African American Women's Exposure to Interpersonal Racial Discrimination in Public Settings and Preterm Birth: the Effect of Coping Behaviors

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Objectives: To determine whether African American women's coping behaviors modify the relationship between exposure to interpersonal racial discrimination in public settings and preterm birth (<37 weeks).

Design: A case-control study was performed among African American women delivering infants at two tertiary care hospitals in Chicago, IL between July 2001–June 2005. A structured questionnaire was administered to measure maternal perceived exposure to interpersonal racial discrimination in public settings and coping behaviors.

Results: A greater percentage of African American mothers of preterm infants had high lifetime and past year exposure to racism in public settings than their peers who deliver term infants; odds ratios (OR) and 95% confidence intervals (95% CI) equaled 1.5 (0.9–2.8) for lifetime and 2.5 (1.2–5.2) for past year exposure. Active coping, especially ''working harder to prove them wrong'' led to attenuated ORs (interaction *P* value<.05 for lifetime and <.10 for past year.

Conclusions: African American women's exposure to racism in public settings is a risk factor for preterm birth; active coping behaviors weaken this relationship. *Ethn Dis.* 2011; 21(3): 370–376.

Key Words: Racism, Preterm Birth, Coping

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Introduction

It is well-known that non-Hispanic African American women have approximately a two-fold greater risk of delivering preterm (< 37 weeks) infants than their white counterparts.[1] For the past several decades reducing the racial disparity in preterm birth rates has been a national public health priority[2]; however, the mechanisms underlying African American women's pregnancy disadvantage remain poorly understood and consequently the racial disparity in preterm birth rates persists.

Interpersonal racism against African Americans remains highly prevalent in the United States.[3,4] Moreover, an expanding literature suggests that African American women's exposure to interpersonal racial discrimination is a risk factor for poor pregnancy outcome.[5–12] While many studies have used scales to quantify exposure to racial discrimination combined across several domains, such as school, work, public settings, medical care, and others, the studies that have looked specifically at interpersonal racism in public settings have found mixed results. A prospective study found that women who reported having people act as if they were afraid of them or as if they were not intelligent or receiving poorer service than others were more likely to have a preterm infant, especially if they had a high school education or less.[9] In another study, when asked more generally about exposure to interpersonal racism in public settings, however, women who reported higher exposure did not have higher odds of very low birthweight.[6] Therefore, the extent to which experiences of interpersonal racism in public settings is associated with birth outcome is incompletely understood.

In discussing the relationship between preterm birth and stress, of which exposure to interpersonal racial discrimination is a unique form, Hogue et al suggested that there is a complex relationship between the environment, agent and host.[13] Effective coping responses may reduce the duration and magnitude of the psychological and physiological stress response to experiences of racial discrimination and therefore attenuate or ''buffer'' the relationship between experiences of discrimination and poor health outcomes.[14,15] Ineffective coping responses, on the other hand, may extend or enhance the stress response which could therefore increase the likelihood of having a deleterious health outcome. To our knowledge there are no published data on the potential modifying effect of African American women's coping behaviors on the relationship between perceived exposure to interpersonal racial discrimination in public settings and birth outcome.

We, therefore, designed a case-control study to determine the extent to which African American women's exposure to interpersonal racial discrimination in public settings is associated with preterm birth and whether their coping behaviors modify this relationship.

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METHODS

Study Sample

African American mothers delivering at Stroger Hospital of Cook County and University of Chicago Hospital in Chicago, IL between July 2001–June 2005 were recruited for this study. These hospitals serve critically ill and healthy infants. The medical record was abstracted to determine infants' gestational age based on physician assessment of the neonate, infant's birthweight as defined by nursing measurement, and maternal race as self-defined. Case participants were limited to African American mothers of singleton preterm (<37 weeks gestational age), low birthweight (<2500 grams, LBW) infants. Control participants were limited to African American mothers of term, non-low birthweight infants admitted to the normal newborn nursery. Mothers were contacted within 72 hours of their infant's admission and a face-to-face interview was completed within 7 days of delivery.

We offered a $10 participation reward to all eligible participants. We obtained informed consent from the women before study enrollment. Mothers of infants who died within 72 hours of birth were not requested to complete the study questionnaire. The study was approved by the Institutional Review Boards of the participating hospitals and Children's Memorial Hospital.

In the present study, we enrolled 163 cases and 121 controls. An earlier study using a similar methodology within the same target population suggests that this sample size represents approximately 89% of eligible cases.[6] One case was not interviewed and was excluded. An additional two cases and four controls were excluded because they had missing responses to all of the questions of interest to this study, either because they did not complete the interview or they responded "I don't know/I don't remember" for every question in the series. Therefore, the final sample included 160 cases and 117 controls.

Study Questionnaire

Trained female African American interviewers administered a structured questionnaire in the hospital. They collected data on mother's age, education, marital status, parity, prenatal care initiation, cigarette smoking, and alcohol use. A modified version of the Perceived Racism Scale (PRS)[16] was included in the questionnaire. The PRS includes a subscale for exposure to racial discrimination in public settings that consists of nine questions about experiences such as being called insulting names, being talked down to, or being followed by security guards while shopping (Table 2). This subscale was asked twice: once for experiences in the past year and once for experiences during the participant's lifetime.

For each of the scale items, six response options were given during the interview, which were grouped for analysis into those who were exposed to that experience of racial discrimination (*a few times per year, a few times a month, at least once a week*, or *nearly every day*) and those who were unexposed (*never* or *less than once per year*). If a participant responded *not applicable*, she was considered unexposed, but if she responded *I don't know/I don't remember* to any of the nine individual items, the data were considered missing and dropped from analysis for that item.

In addition, the expanded response options were used to generate a score to represent the overall frequency of exposure to racial discrimination in public settings. Given nine items and a scale that ranged from 0 (*never*) to 6 (*nearly every day*) for each item, the theoretical range for this exposure score was 0 to 54. The empirical range in this sample was 0–22. Given that the distributions of the scores for lifetime and past year exposure to racism were right skewed, a dichotomous variable was created to indicate high exposure vs low or medium exposure, as determined by using the value for the top quintile of lifetime exposure among controls (a score of ≥ 7 or <7).

Scores were calculated for participants who had two or less items with missing values and missing values were changed to zero (*never*) for up to two factors when calculating scores to retain as much data as possible. Therefore, the final sample sizes for the lifetime and past year exposure scores were 267 and 269, respectively.

Participants were also asked in general about their coping behaviors in response to experiences of racial discrimination in the public setting. Each of the coping behaviors was measured using the following question: "If you experience racism in public settings, do you generally deal with it by ____?" and behaviors were not mutually exclusive, so a woman could report using multiple different coping strategies. The list of coping behaviors that completed this sentence, which consisted of passive, external active and internal active behaviors, is available in Table 3. The following response options were given during the interview: *not at all, not that often, often*, or *very often*. Women responding *not at all* or *not that often* were combined to represent those who did not report the coping behavior and those responding *often* or *very often* were combined to represent those who did report the coping behavior.

Several women responded *not applicable* to the coping behavior questions, presumably because they did not feel

that they experienced racism. Therefore, the sample size is approximately 15% lower for the analyses that incorporate coping behaviors. However, sensitivity analyses were performed using the entire sample by grouping women who chose *not applicable* for each coping behavior with those who responded *not at all* and results did not change meaningfully (data not shown).

Statistics

Chi-square tests were used to compare the distributions of maternal characteristics between cases and controls, including age, education, marital status, parity, prenatal care, income, cigarette smoking, alcohol use, and site of care. We tested for interaction and assessed confounding by maternal characteristics mentioned above using single-factor stratified analysis: if the *P* value for the Breslow-Day test was <.05, the variable was considered an effect modifier and if the adjusted OR was different than the crude OR by 10% or more, the variable was considered a confounder. Odds (OR) and 95% confidence intervals (95% CI) were calculated for the association between the nine experiences of racism and overall exposure to racism in the public setting and preterm low birthweight (LBW). To test the hypothesis that women's coping behaviors in response to discrimination modify the relationship between perceived racial discrimination and preterm, LBW, stratified analyses were conducted by each type of coping behavior for the relationship between lifetime or past year overall exposure to racism (high vs low/medium) and preterm, LBW. Stratum-specific ORs and 95% CIs were estimated for those who reported and those who did not report each type of coping behavior and Breslow-Day tests were computed to determine whether stratum-specific ORs were significantly heterogeneous. SAS Version 9.2 (SAS Institute: Cary, NC) software was used to perform all analyses.

Table 1. Characteristics of African American mothers of preterm low birthweight (cases) and term normal birthweight infants (controls), 2001–2005

Maternal Characteristics*	Cases (%) *n*=160	Controls (%) *n*=117	*P* value†
Age			
<20	22.8	19.7	
20–34	63.9	71.8	.32
35+	13.3	8.6	
Education			
<HS	36.1	35.9	
HS	39.2	40.2	.98
>HS	24.7	23.9	
Marital status			
Married	27.5	31.6	
Unmarried, living together	4.4	4.3	.76
Unmarried, not living together	68.1	64.1	
Parity			
Primiparous	47.8	37.3	
1–3 previous livebirths	42.8	50.0	.22
4+	9.4	12.7	
Prenatal care			
First trimester initiation	69.8	67.2	.65
Late initiation of care	30.2	32.8	
Income			
<$16,000	45.0	35.9	
$16,000–30,999	11.3	13.7	.49
$31,000+	9.4	12.0	
Refused/don't know/missing	34.4	38.5	
Cigarette smoking			
Smoker	31.9	29.9	.73
Non-smoker	68.1	70.1	
Alcohol use			
Any	16.5	13.8	.55
None	83.5	86.2	
Site			
University of Chicago	50.0	43.6	.29
Stroger Hospital of Cook County	50.0	56.4	

* Unless indicated, less than five people had missing values on any of the characteristics listed.
† Chi-square test.

RESULTS

Cases (n=160) and controls (n=117) were similar with respect to maternal age, education, martial status, parity, prenatal care initiation, income, smoking status, alcohol use and site of delivery (Table 1). Stratified analysis revealed that none of these covariates were significant effect modifiers or meaningful confounders of the relationship between exposure to interpersonal racism and preterm-LBW, so they were not included in further analyses in the interest of parsimony.

Table 2 shows the relation between maternal lifetime and past-year exposure to nine specific experiences of interpersonal racism in the public domain and preterm-LBW. With the exception of "I am followed, stopped, or arrested by police more than others because of my race", the odds of preterm-LBW was elevated for women who reported each experience of discrimination, compared to those who did not report the

Table 2. Experiences of perceived racism for African American mothers of preterm low birthweight (cases) compared to term normal birthweight infants (controls), 2001–2005

Experience	Experiences in Lifetime				Experiences in Past Year			
	*n**	Cases (%)	Controls (%)	OR (95% CI)	*n**	Case (%)	Controls (%)	OR (95% CI)
I have been called insulting names related to my race or skin color	270	30.4	17.0	2.1 (1.2, 3.9)	268	14.1	8.9	1.7 (0.8, 3.7)
When I go shopping, I am often followed by security guards or watched by clerks.	274	42.5	36.0	1.3 (0.8, 2.2)	274	31.9	26.3	1.3 (0.8, 2.2)
I hear comments from Whites expressing surprise at my or other ''minority'' individuals' intelligence or industriousness.	259	25.2	13.9	2.1 (1.1, 4.0)	260	22.5	11.9	2.1 (1.1, 4.3)
People ''talk down'' to me because I am Black.	273	20.9	10.4	2.3 (1.1, 4.6)	273	13.9	5.2	2.9 (1.2, 7.5)
I have been refused rental housing which was later rented to Whites of similar standing.	260	3.9	0.9	4.3 (0.5, 35.9)	262	3.2	0.0	**
I have difficulty getting a loan because I am Black.	262	5.1	1.9	2.8 (0.6, 13.3)	262	2.6	1.9	1.4 (0.2, 7.6)
I am followed, stopped, or arrested by police more than others because of my race.	273	10.6	15.0	0.7 (0.3, 1.4)	273	8.8	5.3	1.7 (0.6, 4.6)
Waiters and waitresses serve people who are not Black first.	272	19.5	15.0	1.4 (0.7, 2.6)	271	13.3	10.6	1.3 (0.6, 2.7)
I have been denied hospitalization or medical care because of my race.	276	2.5	0.9	3.0 (0.3, 27.1)	277	0.6	0.0	**
High exposure to perceived racial discrimination†	**267**	**28.3**	**20.4**	**1.5 (0.9, 2.8)**	**269**	**21.9**	**10.1**	**2.5 (1.2, 5.2)**

* Sample sizes are different for each variable because women were excluded if they responded ''I don't know/ I don't remember'' or ''Not applicable'' to that question.
† High exposure equals a score of ≥7 for overall frequency of exposure to all items, compared to a score of <7 (low/medium exposure); scoring is described in Methods.

experience. The magnitude of the association between maternal (lifetime and past year) exposure to racial discrimination within the public domain and preterm-LBW was strongest among mothers who responded ''I hear comments from Whites expressing surprise at my or other minority individuals' intelligence or industriousness'' and ''People 'talk down' to me because I am Black.'' The OR of preterm-LBW for maternal overall exposure to high vs low/medium levels of perceived racial discrimination equaled 1.5 (0.9, 2.8) for lifetime and 2.5 (1.2, 5.2) for past-year exposure.

Table 3 shows the effect of mothers' coping strategies on the association between overall lifetime and past-year exposure to interpersonal racism and preterm-LBW. With the exception of mothers who reported getting violent, all of the ORs of preterm-LBW for maternal exposure to racial discrimination (lifetime and past year) exceeded unity across all measured coping behaviors. Women who reported employing passive coping behaviors generally had higher ORs for the relationship between perceived racism and preterm-LBW than those who did not report the passive behaviors; however, the stratum-specific ORs for those who did and did not report the behavior were not significantly different for any of the passive coping behaviors. Women who reported one or more passive coping behaviors in the absence of any active behaviors had a five and seven-fold increased odds of preterm LBW if they reported high levels of perceived racism in their lifetime or in the past year; however, the CI were wide and included unity. Women reporting active coping behaviors, especially ''working harder to prove them wrong,'' (Breslow-Day P value $<.05$ for lifetime and $<.10$ for the past year), generally had attenuated ORs for the relationship between perceived maternal lifetime and past-year exposure to racism and preterm-LBW compared to their counterparts who did not report this behavior, indicating that certain active coping strategies may buffer the effect of racism on preterm-LBW. Getting violent also demonstrated a buffering effect on the relationship

We found that African American mothers who delivered preterm-LBW infants were more likely to report experiencing interpersonal racial discrimination in public settings within the past year than African American mothers who delivered term, non-LBW infants.

Table 3. Odds ratios (OR) and 95% confidence intervals (95% CI) for the relationship between experiencing high levels of perceived racism and having a preterm low birthweight delivery, stratified by type of reported coping behaviors, African American mothers, 2001–2005

	Lifetime (*n*=228)		Past Year (*n*=230)	
Coping Behaviors	Reported Coping Behavior Stratum-specific OR (95% CI)*	Did not Report Behavior Stratum-specific OR (95% CI)*	Reported Coping Behavior Stratum-specific OR (95% CI)*	Did not Report Behavior Stratum-specific OR (95% CI)*
Passive				
Accept it	1.2 (0.3, 5.2)	2.1 (1.0, 4.2)	10.9 (1.1,104)	3.2 (1.3, 7.7)
Keep it to yourself	4.5 (0.8,25.3)	1.5 (0.8, 3.0)	8.0 (0.9, 73.4)	3.2 (1.3, 7.7)
Ignore it	3.1 (0.7,13.4)	1.5 (0.8, 3.1)	7.6 (0.9, 66.7)	3.1 (1.3, 7.6)
Forget about it	1.9 (0.4, 8.3)	1.7 (0.9, 3.4)	4.0 (0.4, 36.4)	3.6 (1.5, 8.7)
Avoid it	1.6 (0.6, 4.7)	1.9 (0.9, 4.0)	3.8 (0.8, 19.1)	3.6 (1.4, 9.3)
Passive only|	5.3 (0.9,31.4)	1.5 (0.8, 3.0)	7.1 (0.7, 68.2)	3.4 (1.4, 8.1)
External active				
Work harder to prove them wrong	0.8 (0.4, 1.9)	6.7 (1.9, 23.7) †	2.0 (0.7, 5.3)	15.3 (2.0,118) ††
Speak up	1.8 (0.9, 4.0)	1.8 (0.6, 5.3)	3.9 (1.5, 10.2)	3.8 (0.8, 18.6)
Try to change things	1.4 (0.5, 3.4)	2.3 (1.0, 5.4)	3.6 (1.1, 11.7)	3.8 (1.2, 12.1)
Get violent	0.3 (0.1, 1.7)	2.4 (1.2, 4.8) †	1.6 (0.3, 10.1)	4.4 (1.7, 11.1)
Internal active				
Praying	1.9 (0.9, 4.3)	1.7 (0.6, 4.6)	2.4 (1.0, 6.1)	13.0 (1.6, 105)

* For each coping behavior, women are stratified by whether they reported or did not report the behavior; ORs (95% CI) for the relationship between high vs low/medium exposure to racism and preterm, LBW are computed for each stratum.

† *P* value <.05 for Breslow-Day test of the homogeneity of stratum-specific ORs for those who reported versus did not report the coping response.

†† *P* value <.10 for Breslow-Day test.

| Women who reported passive behaviors only, compared to those who reported at least one active behavior.

between perceived racism during a woman's lifetime and preterm LBW ($P<.05$).

DISCUSSION

Our study adds to the growing body of evidence showing that African American mothers' exposure to perceived interpersonal racism is a risk factor for pathologic birth outcome. We found that African American mothers who delivered preterm-LBW infants were more likely to report experiencing interpersonal racial discrimination in public settings within the past year than African American mothers who delivered term, non-LBW infants. Our stratified analyses show that certain coping behaviors modify but rarely eliminate this relationship. Mothers with passive coping behaviors in the absence of any active behaviors have seven-fold increased odds of preterm-LBW when exposed to high levels of perceived racism within the past year. In contrast, active coping behaviors attenuate the association of perceived exposure to interpersonal racism in public settings and preterm birth. These exploratory findings suggest that the strength of the association between African American mothers' exposure to perceived interpersonal racism within the public domain and preterm birth is influenced by their coping behaviors in response to racism, and that employing active vs passive coping strategies may be effective in buffering the effects of racism on adverse pregnancy outcomes.

Some individual items on the PRS were more strongly related with preterm-LBW than others. Being talked down to or hearing Whites expressing surprise at her or other minorities' intelligence or industriousness both had elevated ORs for past-year and lifetime exposure to racism in public. Both of these items loaded on the "subtle racism" factor during the principal components analysis performed by the PRS's developers.[16] This suggests that the more subtle forms of discrimination may be more detrimental to health, or potentially that subtle forms of discrimination are more likely to engender passive responses to discrimination. Since it has been suggested that subtle forms of interpersonal racism in the US are increasing as the more overt forms are dissipating,[17] further study is needed to better understand how subtle racism affects health.

Our data show that African American women's exposure to interpersonal racial discrimination in public settings during the past year has a stronger relationship with preterm birth than lifetime exposure. Interestingly, the limited available data suggest that more chronic experiences of racism, such as childhood experiences of racial discrimination,[11] unfair treatment at work,[10] and lifetime exposure to racism associated with employment situations[6] are stronger predictors of adverse birth outcomes than acute events during

pregnancy. However, as suggested by Hogue and colleagues,[13] we suspect that experiences of interpersonal racial discrimination in public settings act more as acute than chronic stressors. Acute stressors may manifest their biological effects during pregnancy through the release of placental corticotropin-releasing hormone (CRH) in response to the increased levels of adrenocorticotropin hormone (ACTH) and cortisol brought on by the stressful experience of interpersonal racism. If a woman's hypothalamic-pituitary-adrenal (HPA) axis is already dysregulated as a result of high levels of cumulative pre-pregnancy chronic stress (''allostatic load''),[18] which many inner-city African American women experience due to institutional racism, poverty, and other stressful stimuli, levels of placental CRH may become elevated as a result of the acute stressor, leading to early parturition and preterm birth.[19] More research is needed to better understand whether interpersonal experiences of racial discrimination act as acute or chronic stressors and the relevant biological pathways through which these experiences affect women's risk of preterm birth.

There are individual differences, however, in biological responsivity to stress, which can lead to heterogeneity in the relationship between stress or interpersonal racism and poor birth outcomes.[19] Some of these differences in the magnitude and duration of physiological and psychological stress responses may be influenced by adaptive or maladaptive behavioral coping responses to experiences of racism.[14] Previous studies have shown differential health effects for people who cope differently in response to stress.[17,20–22] To our knowledge, the present study is the first to show that the impact of exposure to racial discrimination on preterm birth may differ by mothers' coping behaviors in response to those experiences. Women in our study who reported only a passive coping behavior had elevated ORs compared to those who did not report any passive behaviors, or reported both active and passive behaviors. However, the test of the heterogeneity of the ORs for these relationships was not statistically significant in our small study, so this relationship should be examined using larger samples in future studies. In contrast, active coping responses may lessen the magnitude and shorten the duration of the stress response.[14] Interestingly, our data show that the association between interpersonal racism in public settings and preterm birth is weakened among African American mothers who report that they ''work harder to prove them wrong'' or ''get violent'' in response to racial discrimination. It is possible that coping style in the face of interpersonal racism is associated with the level of internalized racism that women experience. If women with high levels of internalized racism respond passively rather than actively to interpersonal racism and vice versa, an interaction may exist between two of the three types of racism defined by Jones[23] - personally mediated and internalized racism – especially with regard to their effects on poor birth outcomes.

Future research is needed to better understand the myriad and complex associations between coping behaviors, experiences of racism and birth outcomes. Prospective studies that capture measures of racism at several timepoints during a woman's life and detailed information about how women coped with or responded to those specific experiences would be most effective in establishing the temporal relationship between racism and birth outcomes.

The strengths of our exploratory study include the enrollment of a demographically homogeneous group of inner-city African American women and the use of a validated measure to capture perceptions of racial discrimination and coping behaviors in response to racism. Notwithstanding, there are several limitations. First, inherent to any case-control study is the potential for recall bias. Second, due to the logistics of recruitment at the study sites, more cases were recruited than controls near the end of the study. A sensitivity analysis was performed on a limited sample of cases that were recruited during the same time period as the available controls. ORs remained unchanged, and 95% CIs were wider, but still did not include the null value for the main findings of interest, so the full sample was used to optimize power. Third, while getting violent should not necessarily be seen as an ''adaptive'' coping strategy for dealing with racial discrimination, it is unclear whether the relatively small sample of women in our study who reported this strategy (n=30) meant that they actually struck out against another individual, or if that expression of violence was directed in another less destructive, yet cathartic, way. It is clear that the social context and circumstance under which the racist behavior is experienced has an impact on behaviors and potential consequences of those behaviors, which complicates the measurement of racism and associated coping strategies.[15] Similar measurement issues may exist in the reporting of other coping behaviors and experiences of racism in our study. Finally, this study did not account for institutionalized racism, which likely has much a stronger effect on poor health outcomes than interpersonal or internalized racism,[23] but is difficult to study given its unfortunate pervasiveness in US society.

In summary, African American mother's exposure to racism in public settings is a risk factor for preterm birth; however, coping behaviors may modify this relationship.

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Statistical expertise: Rankin
Acquisition of funding: Collins
Administrative: David, Collins
Supervision: David, Collins