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Original Investigation

Psychosocial Stressors and Cigarette Smoking Among African American Adults in Midlife

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Abstract

Introduction: Psychosocial stress is a significant risk factor for smoking, and Blacks experience higher levels of psychosocial stress relative to other racial/ethnic groups. Limited research has comprehensively examined psychosocial stressors in relation to smoking among Blacks.

Methods: We examined psychosocial stressors in relation to smoking status (current, previous, and never) in middle-aged Blacks (34–85 years, $n = 592$) from Milwaukee, Wisconsin, a subset of the Midlife in the United States Study II (2004–2006). Eleven stressor domains were assessed, including psychological and physical work stress, work–family conflict, perceived inequality, relationship stress, neighborhood stress, discrimination, financial stress, recent problems, stressful events, and childhood adversity. We also calculated a cumulative score. Multinomial models were adjusted for age, gender, education, and income.

Results: Seven of the 11 stressors and the cumulative score were associated with higher odds of being a current smoker compared with a never-smoker: neighborhood, financial, relationship, and psychological work stress, perceived inequality, stressful events, childhood adversity (p values $<.05$; *OR*s ranged from 1.28 to 1.77). Three stressors and the cumulative score were associated with higher odds of being a previous smoker versus a never-smoker ($p < .05$). Individuals who scored in the top quartile on 5 or more stressors were 3.74 (95% *CI* = 2.09–6.71) times as likely to be current smokers, and more than twice as likely to be previous smokers, compared with individuals with no high stressors.

Conclusions: These results demonstrate a strong relationship between stress and smoking among urban middle-aged Blacks and suggest that cessation programs should address modifiable individual and community-level stressors.

Introduction

Tobacco smoking continues to be the leading cause of preventable disease in the United States (Centers for Disease Control [CDC], 2011). Although there have been considerable reductions in overall smoking rates in the United States, in 2010, 19.3% of all adults in the United States were regular smokers (CDC, 2011). National prevalence estimates of smoking among adults (ages 18 and older) are similar for Blacks (or African Americans, we use these terms interchangeably; 20.6%) and Whites (21.0%), higher for American Indian/Alaska Native adults (31.4%), and markedly lower among Hispanics (12.5%) and Asian Americans (9.2%). However, national averages by race obscure dramatically higher rates of smoking for certain subgroups, including low-income individuals (CDC, 2011) and urban racial/ethnic minorities (Dell, Whitman, Shah, Silva, & Ansell, 2005; Delva et al., 2005). For example, in a recent study of Chicago's North Lawndale community (almost entirely African American, with 45% living below the poverty line), 39% of adults reported smoking regularly (Dell et al., 2005). Similarly, a community-based area probability sample of low-income Blacks in Detroit reported a smoking prevalence of 41.8% (Delva et al., 2005). High rates of smoking within urban Black communities is of great concern, given that Blacks experience disproportionately higher rates of tobacco-related health consequences than other racial/ethnic groups (Haiman et al., 2006). Research is needed on factors associated with

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smoking among urban Blacks in order to reduce disparities in tobacco use and the national prevalence of smoking.

Psychosocial stressors, defined as social or environmental exposures or demands that place a burden on adaptive capacities of an individual (Cohen, Janicki-Deverts, & Miller, 2007), are important to consider. A substantial amount of research has documented that psychosocial stress is a significant risk factor for smoking (Webb & Carey, 2008) and predicts difficulty with smoking cessation (Berg et al., 2010). Smoking is more common among individuals who report higher levels of work strain (Ayyagari & Sindelar, 2010), financial strain (Siahpush, Spittal, & Singh, 2007), relationship stress (Stein et al., 2008), discrimination (Williams & Mohammed, 2009), and stressful life events (McKee, Maciejewski, Falba, & Mazure, 2003). However, to date, many studies linking psychosocial stress to smoking have used generalized measures of perceived stress or counts of stressful life events (Berg et al., 2010; Webb & Carey, 2008), as opposed to information about specific domains of acute and chronic stress. Furthermore, few studies have assessed the relationship between multiple types of stressors and smoking or how these diverse stressors relate to smoking abstinence among individuals who regularly smoked in the past. Thus, limited information exists about the relative impact of different types of stressors on current smoking or quitting smoking, which is needed for the design of prevention and cessation interventions.

Sociologists emphasize that stressful experiences take place within the context of social structures, and one's position within these social structures influences exposure to stressful events and environments (Turner & Avison, 2003). Blacks experience particularly high exposure to stressors relative to Whites (Hatch & Dohrenwend, 2007; Sternthal, Slopen, & Williams, 2011), and residential segregation may predispose low-income urban Blacks to high exposure to a variety of stressors (Williams & Collins, 2001), such as poverty, unsafe neighborhoods, and traumatic events. On this basis, we examined the relationship between a range of psychosocial stressors and smoking status in a sample of Blacks in Milwaukee, Wisconsin, one of the most highly segregated cities in the United States (Frey, 2010). We hypothesized that each domain of psychosocial stress would be associated with a higher prevalence of current smoking. We retained previous smokers in the analyses to expand knowledge about the relationship between stressors and smoking cessation. We hypothesized that higher levels of psychosocial stress would be more consistently associated with current smoking across stressor domains than with previous smoking.

Methods

Sample

The sample was comprised of African American adults (ages 34–85) from Milwaukee, Wisconsin ($N = 592$) recruited to participate in Wave II of the Midlife in the United States (MIDUS II, 2004–2006) study. As described in other publications (Brim, Ryff, & Kessler, 2004), MIDUS was initiated to examine the influence of social, behavioral, and psychological factors on physical and mental health. Milwaukee participants were recruited as a supplement to MIDUS I (1995–1996) to increase representation of Blacks and to facilitate examination of psychosocial influences on health in a highly segregated city. Participants were identified using a sampling frame restricted to census tracts in which at least 40% of residents were Black. Roughly half of the sample resided in tracts with a median household income below $40,000, and interviewers screened households to match the age and gender distributions of MIDUS I. The inclusion criteria required that participants self-identified as Black/African American, lived in a noninstitutionalized setting, were able to speak English with sufficient literacy to complete a self-administered questionnaire, and were healthy enough to complete a 40-min interview. Participants were interviewed at home using a Computer Assisted Personal Interview (response rate = 70.7%). This study was approved by the Institutional Review Board at the University of Wisconsin, Madison. All participants provided informed consent.

Measures

Smoking Status

Participants were classified as never, previous, or current smokers based on their responses to two questions: "Have you ever smoked cigarettes regularly, that is, at least a few cigarettes every day?" and "Do you smoke cigarettes regularly NOW?" Participants who responded "no" to the first question were categorized as never-smokers. Participants who responded "yes" to the first question and "no" to the second question were categorized as previous smokers, and participants who responded "yes" to both questions were categorized as current smokers (Chapman, Fiscella, Duberstein, & Kawachi, 2009).

Psychosocial Stressors

We considered 11 domains of stressors that encompass demands people experience in key roles and contexts: psychological work stress, physical work stress, work–family conflict, perceived inequality, relationship stress, neighborhood stress, discrimination, financial stress, problems in immediate family during the past year, stressful life events, and childhood adversity. The majority of stressor domains were composites of multiple stress scales. These composites were created in three steps: (a) All component measures for a given domain were individually standardized into Z-score distributions, (b) the Z-scores were summed together, and (3) the resulting value was standardized into a Z-score distribution. A cumulative stress score was created by summing together the 11 stress domain Z-scores and standardizing this value into a Z-score. Below, we describe the stress measures and provide internal consistency reliabilities, when the items were designed to reflect a single underlying construct (e.g., not a count measure). Full scales for all of the measures are available online (http://www.midus.wisc.edu/midus2/project2/).

"Psychological work stress" consisted of measures of skill discretion (three items; range: 3–15; $\alpha = .76$; e.g., How often does your job provide you with a variety of things that interest you?), decision authority (six items; range: 6–30; $\alpha = .89$; e.g., How often do you have a say in decisions about your work?), demands (four items; range: 4–20; $\alpha = .61$; e.g., How often do you have too many demands made on you?), coworker nonsupport (two items; range: 2–10; $\alpha = .68$; e.g., How often do you get help and support from your coworkers?), and supervisor nonsupport (two items; range: 2–10; $\alpha = .87$; e.g., How often do you get help and support from your immediate supervisor?; Karasek, 1985). "Physical work stress" measured the frequency of physical strain (such as lifting, standing, and crouching) at work (nine items; range: 9–45; $\alpha = .94$) and exposure to risk of accident or injury on the job (one item, range: 1–4). "Work–family conflict"

measured negative work-to-family spillover (four items; range: 4–20; α = .82; e.g., Stress at work makes you irritable at home) and negative family-to-work spillover (four items; range: 4–20; α = .80; e.g., Responsibilities at home reduce the effort you can devote to your work; Grzywacz, 2000).

"Perceived inequality" assessed feelings of inequality in (a) the family, focusing on inequality related to child rearing (six items; range: 6–24; α = .56; e.g., It seems to me that family life with my children has been more negative than most people's); (b) housing and neighborhood conditions (six items; range: 6–24; α = .65; e.g., Most people live in a better neighborhood than I do); and (c) work (six items; range: 6–24; α = .64; e.g., I feel cheated about the chances I have had to work at good jobs; Ryff, Magee, Kling, & Wing, 1999). "Relationship stress" consisted of four measures: family strain (four items; range: 4–16; α = .80; e.g., Not including your spouse or partner, how often do members of your family criticize you?); friend strain (four items; range: 4–16; α = .82; e.g., How often do your friends make too many demands on you?); marital risk scale (five items; range: 5–21; α = .64; e.g., During the past year, how often have you thought that your relationship might be in trouble?), and spouse/partner strain scale (six items; range: 6–24; α = .83; e g., How much does your spouse or partner really care about you?; Walen & Lachman, 2000). "Neighborhood stress" measured safety and trust in the neighborhood (four items; range: 4–16; α = .59; e.g., I feel safe being out alone in my neighborhood at night; Keyes, 1998).

"Discrimination" consisted of an inventory measuring major discrimination events (11 items; e.g., unfairly denied a promotion), the Everyday Discrimination Scale (nine items, range: 9–26; α = .88; e.g., You are treated with less courtesy than other people), and job discrimination (six items; range: 6–30; α = .83; e.g., How often are you watched more closely than other workers?; Williams, Yu, Jackson, & Anderson, 1997). "Financial stress" was assessed using a two-item measure (range: 2–7; α = .66; e.g., How difficult is it for you to pay your monthly bills?). "Recent problems" included three inventories that measured health-, financial-, legal-, and relationship-related problems for the respondents' spouse (10 items), parents (10 items), and children (10 items). "Stressful events in adulthood" were assessed using standard stressful life events measures; we combined two inventories, stressful events in the past 5 years (20 items) and stressful life events six or more years ago (23 items). "Childhood adversity" consisted of an inventory of stressful events during childhood/adolescence (nine items), childhood relationship with parents (one rating for mother, one rating for father; range: 2–10), and verbal or physical abuse during childhood (six items, range: 6–24; α = .84; Straus, 1979).

The 11 stress domains were modeled as continuous individual predictor variables. And we also created a cumulative stress count representing the total number of stress domains for which the participant had high scores (i.e., values above the top quartile of the Z-score distribution were coded as "high") in order to examine the excess risk associated with reporting high levels of stress across multiple domains. If a given measure was not applicable (e.g., work stress for unemployed individuals or marital stress for unmarried individuals), the participant was assigned the lowest value on the scale. As appropriate, some models included variables to adjust for whether or not the respondent was employed, had a spouse/partner, or had any children (see Table 3 for details). To address missing data in the psychosocial stress measures, we used IveWare (Raghunathan, Van Hoewyk, & Solenberger, 2002) to impute missing values. IveWare draws on information from all other variables in the dataset to predict missing values.

Sociodemographic Characteristics

Demographic variables included gender, age, household-adjusted income, and education. In addition, dichotomous variables were used to indicate whether the respondent was currently working, had any children, and or had a partner (married or a "marriage-like" relationship). Negative affect was assessed using a standard six-item scale (α = .86; Mroczek & Kolarz, 1998) and was included as a potential confounder in sensitivity analyses based on existing literature that suggests a relationship between smoking behavior and negative affect (Kassel, 2000).

Analysis

Demographic and stress exposure variables were calculated for the total sample and by smoking status. Chi-square tests compared characteristics across groups of participants classified by smoking status. Pearson's correlations examined the relationships between the stress variables. A series of multinomial logistic regression (MLR) models examined the associations between psychosocial stressors and smoking status. MLR is similar to standard logistic regression models except that it allows for outcome variables with three or more categories. The exponentiated forms of the parameter estimates are *OR*s and can be interpreted as the odds of current smoking, or previous smoking, relative to never smoking (the reference group) for each one unit increase in the predictor variable. All models included gender, age, income, and education as control covariates, and alpha was set at .05.

The first set of models estimated the effect of each stressor domain Z-score on smoking status independently, using separate regression models. Second, we estimated the effect of all 11 stressor domain Z-scores within a single model, given that stressors often cooccur (and are therefore correlated). In a third set of models, we examined the number of high stressor domain scores endorsed in relation to smoking status. Finally, we performed sensitivity analyses to examine (a) potential confounding by negative affect; (b) effect modification by age, gender, income, and education; and (c) the sensitivity of the "high stress" threshold used in models that examined the number of "high" stress domains.

Results

Table 1 presents descriptive statistics for the full sample and stratified by smoking status. More than one quarter (27.53%) of the participants was current smokers, while 22.70% were previous smokers, and 44.76% had never been regular smokers. Smoking status was significantly related to nearly every demographic characteristic considered. For example, males and younger participants (<55 years) were disproportionately more likely to be current smokers compared with females and older participants, respectively. Smoking status was also patterned by socioeconomic position; current smokers included a disproportionate number of participants with lower education and income levels relative to the distribution of the full sample. In addition,

Table 1. Smoking Status by Demographic Characteristics, Midlife in the United States Milwaukee Sample (*N* = 592)

		Stratified by smoking status[a]			
	Full sample	Never-smoker (*N* = 265)	Current smoker (*N* = 163)	Previous smoker (*N* = 164)	Chi-square
	% (*n*)	%	%	%	*p* value
Sample characteristics	100.00 (592)	44.76	27.53	22.70	
Gender					
Male	37.50 (222)	32.08	46.95	36.81	.0078
Female	62.50 (370)	67.92	53.05	63.19	
Age					
34–54 years	60.30 (357)	63.02	76.83	39.26	<.0001
55–85 years	39.70 (235)	36.98	23.17	60.74	
Education					
Less than high school	19.29 (114)	18.49	22.56	17.28	.0301
High school degree	36.38 (215)	30.94	44.51	37.04	
Some college	26.23 (155)	30.19	20.12	25.93	
Associate/bachelors degree or beyond	18.10 (107)	20.38	12.80	19.75	
Household income (adjusted for family size)					
≤$7,000	26.35 (156)	24.53	32.93	22.70	.0480
$7,001–$15,000	25.84 (153)	24.53	28.05	25.77	
$15,001–$30,000	24.83 (147)	23.77	25.00	26.38	
≥$31,000	22.97 (136)	27.17	14.02	25.15	
Work status					
Currently employed	42.57 (252)	38.49	46.34	45.40	.1929
Not working	57.43 (340)	61.51	53.66	54.60	
Marital status					
Currently married	62.50 (370)	61.13	67.68	59.51	.2575
Not currently married	37.50 (222)	38.87	32.32	40.49	
Parent status					
No children	10.64 (63)	9.43	14.02	9.20	.2548
One or more children	89.36 (529)	90.57	85.98	90.80	
Number of high stress domains[b]					
0	13.34 (79)	16.98	6.10	14.72	<.0001
1–2	39.86 (236)	42.26	28.05	47.85	
3–4	28.72 (170)	29.06	36.59	20.25	
5 or more	18.07 (107)	11.70	29.27	17.18	

Note. [a]Columns percentages are presented.
[b]High scores were defined as values above the 75th percentile.

smoking status was related to high stressor exposure across multiple domains: 30% of current smokers scored high on five or more stressor domains, while only 11% of never-smokers and 17% of previous smokers had scores in the top quartile on five or more stressor domains.

Table 2 shows the correlations among stressor domains. The majority of the 11 domains were positively correlated (42 of 55 coefficients), with significant positive correlation coefficients ranging from 0.10 to 0.39. There was one significant inverse correlation (physical work stress and financial stress, $r = -.09$, $p < .05$).

Table 3 presents *OR*s according to smoking status; never-smokers were used as the reference group. Higher levels of psychological work stress, perceived inequality, relationship stress, neighborhood stress, financial stress, stressful events in adulthood, childhood adversity, and the cumulative stress score were associated with higher odds of being a current smoker versus a never-smoker (Panel A). The magnitude of significant associations ranged from 1.28 (95% *CI*: 1.04–1.57) for childhood adversity to 1.77 (95% *CI*: 1.41–2.22) for relationship stress, and the cumulative stress score had the largest association (*OR* = 1.86, 95% *CI*: 1.47–2.35). Higher levels of psychological work stress, stressful events in adulthood, childhood adversity, and the cumulative stress score (*OR*s ranged from 1.30 to 1.45) were associated with higher odds of being a previous smoker versus a never-smoker. Respondents reporting higher work–family conflict were less likely to be previous smokers (*OR* = 0.81, 95% *CI* = 0.67–0.98) than never-smokers.

Table 2. Correlations Between Psychosocial Stressor Domains

	1	2	3	4	5	6	7	8	9	10	11
1. Psychological work stress	1										
2. Physical work stress	0.38***	1									
3. Work–family conflict	0.37***	0.28***	1								
4. Perceived inequality	0.35***	0.18***	0.16**	1							
5. Relationship stress	0.12**	0.16***	0.17***	0.18***	1						
6. Neighborhood stress	0.03	−0.04	−0.01	0.39***	0.06	1					
7. Discrimination	0.34***	0.24***	0.24***	0.34***	0.23***	0.08	1				
8. Financial Stress	−0.09*	0.04	−0.01	0.29***	0.11**	0.22***	0.12**	1			
9. Recent family problems	0.08	0.11**	0.17***	0.24**	0.28***	0.08	0.15**	0.10*	1		
10. Childhood adversity	0.06	0.11**	0.07	0.26***	0.25**	0.14**	0.21***	0.13**	0.28***	1	
11. Adult stress events	0.02	0.11**	−0.01	0.21***	0.19***	0.15**	0.17***	0.20***	0.34***	0.35***	1
Cumulative stress score	0.48***	0.47***	0.48***	0.64***	0.50***	0.37***	0.59***	0.38***	0.50***	0.52***	0.51***

Note. Correlations were calculated using continuous stress Z-scores.
*$p < .05$. **$p < .01$. ***$p < .001$.

Panel B presents the results of a model in which all 11 stress domain Z-scores are included in a single multinomial regression model to assess the independent effects of each stressor. In general, the *OR*s for this model were attenuated compared with models that evaluated each stress domain in a separate regression model. Only psychological work stress, relationship stress, neighborhood stress, financial stress, and adult stressful events remained significantly associated with current smoking (*OR*s range from 1.32 to 1.62). The associations between previous smoking and psychological work stress (*OR* = 1.56, 95% *CI*: 1.15–2.11), work–family conflict (*OR* = 0.76, 95% *CI*: 0.61–0.94), and childhood adversity (*OR* = 1.36, 95% *CI*: 1.07–1.73) were maintained.

Table 4 presents the associations between cumulative stress and smoking status, with cumulative stress modeled as a count of the total number of stress domains endorsed as high (i.e., top quartile of the sample distribution; see Model 1). Individuals who scored high on three to four stress domains and five or more stress domains were, respectively, nearly 3 (*OR* = 2.76, 95% *CI*: 1.48–5.13) and 4 (*OR* = 3.74, 95% *CI*: 2.09–6.71) times more likely to be current smokers than individuals who did not score high on any stress domain. Individuals who scored high on five or more stress domains were more than twice (*OR* = 2.40, 95% *CI*: 1.26–4.54) as likely to be previous smokers compared with those who did not score high on any domain.

Sensitivity Analyses

Three sensitivity analyses were performed. First, we examined the relationships between the psychosocial stressors and smoking status controlling for negative affect (results only shown for Table 4). The relationships between the stressors and smoking status were similar to the original values when not adjusting for negative affect (see Table 4, Model 2). Second, we used interaction terms to test for effect modification of the effect of stress on smoking behavior by age, gender, education, household income, or neighborhood-level income. We did not find evidence that the associations between psychosocial stress and smoking status varied by any of these characteristics. Third, we examined the sensitivity of the "high stress" threshold used in models that included number of stress domains endorsed as high as the predictor variable (i.e., Table 4). We redefined high exposure for each stress domain to include scores in the top tertile rather than the top quartile (data not shown); this analysis yielded similar results.

Discussion

We examined the relationships between multiple types of psychosocial stressors and smoking in a sample of middle-aged Blacks residing in Milwaukee, WI. Consistent with other surveys of urban African Americans (Dell et al., 2005; Delva et al., 2005), our study found a high prevalence of current smoking in this sample (27.70%), compared with the national average for Blacks (20.6%; CDC, 2011) and with the overall prevalence in Milwaukee from 2006 through 2008 (22%; Palmersheim, Voskuil, & Glysch, 2011). Results were largely consistent with our primary hypothesis: Higher stress levels were associated with increased odds of current smoking for 7 of the 11 stressors considered as well as for the cumulative stress score. And associations between specific stressors and previous smoking were less consistent across stressor domains relative to current smoking. Psychological work stress, stressful events in adulthood, childhood adversity, and the cumulative stress score were associated with an increased likelihood of previous smoking relative to never smoking; and one stressor (work–family conflict) was associated with lower odds of previous smoking, relative to never smoking.

Our findings support earlier studies of African Americans showing that high stress levels are associated with smoking and/or inability to quit smoking (Manning, Catley, Harris, Mayo, & Ahluwalia, 2005; Webb & Carey, 2008). Our findings also complement previous research documenting specific stressor domains as risk factors for smoking, including relationship stress (Stein et al., 2008), work stress (Ayyagari & Sindelar, 2010; Stein et al., 2008), and financial stress (Siahpush, Yong, Borland, Reid, & Hammond, 2009). We extend the existing work by considering these domains together. In contrast with previous research (Landrine & Klonoff, 2000), we

Table 3. Relation of Psychosocial Stressor Z-scores to Smoking Status

	Never-smoker	Current smoker	Past smoker	
		OR (95% *CI*)	*OR* (95% *CI*)	Overall *p* value
A. Separate models for each of the stress domains and the cumulative score[a]				
Psychological work stress[b]	1.00	1.33 (1.04, 1.70)*	1.40 (1.08, 1.81)**	.0138
Physical work stress[b]	1.00	1.20 (0.98, 1.47)	1.01 (0.81, 1.25)	.1861
Work–family conflict[b]	1.00	1.01 (0.86, 1.20)	0.81 (0.67, 0.98)*	.0629
Perceived inequality[b,c]	1.00	1.45 (1.15, 1.82)**	1.19 (0.93, 1.52)	.0071
Relationship stress[d]	1.00	1.77 (1.41, 2.22)***	1.14 (0.90, 1.43)	<.0001
Neighborhood stress	1.00	1.42 (1.15, 1.74)**	1.09 (0.88, 1.36)	.0039
Discrimination stress[b]	1.00	1.16 (0.98, 1.37)	1.07 (0.90, 1.27)	.2455
Financial stress	1.00	1.57 (1.25, 1.97)***	0.99 (0.80, 1.23)	.0002
Recent family problems[c,d]	1.00	1.16 (0.91, 1.47)	1.25 (0.98, 1.58)	.1711
Adult stressful events	1.00	1.50 (1.26, 1.78)***	1.30 (1.08, 1.58)**	<.0001
Childhood adversity	1.00	1.28 (1.04, 1.57)*	1.45 (1.17, 1.79)***	.0020
Cumulative stress score[e]	1.00	1.86 (1.47, 2.35)***	1.33 (1.04, 1.69)*	<.0001
B. Single model containing all 11 stress domains[e]				
Psychological work stress	1.00	1.37 (1.00, 1.87)*	1.56 (1.15, 2.11)**	.0095
Physical work stress	1.00	1.04 (0.82, 1.31)	0.92 (0.72, 1.17)	.6607
Work–family conflict	1.00	0.96 (0.79, 1.16)	0.76 (0.61, 0.94)*	.0418
Perceived inequality	1.00	1.03 (0.76, 1.39)	0.97 (0.72, 1.31)	.9518
Relationship stress	1.00	1.62 (1.26, 2.08)***	1.05 (0.81, 1.36)	.0004
Neighborhood stress	1.00	1.32 (1.04, 1.66)*	1.04 (0.82, 1.32)	.0568
Discrimination stress	1.00	0.91 (0.74, 1.12)	0.95 (0.78, 1.17)	.6541
Financial stress	1.00	1.33 (1.03, 1.72)*	0.99 (0.78, 1.26)	.0583
Recent family problems	1.00	0.81 (0.61, 1.09)	1.11 (0.84, 1.47)	.1638
Adult stressful events	1.00	1.39 (1.13, 1.70)**	1.17 (0.94, 1.45)	.0073
Childhood adversity	1.00	1.03 (0.81, 1.32)	1.36 (1.07, 1.73)*	.0357

Note. [a]All models use continuous Z-scores and are adjusted for age, gender, education, and income.

[b]Adjusted for employment status.

[c]Adjusted for whether the respondent has 1+ children.

[d]Adjusted for marital/partner status.

[e]The cumulative stress score combines all stress domain Z-scores across all 11 domains and is restandardized to a Z-score; this model is adjusted for all covariates noted above.

*$p < .05$. **$p < .01$. ***$p < .001$.

did not find an association between discrimination and smoking status. And importantly, our findings do not align with a recent national survey which found that psychological distress was related to smoking status for Whites, but not for Hispanic or Black respondents (Kiviniemi, Orom, & Giovino, 2011). Our findings may differ because that study considered a measure of generalized psychological distress rather than specific psychological stressors.

While it may seem somewhat counterintuitive that higher stress was associated with previous smoking for a number of stressor domains, overall, previous smokers reported less domains of high stress, relative to current smokers. It is possible that previous smokers in this study quit during a low-stress period in their lives and that stress levels have increased since then. This hypothesis is supported by prospective research showing that lower perceived stress is associated with a greater likelihood of successful smoking cessation, compared with smoking reduction, among African Americans (Berg et al., 2010). The finding that higher work–family conflict is associated with lower odds of being a previous smoker relative to a never-smoker needs further study.

There are several potential mechanisms by which psychosocial stressors may be linked to smoking, one of which conceptualizes smoking as a coping behavior. Individuals may respond to stress by using nicotine to self-medicate (Koob & Nestler, 1997). Stressors can thus trigger both the onset and the maintenance of smoking behaviors. Another potential explanation may involve self-control. Psychologists have shown that self-control is a limited resource; exposure to stress can thus result in diminished self-regulation for tasks such as controlling the urge to smoke (Muraven & Baumeister, 2000). Similarly, exposure to high levels of stress may lead to smoking relapses among individuals who are trying to quit smoking. National data show that Blacks who initiate smoking have lower cessation rates than Whites and Hispanics (Lee & Kahende, 2007). High levels of stress among Blacks may be one of many factors that contribute to lower success levels for quitting.

Table 4. Odds Ratios for Risk of Smoking Status by Number of High Stressor Scores

	Model 1[a]				Model 2[b]			
	Never smoked	Current smoker *OR* (95% *CI*)	Past smoker *OR* (95% *CI*)	Overall *p* value	Never smoked	Current smoker *OR* (95% *CI*)	Past smoker *OR* (95% *CI*)	Overall *p* value
Number of high stress domains[c]								
0	100	100	100		100	100	100	
1–2	100	086 (0.45, 1.63)	105 (0.60, 1.81)	.8546	100	084 (0.44, 1.60)	105 (0.61, 1.83)	.8161
3–4	100	276 (1.48, 5.13)**	090 (0.43, 1.89)	.0020	100	266 (1.42, 4.97)**	092 (0.44, 1.93)	.0036
5+	100	374 (2.09, 6.71)***	226 (1.22, 4.20)**	<.0001	100	343 (1.87, 6.30)***	240 (1.26, 4.54)**	.0002

Note. [a]Model 1 is adjusted for age, gender, education, income, employment status, marital/partner status and if the respond has any children.
[b]Model 2 is adjusted for covariates in Model 1, in addition to negative affect score.
[c]High scores were defined as values above the 75th percentile.
*$p < .05$. **$p < .01$. ***$p < .001$.

Our results, in combination with prospective research (Ayyagari & Sindelar, 2010; McKee et al., 2003), suggest that it may be valuable to include stress reduction strategies in future smoking cessation interventions. Of particular benefit may be interventions that address psychological work stress, relationship stress, neighborhood stress, financial stress, and stressful life events, as these stood out as independent predictors of current smoking in a model taking into account the potential clustering of stressors. Additional research is needed to determine if cessation outcomes can be improved by helping individuals and/or communities address the root causes of stress (i.e., neighborhood safety or financial safety net programs) or by teaching individuals effective coping strategies for stress.

Several limitations should be considered when interpreting our results. First, analyses were based on cross-sectional data, and temporality between the experience of stress and smoking cannot be established. Second, psychosocial measures of stress use self-reported information, and individual variability likely exists in the way stressors are perceived and rated. This may also be a strength, however, given that self-report measures take into account appraisals of stress relevant to understanding the relationship between stress and smoking behaviors. Third, our sample was comprised of middle-aged Blacks from Milwaukee, WI; thus, the generalizability of these findings to Blacks in nonurban settings, other regions of the country, or other age groups is unknown. Fourth, although our assessment of smoking does not provide information about smoking frequency or duration of cessation, our method is consistent with that of other studies (Chapman et al., 2009). Finally, the validity of some of the stressor measures, especially for African American samples, is not well established: Some domains had relatively low Cronbach's alphas, suggesting that these measures may not reflect one unidimensional construct or that they do not include the optimal items for capturing this phenomenon among Blacks.

Nevertheless, our study advances the research on stress and smoking in two important ways. First, in light of research that has emphasized the value of measuring stress comprehensively to understand population patterns of health (Turner & Avison, 2003), we utilized a multidimensional assessment of stress to capture experiences in a variety of roles and life contexts. This allowed us to carefully consider the relationship between various types of stress in relation to smoking. Second, our analyses acknowledged the natural clustering of stressors and provided estimates that accounted for concurrent stress experiences. Through this approach, we were able to identify the stress domains having the strongest independent associations with smoking, which may have implications for establishing priorities within cessation interventions.

In conclusion, this study demonstrates that a wide variety of psychosocial stressors are associated with smoking among middle-aged urban Blacks, a population at high risk of smoking and smoking-related morbidity and mortality. Since research indicates that substantial health gains occur as a result of quitting smoking, even among older adults (Taylor, Hasselblad, Henley, Thun, & Sloan, 2002), there is a critical need for prospective research to better understand factors that may prevent adult urban Blacks smokers from quitting. In light of the high smoking rates in U.S. urban communities primarily composed of racial/ethnic minorities, such work holds promise for reducing health disparities and improving the nation's health.

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Declaration of Interests

The authors have no financial disclosures or conflicts of interest to report.

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