Original Contribution

Association Between Perceived Interpersonal Everyday Discrimination and Waist Circumference Over a 9-Year Period in the Midlife Development in the United States Cohort Study

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The relation between perceived interpersonal experiences of discrimination and measures of obesity is of great interest to many. This study examined the relation between changes in waist circumference and changes in perceived interpersonal everyday discrimination using the 1995–2004 Midlife Development in the United States cohort study ($N = 1,452$). After controlling for potential confounding variables that assessed behavioral and sociodemographic characteristics, sex-stratified ordinary least squares regression analyses suggested that the waist circumference of adult males who reported consistently high levels of interpersonal everyday discrimination increased 2.39 cm more than that of adult males who consistently reported low levels of interpersonal everyday discrimination ($P < 0.05$). Similarly, the waist circumference of adult females who reported an increase in interpersonal everyday discrimination increased 1.88 cm more than that of adult females who reported consistently low levels of interpersonal everyday discrimination ($P < 0.05$). These findings suggest that perceived interpersonal everyday discrimination may be associated with an increase in waist circumference over time among adults in the United States.

body weight changes; discrimination (psychology); obesity; stress, psychological

Abbreviations: BMI, body mass index; MIDUS, Midlife Development in the United States.

Editor's note: A related article appears on page 1223, an invited commentary on the 2 articles is published on page 1240, and a response to the commentary by the authors of the first article is on page 1244. In accordance with Journal *policy, the authors of the second article were asked whether they wanted to respond to the commentary, but they chose not to do so.*

As the obesity prevalence rate continues to increase to pandemic proportions, it is becoming one of the leading public health challenges (1, 2). Interest is growing among some researchers in the relation between psychosocial stressors and obesity (3–15). Socioepidemiologic studies have examined the association of various types of psychosocial stressors with waist circumference and general obesity. For example, in some studies, work stress was related to body mass index (BMI) (14–16) and to waist circumference (14).

Similarly, other studies showed that trait disorders, such as anxiety (17) and depressive mood (17, 18), were also related to obesity.

Researchers hypothesized that excess body fat may in part be a result of the deregulation in the hypothalamic-pituitary axis, a major component of the physiologic stress reaction pathway (5, 19–21). Although the key factors underlying the physiologic reactions to psychosocial stressors have not been completely elucidated, McEwen and Seeman (21) and others (4, 19, 22) have hypothesized that continued adaptation of the physiologic system to external challenges alters the normal physiologic stress reaction pathway, and that these changes are related to adverse health outcomes and risk factors (5, 19–21), including excess abdominal fat (4, 5) and general body fat (14–16).

Consistent findings suggest that stress is associated with excess body fat; however, the difference between general body fat and abdominal fat (visceral fat) accumulation is

not completely understood. Because visceral fat contains a large number of glucocorticoid receptors, cortisol is hypothesized to increase the lipid-accumulating enzymes in visceral fat more efficiently than in other adipose tissue (23, 24). Similarly, the relation between chronic and acute stress in terms of deregulation of the hypothalamic-pituitary axis and subsequently excess fat accumulation is not clearly understood. Chronic stress is seemingly studied more often because of its ongoing nature when compared with acute stressors. This is not to suggest that acute stress is not important; chronic stress is often linked by the same life domains as acute stress, one often potentially exacerbating the effects of the other (25).

An emerging area of interest is the relation between perceived interpersonal experiences of discrimination (hereafter referred to as interpersonal discrimination) and excess body fat. Recent studies have also suggested that interpersonal discrimination, including race-related perceptions, may be associated with excess general and abdominal body fat (6, 10, 13, 26–28). Three of these studies (6, 10, 26) showed that Afro-Caribbean women in Dominica and adolescent girls in Barbados who internalized negative beliefs about their race/ethnicity were more likely to be overweight based on BMI or have a higher waist circumference. These researchers posit that individuals with relatively high levels of internalized beliefs about their race/ethnicity may have adopted a defeatist mind-set, which is thought to be related to the physiologic pathway associated with excess body fat accumulation (4). Similarly, Hunte and Williams (27) suggested that interpersonal racial/ethnic discrimination was related to BMI among whites, whereas interpersonal nonracial/nonethnic discrimination was related to high-risk waist circumference among ethnic whites. Likewise, in a national sample of Asian Americans, Gee et al. (28) showed that racial interpersonal discrimination was associated with increased BMI, especially after controlling for length of time in the United States. In contrast, using waist-to-hip ratio, another accepted measure of abdominal obesity, Vines et al. (13) found that perceived racism was inversely associated with lower levels of waist-to-hip ratio among black women in the United States.

However, until recently, no known studies have examined the relation between discrimination and excess body fat prospectively. Lifetime and everyday racism have been positively associated with weight gain and increased waist circumference over an 8- and 10-year period, respectively, in a sample of black women (29). Several measures of discrimination have been used in the literature, including internalized racism and interpersonal discrimination, as was used in this study. Interpersonal discrimination is the resultant action toward others based on many personal attributes, such as race/ethnicity and gender (30). Racism is a specific type of interpersonal discrimination based on race/ethnicity. Internalized racism, on the other hand, is the acceptance of negative messages about one's own abilities and intrinsic worth based on race/ethnicity (30). Although there are potentially some differences between these various stressors, it is not surprising that they were related to obesity because they all can challenge the normal functioning of the hypothalamic-pituitary axis, as proposed (4, 20, 21).

Even so, our understanding of the relation between interpersonal discrimination and excess fat accumulation over time is very limited, especially when considering experiences of discrimination over time and among populations other than nonblack females. Using the National Survey of Midlife Development in the United States (MIDUS) study, a prospective 9-year study of adults in the United States, we examined the hypothesis that interpersonal experiences of discrimination are associated with an increase in waist circumference over time, in the general sample and among non-abdominally-obese individuals.

MATERIALS AND METHODS

Study population

Analyses include data from the baseline (1995) and follow-up (2004) studies of the MIDUS cohort study. MIDUS is a stratified, multistage probability sample of community-based, English-speaking adults aged 25–74 years recruited from a random digit dialing, nationally representative sampling frame of the coterminous United States. Information was obtained from the respondents initially via telephone interviews, then by follow-up self-administered mail questionnaires and face-to-face interviews with a smaller subsample. MIDUS was developed to study the role of behavioral, psychological, biologic, and social factors in understanding age-related differences in physical and mental health (31, 32). In 2004–2006, 4,975 of the baseline participants ($n = 7,108$) were reinterviewed. Accounting for the 421 confirmed decedents, the overall response rate between the 2 data collection periods was approximately 76%. To ensure that the analyses were appropriately weighted to be representative of the United States, the initial analytic sample was limited to the main random digit dialing cases where analytic weights were available in the publicly available data set ($n = 2,242$). For the 2,242 respondents, one or more responses were missing for 790 (35%), leaving data on 1,452 respondents available for analyses. The institutional review board for Human Subject Protection at the University of Wisconsin-Madison approved the data collection study protocol.

Change in waist circumference

Change in waist circumference, the dependent variable of interest, was calculated as waist circumference in 2004 minus waist circumference in 1995. The waist circumference measurement was self-reported by the respondent using a tape measure and diagram provided by the MIDUS study investigators. While standing, respondents were instructed to use the tape measure to measure their waist size under their clothes at the level of their navel to the nearest ¼ inch (0.6 cm), which was converted to centimeters in this study.

Interpersonal discrimination

Perceived interpersonal experiences of discrimination were measured using the 9-item version of the interpersonal discrimination scale constructed by Williams et al. (33) in

both study waves. The interpersonal discrimination scale, a measure constructed to measure perceived day-to-day interpersonal discrimination, assesses the frequency with which individuals encounter routine and relatively minor experiences of unfair treatment (33). Specifically, respondents reported their perception of how often they 1) were treated with less courtesy than other people; (2) were treated with less respect than other people; 3) received poorer service than others did; and how often they believed others acted as if they were 4) not smart, 5) afraid of them, 6) dishonest, or 7) not as good as they were; 8) were called names or were insulted; or 9) felt threatened or harassed. The response option indicating frequency for each item in the questionnaire ranged from 1 to 4, with 1 indicating often and 4 indicating never. Within each wave, the responses were reverse coded (4 = 0, 3 = 1, 2 = 2, 1 = 3) and summed across the 9 items, which resulted in a range of 0–27, with higher scores reflecting greater frequency of discrimination (33). The 9 items in this study have an internal consistency of 0.93 in the first wave and 0.91 in the second wave, using the full sample.

A categorical variable with 4 groups was created to characterize change in interpersonal discrimination. The 9-item scale for each wave was first divided into quartiles and was then combined into a categorical variable using the following schema: 1) no change from the first or second lowest quartiles in both waves (low-stable); 2) movement from a higher to a lower quartile in wave I to wave II (decrease); 3) movement from a lower quartile to a higher quartile in wave I to wave II (increase); and 4) no change from the third and fourth highest quartiles in both waves (high-stable). When this coding scheme was used, the analytic sample ($N =$ 1,452) was classified as follows: low-stable (27.4%), decrease (24.7%), increase (26.2%), and high-stable (21.7%). The high-stable group comprises the respondents who experienced a persistently high level of interpersonal discrimination, whereas the decreasing and increasing groups are intended to reflect the change (high to low and low to high, respectively) in interpersonal discrimination over the 9-year period. It is hypothesized that the decreasing, increasing, and high-stable groups should have experienced a larger change in waist circumference, especially the high-stable group, compared with the low-stable group over the 9-year period. Although little evidence is available to provide a more specific hypothesis about the difference between the decreasing and increasing groups with respect to change in waist circumference, the aim was to not treat the 2 groups homogeneously.

Covariates

To adjust for potential confounding, an a priori decision was made to include additional risk factors for weight gain in the analyses. Measures assessing depression diagnosis and stressful life events, 2 important items believed to be associated with weight gain, were also included in the analyses. The depression variable assesses the presence of a depressive disorder (31). For the life events variable, a count of the ''yes'' responses to questions regarding 24 potential major stressful life events, such as experiencing the death of

a parent and/or a sibling or being fired from a job, was summed and then categorized using the tertile percentage cutpoint, representing no experience (first tertile), moderate experience (second tertile), and high experience (third tertile) (34).

The health behavior variables included tobacco and alcohol use and physical activity. The smoking and alcohol use variables were divided into 2 groups: current use versus noncurrent use. Based on 4 self-reported answers to questions about vigorous and moderate physical activity during the winter and summer, 2 physical activity variables were constructed to indicate moderate-to-vigorous physical activity in the winter and summer (yes vs. no). Educational level was classified into 3 categories: having completed 12 or fewer years, 13–15 years, or 16 or more years. Household income was classified into 2 categories of less than $10,000 versus $10,000 or more. After some preliminary analyses, age was classified into 2 categories: less than 56 years of age versus more than 55 years of age. BMI (weight in kilograms divided by height in meters squared) was included as a continuous variable. All covariates in the analyses were from the first wave only except for BMI, which was assessed in both waves, and life events, which was measured in only the second wave.

Analysis

Three ordinary least squares regression models were developed to evaluate whether the changes in interpersonal discrimination (with the low-stable group serving as the reference category) were associated with changes in waist circumference between the 2 study periods, adjusting for all of the potential confounders, including waist circumference at baseline (1995). To further investigate the incidence of increasing waist circumference, additional analyses excluded abdominally obese respondents (defined as >102 cm for males and >88 cm for females) at baseline. Based on evidence that suggests that change in obesity patterns differs over time (35) between males and females, interactions between the interpersonal discrimination and sex variables were included in the regression models. Formal Wald tests for the interactions were performed using the 2-way cross-product terms between the sex and the change in interpersonal discrimination variables. To determine the linear trend of the interpersonal discrimination variable, the mean of each category was included in the analyses as a continuous variable. All analyses in this study were weighted to make the sample comparable to the US population with respect to race, age, education, and gender. In all of the analyses, 2-sided P values of <0.05 were considered statistically significant. All analyses were performed using STATA version 10 software (36).

RESULTS

The mean change in waist circumference and the demographic, socioeconomic, and psychosocial characteristics used in this study by the 4 groups of the interpersonal discrimination variable are presented in Table 1. The study participants differed across the 4 groups of the interpersonal

Table 1. Demographic, Socioeconomic, and Psychosocial Characteristics of Participants in the Midlife Development in the United States Survey Cohort Study by Change in Interpersonal Discrimination, 1995–2004[a]

	Full Sample (N = 1,452)		Low Stable[b] (n = 398)		Decrease[c] (n = 359)		Increase[d] (n = 380)		High Stable[e] (n = 315)		P Value[f]
	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	
Change in waist circumference, cm		5.98 (0.25)		4.52 (0.39)		5.80 (0.55)		6.80 (0.49)		6.80 (0.64)	0.004
Waist circumference in 1995, cm		89.79 (0.40)		89.75 (0.73)		88.56 (0.77)		88.80 (0.75)		92.38 (0.96)	0.004
Waist circumference in 2004, cm		95.77 (0.42)		94.27 (0.72)		94.36 (0.80)		95.61 (0.83)		99.18 (1.00)	0.000
Daily discrimination		4.03 (0.12)		0.14 (0.02)		6.70 (0.20)		1.46 (0.12)		8.54 (0.25)	0.000
Major life events											0.001
First tertile (0 events)	10.60		13.5		10.9		9.6		8.4		
Second tertile (1–2 events)	43.48		48.7		40.4		45.9		38.2		
Third tertile (3 events)	45.92		37.9		48.7		44.5		53.5		
Age, years											0.000
<55	76.61		66.5		79.0		77.3		84.2		
55–75	23.39		33.5		21.0		22.7		15.8		
Race											0.000
White	91.09		98.0		87.7		94.2		83.4		
Nonwhite	8.91		2.0		12.3		5.8		16.6		
Sex											0.029
Male	45.86		50.3		46.8		44.5		41.6		
Female	54.14		49.7		53.2		55.5		58.4		
Education											0.137
High school graduate	44.38		43.8		40.0		50.4		42.4		
Some college	26.92		25.0		28.4		25.6		29.1		
≥College graduate	28.70		31.2		31.6		24.0		28.5		
Household income											0.000
≤$29,999	30.93		21.3		31.5		34.4		37.8		
$30,000–49,999	29.30		27.5		32.0		31.6		25.5		
≥$50,000	39.77		51.2		36.4		35.0		36.7		
Drinking status											0.214
Lifetime drinker	94.38		92.1		95.8		95.0		94.6		
Never drinker	5.62		7.9		4.2		5.0		5.4		
Smoking status											0.089
Current smoker	22.45		20.5		19.5		25.4		24.2		
Never smoker	77.55		79.5		80.5		74.6		75.8		
Physical activity											
Moderate-vigorous, summer											0.441
No	61.43		59.5		61.0		62.8		64.0		
Yes	38.58		40.5		39.3		39.0		35.7		
Moderate-vigorous, winter											0.567
No	73.54		72.9		74.2		73.1		74.7		
Yes	26.46		27.0		26.1		27.6		24.1		
Depression diagnosis											0.055
No	88.06		91.3		86.0		90.5		84.2		
Yes	11.94		8.7		13.9		9.8		15.7		
Body mass index, kg/m^2											
Body mass index in 1995		26.85 (0.14)		26.86 (0.24)		26.40 (0.27)		26.63 (0.26)		27.92 (0.36)	0.000
Body mass index in 2004		28.32 (0.16)		27.51 (0.26)		28.01 (0.32)		28.10 (0.30)		29.83 (0.39)	0.000

Abbreviation: SD, standard deviation.

[a] All of the variables are from wave I (baseline) except for body mass index in wave II and major life events.

[b] Low levels of interpersonal discrimination in waves I and II; no change.

[c] Change from high levels of interpersonal discrimination in wave I to low levels in wave II.

[d] Change from low levels of interpersonal discrimination in wave I to high levels in wave II.

[e] High levels of interpersonal discrimination in waves I and II; no change.

[f] P values were derived from 1-way analysis of variance for continuous variables and chi-square statistics for categorical variables.

Table 2. Multiple Ordinary Least Squares Regression Analysis Predicting Mean Change in Waist Circumference (cm) in the Midlife Development in the United States Survey Cohort Study, 1995–2004

	Men			Women		
	Model 1[a]	Model 2[b]	Model 3[c]	Model 1[a]	Model 2[b]	Model 3[c]
Low stable[d] (referent)	0.0	0.0	0.0	0.0	0.0	0.0
Decrease[e]	0.20 (0.82)[f]	0.20 (0.82)	0.20 (0.82)	1.57 (1.09)	1.59 (1.10)	1.54 (1.09)
Increase[g]	0.18 (0.62)	0.18 (0.62)	0.17 (0.62)	2.14 (0.88)**	2.09 (0.89)**	1.88 (0.89)**
High stable[h]	2.41 (0.96)**	2.41 (0.96)**	2.39 (0.96)**	2.27 (1.19)*	2.25(1.19)*	2.09(1.19)*
P value for linear effect	>0.05	>0.05	>0.05	<0.05	<0.05	<0.05
Adjusted R-squared value	0.437	0.437	0.438	0.410	0.408	0.412
F-test result	44.764	33.901	28.746	45.747	34.361	29.533
P value for model significance	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. of participants	678	678	678	774	774	774

*$P < 0.10$; **$P < 0.05$.
[a] Adjusted for age, race, discrimination at wave I, waist circumference at wave I, body mass index at waves I and II, education at wave I, household income at wave I, and depression disorder at wave 1.
[b] Adjusted for the covariates in model 1 and smoking at wave I, drinking at wave I, and physical activity at wave I.
[c] Adjusted for the covariates in model 2 and major life events at wave II.
[d] Low levels of perceived interpersonal discrimination in waves I and II; no change.
[e] Change from high levels of interpersonal discrimination in wave I to low levels in wave II.
[f] Values in parentheses, standard errors.
[g] Change from low levels of interpersonal discrimination in wave I to high levels in wave II.
[h] High levels of perceived interpersonal discrimination in waves I and II; no change.

discrimination variable with respect to mean change in waist circumference and all of the covariates except for education, alcohol and tobacco use, physical activity, and depression. In particular, respondents who reported either a decrease or increase in interpersonal discrimination over the 9-year period did not have a higher waist circumference at baseline; however, they did experience a higher increase in waist circumference than those in the low-stable group. On the other hand, individuals who experienced consistently high levels of interpersonal discrimination over the 9-year study period tended to have a larger waist circumference at baseline and also experienced the largest increase, approximately ≥2.28 cm, over the study period ($P < 0.05$).

The 2-way interaction terms between sex and change in interpersonal discrimination variable were significant after adjusting for none of the covariates ($P < 0.05$) and were marginally significant ($P = 0.067$) when adjusting for all of the covariates listed in Table 2, suggesting that the relation between the change in interpersonal discrimination variable and waist circumference may differ for men and women (data not shown). Results from the sex-stratified analyses predicting mean change in waist circumference are presented in Table 2. These results suggest that men who consistently reported high levels of interpersonal discrimination over the study period experienced a larger (2.39 cm) increase in waist circumference compared with men who consistently experienced low levels of interpersonal discrimination ($P < 0.05$). Likewise, the waist circumference of women who reported an increase in interpersonal discrimination increased approximately 1.88 cm more than that for women who were in the low-stable group ($P < 0.05$). Although the value was marginally statistically

significant, women in the high-stable group also experienced a larger (2.1 cm) increase in their waist circumference when compared with women who were in the low-stable group ($P < 0.08$).

Secondary analyses were conducted to further investigate the incidence of increasing waist circumference by excluding abdominally obese respondents (defined as >102 cm for males and >88 cm for females) at baseline (Table 3). As noted in Table 3, a similar pattern was also evident among women respondents who were nonabdominally obese (≤88 cm) at baseline. Non-abdominally-obese women in 1995 who consistently reported high levels of interpersonal discrimination over the study period experienced a larger increase (3.14 cm) in waist circumference compared with nonobese women who consistently experienced low levels of interpersonal discrimination ($P < 0.01$).

The P values from the regression analyses testing for a linear trend of the interpersonal discrimination variable are presented in Tables 2 and 3. The P values suggest a positive association between interpersonal discrimination and increases in waist circumference for women but not for men over the 9-year study period ($P < 0.05$).

DISCUSSION

Results from this representative sample of adults in the United States provide some additional prospective evidence to support the hypothesis that interpersonal discrimination is positively associated with body fat accumulation. Results suggest that (among men) persistently high levels of and (among women) increases in interpersonal discrimination

Table 3. Multiple Ordinary Least Squares Regression Analysis Predicting Mean Change in Waist Circumference (cm) in the Midlife Development in the United States Survey Cohort Study Between 1995 and 2004[a] Among the Nonabdominally Obese at Baseline[b,c]

	Women	Men
Low stable[d] (referent)	0.0	0.0
Decrease[e]	1.95 (1.05)*	−0.30 (0.82)
Increase[f]	1.48 (0.87)*	−0.31 (0.63)
High stable[g]	3.14 (1.21)**	1.59 (0.99)
P value for linear effect	<0.05	>0.05
Adjusted *R*-squared value	0.529	0.404
F-test result	31.16857	18.71291
P value for model significance	0.0000	0.0000
No. of participants	511	498

* $P < 0.10$; ** $P < 0.01$.

[a] Adjusted for age, sex, race, depression disorder, discrimination at wave I, waist circumference at wave I, body mass index at waves I and II, education at wave I, household income at wave I, smoking at wave I, drinking at wave I and physical activity at wave I, and major life events at wave II.

[b] Waist circumference ≤102 cm for males and ≤88 cm for females.

[c] In the first 4 rows, values are expressed as β (standard error).

[d] Low levels of perceived interpersonal discrimination in waves I and II; no change.

[e] Change from high levels of interpersonal discrimination in wave I to low levels in wave II.

[f] Change from low levels of interpersonal discrimination in wave I to high levels in wave II.

[g] High levels of perceived interpersonal discrimination in waves I and II; no change.

over a 9-year period are significantly associated with an increase in waist circumference ($P < 0.05$). In this study, the high-stable group comprised the respondents who experienced a persistently high level of interpersonal discrimination, whereas the decreasing and increasing groups comprised individuals who reported a change in interpersonal discrimination over the 9-year period. Although little evidence is available to provide a more specific hypothesis about the difference between the decreasing and increasing groups with respect to change in waist circumference, it was hypothesized that the decreasing, increasing, and high-stable groups should experience a larger change in waist circumference.

Several measures of discrimination have been widely used in previous studies. For example, results from 3 studies (6, 10, 26) of black females in the Caribbean have shown that internalized racism may be related to excess BMI and a higher waist circumference. Likewise, studies within the United States have shown that interpersonal discrimination was related to BMI among whites and to waist circumference among ethnic whites in Chicago, Illinois (27), while both racial and weight discrimination were shown to be associated with BMI among a national sample of Asian Americans (28). In a large sample of black women, high levels of racism were associated with a high waist-to-hip ratio, albeit in the reverse direction than hypothesized

(13). Interpersonal discrimination is the resultant action toward others based on many personal attributes, such as race/ethnicity, whereas internalized racism is the acceptance of negative messages about one's own abilities and intrinsic worth based on race/ethnicity (30). Although there are potentially some differences between these various measures, it is not surprising they were related to obesity because they all can challenge the normal functioning of the hypothalamic-pituitary axis (4, 20, 21).

The concern about disentangling the effects of nonweight and weight discrimination on body fat (27, 28) was also explored in this study by limiting the analyses to respondents who reported no weight discrimination (data not shown). Similar to the analyses that included all types of discrimination, the waist circumference of adult males who reported consistently high levels of nonweight interpersonal discrimination increased 2.39 cm more than that of adult males who consistently reported low levels of nonweight interpersonal discrimination ($P < 0.05$). Similarly, the waist circumference of adult females who reported an increase in nonweight interpersonal discrimination increased 2.34 cm more than that of adult females who reported consistently low levels of nonweight interpersonal discrimination ($P < 0.05$).

Until recently, all studies in this research area were cross-sectional. Results from the Black Women's Health Study showed that the waist circumference of black women who reported the highest levels of racism at baseline modestly increased by 0.254 cm more when compared with that of black women in the lowest group over a 10-year period (29). Although this study was the first (29) to examine change in body fat accumulation over time, the results are limited in scope because of their reliance on a select group of black women and the inability to examine discrimination over time. Although the results do suggest that high levels of discrimination measured at one point in time (baseline) are associated with a modestly higher gain in waist circumference (0.254 cm), they may be limited if the perception of interpersonal discrimination changes over time and if the changing perceptions are also related to change in waist circumference.

If the experiences of discrimination are not static, prospective studies that measure discrimination at only one point in time may be limited in their ability to characterize the effect of discrimination over time as it changes. Furthermore, the confidence intervals around the adjusted means in the lowest and highest quartiles reported in the Cozier et al. (29) study suggest that the difference between the 2 groups (0.254 cm) may not be statistically significant. On the other hand, results from this study, based on a comparable study period, showed that the adversity of interpersonal discrimination was associated with a 2–3 cm higher increase in waist circumference in a nationally representative sample of women and men ($P < 0.05$).

The reported findings of this study are somewhat noteworthy given its strength over prior studies. Among them are the population-based nature of the sample, its longitudinal design, the inclusion of men and women in the sample, and the ability to characterize the change in interpersonal discrimination over 2 time periods.

This study is not without its limitations, however. The first concerns the accuracy of self-reported waist circumference, the outcome of interest. As suggested by previous studies, the most likely systematic error would result in underreporting of waist circumference by both men and women (37–39). If underreporting of waist circumference did occur in this study, the reported relation between interpersonal discrimination and waist circumference would be biased downward. A second limitation is the lack of information on energy balance (intake minus expenditure), one risk factor for weight gain. Although the analyses included physical activity, an energy expenditure, no information regarding energy intake was available. As such, results from this study may be biased because of the lack of dietary intake information in the analytic sample.

Nonetheless, the results of this study provide some evidence to support the hypothesis that interpersonal discrimination, a psychosocial stressor, is related to an increase in waist circumference. Additionally, the results suggest that interpersonal discrimination is positively related to excess adiposity in a majority white sample. This result and those of other studies, including the one other prospective study, warrant further investigations, as suggested by Hunte and Williams (27), to determine under what conditions the differing types of discrimination/racism matter for excess body fat accumulation, and for whom.

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