.9–1.6	1.3	0.8–2.0	1.5	0.9–2.5	1.0	0.7–1.6				
100% FPL	1.6*	1.2–2.1	1.8*	1.2–2.7	1.8*	1.1–3.1	1.1	0.7–1.7				
Smoking during third trimester	1.2	0.9–1.6	0.9	0.6–1.4	1.4	0.7–2.7	1.5	0.8–2.6				
Pregnancy BMI ^d (Ref. = normal)												
Underweight	1.0	0.7–1.5	1.1	0.6–2.1	0.8	0.3–2.0	0.8	0.5–1.5				
Overweight	1.0	0.8–1.2	0.7	0.5–1.1	1.8*	1.2–2.7	0.8	0.5–1.3				
Obese	0.9	0.7–1.1	1.0	0.7–1.3	0.9	0.6–1.4	0.8	0.5–1.2				
Married (Ref. = other)	1.3*	1.1–1.6	1.0	0.7–1.5	1.1	0.8–1.6	1.6*	1.1–2.3				
Financial stressors reported ^e	1.3	0.9–1.4	1.1	0.8–1.5	1.5*	1.1–2.2	0.9	0.7–1.3				
Relational stressors reported ^f	1.8*	1.0–1.4	1.8*	1.3–2.4	2.2*	1.5–3.2	1.6*	1.1–2.3				
Physical stressors reported ^g	1.2*	1.5–2.2	1.2	0.9–1.7	1.1	0.7–1.8	0.9	0.7–1.4				

	Model 1: all women of color <i>n</i> = 12,587			Model 2: NH Black women <i>n</i> = 6097			Model 3: Hispanic women <i>n</i> = 3650			Model 4: other NH non-White women ^a <i>n</i> = 2802		
Unless specified, reference is “No”	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Physical abuse during pregnancy	2.0*	1.3–3.1	2.3*	1.4–3.8	2.0*	1.0–4.2	1.2	0.5–2.9				

Adjusted for birth payer, maternal age, maternal education, household poverty level, third trimester smoking, prepregnancy BMI, marital status, and financial, relational, physical, and abusive stressors.

^a49.8% Asian women, 8.4% American Indian women, 30.1% women of mixed race, 11.7% women of other races.

^bIncludes Medicaid and Indian Health Service.

^cFederal Poverty Guidelines.

^dBMI: underweight: below 18.5; normal: 18.5–24.9; overweight: 25.0–29.9; obese: 30 and above.

^eSeparation or divorce, arguments at home, partner does not want pregnancy, close friend or family with a substance use problem.

^fMoved to a new address, self or partner lost job or had a cut in hours or pay, trouble paying bills.

^gDeath or illness of someone close to the respondent, incarceration of self or partner, homelessness.

* $p < 0.05$.

AOR, adjusted odds ratio.

Source: 2012–2015 Pregnancy Risk Assessment Monitoring System, author analysis.

Table 4. Adjusted Odds Ratios for Postpartum Depressive Symptoms When Racial Discrimination Is Reported, by Maternal Education and Race/Ethnicity, Among Women of Color in Select Pregnancy Risk Assessment Monitoring System Jurisdictions, 2012–2015

	Model 1		Model 2		Model 3		Model 4	
	All women of color <i>n</i> = 12,587	AOR	NH black women <i>n</i> = 6097	AOR	Hispanic women <i>n</i> = 3650	AOR	Other NH, nonwhite women ^d <i>n</i> = 2802	AOR
Racial discrimination (Ref. = no)								
Less than high school	1.7	1.1–2.6	3.4	1.8–6.3	1.4	0.7–3	0.6	0.2–2.1
High school diploma/GED	2.7	1.9–4	3.1	1.9–5.2	1.9	0.9–4.1	2.5	1.2–5.4
At least some college	3.3	2.5–4.4 ^b	3.9	2.5–6	3.2	1.7–5.9	3.0	1.9–4.7 ^c

Adjusted for birth payer, maternal age, maternal education, household poverty level, third trimester smoking, prepregnancy BMI, marital status, and financial, relational, physical, and abusive stressors.

^a 49.8% Asian women, 8.4% American Indian women, 30.1% women of mixed race, 11.7% women of other races.

^b AOR significantly different from that for women with less than a high school education, *p* < 0.05.

^c AOR significantly different from that for women with less than a high school education, *p* = 0.01.

Source: 2012–2015 Pregnancy Risk Assessment Monitoring System, author analysis.