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Afua Nyame-Mireku Date

The Role of Home Visiting in the Association between Racial Discrimination and Preterm Birth among Black Women in the United States, PRAMS 2016 – 2019

By

Afua Nyame-Mireku

Master of Public Health

Global Epidemiology

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Michael R. Kramer, PhD

Committee Chair

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By

Afua Nyame-Mireku

B.S., University of Maryland College Park, 2020

Thesis Committee Chair: Michael R. Kramer, PhD

An abstract of
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Abstract

The Role of Home Visiting in the Association between Racial Discrimination and Preterm Birth among Black Women in the United States, PRAMS 2016 – 2019

By Afua Nyame-Mireku

Objective: There is substantial evidence that home visiting is associated with lower odds of preterm birth among Black women. However, its role in the relationship between racial discrimination and preterm birth has yet to be explored. This study investigated: 1) if feeling upset about experiencing racial discrimination in the 12 months before giving birth was associated with preterm birth and 2) whether access to a home visitor during the prenatal period was an effect modifier for this relationship.

Methods: Data from the Pregnancy Risk Assessment Monitoring System were used for the analysis. The study population included Black respondents who gave birth between 2016 and 2019 from eight US states that included the survey questions about racial discrimination and home visiting (n = 6,793). Logistic regression was used to model the relationship between racial discrimination, home visiting, and preterm birth.

Results: Feeling upset about experiencing racial discrimination was weakly associated with preterm birth risk, adjusting for maternal education, maternal age, and adequacy of prenatal care (aOR = 1.08, 95% CI: 0.67 – 1.74). There was no evidence of statistically significant effect modification of the relationship between racial discrimination and preterm birth based on home visiting status when evaluated on the multiplicative scale (p-interaction = 0.12). Black women who had a home visitor and felt upset about experiencing racial discrimination had over four times the odds of preterm birth compared to those who experienced neither exposure (aOR = 4.68, 95% CI: 2.08 – 10.54).

Conclusions: Our study suggests that there is not a statistically significant difference in the relationship between racial discrimination and preterm birth based on access to home visiting during the prenatal period. Further research should consider the role of various home visiting models on the relationship between racial discrimination and preterm birth among Black women living in the United States.

Keywords: Racial Discrimination, Home Visiting, Preterm Birth

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Table of Contents

Introduction

Birth Outcomes

Addressing preterm birth, defined as delivering before 37 weeks of gestation, in the United States (US) is a significant maternal and child health concern (CDC, 2021b). The preterm birth rate in the US has progressively worsened since 2014 after a period of steady decline (Osterman et al., 2021). At present, about 1 in 10 live births in the US are delivered preterm (Osterman et al., 2021). Given this challenge, the US has recognized reducing preterm birth as a national priority. Healthy People 2030, a list of national health objectives and target measures set by federal experts, includes a target of reducing the preterm birth rate from 10.2% to 9.4% by 2030 (HHS, 2021).

Preterm birth can cause health complications for both women[1] and infants. Infants born preterm often suffer from breathing and neurological challenges because the brain, lungs, and liver are still developing after 37 weeks of gestation (CDC, 2021b). Moreover, preterm birth often causes low birth weight among infants, where the infant weighs less than 2500 grams (CDC, 2021b). Prematurity and low birth weight are among the leading causes of infant mortality in the US (CDC, 2021a). Likewise, people who give birth prematurely are also at risk of health challenges. Women who deliver their infants before 37 weeks of gestation are at a higher risk of cardiovascular disease compared to women who deliver to term (Ngo et al., 2015). Additionally, premature infants often go to the neonatal intensive care unit, which could be a stressful experience for their parents (Ionio et al., 2019).

[1] We acknowledge that trans or nonbinary identities experience systemic inequities and birth challenges. The term "women" will be used throughout this paper as that is how the study participants self-identified.

Racial Disparities in Birth Outcomes

As the rates of preterm birth have progressed in the US, Black-White disparities in these outcomes have remained relatively constant over the years (Osterman et al., 2021). Black women bear the brunt of these challenges, as they fare worse than women of other races across maternal and child health indicators. Black women experience the highest rates of preterm birth and low birth weight, 14.39% and 14.15% respectively, compared to women of other races (Osterman et al., 2021). Notably, the infant mortality rate among Black infants is two times the rate among non-Hispanic/Latine White infants (Pham et al., 2020).

Given the numerous challenges that Black women experience around the time of pregnancy, researchers have speculated about the causes of these disparities. Black-White disparities in preterm birth often remain after adjusting for socioeconomic factors (Braveman et al., 2015). Education does not have as much of a protective effect on birth outcomes for Black women compared to White women (Assari, 2020). A study on Black-White disparities found that Black women who completed college had 0.92 times the odds of delivering a baby that was low birth weight compared to Black women who had less than a high school education while White women had 0.70 times the corresponding odds (Assari, 2020). Infants born to Black women with a college education have 3.1 more deaths per 1000 live births compared to infants born to White women with a high school education or less (Fishman et al., 2020). Given that these disparities persist despite accounting for socioeconomic status, a common risk factor for adverse birth outcomes, the conversation has shifted from a focus on racial differences in birth outcomes to an emphasis on the effects of racism.

Racism and Birth Outcomes

Racial discrimination has emerged as one of the main drivers of racial disparities in birth outcomes. In the US, race has been unjustly used as a reason to restrict resources and exert control over groups of people who are deemed societally inferior by those with privilege (D. R. Williams, 1997). There are several types of racism. Interpersonal racism is defined as prejudice, as well as differential expectations and behaviors towards a group of people based on their race (Jones, 2000). Structural racism is a form of racism that causes differential access to services for marginalized races, often limiting access to economic and educational opportunities (Jones, 2000). Racism is a chronic stressor for Black people and is linked to several adverse health outcomes, such as cardiovascular disease (Wyatt et al., 2003).

There is growing evidence that racism is related to preterm birth and low birth weight. While the causes of preterm birth are not fully understood, it is posited to be a syndrome that occurs due to systemic inflammation and maternal infection (Goldenberg et al., 2008). Chronic stress, such as that caused by racial discrimination, could increase risk of maternal infection or systemic inflammation, which could cause preterm birth (Giurgescu et al., 2016; Goldenberg et al., 2008). Additionally, stress related to racial discrimination may alter corticotropin-releasing hormone and affect labor timing (Kramer & Hogue, 2009). There is also epidemiologic evidence of a relationship between racism and negative birth outcomes for Black women. Black or African American women who experience interpersonal racism have 1.11 – 2.00 times the risk of preterm birth compared to non-Hispanic/Latine White women (Braveman et al., 2017; Mustillo et al., 2004). Black women who live in areas with high levels of structural racism are more likely to deliver preterm compared to Black women who live in areas with lower levels of structural racism (Chae et al., 2018; Chambers et al., 2018).

Prenatal care adequacy and utilization may explain some of the relationship between racial discrimination and preterm birth. Slaughter-Acey and colleagues (2019) found that African-American women who scored above the median on the Daily Life Experiences of Racial Discrimination and Bother Scale (DLE-B) were 1.24 times more likely to have no prenatal care compared to those who scored at or below the median of the DLE-B scale (Slaughter-Acey et al., 2019). Additionally, Black women are more likely to delay prenatal care or have inadequate prenatal care compared to White women (Cox et al., 2011). Intensive, intermediate, inadequate, and no prenatal care independently resulted in increased odds of preterm birth compared to adequate prenatal care among Black women (Cox et al., 2011).

Obstetric racism is also a concern for Black women. Obstetric racism is the combined effect of obstetric violence and medical racism against people giving birth by medical staff whose perceptions and diagnostic decisions put a patient's life at risk (Davis, 2019). Women of color in the US often report medical mistreatment during pregnancy and childbirth, such as being shouted out, ignored, or forced into a treatment option by a healthcare provider (Vedam et al., 2019). Additionally, there are racial disparities in pain management in healthcare settings due to pervasive false beliefs that Black patients can endure more pain than White patients (Hoffman et al., 2016). A study of satisfaction with prenatal care found that Black and Hispanic/Latine people with a history of experiencing racial discrimination in healthcare settings were 2.45 times more likely to have an unpleasant prenatal care visit compared to those who did not have a similar history (Dillon et al., 2020).

Racial discrimination has been found to decrease psychological well-being among African American pregnant women, however, there is evidence that social support improves psychological well-being among this population (Giurgescu et al., 2017). Scholars have

hypothesized that birth workers, who provide social support, may mediate the relationship between obstetric racism and poor birth outcomes, though, there has been no quantitative research that has examined this relationship (Davis, 2019). A multi-country Cochrane review found moderate evidence that social support (emotional, instrumental, or informational) for high-risk pregnancies could decrease the preterm birth rate from 128 preterm births per 1000 live births to 117 preterm births per 1000 live births (East et al., 2019). Thus, the relationship between racism, social support, and preterm birth remains an important area of research.

Home Visiting and Birth Outcomes

Home visitors are birth workers who provide emotional and informational support to expectant and/or new parents (Abbott & Elliott, 2017). Home visitors can be trained nurses, midwives, social workers, doulas, paraprofessionals, or individuals with lived experience (Abbott & Elliott, 2017; National Home Visiting Resource Center, 2021). While there is no centralized process to become a home visitor, most funding for home visiting in the US comes from the Maternal, Infant, and Early Childhood Home Visiting Program (MIECHV), a national program that provides funding to US states and territories to support evidence-based home visiting programs (Campos et al., 2018).

Home visitors and other birth workers are well-accepted in Black communities. In the early twentieth century, Black lay midwives, also known as Granny Midwives, supported Black and White women throughout the southern US with pregnancy and childbirth often with the help of younger Black women apprentices (Bonaparte, 2007). With the transition from home births to hospital births, obstetricians and other healthcare professionals ostracized traditional birth workers and medicalized the birth process (Bonaparte, 2007). However, the cultural significance of birth and birth work remains through numerous organizations that support Black birthing

practices through midwifery, doula care, lactation counseling, and other nonmedical birth support.

Though there is currently no epidemiologic evidence that home visitors may mitigate the impacts of racism on birth outcomes, home visiting has shown improvement in positive birth and childcare outcomes among women of color (Gruber et al., 2013; Hans et al., 2018; Kozhimannil et al., 2014; Thomas et al., 2017). A randomized controlled trial of primarily African American or Hispanic/Latine women found that those with access to doula-home-visiting services had 0.57 times the odds of having a preterm birth compared to those who did not (Hans et al., 2018). Another study of majority non-Hispanic/Latine Black participants found that women who did not have access to doula-home-visiting had two times the rate of preterm birth compared to women who did (Thomas et al., 2017). Furthermore, there is evidence that women of color who use home visiting services benefit from increased breastfeeding duration, lower rates of low birth weight, improved infant safe-sleep behaviors, fewer pregnancy complications, increased adequate prenatal care, and decreased cesarean delivery rates (Gruber et al., 2013; Hans et al., 2018; Kozhimannil et al., 2014; C. M. Williams et al., 2017). Moreover, qualitative research supports the value of home visiting services. A study done among a racially-ethnically diverse sample of pregnant women found that nonmedical maternal support workers improved agency and personal security among patients in medical settings, respected patient decision-making, and increased patients' knowledge surrounding pregnancy (Kozhimannil et al., 2016).

Though there is evidence that Black women significantly benefit from access to home visitors, those who are most in need often do not have access to these services. Black women are more likely than White women to desire to have a doula during pregnancy but less likely to have access (Kozhimannil et al., 2014). Nineteen percent of Black women in the US meet the criteria

for MIECHV, however, only 14% of MIECHV's beneficiaries are Black. Socioeconomic barriers further limit access to home visiting services. For women who do not have access to a free home visiting program, home visiting services may cost between $300 to $1200 with differential costs based on whether home visiting is covered by their health insurance (Kozhimannil et al., 2014). Moreover, while several states fund home visiting services through Medicaid, this approach is not universal given that states have the option to choose how they want to implement their Medicaid programs, including whether home visiting will be included (Johnson, 2019).

Research Question

As previously mentioned, there is currently no existing literature on whether the relationship between racial discrimination and birth outcomes is moderated by access to home visiting services among Black women in the US. Therefore, this study aims to use population-based data across eight US states to determine 1) if feeling upset about experiencing racial discrimination in the past 12 months is associated with preterm birth among Black women and 2) whether access to a home visitor during the prenatal period is an effect modifier for this relationship.

Methods

Data Source

This study is a cross-sectional analysis of the Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based survey on experiences before, during, and shortly after pregnancy in the US. PRAMS is jointly administered by the Centers for Disease Control and Prevention and state, territorial, or local health departments. PRAMS respondents are sampled

from birth certificates by jurisdiction. PRAMS samples between 1,300 to 3,400 women from each participating site, while oversampling groups that are at a higher risk for pregnancy-related complications, often by race/ethnicity, geographic location, maternal age, and infant birth weight. PRAMS uses weighting to obtain a valid population estimate. The Phase 8 PRAMS questionnaire revision includes respondents from 2016 to 2019 (Shulman et al., 2018).

This analysis was limited to Black, Phase 8 participants from eight states that included the survey questions on home visiting during pregnancy and feeling upset about experiencing racism in the 12 months before giving birth: Delaware, Nebraska, New Jersey, New York, Pennsylvania, Virginia, Wisconsin, and Wyoming. Participants were excluded if they were multiple gestation, adoption/surrogate births, and/or missing birth certificate data.

Variables

The dependent variable was preterm birth. Preterm birth was determined by a clinical estimate of gestational age, which was obtained from birth certificate records. Delivering before 37 weeks was defined as preterm birth. Responses were "Yes" or "No" for this variable.

The *primary independent variable* was feeling upset about experiencing racism during the 12 months before giving birth. The variable was selected from PRAMS survey question BB1, which is "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?" Responses were "Yes" or "No" for this variable.

The *secondary independent variable* was home visiting. This variable was a binary variable based on the following question, "During your most recent pregnancy, did a home visitor come to your home to help you prepare for your new baby? A home visitor is a nurse, a

health care worker, a social worker, or other person who works for a program that helps pregnant women." Responses were "Yes" or "No" for this variable.

The *covariates* of interest were selected by doing a thorough review of the literature for variables that impact the relationship between racism, home visiting, and preterm birth. Confounders were included in the final model if they changed the odds ratios for the association by ≥10%. Adequacy of prenatal care (e.g., Kotelchuck Index: inadequate, intermediate, adequate, and adequate plus), maternal education (e.g., less than high school, high school/GED, some college or vocational school, and college or higher), and maternal age (e.g., <20, 20-24, 25-29, 30-34, 35-39, 40+) were selected as confounders for the relationship between feeling upset about experiencing racial discrimination and preterm birth. Smoking three months before pregnancy (e.g., yes/no), access to health insurance (e.g., yes/no), pre-pregnancy body mass index (BMI), and history of preterm birth (e.g., yes/no) were also considered as potential confounders but were not included in the final models. Pre-pregnancy BMI was calculated from the mother's self-reported height and weight on the questionnaire (e.g., underweight < 18.5, normal 18.5-24.9, overweight 25.0-29.9, obese 30+).

An *interaction term* for racial discrimination and home visiting was included in the model to assess whether the relationship between racial discrimination and preterm birth differed by home visiting status on the multiplicative scale.

Analysis

Descriptive statistics and chi-square analyses were used to examine maternal characteristics related to the exposures and outcome (Table 1). Bivariate and multivariable logistic regression were used to examine the relationship between maternal characteristics and

preterm birth (Table 2). Logistic regression was used to examine the crude and adjusted relationship between feeling upset about experiencing racial discrimination and preterm birth by home visitation status (Table 3). The independent and combined effects of racial discrimination and home visiting on preterm birth were calculated using multivariable logistic regression (Table 4). A three-way interaction between adequacy of prenatal care, home visiting, and racial discrimination were visualized (Figure 1) and considered in an alternative model. All statistical analyses were conducted using SAS version 9.4 and accounted for complex survey sample design, including weights and strata.

Results

From the eight states that included the racial discrimination and home visiting questions in their survey designs, there were 31,077 PRAMS respondents. 6,793 survey respondents identified as Black, and the rest were excluded (n = 24,284). 3,733 out of 6,793 Black women responded to both survey questions (i.e., feeling upset about experiencing racial discrimination in the year before giving birth and having a home visitor during the prenatal period), making them eligible for the analysis.

Table 1 describes the maternal characteristics of Black women by both racial discrimination and home visiting status using weighted percentages (%) and standard errors (SE). Overall, 13.0% of the study participants delivered preterm (SE = 0.7). Black women who felt upset about experiencing racial discrimination and had a home visitor had the highest percentage of delivering preterm, 35.9% ± 9.3. Black women who did not have a home visitor had the lowest percentages of preterm birth with (11.5% ± 2.3) and without (11.4% ± 1.0) feeling upset about experiencing racial discrimination. Among Black women who felt upset about

experiencing racial discrimination, those who had a home visitor were more likely to have a preterm birth, be below 20 years old or over 40 years old, and have inadequate prenatal care compared to mothers who did not have a home visitor. Among Black women who did not feel upset about experiencing racial discrimination, those who used home visiting services were more likely to deliver preterm, have less than high school education, be younger, and have inadequate prenatal care compared to those who did not have a home visitor.

Table 2 shows the association between maternal characteristics and preterm birth without considering differences in the association by home visiting status. The models were adjusted for maternal education, maternal age, and adequacy of prenatal care. After adjusting for confounders, most of the associations between maternal characteristics and preterm birth were attenuated. Feeling upset about experiencing racial discrimination was very weakly and imprecisely associated with preterm birth (aOR = 1.08, 95% CI: 0.67 – 1.74). Black women who had a home visitor had 56% increased odds of delivering preterm compared to those who did not have a home visitor (95% CI: 1.07 – 2.29). Smoking three months before pregnancy (aOR = 1.39, 95% CI: 1.02 – 1.89) and having access to health insurance (aOR = 1.81, 95% CI: 1.04 – 3.16) were relatively strongly positively associated with increased odds of delivering preterm. Black women who had adequate plus prenatal care had nearly four times the odds of delivering preterm compared to women who had intermediate prenatal care (aOR = 3.91, 95% CI: 2.52 – 6.07). Black women who had inadequate prenatal care had 2.40 times the odds of delivering preterm compared to women who had intermediate prenatal care (95% CI: 1.47 – 3.91).

Table 3 shows the interaction test for whether the association between feeling upset about experiencing racial discrimination and preterm birth is different for those who had a home visitor compared to those who did not have a home visitor. Among Black women who had a home

visitor, there was a strong, positive, yet imprecise, association between feeling upset about experiencing racial discrimination and preterm birth (aOR = 2.19, 95% CI: 0.85 – 5.68). Among Black women who did not have a home visitor, feeling upset about experiencing racial discrimination was inversely and imprecisely associated with preterm birth (aOR = 0.91, 95% CI: 0.53 – 1.57). However, there was no statistically significant difference between feeling upset about experiencing racial discrimination and preterm birth by home visiting status when evaluated on the multiplicative scale (*p*-interaction = 0.12).

Table 4 shows the odds ratios for the effect of racial discrimination alone, the effect of home visiting alone, and the combined effect of home visiting and racial discrimination. Feeling upset about experiencing racial discrimination and having no home visitor was inversely and imprecisely associated with preterm birth (aOR = 0.91, 95% CI: 0.53 – 1.57). Having a home visitor without feeling upset about experiencing racial discrimination was positively associated with preterm birth (aOR = 2.13, 95% CI: 1.17 – 3.88). Black women who had a home visitor and felt upset about experiencing racial discrimination had over four times the odds of delivering preterm compared to women who experienced neither exposure (aOR = 4.68, 95% CI: 2.08 – 10.54).

In posthoc analyses, a three-way interaction term between adequacy of prenatal care, racial discrimination, and preterm birth was considered (*Figure 1*). Among those who did not feel upset about experiencing racial discrimination, Black women who had adequate plus or inadequate prenatal care had a higher probability of delivering preterm than those with adequate or intermediate prenatal care. The probability of delivering preterm was highest among Black women who had a home visitor, particularly among women who had inadequate or adequate plus prenatal care. Black women who had adequate prenatal care experienced a relatively similar

increase in preterm birth risk, with and without a home visitor, as racial discrimination increased. Among Black women who a home visitor, those who had adequate plus, inadequate, or adequate prenatal care experienced an increase in preterm birth risk as racial discrimination increased. However, in the absence of a home visitor, preterm birth was inversely related to racial discrimination for those with inadequate, adequate plus, and intermediate prenatal care. There was evidence of statistically significant three-way interaction between racial discrimination, adequacy of prenatal care, and preterm birth (*p*-interaction = <0.001; not shown).

Discussion

Findings

We examined whether feeling upset about experiencing racial discrimination during the year before giving birth was associated with preterm birth among Black women in the US and whether this relationship was modified by having a home visitor during the prenatal period. Our results suggested that feeling upset about experiencing racial discrimination does not significantly contribute to preterm birth risk among Black women in our sample, adjusting for maternal education, maternal age, and adequacy of prenatal care. Using an interaction term, our results suggested that there is no difference in the association between feeling upset about experiencing racial discrimination and preterm birth based on whether there was a home visitor during the prenatal period. However, the combined effect of feeling upset about experiencing racial discrimination and having a home visitor was significantly associated with preterm birth.

Comparisons to Similar Studies

The results of our study were not consistent with previous literature on racial discrimination and preterm birth (Bower et al., 2018; Braveman et al., 2017; Slaughter-Acey et

al., 2016). A similar PRAMS study among non-Hispanic Black mothers from 11 states and New York City found a statistically significant association between feeling upset about experiencing racial discrimination and preterm birth after adjusting for maternal age, pre-pregnancy BMI, and US geographical region (aOR = 1.29, 95% CI: 1.04 – 1.59) (Bower et al., 2018). We found a similar distribution of maternal characteristics by exposure status for most variables. However, Bower and colleagues had a higher proportion of uninsured participants compared to our study population. Additionally, our study results may vary because pre-pregnancy BMI did not meet our criteria for adjustment, and we did not consider US geographical region as a potential confounder. In addition to Wisconsin and Virginia, their team included data from Massachusetts, Ohio, Utah, Michigan, Colorado, Tennessee, North Carolina, and Washington, which were excluded from our study based on our eligibility criteria. Slaughter-Acey and colleagues (2016) used the Daily Life Experiences of Racism & Bother Scale, which measures how much daily racial microaggressions bother individuals during their pregnancy and the year prior, to examine the relationship between racism and preterm birth. They found a statistically significant association between feeling bothered about experiencing racial discrimination and preterm birth when comparing higher summary scores to lower summary scores (Slaughter-Acey et al., 2016). However, statistical significance varied based on the degree of racism, which was unable to be accounted for in our study (Slaughter-Acey et al., 2016). Lastly, a cross-sectional California survey of non-Hispanic/Latine, US-born Black women found that lifetime chronic worry about racial discrimination was associated with increased risk of preterm birth after adjustment for maternal demographic, socioeconomic, and psychosocial covariates (PR = 2.00, 95% CI: 1.33 – 3.01) (Braveman et al., 2017). Unlike these previous studies, our findings only accounted for racial discrimination experienced in the past year.

Our results suggested that home visiting was statistically significantly associated with an increased risk of preterm birth. These results differ from similar studies, which found that home visiting was associated with either no change or decreased risk of preterm birth (Goyal et al., 2017; Hans et al., 2018; Holland et al., 2018; Thomas et al., 2017). The results of our study may differ because we used a cross-sectional design, in contrast to the previously referenced studies, which used longitudinal designs. Furthermore, several of these studies restricted their study populations to women at higher risk for pregnancy complications based on age, socioeconomic status, marital status, and access to prenatal care, while our study did not restrict eligibility based on those criteria (Goyal et al., 2017; Hans et al., 2018; Holland et al., 2018). Additionally, these previous studies evaluated the effects of specific home visiting program models, including Healthy Families America (HFA), Nurse-Family Partnership (NFP), and Parents as Teachers (PAT). The criteria for NFP include being a first-time mom, 28 weeks or less gestation, and being classified as "low-income" by implementing agencies (NFP, 2022). In contrast, individual HFA and PAT sites determine their own eligibility criteria, such as age, marital status, and insurance status (Healthy Families America, 2022; Home Visiting Evidence of Effectiveness, 2019). Our study did not include data on the type of home visiting model, so we could not evaluate the effect of this variable. Differences in the type of home visiting model may lead to unmeasurable confounding in the relationship between home visiting and preterm birth in our study.

Lastly, when we accounted for the combined effect of home visiting and racial discrimination on preterm birth, we found a statistically significant association. This result suggests that having a home visitor and experiencing racial discrimination is associated with the prenatal experience and subsequent birth outcomes in a way that the singular effect of racial

discrimination is not. There is currently no quantitative evidence of the relationship between home visiting and racial discrimination. However, there is journalistic evidence that experiencing or anticipating racial discrimination based on knowledge of Black maternal mortality rates in the US may influence desire for additional support in the delivery room to advocate for the birthing person (Meyerson, 2019).

Limitations

There are several limitations of our research study. First, our sample only included Black women from eight US states: Delaware, Nebraska, New Jersey, New York, Pennsylvania, Virginia, Wisconsin, and Wyoming. Other studies included states in the West and South that were excluded from our study, namely Utah, Washington, Colorado, California, Virginia, Tennessee, and North Carolina (Bower et al., 2018; Braveman et al., 2017; Slaughter-Acey et al., 2016). Black women in the Southern and Western US may have differences in their experiences with racial discrimination and home visiting that could not be captured with this data. Segre and colleagues found that Black Midwesterners had 1.33 times the risk of experiencing racial discrimination in health care during the past year compared to Black Southerners (Segre et al., 2021). Our study also did not account for state-level differences in how home visiting programs are financed by insurance. Medicaid only covers home visiting services in certain states, which may introduce confounding by state based on eligibility for home visiting services (Johnson, 2019). Among the states included in this study, New York, Virginia, and Wisconsin cover home visiting services under Medicaid (Johnson, 2019). There may be a difference in the observed associations based on geographic location when controlling for maternal education, maternal age, and adequacy of prenatal care.

There are several plausible reasons for the differences between our findings for the association between racial discrimination and preterm birth compared to previous findings. Our study did not account for differences in degrees of feeling upset about experiences of racial discrimination because it was operationalized as a binary variable in the PRAMS survey. Furthermore, our study only included information about whether racial discrimination was experienced in the past year whereas other studies have used chronic or lifetime exposure to racial discrimination.

Another limitation is that our data on home visiting did not include information on the participant's satisfaction with their home visitor, the type of home visiting program, or the number of home visits. The association between home visiting and higher risk of preterm birth may be because eligibility or referral to home visiting is dependent on being at high risk for pregnancy complications, which would be consistent with the guidelines for several home visiting models including NFP (NFP, 2022). In this scenario, women who receive home visits would already be at higher risk for preterm birth compared to those who did not receive home visits. The number of home visits could have also had an impact on our findings. Goyal and colleagues (2013) found that women who received eight or more prenatal home visits had 0.38 times the odds of delivering preterm compared to women who had 1 – 3 prenatal home visits (Goyal et al., 2013).

Recommendations

For future programs, we recommend that PRAMS require the racial discrimination and home visiting questions for all participating PRAMS sites so that nationally-representative data can be available for these outcomes. Additionally, PRAMS should expand the racial

discrimination variable so it can be scaled, including a measure of frequency, degree, and location of racial discrimination. Future research should use prospective studies, which may be better able to capture the relationship between experiencing racial discrimination before birth, home visiting during the prenatal period, and subsequent risk of preterm birth.

Conclusion

In conclusion, our findings suggest that the association between racial discrimination and preterm birth does not significantly differ based on access to home visiting services.

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Appendix

Table 1. Maternal Characteristics by Home Visiting and Racial Discrimination Status (Weighted Percentages), PRAMS 2016-2019

Maternal Characteristics (%, SE)	Total (N = 6784)	Racial Discrimination (N = 695)		*p*-value	No Racial Discrimination (N = 3038)		*p*-value
		Home Visiting (N=111)	No Home Visiting (N=584)		Home Visiting (N =391)	No Home Visiting (N =2647)	
Preterm Birth							
Yes	12.98 (0.66)	35.88 (9.33)	11.45 (2.33)		21.29 (4.73)	11.42 (1.03)	
No	87.02 (0.66)	64.12 (9.33)	88.55 (2.33)	<0.001	78.71 (4.73)	88.58 (1.03)	0.01
Maternal Education							
Less than High School	11.25 (0.76)	15.44 (4.46)	5.64 (0.99)		16.98 (2.85)	7.16 (0.87)	
High School/GED	38.38 (1.16)	46.47 (8.12)	40.30 (3.94)	0.16	53.16 (5.15)	39.65 (1.75)	<0.001
Some College or Vocational School	31.76 (1.10)	21.03 (8.34)	28.71 (3.63)		18.92 (3.88)	31.89 (1.67)	
College or Higher	18.61 (0.86)	17.07 (8.24)	25.35 (3.39)		10.94 (3.15)	21.30 (1.42)	
Health Insurance							
Yes	92.11 (0.63)	94.71 (2.65)	89.68 (2.53)		89.42 (3.29)	90.43 (1.07)	
No	7.89 (0.63)	5.29 (2.65)	10.32 (2.53)	0.22	10.58 (3.29)	9.57 (1.07)	0.76
Maternal Age							
<20	5.80 (0.51)	16.91 (4.95)	2.85 (0.75)		10.90 (1.99)	4.50 (0.70)	
20-24	23.43 (1.06)	18.05 (4.81)	19.66 (2.95)		32.39 (5.22)	23.04 (1.56)	
25-29	30.04 (1.09)	22.19 (5.18)	31.75 (3.77)	<0.001	26.45 (4.50)	31.86 (1.70)	0.02
30-34	24.08 (0.98)	9.85 (3.27)	24.70 (3.32)		15.61 (3.69)	22.16 (1.37)	
35-39	13.49 (0.77)	23.66 (8.62)	18.36 (3.33)		9.91 (3.04)	14.97 (1.24)	
40+	3.15 (0.36)	9.34 (7.97)	2.68 (0.78)		4.75 (2.87)	3.46 (0.58)	
Pre-pregnancy Body Mass Index							
Underweight (<18.5)	3.38 (0.58)	2.43 (1.35)	3.31 (1.53)		0.91 (0.35)	2.32 (0.49)	
Normal (18.5 – 24.9)	32.70 (1.12)	29.02 (6.92)	31.90 (3.68)	0.22	38.53 (5.22)	33.26 (1.71)	0.44
Overweight (25.0 – 29.9)	28.77 (1.11)	15.13 (4.07)	25.39 (3.52)		23.19 (3.97)	27.23 (1.61)	
Obese (30.0+)	35.14 (1.13)	53.43 (8.26)	39.40 (3.97)		37.36 (5.25)	37.20 (1.76)	
Adequacy of Prenatal Care							
Inadequate	17.07 (0.91)	43.01 (9.07)	15.18 (2.06)		23.58 (4.46)	14.44 (1.15)	
Intermediate	13.13 (0.80)	9.96 (4.03)	10.98 (2.55)	<0.001	13.51 (3.42)	13.52 (1.21)	0.09
Adequate	38.83 (1.17)	29.21 (6.21)	34.98 (2.80)		30.08 (4.75)	39.59 (1.77)	
Adequate Plus	30.97 (1.10)	17.83 (4.69)	38.87 (4.12)		32.82 (5.06)	32.45 (1.73)	
Maternal Smoking 3 Months Before Pregnancy							
Yes	20.44 (0.95)	20.63 (5.30)	26.90 (3.58)	0.35	23.16 (4.46)	17.56 (1.37)	0.20
No	79.56 (0.95)	79.37 (5.30)	73.11 (3.58)		76.84 (4.46)	82.44 (1.37)	
History of Preterm Birth							
Yes	5.72 (0.51)	5.69 (2.24)	5.14 (1.25)	0.83	3.34 (0.89)	4.05 (0.58)	0.52
No	94.28 (0.51)	94.31 (2.24)	94.86 (1.25)		96.66 (0.89)	95.95 (0.58)	

Table 2. Odds Ratios for Effects of Maternal Characteristics on Preterm Birth, PRAMS 2016 – 2019

Maternal Characteristic	Preterm Birth	
	OR (95% CI)	**aOR (95% CI)***
Racial Discrimination		
Yes	1.17 (0.76 – 1.81)	1.08 (0.67 - 1.74)
No	ref	ref
Home Visiting		
Yes	1.44 (1.01 - 2.05)	1.56 (1.07 - 2.29)
No	ref	ref
Maternal Education		
Less than High School	ref	ref
High School/GED	1.18 (0.84 - 1.66)	1.10 (0.75 - 1.61)
Some College or Vocational School	1.04 (0.74 - 1.47)	0.96 (0.65 - 1.41)
College or Higher	1.14 (0.77 - 1.67)	1.00 (0.64 – 1.56)
Health Insurance		
Yes	1.72 (1.04 – 2.86)	1.81 (1.04 – 3.16)
No	ref	ref
Maternal Age		
≤20	ref	ref
20-24	0.91 (0.57- 1.44)	0.92 (0.56 – 1.51)
25-29	1.16 (0.74 - 1.81)	1.08 (0.66 – 1.77)
30-34	1.09 (0.70 - 1.69)	1.07 (0.63 – 1.79)
35-39	1.38 (0.86 - 2.21)	1.19 (0.70 – 2.02)
40+	2.02 (1.09 - 3.76)	1.70 (0.86 – 3.40)
Pre-pregnancy Body Mass Index		
Underweight (<18.5)	ref	ref
Normal (18.5 – 24.9)	1.44 (0.69 - 3.01)	1.16 (0.49 - 2.76)
Overweight (25.0 – 29.9)	1.50 (0.72 - 3.13)	1.11 (0.46 - 2.65)
Obese (30.0+)	1.37 (0.65 - 2.89)	1.10 (0.45 - 2.66)
Adequacy of Prenatal Care		
Intermediate	ref	ref
Adequate	0.68 (0.42 – 1.10)	0.67 (0.41 – 1.09)
Adequate Plus	4.00 (2.58 – 6.21)	3.91 (2.52 – 6.07)
Inadequate	2.39 (1.47 – 3.88)	2.40 (1.47 – 3.91)
Maternal Smoking 3 Months before Pregnancy		
Yes	1.36 (1.03 – 1.80)	1.39 (1.02 – 1.89)
No	ref	ref
History of Preterm Birth		
Yes	4.16 (2.91 - 5.94)	3.31 (2.24 - 4.88)
No	ref	ref

*Adjusted for maternal education, maternal age, and adequacy of prenatal care without interaction term

Table 3. Odds Ratios for Effect of Racial Discrimination on Preterm Birth Stratified by Home Visiting, PRAMS 2016 – 2019

	Preterm Birth	
	OR (95% CI)	**aOR (95% CI)***
Home Visiting	2.06 (0.78 – 5.45)	1.00 (0.61 – 1.64)
No Home Visiting	2.19 (0.85 – 5.68)	0.91 (0.53 – 1.57)
p-interaction (α =0.05)	0.19	0.12

*Adjusted for maternal education, maternal age, and adequacy of prenatal care with interaction term

Table 4. Odds Ratios for Independent and Joint Effects of Racial Discrimination and Home Visiting on Preterm Birth, PRAMS 2016 – 2019

	Preterm Birth	
	OR (95% CI)	**aOR (95% CI)***
No Racial Discrimination and No Home Visiting	--	--
Racial Discrimination and No Home Visiting	1.00 (0.61 – 1.64)	0.91 (0.53 – 1.57)
Home Visiting and No Racial Discrimination	2.10 (1.17 – 3.78)	2.13 (1.17 – 3.88)
Racial Discrimination and Home Visiting	4.34 (1.91 – 9.85)	4.68 (2.08 – 10.54)

*Adjusted for maternal education, maternal age, and adequacy of prenatal care with interaction term

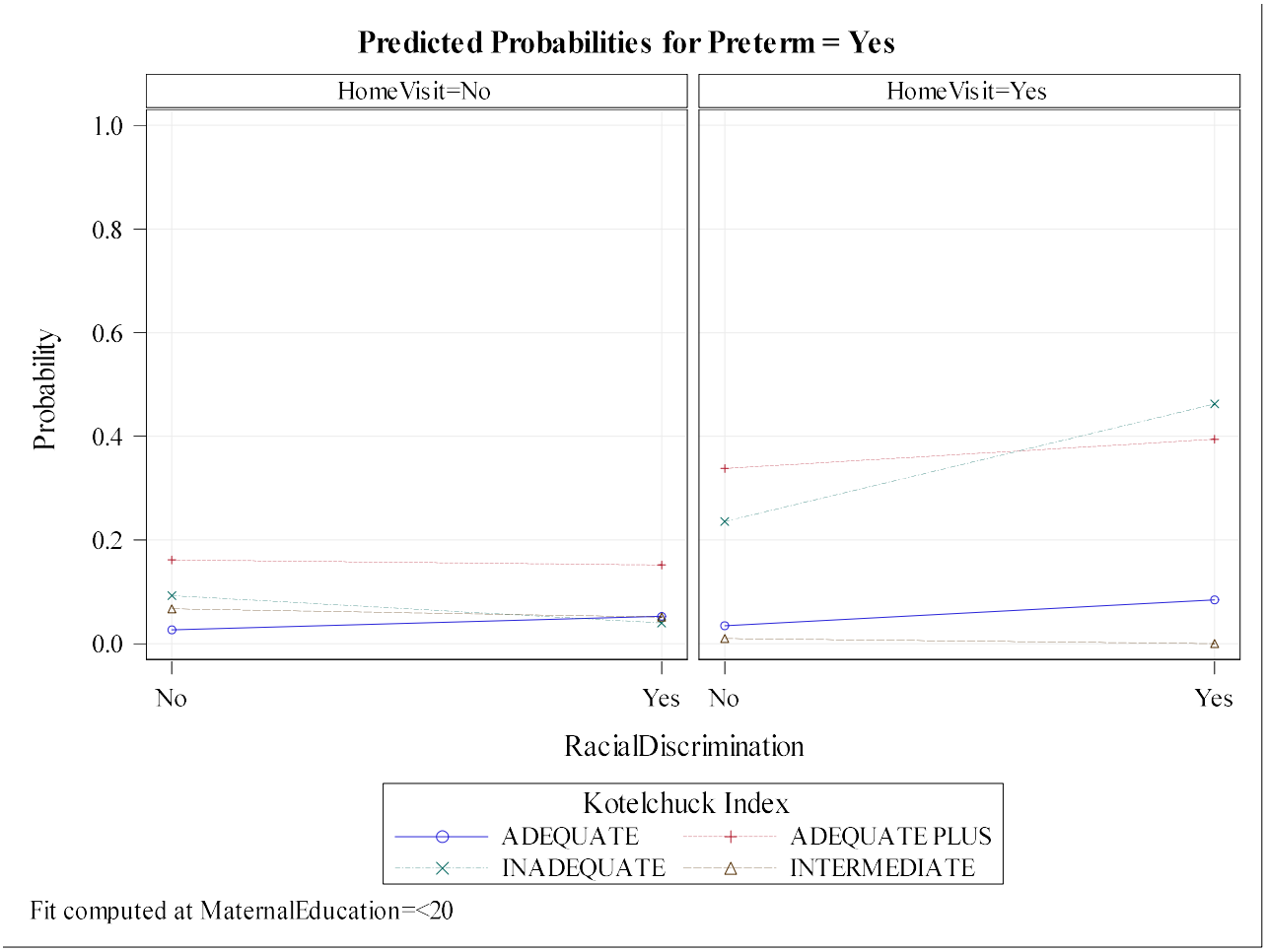

Figure 1. Visualization of Three-Way Interaction between Racial Discrimination, Home Visiting, and Adequacy of Prenatal Care on Preterm Birth, PRAMS 2016 – 2019