



Maternal Health

Experiences of Racism and Preterm Birth: Findings from a Pregnancy Risk Assessment Monitoring System, 2004 through 2012



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ABSTRACT

Background: Racial disparities in birth outcomes represent a significant public health concern in the United States. Factors associated with racism have been posited as a mechanism underlying these disparities. Yet, findings from previous studies are mixed and based on small, geographically limited samples. This study aims to examine the relationship between experiences of racism and preterm birth in a population-based sample and to explore the role of adequacy of prenatal care within that relationship.

Methods: Data from the 2004 through 2012 Pregnancy Risk Assessment Monitoring System were analyzed. The sample included non-Hispanic Black mothers from 11 states and New York City who delivered neonates from 2004 to 2012 ($n = 11,582$). Survey-weighted regression analyses were used to examine the association between women feeling upset by experiences of racism in the 12 months before delivery and subsequent preterm birth. Adequacy of prenatal care was tested as an effect modifier.

Results: Feeling upset by experiences of racism was significantly associated with greater odds of preterm birth (adjusted odds ratio, 1.29; 95% CI, 1.04–1.59). Results from interaction models revealed that the associations of experiences of racism with preterm birth differed by level of prenatal care, although the interaction term was not significant.

Conclusions: Findings suggest that, for non-Hispanic Black women, the emotional effect of experiences of racism may contribute to the risk of preterm birth. Future studies should consider the role of adequate prenatal care in this relationship. Racism is an important public health problem with a measurable impact on preterm birth and should be addressed to eliminate racial inequities in birth outcomes.

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Racial disparities in birth outcomes in the United States are a significant public health issue. In 2013, the infant mortality rate for non-Hispanic Black infants was more than twice the rate of non-Hispanic White infants, 5.06 deaths per 1,000 live births for Black infants, and 11.11 deaths per 1,000 live births for White infants (Matthews, MacDorman, & Thomas, 2015). Preterm birth—the birth of an infant before 37 weeks of gestation—has

been cited as the primary driver of the difference in infant mortality between non-Hispanic Black and White infants and has been found to account for 54% of the disparity (MacDorman, 2011). The preterm birth-related infant mortality rate is three times higher among non-Hispanic Black women compared with non-Hispanic White women, 601 preterm-related deaths per 100,000 live births among Black women versus 179 preterm-related deaths per 100,000 live births for White women (MacDorman, 2011). Maternal sociodemographic characteristics, physical health, and behavioral factors contribute to the disparity (Sudano & Baker, 2006); however, these factors only partially account for the racial disparity in preterm birth. An enhanced understanding of the mechanisms underlying racial

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disparities in preterm birth is needed. This study examines the association between racism and preterm birth among Black women.

Racism has been posited as an important driver of racial disparities in birth outcomes (Alhusen, Bower, Epstein, & Sharps, 2016). Previous research has examined the relationship between racism and preterm birth. For instance, in a sample of 1,410 Black women in Detroit, experiencing racial macroaggressions was associated with preterm birth (Slaughter-Acey et al., 2016). Similarly, a study including 284 Black mothers in Chicago found maternal perceived exposure to interpersonal racial discrimination in public settings to be associated with preterm birth (Rankin, David, & Collins, 2011). By contrast, a study of 832 African American women in Baltimore did not find an association between lifetime experiences of racism and preterm birth (Misra, Strobino, & Trabert, 2010). Taken together, findings are mixed and our understanding of this relationship is limited to small, community-based samples (Alhusen et al., 2016).

Various pathways between the different types of racism and race-based health disparities for Black women have been hypothesized. Racism can lead to 1) a physiologic response resulting in overactivation of the hypothalamic–pituitary–adrenal axis and release of cortisol and other stress hormones, 2) unhealthy coping mechanisms such as substance use and overeating, 3) diminished socioeconomic opportunities, 4) differential exposure to social and environmental risks such as neighborhood safety and housing, and/or 5) differential quality of care or access to care within the health care system (Williams & Mohammed, 2013). Although the effects of racism have been described as complex, research exploring plausible pathways between racism and preterm birth is limited (Williams, Neighbors, & Jackson, 2003).

The role of differential access to care in the relationship between racism and preterm birth has not yet been examined. Population-based studies of women in the United States have found that those women who lack any prenatal care have a relative risk for preterm birth of 2.8 compared with those who have at least one prenatal care visit (Debiec, Paul, Mitchell, & Hitti, 2010; Vintzileos, Ananth, Smulian, Scorza, & Knuppel, 2002). African American women have been found to perceive less access to prenatal care (Ruiz, Shah, Lewis, & Theall, 2014) and do, in fact, receive less care than their White counterparts. In 2012, 63.6% of non-Hispanic Black women initiated prenatal care in the first trimester, compared with 79.0% of non-Hispanic White women (U.S. Department of Health and Human Services, Health Resources & Services Administration, Maternal and Child Health Bureau, 2014). Although socioeconomic status and other factors have been shown to be associated with late entry into prenatal care, controlling for these factors does not completely account for the racial disparity. Black women report experiences of racial discrimination and being treated differently by health care providers, clinic staff, and others during prenatal care (De Marco, Thorburn, & Zhao, 2008). Therefore, although there is evidence to suggest an association between racism and prenatal care, to date there are no studies that explore adequacy of prenatal care in this relationship.

The purpose of this study was to use a population-based sample to 1) describe the relationship between maternal experiences of racism and preterm birth and 2) explore how adequacy of prenatal care may act as an effect modifier in the relationship between racism and preterm birth.

Methods

Sample

The study was a cross-sectional analysis of Pregnancy Risk Assessment Monitoring System (PRAMS) data collected from phases 5 (2004–2008), 6 (2009–2011), and 7 (2012; Centers for Disease Control and Prevention [CDC], Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, 2015). PRAMS is a population-based survey of maternal and neonatal health administered to women who recently delivered a live birth. The survey has been conducted by the CDC since 1987 and is currently administered in 48 states. Each participating state selects 100 to 250 new mothers per month using birth certificates as the sampling frame. Most states oversample women with low birth weight infants and who are racial and ethnic minorities. Women are first contacted at 2–6 months postpartum several times by mail and then by telephone. Per CDC guidelines, data were released for states meeting a minimum response rate of greater than or equal to 70% for 2004 to 2006 and greater than or equal to 65% for 2007 to 2011. Survey responses are linked to birth certificate data for analysis (CDC, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, 2016). Our analysis was limited to non-Hispanic Black respondents from the 12 states that administered a survey item about experiences of racism: Minnesota, Ohio, Utah, Virginia, Wisconsin, Massachusetts, Michigan, Tennessee, North Carolina, Washington, Colorado, and New York City, which operates as a state in PRAMS.

Variables

The dependent variable, preterm birth, was obtained from weeks of gestation at delivery recorded on the birth certificate. The variable was categorized as binary: yes, birth was before 37 weeks of completed gestation, or no, birth was not before 37 weeks of completed gestation. The primary independent variable, felt upset by experiences of racism, was obtained from standard and state-developed questions that were asked in 12 state surveys. The question was asked in two ways. Eight states asked, “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 race?” Three states asked, “This question is about things that may have happened during the 12 months before your new baby was born. I felt emotionally upset (for example, angry, sad, or frustrated) as a result of how I was treated based on my race or ethnic background.” One state asked both versions of the question in different phases/years. Table S1 provides further details. Response options for both questions were binary, yes or no. Because of the similarity between these two items, they were combined into a single variable for the purposes of this analysis.

Adequacy of prenatal care was tested as an effect modifier. Data from birth certificate records were used by PRAMS to calculate a Kotelchuck Index Adequacy of Prenatal Care Utilization (Kotelchuck, 1994). Birth certificates are completed in the hospital after delivery by health care providers or other hospital staff. The Index uses two indicators from the birth certificate: when prenatal care was initiated and the number of prenatal visits from when it began until delivery, and combines these dimensions into a single summary score that is categorized to indicate if prenatal care was inadequate, intermediate, adequate, or adequate plus. The adequate-plus category often captures

women with heightened medical risk who require more frequent monitoring. The Kotelchuck Index is a widely used measure that has been found to be positively associated with gestational age at delivery (Coley & Aronson, 2013).

Covariates were selected based on a review of the literature. Demographic control variables were obtained by PRAMS from birth certificate records. For the current analysis, age was categorized as less than 20 years old, 20–24 years, 25–29 years, or greater than or equal to 30 years old. Education was categorized as equal to or less than high school if a woman reported 12 years of school and greater than high school if she reported 13 or more years of education. Marital status was categorized by PRAMS as married or other. Maternal smoking was assessed using the PRAMS core question “In the last 3 months of your pregnancy, how many cigarettes did you smoke on average a day?” Responses were categorized as yes if they reported smoking any cigarettes in the last 3 months of pregnancy. Prepregnancy body mass index (BMI) was obtained from birth certificate data for participants in states where it is reported (28.2% of respondents). If unavailable from the birth certificate, the prepregnancy BMI was calculated using participant self-report of prepregnancy height and weight in the PRAMS questionnaire (68.8%). BMI was classified as underweight, normal weight, overweight, or obese according to CDC guidelines (2016a, 2016b). To validate the use of two different data sources, we examined BMI data from the 3,262 participants for whom data were available from both sources. In those cases, we found the mean difference to be 0.54 kg/m² (SD = 3.6) and found 79% agreement ($\kappa = 0.69$; $p < .0001$) in the classifications of obesity between the two sources. Income was not used in the analysis owing to the large number of records in which it was missing ($n = 2,989$ respondents missing income data but with complete data on all other variables); therefore, we used prepregnancy insurance status as an alternative indicator of socioeconomic status. Prepregnancy insurance status was obtained from responses to items on the PRAMS questionnaire about insurance coverage in the month before pregnancy and categorized as insured by Medicaid, insured non-Medicaid, or uninsured. Finally, we controlled for regional differences by categorizing states as Northeast (Massachusetts, New York City), Midwest (Minnesota, Ohio, Wisconsin, and Michigan), West (Utah, Washington, Colorado), or South (Virginia, Tennessee, North Carolina), according to the U.S. Census Bureau (U.S. Department of Commerce, Economic and Statics Administration, U.S. Census Bureau, 2016).

Statistical Analysis

The analytic study sample was derived from 357,637 respondents to the PRAMS survey between 2004 and 2012. From that, 13,374 of the respondents were non-Hispanic Black women in states where the items about feeling upset by experiences of racism were asked (Table S1). Of the non-Hispanic Black women who were asked about their experiences of racism, 12,948 (96.8%) responded to the item. Missing data was 5% or less for all variables; region was available for all participants. Participants with missing data were dropped and the final analytic subpopulation consisted of 11,582 non-Hispanic Black women with complete data for all variables. Women excluded owing to missing data did not significantly differ from women included in the analyses based on age, marital status, smoking, prepregnancy BMI, feeling upset by experiences of racism, or delivery of preterm birth. Women with complete data were more likely to have 12 or more years of education (80.1% vs. 74.4%; $p < .001$) and less

likely to have inadequate prenatal care compared with adequate prenatal care (16.5% vs. 21.6%; $p < .001$) than women excluded. Additionally, women with complete data were less likely to have Medicaid (45.3% vs. 50.1%; $p < .001$) or to be uninsured (19.4% vs. 22.6%; $p < .001$) compared with women excluded owing to missing data.

Descriptive statistics included the calculation of percentages and 95% CIs by experiences of racism for preterm birth and each covariate. The statistical significance of the associations between experiences of racism and covariates was assessed using χ^2 tests (alpha level of 0.05). Rao and Scott's correction for survey design was used to convert the χ^2 statistic to an F statistic (Rao & Scott, 1984). Logistic regression was used to examine the bivariate associations between preterm birth, experiences of racism, and each of the covariates. Covariates that were significantly associated with preterm birth in bivariate analysis were included in the adjusted logistic regression model to estimate the association between feeling upset by experiences of racism and preterm birth. Wald tests were used to assess the association of the outcome with categorical variables with more than two levels. Effect modification by level of prenatal care was tested using a logistic regression model with an interaction term for experiences of racism and level of prenatal care to estimate the stratum-specific associations between feeling upset by experiences of racism and preterm birth, adjusted for maternal age, prepregnancy BMI, and region. PRAMS-developed sampling weights were applied to these analyses to account for the differential probability of selection, coverage, and nonresponse to the interview. Additional information about the weighting used in PRAMS can be found elsewhere (CDC, Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, 2016). All statistical analyses were conducted using Stata 13.0 software (StataCorp, 2013). The institutional review board approved the study protocol.

Results

Table 1 describes the sample characteristics and how the prevalence of feeling upset by experiences of racism varied with those characteristics. Overall, 14.2% (95% CI, 13.3–15.2) of the population felt upset by experiences of racism during the 12 months before delivery. Women who delivered a preterm birth, were not married, smoked cigarettes, had less than a 12th-grade education, and were uninsured or insured by Medicaid were more likely to report feeling upset by experiences of racism.

Table 2 describes how maternal characteristics varied by gestational age at birth (preterm vs. term) and the crude and adjusted odds ratios (AOR) for preterm birth by maternal characteristic. Overall, 12.8% (95% CI, 12.1–13.4) of the population delivered a preterm birth. The unadjusted OR of preterm birth was 1.27 (95% CI, 1.04–1.54) times greater among women who felt upset by experiences of racism compared with those who did not. In bivariate analysis, maternal age, BMI, and region were also significantly associated with preterm birth (all Wald test $p < .05$). There also were significantly higher odds of preterm birth observed among women who received inadequate (OR, 3.11; 95% CI, 2.45–3.96) or adequate-plus prenatal care (OR, 7.07; 95% CI, 5.78–8.65) compared with those who received adequate prenatal care. The adjusted logistic model controlled for covariates that were significantly associated with preterm birth in unadjusted models: maternal age, prepregnancy BMI, region, and level of prenatal care. In the fully adjusted model, feeling upset by

Table 1
Maternal Characteristics by Experiences of Racism among Non-Hispanic Black Mothers Who Delivered a Live Neonate in 11 States and New York City

	Felt Upset by Experiences of Racism	Did Not Feel Upset by Experiences of Racism	Total
Unweighted N	1,629	9,953	11,582
Weighted row percentage (95% CI)	14.2 (13.3–15.2)	85.8 (84.8–86.7)	100.0
Preterm birth (<37 weeks gestation), Percentages (95% CI)*,†			
No	84.9 (82.4–87.0)	87.6 (86.9–88.3)	87.2 (86.6–87.9)
Yes	15.1 (13.0–17.6)	12.4 (11.7–13.1)	12.8 (12.1–13.4)
Maternal age (y), Percentages (95% CI)*			
<20	16.1 (13.5–19.2)	14.0 (13.0–15.1)	14.3 (13.4–15.3)
20–24	29.5 (26.2–33.2)	31.0 (29.6–32.4)	30.8 (29.5–32.1)
25–29	23.4 (20.5–26.7)	25.3 (24.0–26.6)	25.0 (23.8–26.3)
≥30	30.9 (27.5–34.4)	29.7 (28.4–31.1)	29.9 (28.7–31.1)
Education (y), Percentages (95% CI)*,†			
<12	27.0 (23.8–30.5)	20.7 (19.5–21.9)	21.6 (20.5–22.8)
≥12	73.0 (69.5–76.2)	79.3 (78.1–80.5)	78.4 (77.2–79.5)
Prepregnancy insurance status, Percentages (95% CI)*,†			
Insured, Medicaid	46.4 (42.6–50.1)	40.0 (38.6–41.4)	40.9 (39.6–42.2)
Insured, non-Medicaid	30.1 (26.7–33.6)	37.2 (35.8–38.7)	36.2 (34.9–37.6)
Uninsured	23.6 (20.4–27.1)	22.8 (21.5–24.1)	22.9 (21.7–24.1)
Marital status, Percentages (95% CI)*,†			
Married	21.9 (19.1–25.1)	28.5 (27.2–29.8)	27.6 (26.4–28.8)
Other	78.1 (74.9–80.9)	71.5 (70.2–72.8)	72.4 (71.2–73.6)
Smoking during last 3 months of pregnancy, Percentages (95% CI)*,†			
No	82.2 (79.1–84.9)	89.2 (88.3–90.1)	88.2 (87.3–89.1)
Yes	17.8 (15.1–20.9)	10.8 (9.9–11.7)	11.8 (10.9–12.7)
Prepregnancy body mass index, Percentages (95% CI)*			
Underweight	4.5 (3.2–6.3)	3.5 (3.0–4.1)	3.6 (3.2–4.2)
Normal weight	38.1 (34.5–41.9)	41.0 (39.5–42.5)	40.6 (39.2–41.9)
Overweight	25.1 (21.9–28.5)	26.1 (24.8–27.5)	26.0 (24.8–27.2)
Obese	32.3 (28.9–35.9)	29.4 (28.1–30.8)	29.8 (28.6–31.1)
Region, Percentages (95% CI)*			
Northeast	27.9 (24.7–31.3)	25.7 (25.2–26.3)	26.0 (25.8–26.3)
Midwest	40.4 (37.2–43.6)	43.8 (43.2–44.4)	43.3 (43.1–43.6)
South	28.2 (24.8–31.9)	25.8 (25.2–26.4)	26.1 (25.9–26.4)
West			
Adequacy of prenatal care, Percentages (95% CI)*			
Inadequate	20.7 (17.8–24.1)	16.7 (15.6–17.9)	17.3 (16.2–18.4)
Intermediate	13.7 (11.3–16.6)	13.0 (12.0–14.0)	13.1 (12.2–14.0)
Adequate	34.4 (30.9–38.0)	36.9 (35.4–38.3)	36.5 (35.2–37.9)
Adequate plus	31.1 (27.8–34.7)	33.4 (31.1–34.8)	33.1 (31.8–34.4)

* Column percentages from weighted population.

† Design-based F statistic $p < .05$.

experiences of racism was associated with a 1.29 (95% CI, 1.04–1.59) times greater odds of preterm birth.

Table 3 displays the test for effect modification by adequacy of prenatal care, which revealed different stratum-specific associations. Using an interaction term of each feeling upset by experiences of racism with adequacy of prenatal care did not find prenatal care to be a statistically significant ($p = .45$) effect modifier when adjusted for maternal age, prepregnancy BMI, and region. In stratified analyses adjusted for maternal age, prepregnancy BMI, and region, experience of racism was not associated with preterm birth among women who received inadequate (AOR, 1.20; 95% CI, 0.77–1.88) or adequate-plus prenatal care (AOR, 1.20; 95% CI, 0.90–1.60). However, experience of racism was positively associated with odds of preterm birth among women who received intermediate (AOR, 2.03; 95% CI, 1.04–3.97) or adequate prenatal care (AOR, 1.57; 0.95, 2.59).

Discussion

Results of this population-based study suggest that the emotional effect of experiences of racism may contribute to risk of preterm birth among non-Hispanic Black women. We observed significantly higher odds of preterm birth associated with feeling upset by experiences of racism after adjustment for

potential confounders. Our results support previous findings from a small body of geographically limited qualitative (De Marco et al., 2008; Giurgescu, Banks, Dancy, & Norr, 2013) and quantitative studies (Dole et al., 2004; Giurgescu et al., 2012; Mendez, Hogan, & Culhane, 2014; Misra et al., 2010; Mustillo et al., 2004; Rankin et al., 2011) and expands the literature by examining this relationship in a large population-based sample. Additionally, our study found prenatal care to be an effect modifier in the association between racism and preterm birth, which expands on only two previous studies that have tested for effect modification in this relationship (Misra et al., 2010; Rankin et al., 2011).

Extant research supports the positive association between racism and preterm birth; however, there is a great deal of variability in the type and timing of discrimination asked about and the measurement tools used. Rankin et al. (2011) conducted the only other study that examined experiences of discrimination in the year before delivery, whereas other studies asked women about their lifetime experiences of discrimination. Although the survey question used in the current study did not measure the type of discrimination women experienced, previous studies examining the association with preterm birth have primarily measured experiences of personally mediated racism outside of health care. Personally mediated racism refers to

Table 2
Maternal Characteristics by Length of Gestation and the OR for Preterm Birth among Non-Hispanic Black Mothers Who Delivered a Live Neonate in 11 States and New York City

	Preterm Birth (<37 weeks)	Full-Term Birth (≥ 37 weeks)	Crude OR (95% CI)*	Adjusted OR (95% CI)*,†
	Percentages (95% CI)*			
Felt upset by experiences of racism				
No	83.1 (80.5–85.4)	86.2 (85.1–87.2)	ref	ref
Yes	16.9 (14.6–19.5)	13.8 (12.8–14.9)	1.27 (1.04–1.54)‡	1.29 (1.04–1.59)‡
Maternal age (y)				
<20	12.5 (10.7–14.6)	14.6 (13.5–15.7)	0.71 (0.57–0.88)‡	0.77 (0.60–0.98)‡
20–24	27.9 (25.3–30.7)	31.2 (29.8–32.7)	0.74 (0.62–0.87)‡	0.80 (0.66–0.96)‡
25–29	24.3 (21.8–26.9)	25.1 (23.8–26.5)	0.80 (0.67–0.95)‡	0.88 (0.73–1.07)
≥ 30	35.3 (32.5–38.2)	29.1 (27.8–30.5)	ref	ref
Education (y)				
<12	22.4 (19.9–25.1)	21.1 (19.8–22.4)	ref	–
≥ 12	77.6 (74.9–80.1)	78.9 (77.6–80.2)	0.93 (0.78–1.10)	–
Smoking during last 3 months of pregnancy				
No	86.8 (84.5–88.8)	88.4 (87.5–89.4)	ref	–
Yes	13.2 (11.2–15.5)	11.6 (10.6–12.5)	1.17 (0.95–1.44)	–
Prepregnancy body mass index				
Underweight	5.2 (4.0–6.7)	3.4 (2.9–4.0)	1.63 (1.16–2.28)‡	1.62 (1.14–2.29)‡
Normal weight	38.1 (35.2–41.1)	40.9 (39.4–42.5)	ref	ref
Overweight	25.3 (22.9–28.0)	26.1 (24.8–27.4)	1.04 (0.88–1.24)	0.98 (0.82–1.17)
Obese	31.4 (28.7–34.2)	29.6 (28.2–31.0)	1.14 (0.97–1.34)	1.04 (0.87–1.24)
Region				
Northeast	28.2 (25.6–30.8)	25.7 (25.3–26.2)	ref	ref
Midwest	41.7 (39.2–44.3)	43.6 (43.1–44.0)	0.87 (0.75–1.02)	0.79 (0.66–0.93)‡
South	26.2 (23.9–28.7)	26.1 (25.7–26.6)	0.92 (0.77–1.10)	0.69 (0.56–0.84)‡
West	3.9 (3.4–4.5)	4.6 (4.5–4.7)	0.78 (0.63–0.96)‡	0.85 (0.67–1.08)
Adequacy of prenatal care				
Inadequate	17.4 (15.3–19.8)	17.3 (16.1–18.5)	3.11 (2.44–3.96)‡	3.12 (2.45–3.97)‡
Intermediate	4.5 (3.5–5.8)	14.3 (13.3–15.4)	0.97 (0.70–1.34)	0.95 (0.69–1.31)
Adequate	12.9 (11.0–15.2)	40.0 (38.5–41.5)	ref	ref
Adequate plus	65.1 (62.2–67.9)	28.4 (27.1–29.8)	7.07 (5.78–8.65)‡	7.39 (6.05–9.04)‡

Abbreviation: OR, odds ratio.

* From weighted population.

† Adjusted for maternal age, prepregnancy body mass index, and region.

‡ $p \leq .05$ in logistic regression.

prejudice and discrimination resulting from one's assumptions and actions toward others according to their race (Jones, 2000). Other studies have described women's experiences of racism during their pregnancy care. A study in Oregon found that 20% of women reported discrimination in receiving prenatal care or labor and delivery (De Marco et al., 2008). A qualitative study found that some Black women described experiences of personally mediated racism in prenatal care, whereas the majority described institutional racism, discussing ways in which the health and social systems countered their attempts to obtain quality prenatal care (Salm Ward, Mazul, Nguui, Bridgewater, & Harley, 2013). Institutional or systematic racism refers to the policies and practices that contribute to structural barriers and

the differential access to good, services, and opportunities by race (Jones, 2000). In our study, it is not possible to know if the racism women reported experiencing in the year before delivery occurred in a prenatal care setting, in another health care setting, or elsewhere, given the phrasing used in PRAMS. It is also not possible to know if women were reporting personally mediated or institutional racism. Nonetheless, we propose that, as supported in the literature, either personally mediated or institutional racism could be associated with preterm birth.

Although the interaction term was not significant, the association between feeling upset by experience of racism and preterm birth differed by level of prenatal care. We observed positive associations between experience of racism and preterm birth among women who received intermediate or adequate prenatal care; indeed, experience of racism was associated with twice the odds of preterm delivery among women who received intermediate prenatal care, after adjustment for relevant potential confounders. However, the association between experiences of racism and preterm birth was closer to the null among women who received inadequate or adequate-plus prenatal care. These findings may be explained by the fact that women who receive adequate-plus care typically have heightened medical risk and women who have inadequate prenatal care typically have heightened psychosocial risk for a poor birth outcome (Sidebottom, Hellerstedt, Harrison, & Jones-Webb, 2017). These additional risk factors may override or mask the influence of racism for these two groups of high-risk women (Debiec et al.,

Table 3
AOR of Preterm Birth Associated with Feeling Upset by Experiences of Racism, Stratified by Adequacy of Prenatal Care

Adequacy of Prenatal Care	Preterm Birth AOR (95% CI)*,†	p Value	Interaction p Value
Inadequate	1.20 (0.77–1.88)	.42	.45
Intermediate	2.03 (1.04–3.97)	.04	
Adequate	1.57 (0.95–2.59)	.08	
Adequate Plus	1.20 (0.90–1.60)	.21	

Abbreviation: AOR, adjusted odds ratio.

* From weighted population.

† Adjusted for maternal age, prepregnancy body mass index, and region.

2010; Vintzileos et al., 2002). Potential effect modification by level of prenatal care may help to explain other studies that have found no association between racism and preterm birth, specifically if samples included large numbers of women with inadequate or adequate-plus levels of prenatal care. Further research considering prenatal care as an effect modifier is warranted.

There are notable limitations to this study. The primary limitations relate to the strength of the measure of racism used in the PRAMS study. Racism is a complex construct and the selection of an appropriate measure requires conceptual clarity regarding the type, pathway, and context (Krieger, 2012). Women's experiences of racism are not easily captured in a single yes/no item. The existing PRAMS survey item does not distinguish experiences of personally mediated racism, including the distinction between acute major experiences versus chronic exposure. Further, it does not collect data on lifetime experiences of racism. This limitation precludes an enhanced understanding of the type(s) of discrimination women experience that may impact preterm birth, along with the mechanisms by which they may function. We recommend that PRAMS include a valid, reliable, multi-item measure of experience of racism that includes lifetime experiences of racism and racism experienced in pregnancy-related care. Second, the sample includes women from 12 of the 48 participating states because the survey item about experiences of racism was not asked by all participating states. We recommend that experiences of racism be measured in all PRAMS participating state surveys. Income was not included as a covariate in the analysis due to the large number of records in which it was missing. We attempted to address this gap by including prepregnancy insurance status as an indicator of socioeconomic status, although it is an imperfect measure. Finally, owing to the nature of cross-sectional data, directionality cannot be confirmed. Future longitudinal studies should be designed to help establish causality in the relationship between racism and birth outcomes to aid the development of relevant interventions.

Implications for Policy and/or Practice

Although there remains a need for research to better understand the complex relationships between various forms of racism and preterm birth, many professional organizations already provide guidance to health care professionals and institutions instructing them to be aware of the role racism plays in the health of Black patients. The American College of Obstetricians and Gynecologists has stated that providers should be aware of the broader context that influences the health of patients to support respectful and patient-centered care. They acknowledge that institutional racism and other forms of discrimination influence health and that provider stereotyping of patients can negatively affect patient interactions (American College of Obstetricians and Gynecologists, 2018). The Institute of Healthcare Improvement suggests that providers inquire about patients' experiences of racism, both within and outside the health care environment. Not only can this raise awareness of the impact of lifetime experiences of racism on health outcomes, but it can help providers to avoid acts of racism in their care of patients and repair systems that may perpetuate racism. The Institute of Healthcare Improvement provides sample dialogues and questions that can be used by providers to talk about racism during clinical encounters (Edno, 2016). These dialogues can also provide insights into the sources of institutional racism that pregnant women encounter and can be helpful in the

examination of organizational policies and practices including quality of services, communication, and organizational culture, that might be racially inequitable.

Conclusions

The findings from this study further establish racism as an important public health problem with a measurable impact on the health of non-Hispanic Black women and their infants. To eliminate racial inequities in birth outcomes, health care professionals, policymakers, and social and economic institutions need to understand, acknowledge, address, and prevent racism. Although women of color experience discrimination across a variety of settings, pregnancy is often viewed as a window of opportunity during which women have relatively greater contact with the health care system. Therefore, this period offers the maternal and child health care professional an opportunity to learn from women about their personal experiences of racism across the life course and better understand its role in maternal and neonatal outcomes. Self-reflection on the part of professionals and institutional examination of policies and practices that may contribute to racism are necessary steps toward ensuring that all patients, regardless of race or ethnicity, achieve equitable health outcomes.

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Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.whi.2018.06.002>.

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