CORRELATES OF CIGARETTE SMOKING AMONG LOW-INCOME AFRICAN AMERICAN WOMEN

Jorge Delva, PhD; Marisol Tellez, PhD; Tracy L. Finlayson, PhD; Kimberlee A. Gretebeck, PhD; Kristine Siefert, PhD; David R. Williams, PhD; Amid I. Ismail, DrPH

Objective: This study examines individual and contextual correlates of cigarette smoking in a randomly selected, community-based sample of low-income African American women.

Design: The study sample was selected by using a two-stage area probability sample design.

Setting: Participants were recruited from >12,000 housing units selected from 39 census tracts in the city of Detroit.

Participants: Participants for this study include a total of 921 women who completed the baseline assessment of a randomized clinical trial aimed at improving the oral health of African American families.

Main Outcome Measures: Past month prevalence of cigarette use and number of cigarettes smoked during this period.

Results: Data were analyzed with fixed-effects and multilevel statistics. Social support was the only variable associated, inversely, with current smoking. Self-reported feelings of anger were positively associated, though marginally, with current smoking. Between-neighborhood variance was small, and no neighborhood level variables were associated with cigarette smoking.

Conclusions: Previously established risk factors did not predict cigarette use in this randomly selected, community-based sample of low-income African American women. Further research is needed to identify risk and protective factors that might be unique to low-income African American populations in order to better inform preventive and cessation interventions. (*Ethn Dis*. 2006;16:527–533)

Key Words: African American, Cigarette Use, Low-Income, Women

From the School of Social Work (JD, KS), School of Dentistry (MT, AI), School of Nursing (KG), and Institute for Social Research (DW), University of Michigan, Ann Arbor Michigan; School of Public Health, University of California-Berkeley, Berkeley, California (TF).

Address correspondence and reprint request to Jorge Delva, PhD; Associate Professor; School of Social Work, Institute for Social Research; University of Michigan; P.O. Box 1248; 426 Thompson St.; Ann Arbor, MI 48106-1248. 734-936-3898. jdelva@umich.edu

INTRODUCTION

Despite recent declines in the prevalence of cigarette use in the general population,[1] cigarette use continues to be disproportionately high among individuals of low-income and racial/ethnic minority groups.[2–4] The excess burden of tobacco-related disease among low-income and racial/ethnic minority groups has been largely attributable to higher rates of use, differential susceptibility, lower cessation rates, and lower access to tobacco cessation counseling among Medicaid and uninsured patients.[5,6] Of particular concern, between 1983 and 2002, the gap in smoking prevalence between adults who were college graduates and those with less than a high school education rose from 14% to 18.2%.[1] These data are of concern because African Americans are overrepresented among the poor, the less educated, and the under-served, and tobacco use has a disproportionate health impact.[7] For example, smoking increases the risk of stroke, and cerebrovascular disease rates are twice as high among African American men and women as among Whites.[5]

Although tobacco use is the single largest preventable cause of death, determinants of observed population differences in exposure and susceptibility to tobacco use, as well as its consequences, are poorly understood among low-income and racial/ethnic minority populations.[8] More research is needed to increase understanding of tobacco use, addiction, and related diseases among populations suffering disparities, as the evidence base is currently inadequate to develop effective interventions.[5,8] A group that has been particularly understudied is African American women. Although African American women have an overall smoking prevalence rate lower than or comparable to that of White women, recent research indicates that low-income African American women have smoking prevalence rates considerably higher than those reported in national surveys.[2–4] Unfortunately, factors associated with smoking behavior among adult African American women remain largely understudied.[9]

This paper examines correlates of cigarette smoking in a community-based sample of African American women who reside in the poorest census tracts in Detroit, Michigan. A better understanding of risk and protective factors for smoking in this under-served group can provide an empiric basis for interventions to reduce the onset, maintenance, and adverse consequences of this health damaging behavior. Risk factors studied include parenting stress, perceptions of discrimination or unfair treatment, feelings of anger, and depressive symptoms. Stress and depressive symptoms have been associated with smoking dependence in African American women,[10] and perceived discrimination has been shown to be a strong predictor of smoking among African Americans.[11–12] Feelings of anger have also been positively associated with smoking in women and are a likely response to poverty and discrimination.[13] Protective factors studied include social support and religiosity.[14–16]

This paper examines correlates of cigarette smoking in a community-based sample of African American women who reside in the poorest census tracts in Detroit, Michigan.

Also examined is whether the prevalence of cigarette use and the association between cigarette use and corresponding risk and protective factors vary according to neighborhood characteristics, as suggested by prior research.[17–18] Some researchers report no association between smoking and neighborhood socioeconomic factors,[17] and others report that individual factors may be more important predictors of smoking initiation and progression than contextual factors.[19] However, other studies suggest that residing in a deprived area has an independent effect on smoking prevalence beyond that of individual characteristics.[18,20–21]

METHODS

Study Sample

The present study includes 921 women participating in a larger study of the determinants of oral health among 1021 African American caregivers and their children (0–5 years old) living in the city of Detroit, with a household income <250% of the 2000 poverty level. The study was conducted by the Detroit Center for Research on Oral Health Disparities, one of five centers funded by the National Institute of Dental and Craniofacial Research to reduce oral health disparities. Male caregivers (n=55) and women who are former smokers (n=45) are not included in the analyses because of small sample sizes. Institutional review board approval was obtained before beginning the study. The overall response rate for the 1021 families was 73.8% (total interviewed families/eligible families).

Sampling, Recruitment, and Screening

The sample was selected by using a two-stage area probability sample design. In the first stage, 565 census blocks were selected from a total of 1526 census blocks located in the 39 census tracts with the lowest median household income and highest concentration of African American children in the city of Detroit. These blocks were combined into 118 segments that contained ≥100 households per segment. In the second stage, all housing units in these segments were listed. From >14,000 households, 12,655 housing units were selected with probabilities proportionate to size. The combination of proportionate to size selection across the two stages yielded an equal chance of selection for all households in the study area. Screening questions were administered at the doorstep to identify households with eligible children living in the home.

Measures

Dependent Variables

The dependent variables, current cigarette smoking and number of cigarettes currently smoking, were measured by using questions from NHANES III.[22] Participants who answered yes to smoking ≥100 cigarettes in their life were asked, ''Do you smoke cigarettes now?'' Current cigarette smoking status responses were categorized as dichotomous (yes/no). To determine number of cigarettes smoked (continuous measure), respondents were asked, ''On average, how many cigarettes do you smoke a day?''

Individual-Level Predictors

Individual-level predictors included unfair treatment or discrimination, parenting stress, depressive symptoms, feelings of anger, instrumental and emotional social support, and religiosity. Unfair treatment was measured by using 11 items adapted from the Unfair Treatment Scale[23] in which participants indicated how frequently (6=''almost every day,'' 5=''at least once a week,'' 4=''a few times a week,'' 3=''a few times a year,'' 2=''less than once a year,'' and 1=''never'') they perceived being treated unfairly, such as receiving poorer service than others. A composite score was generated by summing the responses across all 11 items. Scores ranged from 11 to 66, with higher scores representing more frequent experiences of unfair treatment. The alpha coefficient was .85.

Parenting stress was measured with an eight-item scale adapted from the Parenting Stress Index scale.[24] Participants rated how often (5=''almost always,'' 4=''often,'' 3=''sometimes,'' 2=''rarely,'' and 1=''never'') they felt stressed in the parenting role. A sample item is, ''How often would you say your child gets (or children get) on your nerves?'' Items were averaged to create a composite score that ranged from 1.0 to 4.5, with higher scores representing higher parental stress. The alpha coefficient was .73.

Depressive symptoms were measured by administering the 20-item Center for Epidemiological Studies of Depression (CES-D).[25] The response categories were: ''5–7 days last week,'' ''3–4 days last week,'' ''1–2 days last week,'' and ''not at all or less than one day last week.'' Total scores ranged from 0 to 52. The alpha coefficient was .90. To measure level of anger or hostility, participants were asked: ''In the last week, how many days have you felt angry?'' The response categories were the same as those of the CES-D.

A five-item scale was used to obtain a composite index of instrumental and

Table 1. Neighborhood-level measures reflecting number of churches, social disadvantage, housing infrastructure, and wealth

Neighborhood Characteristic	Percent in 27 Neighborhood Clusters
Median number of churches	6.0
Social disadvantage	
% of female headed household	43.0
% of households with public assistance	17.2
% of adults unemployed	10.8
% of people that use public transportation	14.0
Housing infrastructure	
% of households with no kitchen	1.3
% of households with no plumbing	1.5
% of households with no phone services	10.0
Wealth	
Median household income	$22,390
% of individuals ages ≥16 years who earn income regularly	71.0

Note: For the purpose of the multilevel analyses, all these variables are standardized. The variables social disadvantage, housing infrastructure, and wealth were added to create a standardized variable called neighborhood socioeconomic disadvantage score (NSDS).

emotional support.[26] Individuals responded yes/no if they had someone to count on to run errands, lend money, watch their children, lend a car or give a ride, and provide encouragement if needed. A composite score was created by summing responses across all five items. The scores ranged from zero to five, with higher scores representing more support. The alpha coefficient was .72. Religiosity was measured by asking respondents: ''How religious would you say you are?'' with response categories including: 1=''very religious,'' 2=''fairly religious,'' 3=''not too religious,'' and 4=''not religious at all.''

Neighborhood-Level Predictors

Consideration of sample size requirements for the multilevel modeling led to a clustering process of the 39 original census tracts into 27 groups. This was done by locating the tracts in a map of the city of Detroit/North Wayne County and considered proximity of tracts, transportation/street boundaries, and local neighborhood frames of reference (eg, fire stations, elementary schools). The 27 groups have an average population of 2776 individuals with a range from one to three census tracts per group. For the purpose of this study, the 27 groups are referred to as neighborhood clusters (NCs).

Neighborhood-level covariates included in the study reflect four dimensions: churches as proxy for the presence of social institutions in the neighborhoods, wealth, social disadvantage, and housing infrastructure (see Table 1). Data to create these four dimensions were obtained from two different sources, the online Yellow Pages and the 2000 Census summary files 1 and 3 (SF1–SF3).[27] Ten census measures reflecting wealth, social disadvantage, and housing infrastructure were extracted by using American Fact Finder.[28] The census variables were factor analyzed. The loadings for each factor were used to compute a social disadvantage, housing infrastructure deficiency, and wealth factor score for each neighborhood cluster that used PROC SCORE in SAS 8.0.[29] The standardized scores of the three factors were added to calculate a neighborhood socioeconomic disadvantage score (NSDS) that ranged from −3.44 to +2.76 across the 27 NCs. The NSDS scores represent the deviation of the value from the mean, with higher scores representing greater degree of privilege in the neighborhood cluster. Number of churches was standardized to have all predictors in a common metric (standard deviations). The multilevel models were adjusted for the average population size of each NC.

Demographic Characteristics

Demographic characteristics included age, annual family income, and educational level. The variable age was dummy coded into four categories: 14–20, 21–30, 31–40, and ≥41 years. Income was dummy-coded into four categories: <$10,000, $10,000–$19,000, $20,000–$29,000, and ≥$30,000. Educational level was dummy-coded into three categories—less than high school education, high school degree, and some college education.

Data Analysis

The statistical program STATA,[30] version 8.0, was used to obtain unadjusted weighted estimates of the distribution of each of the dependent variables. Analyses were weighted and took into account the design effects generated by the complex sampling design. Once the bivariate distributions were assessed, individual-level variables that were significantly associated with the dependent variables were included in the fixed-effects multivariate analyses. Weighted multiple logistic regression analysis was used to regress the dichotomous dependent variable, *current smoker*, on the selected predictors. Weighted multiple regression analysis was used to regress the continuous variable, number of cigarettes participants currently smoke, on the predictors.

The multilevel analyses were done by using hierarchical generalized linear modeling (HGLM) to first determine if the prevalence of current cigarette use (intercept) varied significantly between neighborhood clusters. If variation was identified, further analyses involved assessment of the proportion of in-

Table 2. Results of weighted multivariate logistic and multiple regression analyses associated with current cigarette use and with the average number of cigarettes smoked recently

	Current Smokers (*N*=921)		Average No. of Cigarettes Smoked (*N*=390)	
Variable	OR	SE	β	SE
Age				
<20	1.00	—		
21–30	1.79*	.52	.27	1.11
31–40	2.09†	.61	1.73	1.42
≥41	3.55‡	1.29	3.90†	1.56
Education (years)				
<12	1.00	—		
12	.85	.19	.62	1.30
>12	1.04	.20	.88	.87
Employed				
No	1.00	—		
Yes	.82	.11	−.55	.91
Family income in past 12 months ($)				
<10,000	1.00	—		
10,000–19,999	.87	.18	−.92	.76
20,000–29,999	.95	.18	−1.59	1.11
≥30,000	.60	.16	−2.53‡	.99
Feelings of anger‖	1.17*	.10	−.11	.38
Social support¶	.73§	.05	−.23	.27

* *P*<.10;
† *P*<.05;
‡ *P*<.01;
§ *P*<.001.
‖ Scale 0 to 3, with 3 representing more anger/hostility.
¶ Scale of 0 to 5, with 5 representing more support.
Note: ORs and βs adjusted for all variables included in the table.
OR=odds ratio; SE=standard error.

dividual-level variance (within-neighborhoods) and group-level variance (between-neighborhoods) in current smoking and number of cigarettes smoked that was explained by individual and neighborhood covariates, respectively. Assessment of associations between neighborhood factors and the smoking variables, after accounting for individual-level factors, were fitted by the use of intercept as outcome models. These analyses were conducted with the software HLM 5.64a.[31]

RESULTS

More than half of the participants were 21–30 years old (55%), had a high school education (53%), were not employed (61%), and had an income <$20,000 (72%). The prevalence of current cigarette use was 43% On average, smokers had been smoking for nine years, and in the past month they smoked an average of nine cigarettes per day.

Individual-Level Analyses

Initial bivariate analyses revealed that current cigarette use was positively associated with feelings of anger and inversely associated with social support. Therefore, the first set of multivariate analyses included all demographic variables and these two variables (see Table 2). The results confirm that older women have a higher odds ratio (OR) associated with being current smokers than younger women. Social support was also significantly associated with current smoking. For each unit of increase in level of social support, the OR associated with smoking is 27% lower (OR .73, standard error [SE] .05), after adjusting for demographic characteristics and other variables. Women reporting higher levels of anger were 17% more likely to be smokers, although the *P* value was .077, after adjusting for the other variables in the model. Older individuals and those with higher incomes smoke, on average, more cigarettes than younger individuals and those with lower incomes, respectively (see Table 2, right column).

Multilevel Analyses

Assessment of whether current smoking varies between neighborhoods indicated significant variation in smoking status between neighborhood clusters, but the magnitude was small. The intraclass correlation coefficients [ICC] for current smoking status and number of cigarettes recently smoked were 7% and 2%, respectively. Thus, >93% of the variability in the outcomes of interest can be accounted for by individual, not neighborhood, variation. Consequently, when individual and neighborhood predictors were included in the models, no significant improvements were observed in the amount of variance estimated between and within neighborhood clusters. Therefore, only the results of the fixed-effects multivariate models are presented (see Table 2).

DISCUSSION

The inverse association between social support and cigarette use suggests that women in our study with higher social support are less likely to be smokers or that smoking results in lower social support. Although the cross-sectional design precludes causal inference, if supported by longitudinal research, this finding suggests a promising direction for future interventions. However, the effectiveness of social support interventions may depend on the individual's readiness to quit.[32]

The inverse association between social support and cigarette use suggests that women in our study with higher social support are less likely to be smokers or that smoking results in lower social support.

The lack of associations between cigarette use and other predictors (eg, parenting stress, depressive symptoms) may indicate that factors commonly associated with cigarette use in the general population do not apply to the life circumstances of low-income African American women. However, our finding that women who smoked reported higher levels of anger is consistent with a growing body of research that suggests that individuals may smoke, in part, as a means of managing their anger experiences. A recent experimental study[33] found that nicotine exerted its greatest influence on anger compared with other emotions, and that the observed reduction in anger was associated with increased reporting of happiness and well-being, rather than a general dampening of emotional experiences. The authors of this study also note that a major consequence of smoking cessation is an increase in anger or irritability, and that the anger-palliative actions of nicotine may reinforce smoking behavior.[34]

The lack of association between cigarette use and the hypothesized neighborhood factors might be explained by the severe economic disadvantage in which these families live, whereby differences in neighborhood characteristics might be insufficient to overcome the effects of living in extreme poverty.[35] The homogeneity of the sample is likely to have contributed to the lack of significant associations. However, the lack of association with the neighborhood factors and the individual's education and income levels may reflect a downward drift in socioeconomic status. We cannot determine if a downward drift occurred; however, such a drift would explain some of the null findings. Alternatively, multilevel models, regardless of their sophistication, may not identify neighborhood effects from observational data based on cross-sectional designs because of such problems as insufficient variability at the individual level, confounding, problems with appropriate measurement of neighborhood attributes, misspecification of models, selection bias (eg, downward drift mentioned above), and the fact that many environmental variables are dependent on the characteristics of the people who live in the neighborhoods, making the estimation of neighborhood effects moot.[36–38]

A limitation of the present study is its cross-sectional design, which precludes establishing a temporal association between cigarette use and its correlates. Other limitations include the use of self-report data and the potential for social desirability bias. However, the high prevalence of current cigarette use reported by respondents argues against social desirability. The use of two items to measure cigarette use and of single items to measure the variables religiosity and anger are another limitation; complete scales measuring smoking history, religiosity, and anger or hostility could not be included because of time constraints. Another limitation is the use of census data to measure neighborhood characteristics; research that relies on census definitions alone may underestimate neighborhood effects because the real conditions that affect residents are not accurately assessed in census data and may not be represented within census boundaries nor represent the residents' perceptions on neighborhood boundaries definitions.[39] Similarly, in this study we may not have an accurate count of the number of churches in the communities studied,[40] as only those churches listed in the online yellow pages were included. We could not directly quantify neighborhood attributes that could replace the use of census-derived and geocoded data, and no direct information was available on participants' perception of their place of residence.

This study also has a number of strengths. The sample is unique in that it is a representative sample of one of the most impoverished and disadvantaged populations living in a large US city, and the high prevalence of cigarette use provides further evidence of the health burden facing low-income African American families. Moreover, the sample includes African American women at different developmental stages, from late adolescence to adulthood. Also, despite the limitations of the community-level measures, this study included a comprehensive array of community-level measures that allowed us to test if cigarette use could be explained by contextual correlates.

The present study highlights the need to further investigate the risk and protective factors associated with cigarette use among low-income African-American women, as such factors appear to differ from those commonly associated with cigarette use in the general population. In particular, future research should identify individual- and community-level variables that can provide an empiric basis for the development and testing of smoking prevention or cessation interventions. For example, if the relationship between smoking and anger is confirmed by further research, identifying the determinants of anger might uncover specific risk factors that need to be addressed if smoking cessation interventions are to be successful. Such factors might include lack of adequate food, clothing, shelter, and transportation; stressful work conditions and low-wage, dead-end jobs; domestic

violence; neighborhood crime and inadequate police protection; and lack of access to health and mental health care.

The finding that social support was protective suggests that the relationship between extended kinship support systems and smoking should be examined; such systems could be mobilized in interventions to help those trying to quit cigarette use. Religiosity should be better measured, and further studies could also include measures of church attendance. Access to cigarettes in neighborhood stores and cigarette advertising and promotions may also have an effect on smoking in this population. Future research should examine these and other relevant variables to inform the development of appropriate interventions that can reach under-served populations such as low-income African American women and reduce the deadly burden of disease associated with cigarette use.

ACKNOWLEDGMENTS

This study was supported with funding from the National Institute on Dental and Craniofacial Research grant # U-54 DE 14261-01, the Delta Dental Fund of Michigan, and the University of Michigan's Office of the Vice President for Research. The authors also acknowledge all the investigators, staff, and participants in the Detroit Center for Research on Oral Health Disparities, without whom this study could not have been conducted.

REFERENCES

1. Centers for Disease Control and Prevention. Cigarette smoking among adults—United States, 2002. *MMWR CDC Surveill Summ*. 2004;53(29):427–431.
2. Delva J, Tellez M, Finlayson TL, et al. Cigarette smoking among low-income African Americans: a serious public health problem. *Am J Prev Med*. 2005;29:218–220.
3. Voices of Detroit Initiative. Evaluation workgroup meeting. Unpublished report 2004.
4. Northridge ME, Morabia A, Ganz ML, et al. Contribution of smoking to excess mortality in Harlem. *Am J Epidemiol*. 1998;147: 250–258.
5. US Department of Health and Human Services. *Tobacco Use Among US Racial/Ethnic Minority Groups—African Americans, American Indians and Alaska Natives, Asian Americans and Pacific Islanders, and Hispanics: A Report of the Surgeon General*. Atlanta, Ga: USDHHS, Centers for Disease Control and Prevention; 1998.
6. Parnes B, Main DS, Holcomb S, Pace W. Tobacco cessation counseling among underserved patients: a report from CaReNet. *J Fam Pract*. 2002;51:65–69.
7. American Cancer Society, Inc. *Cancer Facts and Figures 2000*. Atlanta, Ga: ACS; 2000.
8. Fagan P, King G, Lawrence D, et al. Eliminating tobacco-related health disparities: directions for future research. *Am J Public Health*. 2004;94:211–217.
9. Moon-Howard J. African American women and smoking: starting later. *Am J Public Health*. 2003;93:418–420.
10. Ludman EJ, Curry SJ, Grothaus LC, Grahm E, Stout J, Lozano P. Depressive symptoms, stress, and weight concerns among African American and European American low-income female smokers. *Psychol Addict Behav*. 2002;16:68–71.
11. Landrine H, Klonoff EA. Racial discrimination and cigarette smoking among Blacks: findings from two studies. *Ethn Dis*. 2000;10:195–202.
12. Guthrie BJ, Young AM, Williams DR, Boyd CJ, Kintner EK. African American girls' smoking experiences and day-to-day experiences with racial discrimination. *Nurs Res*. 2002;51:183–190.
13. Whiteman MC, Fowkes FGR, Deary IJ, Lee AF. Hostility, cigarette smoking, and alcohol consumption in the general population. *Soc Sci Med*. 1997;44:1089–1096.
14. Romano PS, Bloom J, Syme SL. Smoking, social support, and hassles in an urban African American community. *Am J Public Health*. 1991;81:1415–1422.
15. Wallace JM Jr, Brown TN, Bachman JG, LaVeist TA. The influence of race and religion on abstinence from alcohol, cigarettes, and marijuana among adolescents. *J Stud Alcohol*. 2003;64:843–848.
16. Whooley MA, Boyd AL, Gardin JM, Williams DR. Religious involvement and cigarette smoking in young adults. *Arch Intern Med*. 2002;162:1604–1610.
17. Ahern J, Pickett KE, Selvin S, Abrams B. Preterm birth among African American and White women: a multilevel analysis of socioeconomic characteristics and cigarette smoking. *J Epidemiol Community Health*. 2003; 57:606–611.
18. Stead M, MacAskill S, MacKintosh A-M, Reece J, Eadie D. "It's as if you're locked in": qualitative explanations for area effects on smoking in disadvantaged communities. *Health Place*. 2001;7:333–343.
19. Kandel DB, Kiros G-E, Schaffran C, Hu M-C. Racial/ethnic differences in cigarette smoking initiation and progression to daily smoking: a multilevel analysis. *Am J Public Health*. 2004;94:128–135.
20. Kleinschmidt I, Hills M, Elliott P. Smoking behavior can be predicted by neighborhood deprivation measures. *J Epidemiol Community Health*. 1995;49(suppl 2):S72–S77.
21. Duncan C, Jones K, Moon G. Smoking and deprivation: are there neighborhood effects? *Soc Sci Med*. 1999;48:497–505.
22. National Center for Health Statistics. National Health and Nutrition Examination Survey III. Centers for Disease Control and Prevention. Available at: www.cdc.gov.
23. Williams DR, Yu Y, Jacson JS, Anderson NB. Racial differences in physical and mental health: socio-economic status, stress, and discrimination. *J Health Psychol*. 1997;2: 335–351.
24. Abidin R. *Parenting Stress Index,* 3rd ed. Odessa, Fla: Psychological Assessment Resources, Inc; 1995.
25. Radloff LS. The CES-D Scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1: 385–401.
26. McLoyd VC, Jayaratne TE, Ceballo R, Borquez J. Unemployment and work interruption among African American single mothers: effects on parenting and adolescent socioemotional functioning. *Child Dev*. 1994;65:562–589.
27. US Census Bureau. 2000 Census Summary Files 1 and 3 (SF1–SF3). Available at: www.census.gov.
28. US Census Bureau. American Fact Finder. Available at: factfinder.census.gov.
29. SAS. *SAS System 8.0 for Windows*. Cary, NC: SAS Institute Inc; 2004.
30. Stata Corporation. *Stata 8.0 Statistics/Data Analysis*. College Station, Tex: Stata Corporation; 2003.
31. Raudenbush S, Bryk A, Cheong YF, Congdon R. *HLM 5. Hierarchical Linear and Nonlinear Modeling*. Lincolnwood, Ill: Scientific Software International, Inc; 2001.
32. Fiore MC, Bailey WC, Cohen SJ, et al. *Treating Tobacco Use and Dependence. Clinical Practice Guideline*. Rockville, Md: US Dept of Health and Human Services, Public Health Service; June 2000.
33. Jamner LD, Shapiro D, Jarvik ME. Nicotine reduces the frequency of anger reports in smokers and nonsmokers with high but not low hostility: an ambulatory study. *Exp Clin Psychopharmacol*. 1999;7: 454–463.

34. Hughes JR, Gust SW, Skoog K, Keenan RM, Fenwick JW. Symptoms of tobacco withdrawal: a replication and extension. *Arch Gen Psychiatry*. 1991;48:52–59.
35. Diez-Roux AV, Merkin SS, Hannan P, Jacobs DR, Kiefe CI. Area characteristics, individual-level socioeconomic indicators, and smoking in young adults. *Am J Epidemiol*. 2003;157: 315–326.
36. Oakes JM. The (mis)estimation of neighborhood effects: causal inference for a practicable social epidemiology. *Soc Sci Med*. 2004;58: 1929–1952.
37. Subramanian SV. Commentary: the relevance of multilevel statistical methods for identifying causal neighborhood effects. *Soc Sci Med*. 2004;58:1961–1967.
38. Diez Roux AV. Commentary: estimating neighborhood health effects: the challenges of causal inference in a complex world. *Soc Sci Med*. 2004;58:1953–1960.
39. Coulton CJ, Korbin J, Chan T, Su M. Mapping resident's perceptions of neighborhood boundaries: a methodological note. *Am J Community Psychol*. 2001;29:371–383.
40. Williams DR, Griffith EH, Young JL, Collins C, Dodson J. Structure and provision of services in Black churches in New Haven, Connecticut. *Cult Divers Ethnic Minority Psychol*. 1999;5:118–133.

AUTHOR CONTRIBUTIONS

Design concept of study: Delva, Finlayson, Siefert, Williams, Ismail
Acquisition of data: Delva, Siefert, Ismail
Data analysis interpretation: Delva, Tellez, Finlayson, Gretebeck, Siefert, Williams
Manuscript draft: Delva, Tellez, Finlayson, Gretebeck, Siefert, Williams
Statistical expertise: Delva, Tellez, Williams
Acquisition of funding: Ismail
Administrative, technical, or material assistance: Delva, Ismail
Supervision: Delva, Siefert, Williams, Ismail