

The Association Between Perceived Discrimination and Obesity in a Population-Based Multiracial and Multiethnic Adult Sample

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It is estimated that 2 of every 3 adults in the United States are overweight or obese.^{1,2} Obesity is a major risk factor for chronic health conditions, such as type 2 diabetes, coronary heart disease, hypertension, stroke, some forms of cancer, and osteoarthritis.³ Although it is widely accepted that high-fat diets and physical inactivity are preventable risk factors,⁴ obesity continues to increase.^{1,2,5}

There is a growing interest in the relationship between psychosocial risk factors and excess body fat accumulation.^{6–16} In particular, some evidence suggests that psychosocial stressors may play a role in disease progression in general and in excess body fat in particular.^{7,8,17} The key factors underlying physiological reactions to psychosocial stress have not been completely elucidated, but McEwen and Seeman¹⁷ and others^{7,18,19} posit that the continued adaptation of the physiological system to external challenges alters the normal physiological stress reaction pathways and that these changes are related to adverse health outcomes.^{8,17,18,20} For example, in examining the association between psychosocial stress and excess body fat accumulation, Björntorp and others have suggested that psychosocial stress is linked to obesity, especially in the abdominal area.^{7,8}

Perceived discrimination, as a psychosocial stressor, is now receiving increased attention in the empirical health literature.^{21–24} Such studies suggest perceived discrimination is inversely related to poor mental and physical health outcomes and risk factors, including hypertension,^{24,25} depressive symptoms,^{26–28} smoking,^{29–31} alcohol drinking,^{32,33} low birth-weight,^{34,35} and cardiovascular outcomes.^{36–38}

Internalized racism, the acceptance of negative stereotypes by the stigmatized group,³⁹ has also been recognized as a race-related psychosocial risk factor.⁴⁰ Recent studies have also suggested that race-related beliefs and experiences including perceived discrimination might be potentially related to excess body fat

Objectives. We examined whether perceived chronic discrimination was related to excess body fat accumulation in a random, multiethnic, population-based sample of US adults.

Methods. We used multivariate multinomial logistic regression and logistic regression analyses to examine the relationship between interpersonal experiences of perceived chronic discrimination and body mass index and high-risk waist circumference.

Results. Consistent with other studies, our analyses showed that perceived unfair treatment was associated with increased abdominal obesity. Compared with Irish, Jewish, Polish, and Italian Whites who did not experience perceived chronic discrimination, Irish, Jewish, Polish, and Italian Whites who perceived chronic discrimination were 2 to 6 times more likely to have a high-risk waist circumference. No significant relationship between perceived discrimination and the obesity measures was found among the other Whites, Blacks, or Hispanics.

Conclusions. These findings are not completely unsupported. White ethnic groups including Polish, Italians, Jews, and Irish have historically been discriminated against in the United States, and other recent research suggests that they experience higher levels of perceived discrimination than do other Whites and that these experiences adversely affect their health. (*Am J Public Health.* 2009;99:1285–1292. doi:10.2105/AJPH.2007.128090)

accumulation. Three of these studies^{9,13,41} showed that internalized racism was associated with an increased likelihood of overweight or abdominal obesity among Black Caribbean women in Dominica⁴¹ and Barbados¹³ and adolescent girls in Barbados.⁹ These researchers posit that individuals with relatively high levels of internalized racism have adopted a defeatist mindset, which is believed to be related to the physiological pathway associated with excess body fat accumulation. However, Vines et al.¹⁶ found that perceived racism was associated with lower waist-to-hip ratios among Black women in the United States. Although the assessment of race-related risk factors varied across these studies, the findings suggest that the salience of race-related beliefs and experiences may be related to excess body fat accumulation.

Collectively, the results of these studies are limited. First, because they examined the relationship between race-related beliefs and experiences and excess body fat only among

women, we do not know if this relationship is generalizable to men.^{13,16,41} Second, these studies only examined this relationship among Blacks, even though perceived unfair treatment because of race/ethnicity has been shown to be adversely related to the health of multiple racial/ethnic population groups in the United States^{42–49} and internationally.^{27,50–55} Third, none of the studies have examined the relationship between excess body fat accumulation and perceived nonracial/nonethnic experiences of interpersonal discrimination. Some evidence suggests that the generic perception of unfair treatment or bias is adversely related to health, regardless of whether it is attributed to race, ethnicity, or some other reason.^{45,55,56} Fourth, none of these studies included other measures of stress. We do not know if the association between race-related risk factors and obesity is independent of other traditional indicators of stress.

Using a multiethnic, population-based sample of adults, we examined the association of

perceived discrimination and obesity independent of other known risk factors for obesity, including stressful major life events. Additionally, because reports of perceived racial/ethnic discrimination and non-racial/ethnic discrimination vary by racial/ethnic groups^{24,45,46,57} and because Whites tend to have less excess body fat than do Blacks and Hispanics,^{1,3} we examined the relationships between perceived discrimination and excess body fat accumulation among Hispanics, non-Hispanic Whites, and non-Hispanic Blacks.

METHODS

Participants

We analyzed data collected between May 2001 and March 2003 from the Chicago Community Adult Health Study (CCAHS), a stratified, multistage probability sample of 3105 adults 18 years and older living in Chicago, Illinois.⁵⁸ The CCAHS obtained self-reported measures of individual and household psychological risk factors and resources, environment, and social contexts. The sample included 802 Hispanics, 1240 non-Hispanic Blacks (Blacks), 983 non-Hispanic Whites (Whites), and 80 individuals of other races/ethnicities. We excluded the “other” racial/ethnic group because of small sample size ($n=80$). One individual per household was interviewed face-to-face for a response rate of 71.82%. The weighted sample matches the distribution of the 2000 Census population estimates for the city of Chicago in age, race or ethnicity, and gender.⁵⁹

Anthropometric Measures

There are 2 dependent variables for this study, body mass index (BMI; weight in kilograms divided by height in meters squared, an indicator for general body fatness) and waist circumference. During the interview process, following standardized procedures from the National Health and Nutrition Examination Survey, trained interviewers measured each respondent’s height without shoes, weight with a calibrated scale, and waist circumference with a tape measure.⁶⁰ The 3 BMI categories used for this study were underweight and normal (<25.0 kg/m²), overweight (25.0–29.9 kg/m²), and obese (≥ 30.0 kg/m²).³ Waist circumference, an aggregate measurement of total and abdominal

fat accumulation, is considered to be superior for assessing abdominal adiposity because of its high correlation with visceral adiposity and high predictive value for subclinical metabolic disease.^{61–67} We used a gender-specific dichotomous measure indicating high-risk waist circumference: greater than 88 cm for women and greater than 102 cm for men.⁴

Perceived Discrimination Variables

We assessed perceived discrimination with a 5-item version of the everyday discrimination scale, a measure of perceived chronic interpersonal discrimination that assesses the occurrence and frequency with which individuals encounter routine and relatively minor experiences of unfair treatment.⁵⁷ Specifically, respondents reported their perception of how often (1) they were treated with less courtesy or respect than others, (2) they received poorer service than others, (3) they believed others acted as if they were not smart, (4) others acted as if they were afraid of them, or (5) they felt threatened or harassed. The response scale ranged from 1 to 5, with 1 indicating the highest frequency of at least once per week to 5 indicating never. The 5 items in this study have an internal consistency of 0.75 with the full sample. The everyday discrimination scale, with a range of 0 to 20, was created by reverse coding (response option 5=0; 4=1; 3=2; 2=3; 1=4) and summing across the 5 items.

After answering all of the questions, respondents were asked to provide a main reason why they thought these experiences had happened to them. Respondents who indicated ancestry, national origin, or race as the main reason for the unfair treatment were classified as having experienced racial/ethnic discrimination; any other reason, such as some other physical attribute, gender, or age, was coded as nonracial/nonethnic discrimination. Because the frequencies of both discrimination variables were skewed, and after some exploratory analyses with categorical variables based on quartile and quantile cutoff points, we created dichotomized variables that contrast any versus no reports of perceived discrimination.⁶⁸

Covariates

The other covariates used in this analysis were: age in years, education (dummy coded as

<12 years, 12–15 years, and ≥ 16 years), income (dummy coded as $< \$10\,000$, $\$10\,000$ – $\$29\,999$, $\$30\,000$ – $\$49\,999$, $> \$49\,999$, and missing), drinking status (dummy coded as nondrinker, past drinker, and current drinker), smoking status (dummy coded as nonsmoker, past smoker, and current smoker), self-reported physical activity (dummy coded as never, light, moderate, regular, and vigorous regular), and stressful major life events (a summary measure of the count of major life events, ranging from 0 to 11).

Analytic Plan

All analyses in this study were weighted to take into account the different rates of selection, as well as household size, differential coverage, and nonresponse across each of the neighborhood clusters. To ensure that the standard errors were correctly calculated, because of the complex sampling design, we used the complex survey feature of Stata software version 9.2 (StataCorp LP, College Station, TX), which uses first-order Taylor series linearization. We first calculated the weighted distribution of all of the variables of interest for the entire sample and then for each of the 3 racial/ethnic groups. Multinomial logistic regression and logistic regression analyses were conducted to examine the relationship between interpersonal experiences of perceived discrimination and the 2 outcome measures, BMI and waist circumference, controlled for individual-level characteristics. A series of analyses was performed with the covariates added in an iterative manner; however, only the final models are presented here.

RESULTS

Table 1 shows the characteristics of the entire sample and separately for Hispanics, Blacks, and Whites. Forty percent of all respondents had a high-risk waist circumference and more than two thirds of the sample were either overweight or obese. A larger proportion of Blacks and Hispanics had a high-risk waist circumference and was either overweight or obese compared with Whites.

About 25% of all respondents reported at least 1 experience of perceived racial/ethnic discrimination and about 40% of the sample reported at least 1 perceived experience of

TABLE 1—Sample characteristics: Chicago Community Adult Health Study Sample, Chicago, IL, 2001–2003

	Full Sample ^a (N = 3025)	Hispanics (n = 811)	Non-Hispanic Whites (n = 1206)	Non-Hispanic Blacks (n = 1008)
With at-risk waist circumference, ^b %	40.0	41.3***	29.0	50.3***
BMI, %				
Underweight or normal weight (<25.0 kg/m ²)	30.5	19.2***	42.0	25.9***
Overweight (25.0–29.9 kg/m ²)	34.1	39.7*	33.8	29.9
Obese (≥30.0 kg/m ²)	35.4	41.1***	24.2	44.2***
Everyday discrimination, %				
Racial/ethnic	25.6	30.5***	7.8	42.9***
Any nonracial/nonethnic	41.0	27.3***	55.6	34.8***
Some other aspect of physical appearance ^c	11.7	14.4	11.7	10.3
Gender ^c	11.2	3.9***	17.9	9.1***
Age ^c	11.1	10.9	15.5	7.1***
None	33.3	42.2	36.6	22.3***
Major life events, mean no. (SE)	2.8 (0.1)	2.5 (0.1)	2.6 (0.1)	3.1 (0.1)***
Education, y, %				
<12	24.2	44.7***	11.0	23.4***
12–15	49.2	45.2	43.7	59.0***
≥16	26.7	10.1***	45.3	17.6***
Income, \$, %				
<10 000	11.5	10.1	6.6	18.6***
10 000–29 999	25.5	32.8***	17.1	29.6***
30 000–49 999	18.4	21.0	17.5	17.3
≥50 000	26.1	18.0***	37.8	18.7***
Missing	18.5	18.1	21.0	15.8*
Smoking status, %				
Nonsmoker	54.4	66.1***	49.2	51.1
Past smoker	20.5	16.0***	25.8	17.7***
Current smoker	25.5	18.3**	25.4	31.3**
Drinking status, %				
Nondrinker	18.0	24.7***	11.6	20.3***
Past drinker	19.7	20.8*	15.0	24.2***
Current drinker	62.4	54.5***	73.0	55.2***
Physical activity index, %				
Never	20.6	21.5	19.1	21.8
Light	15.8	14.0	15.7	17.2
Moderate	20.3	19.5	21.9	18.9
Regular	24.5	26.5	24.5	22.9
Vigorous regular	18.8	18.5	18.8	19.1
Mean age, y (SE)	42.6 (0.4)	38.1 (0.7)***	44.4 (0.8)	44.2 (0.6)
Women, %	53.0	51.4	50.3	57.4*

Note. BMI = body mass index.

^aFull sample statistics excludes “other” racial group (n = 80).

^bAt risk was defined as a waist circumference greater than 102 cm for men and greater than 88 cm for women.

^cTop 3 attributions besides race/ethnicity.

* $P < .025$; ** $P < .005$; *** $P < .001$, compared with Whites.

nonracial/nonethnic discrimination. The sample average masks great differences among the 3 racial/ethnic groups. For example, 42.9% of Blacks and 30.5% of Hispanics reported racial/ethnic discrimination, compared with only 7.8% of Whites. By contrast, 55.6% of Whites reported experiencing nonracial/nonethnic discrimination, compared with 27.3% of Hispanics and 34.8% of Blacks. Blacks reported a greater number of stressful major life events than did Hispanics and Whites (Table 1).

Perceived Discrimination and Excess Body Fat Accumulation

Table 2 presents the adjusted odds ratios (ORs) and the 95% confidence intervals (CIs) from the multivariate multinomial logistic regression analysis for the association between perceived discrimination and BMI. Model 1 adjusted for the sociodemographic and behavioral covariates. Model 2 additionally adjusted for major life events. Racial/ethnic discrimination was significantly associated with BMI, but only for Whites. Whites who reported experiencing any racial/ethnic discrimination were more likely to be obese than were Whites who experienced no racial/ethnic discrimination (model 2). Although experiences of non-racial/nonethnic discrimination were positively associated with obesity among Blacks and with overweight and obesity among Hispanics, none of these relationships were statistically significant. The association between experiences of stressful major life events and BMI was only statistically significant among Hispanics (Table 2, model 2). Each additional stressful major life event increased the risk of Hispanics being obese by 16%.

Table 3 presents the adjusted ORs and the 95% CIs from the multivariate logistic regression for the high-risk waist circumference analysis. A similar pattern to the BMI analysis emerged for Whites in the high-risk waist circumference analysis (Table 3). However, among Whites, adjusting for BMI completely mediated the relationship between high-risk waist circumference and racial/ethnic discrimination, decreasing the odds of having a high-risk waist circumference from 2.87 ($P < .01$) to 1.90 ($P > .05$). The OR for reported experiences of nonracial/nonethnic discrimination, however, increased slightly from 2.02 to 2.11. There were no statistically significant relationships

TABLE 2—Predicted Probability of Overweight and Obesity, by Race/Ethnicity: Chicago Community Adult Health Study Sample, Chicago, IL, 2001–2003

	Model 1 ^a		Model 2 ^b	
	Overweight, ^c OR (95% CI)	Obese, ^d OR (95% CI)	Overweight, ^c OR (95% CI)	Obese, ^d OR (95% CI)
Hispanics				
Any racial/ethnic discrimination	1.22 (0.64, 2.31)	1.35 (0.72, 2.55)	1.14 (0.59, 2.20)	1.14 (0.59, 2.18)
Any nonracial/nonethnic discrimination	1.00 (0.53, 1.88)	1.28 (0.69, 2.37)	0.94 (0.49, 1.80)	1.04 (0.55, 1.96)
Major life events			1.04 (0.91, 1.19)	1.16* (1.02, 1.31)
Non-Hispanic Whites				
Any racial/ethnic discrimination	1.28 (0.55, 3.00)	2.43* (1.09, 5.40)	1.25 (0.53, 2.98)	2.19* (1.00, 4.80)
Any nonracial/nonethnic discrimination	1.16 (0.73, 1.83)	1.76* (1.02, 3.03)	1.11 (0.70, 1.76)	1.53 (0.90, 2.60)
Major life events			1.03 (0.93, 1.15)	1.12* (1.00, 1.24)
Non-Hispanic Blacks				
Any racial/ethnic discrimination	0.83 (0.46, 1.48)	1.02 (0.61, 1.71)	0.88 (0.49, 1.56)	1.00 (0.60, 1.67)
Any nonracial/nonethnic discrimination	0.96 (0.50, 1.83)	1.46 (0.84, 2.55)	1.03 (0.54, 1.97)	1.41 (0.82, 2.43)
Major life events			0.94 (0.86, 1.03)	1.03 (0.95, 1.11)

Note. OR=odds ratio; CI=confidence interval. Reference category: underweight or normal (body mass index [BMI; weight in kilograms divided by height in meters squared] less than 25.0 kg/m²).

^aModel 1 adjusted for age, gender, income, education, smoking, drinking, and physical activity.

^bModel 2 additionally adjusted for major life events.

^cOverweight was defined as a BMI between 25.0 to 29.9 kg/m².

^dObese was defined as a BMI of 30.0 kg/m² or greater.

**P*<.05.

between discrimination and high-risk waist circumference for Blacks or Hispanics.

Similar to results from the BMI analyses, major life events slightly attenuated the relationship between perceived discrimination and high-risk waist circumference. However, unlike in the BMI analyses, experiences of stressful life events were positively associated with high-risk waist circumference among all 3 racial/ethnic groups (Table 3, model 2) after adjustment for all of the covariates except for BMI. However, after adjustment for BMI, the relationship was only significant (*P*<.05) for Blacks.

We conducted additional analyses to explore the finding that perceived discrimination was associated with excess body fat accumulation among Whites but neither among Blacks nor Hispanics. Because of the ethnic heterogeneity among Whites in the Chicago sample, in our posthoc analyses, we focused on several subpopulations of Whites. Previous research suggests that “discriminated-against Whites,” ethnic Whites that had historically been at elevated risk of discrimination in the United States, currently report higher levels of discrimination than do other Whites.⁶⁹ We

defined ethnicity to include ancestral and geographical origins, cultural traditions, or languages.^{70,71} On the basis of similar typologies suggested by other studies,^{54,72,73} we created a dichotomized variable, contrasting Whites who reported their ethnicity as Polish, Irish, Italian, or Jewish (ethnic Whites) to all other Whites (other Whites). To determine if the relationship between perceived experiences of discrimination and excess body fat differed among ethnic Whites (unweighted *n*=327) and all other Whites (unweighted *n*=656), we conducted separate logistic regression analyses stratified by these 2 groups of Whites.

Although similar proportions of both groups of Whites perceived ethnic and non-ethnic discrimination (data not shown), subsequent analyses did show that the relationship between perceived discrimination and high-risk waist circumference differed between the 2 groups (Table 4). Ethnic Whites who reported perceived ethnic discrimination were more than 6 times as likely to have a high-risk waist circumference than were ethnic Whites who reported no ethnic discrimination. Similarly, ethnic Whites who reported nonethnic

discrimination were more than 2 times as likely to have a high-risk waist circumference than were ethnic Whites who did not experience nonethnic discrimination. Although the odds of having a high-risk waist circumference were elevated (OR>1.0) among the group of other Whites who reported perceived discrimination compared with those who reported no discrimination, the discrimination measures were not statistically significant after we controlled for all of the covariates.

Interestingly, additional exploratory analyses not presented here indicated that the relationship between perceived discrimination and high-risk waist circumference observed in this study was only among White men and not among White women. However, because of the relatively large linearized standard errors stemming from the small sample size of men in the respective categories, we interpret this gender effect with caution.

DISCUSSION

Our study provides additional evidence to support the hypothesis that psychosocial stress is positively associated with excess body fat accumulation, at least under certain conditions.^{7,8} Consistent with other studies,^{9,13,16,41} our analyses show that perceived experiences of unfair treatment were associated with increased abdominal obesity after we controlled for other confounding characteristics. Contrary to our expectations, though, this pattern was only evident among Whites of Irish, Jewish, Polish, and Italian ancestry in Chicago. This finding is not completely unsupported, because these groups of Whites, in particular, have historically been discriminated against in the United States⁷³ and other recent research suggests that they experience higher levels of discrimination than do other Whites and that these experiences adversely affect their health.⁶⁹ However, because of the relatively small number of ethnic Whites reporting racial/ethnic discrimination, the parameter estimate for the racial/ethnic discrimination measure among ethnic Whites should be interpreted with some caution. Nonetheless, the strength of the association (*P*<.01) suggests that the findings are not because of chance.

Surprisingly, perceived discrimination was not statistically associated with excess body fat accumulation among Hispanics and Blacks. Although

TABLE 3—Predicted Probability of a High-Risk Waist Circumference, by Race/Ethnicity: Chicago Community Adult Health Study Sample, Chicago, IL, 2001–2003

	Model 1, ^a OR (95% CI)	Model 2, ^b OR (95% CI)	Model 3, ^c OR (95% CI)
Hispanics			
Any racial/ethnic discrimination	1.30 (0.85, 1.99)	1.17 (0.75, 1.81)	1.12 (0.61, 2.05)
Any nonracial/nonethnic discrimination	1.51 (0.95, 2.40)	1.32 (0.82, 2.12)	1.68 (0.77, 3.67)
Major life events		1.11* (1.02, 1.21)	1.01 (0.88, 1.16)
Non-Hispanic Whites			
Any racial/ethnic discrimination	3.23*** (1.67, 6.25)	2.87** (1.47, 5.62)	1.90 (0.75, 4.79)
Any nonracial/nonethnic discrimination	2.39*** (1.49, 3.83)	2.02** (1.25, 3.28)	2.11* (1.09, 4.09)
Major life events		1.14** (1.03, 1.25)	1.12 (0.98, 1.27)
Non-Hispanic Blacks			
Any racial/ethnic discrimination	0.84 (0.55, 1.28)	0.78 (0.51, 1.19)	0.71 (0.39, 1.30)
Any nonracial/nonethnic discrimination	1.20 (0.76, 1.89)	1.09 (0.69, 1.70)	0.88 (0.47, 1.63)
Major life events		1.09* (1.02, 1.17)	1.14* (1.02, 1.26)

Note. OR=odds ratio; CI=confidence interval. High-risk waist circumference was defined as greater than 102 cm for men and greater than 88 cm for women.

^aModel 1 adjusted for age, gender, income, education, smoking, drinking, and physical activity.

^bModel 2 additionally adjusted for major life events.

^cModel 3 additionally adjusted for body mass index (weight in kilograms divided by height in meters squared).

P*<.05; *P*<.01; ****P*<.001.

not significant, some of the patterns were in the opposite direction. It is possible, given the acceptance of greater body weight among Blacks and Hispanics compared with Whites, that cultural norms and experience rather than the stress of perceived discrimination is associated with body weight for these groups.

Alternatively, the observed patterns may be related to the socialization regarding experiences of discrimination, especially racial/ethnic discrimination. Blacks and Hispanics, who are socialized to expect discrimination, may have developed a wide variety of coping mechanisms that may be protective. Conversely,

TABLE 4—Predicted Probability of a High-Risk Waist Circumference Among Whites: Chicago Community Adult Health Study Sample, Chicago, IL, 2001–2003

	Model 1, ^a OR (95% CI)	Model 2, ^b OR (95% CI)	Model 3, ^c OR (95% CI)
Ethnic Whites^d			
Any racial/ethnic discrimination	6.60** (2.07, 21.02)	6.29** (1.91, 20.73)	6.52** (1.59, 26.77)
Any nonracial/nonethnic discrimination	3.02** (1.46, 6.25)	2.77** (1.31, 5.85)	2.61* (1.04, 6.56)
Major life events		1.07 (0.89, 1.30)	0.99 (0.80, 1.24)
Nonethnic Whites			
Any racial/ethnic discrimination	2.82* (1.21, 6.56)	2.43* (1.04, 5.72)	1.20 (0.39, 3.70)
Any nonracial/nonethnic discrimination	2.19* (1.19, 4.00)	1.77 (0.96, 3.28)	1.98 (0.80, 4.89)
Major life events		1.19** (1.05, 1.35)	1.21* (1.01, 1.45)

Note. OR=odds ratio; CI=confidence interval. High-risk waist circumference was defined as greater than 102 cm for men and greater than 88 cm for women.

^aModel 1 adjusted for age, gender, income, education, smoking, drinking, and physical activity.

^bModel 2 additionally adjusted for major life events.

^cModel 3 additionally adjusted for body mass index (weight in kilograms divided by height in meters squared).

^dEthnic Whites comprises Irish, Italian, Jewish, and Polish Whites.

P*<.05; *P*<.01; ****P*<.001.

Whites, who are not socialized to expect discrimination, may have fewer coping resources to deal with such experiences or may use behavioral coping strategies that increase the risk of obesity such as consuming additional food or alcohol. That is, the variation in the relationship between perceived discrimination and high-risk waist circumference between ethnic Whites and the other groups may be because of the selection of varying coping mechanisms that may be differentially related to the outcome. For example, a study found that Blacks who recognized and verbalized interpersonal experiences of discrimination were less likely to be hypertensive compared with Blacks who did not report any perceived experiences of discrimination.^{16,24} Research needs to delineate the full range of coping responses to perceptions of discrimination and identify how these may vary by race and ethnicity. It is worth noting that we also explored whether discrimination was related to obesity in ethnic subgroups of Blacks and Hispanics; however, none of these relationships was significant.

The single previous study that examined perceived discrimination and body fat found that discrimination and waist-to-hip ratio were inversely associated with each other in a sample of Black women.¹⁶ Although in our study perceived discrimination also appeared to be inversely (OR<1.0) associated with excess body fat accumulation for Blacks, none of the parameter estimates was statistically significant. The null findings among all Blacks and Black women in our study (data not shown) may be attributed to several reasons. First, the observed differences may be an artifact of the variation in the perceived discrimination instruments used by Vines et al.¹⁶ and in our study. The scale used in our study, for example, assessed day-to-day experiences of perceived discrimination, whereas the scale used in the other study¹⁶ was designed to capture both day-to-day and acute experiences of perceived discrimination of Black women.

Second, whereas the discrimination measure in our study captured the occurrence and frequency of personal experiences of perceived unfair treatment, the other study¹⁶ utilized a multidimensional measure that assessed the respondents' personal experiences and their perceptions of racism experienced by Blacks. Last, the age range in the 2 samples was quite different. The other study¹⁶ was of Black women

aged 35 to 49 years, whereas the age of Black women in our study was 18 to 92 years. However, because none of the relationships between discrimination and any of the excess body fat measures in our study was statistically significant among Blacks and Hispanics, we interpret the our study's results for these 2 groups cautiously.

We were also interested in the relationship between stressful major life events and excess body fat accumulation. Several observations are worth noting. First, stressful major life events were not consistently associated with the excess body fat measures used in this study. Stressful major life events were associated with BMI only among Hispanics and with high-risk waist circumference only among Blacks and the ethnic White group. Second, major life events, when significant, marginally attenuated the relationship between the discrimination measure and the excess body fat outcomes. Finally, although major life events were sometimes associated with a higher risk of excess body fat, these events were never associated with a lower risk of excess body fat.

Limitations

One of the major limitations of this study, as with all cross-sectional studies, is its inability to suggest temporal ordering among the relationships observed. Future research needs to elucidate the extent to which exposure to perceived discrimination predates the accumulation of excess body fat.

To address the concern of bias caused by obese individuals who reported discrimination because of their weight, we excluded these individuals ($n=33$) in additional analyses. Because both approaches yielded similar results, we retained these individuals in the analyses presented here.

To safeguard against potentially spurious findings, we also explored the potential confounding with depression. Given that depression is associated with perceived discrimination and obesity, in analyses not shown, we added a scale of depressive symptoms (Center for Epidemiologic Studies depression scale⁷⁴) to the model but it did not meaningfully alter our results. We also explored whether our results were caused by generational or immigrant status rather than ethnic status among Whites. These results (not shown) suggest that the ethnic classification used among Whites in this study was

not a proxy for immigration or generational status.

Another potential limitation of our study concerns the accuracy of the self-reported discrimination events and the relationship of self-reported discrimination to health. This concern, albeit reasonable and likely widely shared, is not supported by the available evidence. One prospective study found that underlying psychological status at baseline is unrelated to future reports of perceived discrimination.²⁶ The underreporting of interpersonal discrimination should also be of concern. Some evidence suggests that at least some socially disadvantaged groups cope with discrimination by minimizing or denying its occurrence (see Williams et al.²² and Paradies²³ for review). If underreporting of perceived discrimination did occur in this study, the relationship between perceived discrimination and excess body fat accumulation would be biased downward. However, the results from this study do not rule out the possibility that reports of perceived discrimination were influenced by other psychosocial characteristics that may be related to excess body fat accumulation.

Conclusions

The results of this study provide some evidence to support the hypothesis that perceived interpersonal experiences of discrimination may be associated with excess body fat accumulation, at least for some population groups. The evidence suggests that perceived experiences of discrimination, a psychosocial stressor, are related to general body fatness and to visceral fat accumulation, particularly among Polish, Irish, Italian, and Jewish Whites in Chicago. Collectively, these observations warrant further investigation to answer the question, Under what conditions do particular psychosocial stressors matter for excess body fat accumulation and for which specific groups?²² Additionally, future research should seek to identify the psychological or behavioral factors that may mediate or moderate the relationship between perceived discrimination and excess body fat accumulation.²² The results of this and other studies suggest that a multidisciplinary research agenda that directly examines the physiological pathways of psychosocial stressors, including perceived interpersonal experiences of discrimination, and obesity is warranted. ■

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Contributors

H.E.R. Hunte originated the study and led the analyses, interpretation of the findings, and writing. D.R. Williams provided consultation for the data analyses and assisted with the interpretation of findings and writing.

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Human Participant Protection

The analysis conducted for this article was exempt from institutional review by the institutional review board at the University of Wisconsin, Madison. The data collection process was approved by the institutional review board for human participant protection at the University of Michigan.

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