Neighborhood social environment as risk factors to health behavior among African Americans: The Jackson Heart Study

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ABSTRACT

Background: Few studies have focused on the impact of neighborhood social environment on changes in smoking and alcohol use over time among African Americans.

Method: Jackson Heart Study participants were recruited from the Jackson, MS metropolitan area from 2000 to 2004. Neighborhood social environment was characterized using census-based neighborhood socio-economic status (NSES) and survey-derived perceptions of neighborhood social cohesion, disorder, and violence. Multinomial logistic regression was used to estimate the associations of neighborhood social environment with prevalence of smoking and alcohol use and with changes in these behaviors over time adjusted for individual sociodemographic characteristics.

Results: Participants (N=3166) resided in 108 census tracts. All neighborhood social environment variables were consistently associated with prevalence of current smoking at baseline (11%) and with persistence of smoking over a median of 8-years follow-up (8%). The odds of being a consistent smoker relative to never smoking was about 30% higher per 1 SD higher neighborhood violence (aOR: 1.30, 95% CI: 1.16–1.46) and disorder (aOR: 1.26, 95% CI: 1.08 – 1.47) and at least 16% lower per 1 SD higher in neighborhood social cohesion (aOR: 0.84, 95% CI: 0.74–0.95) and NSES (aOR: 0.79, 95% CI: 0.67–0.95). Heavy alcohol use at baseline (17%) and consistent heavy use over the study period (8%) were negatively associated with higher NSES (aOR: 0.85, 95% CI: 0.73–0.99 per 1 SD increase in NSES).

Conclusion: Favorable neighborhood social environments may reduce unhealthy behaviors among African Americans.

1. Introduction

Smoking and alcohol use are significant public health concerns associated with numerous negative health consequences (Jamal et al., 2015; NIDA, 2015). Approximately 17% of African Americans are current smokers (similar to the US population as a whole, 16.8%) (Dawson et al., 2015). The most recent data on alcohol use (2008–2010) shows approximately 53% of African Americans consume alcohol and 3.6% are heavy alcohol users compared to 65% and 5.4% in the U.S, respectively (Schoenborn et al., 2013). While African American adults are not more likely to be current smokers or heavy alcohol users than the US population as whole, smoking and alcohol use appears to be increasing (Kerr et al., 2013). Moreover, literature suggests that high-episode drinking (Dawson et al., 2015) and alcohol-related injuries/accidents and social consequences are higher than Whites (Witbrodt et al., 2014).

Health damaging behaviors such as smoking and excessive alcohol use do not occur in a vacuum and cannot be fully understood without careful consideration of the contexts in which they occur. Neighborhood environments are an important context to consider, particularly for African Americans, who are differentially exposed to disadvantaged neighborhood contexts (Williams and Collins, 2001) and the adverse social conditions that accompany these settings (Sampson et al., 1997). Disadvantaged neighborhoods, characterized by poor economic conditions and adverse social exposures such as violence, high levels of disorder and low levels of social cohesion (Williams and Collins, 2001) may be sources of chronic stress that lead to adverse coping behaviors such as smoking and excessive alcohol use (Mezuk et al., 2013). Conversely, favorable social conditions such as high levels of social cohesion may benefit health in a number of ways.

For example, favorable social conditions can promote the rapid diffusion of heath-relevant information as well as strengthen psychological resources (including mutual respect, self-esteem, optimism and hopefulness) which in turn can reduce stress and reduce the likelihood of using health damaging behaviors as coping mechanisms to mitigate the effects of stressors (Mezuk et al., 2013; Kawachi and Berkman, 2000; Patterson et al., 2004; Lin et al., 2012).

Prior studies have mostly used neighborhood socioeconomic conditions (NSES) as a crude proxy for a range of social environment features often correlated with NSES. In cross-sectional studies, higher neighborhood disadvantage has been linked to more smoking and excess drinking (Cohen et al., 2011; Karriker-Jaffe et al., 2012; Diez Roux et al., 2003; Cerda et al., 2010; Rachele et al., 2016; Fone et al., 2013). Longitudinal work has generally confirmed cross-sectional findings, namely that residing in neighborhoods with higher SES is associated with increased rates of smoking cessation (Giskes et al., 2006; Turrell et al., 2012) and reduction of excessive alcohol consumption (Brenner et al., 2015).

A few studies have investigated more specific features of neighborhood social environments. For example, higher neighborhood disorder and violence have been associated with higher prevalence of smoking (Miles, 2006; Shareck and Ellaway, 2011; Jitnarin et al., 2015) and higher social cohesion has been linked to lower prevalence of smoking (Echeverria et al., 2008). Low neighborhood social cohesion has been linked to alcohol initiation and excess alcohol use in adolescents (Bryden et al., 2012). However, the vast majority of studies on neighborhood violence, disorder, or social cohesion and smoking or excessive alcohol outcomes have been cross-sectional.

The present study used data from the Jackson Heart Study (JHS), the largest African American cohort study of cardiovascular disease (CVD) in the United States, to examine the associations of neighborhood social context with health behaviors over a median of 8 years of follow-up. We hypothesized that better neighborhood social environment (higher NSES, higher social cohesion, lower neighborhood violence, lower neighborhood disorder) would be associated with a lower prevalence of unhealthy behaviors, and a lower likelihood of persistence or adoption of unhealthy behaviors over time.

2. Material and methods

2.1. Study population

Data comes from JHS, a cohort study designed to examine the etiology of CVD among African Americans (Fuqua et al., 2005; Taylor et al., 2005). Adults 35–84 residing in the Jackson, MS tri-county area (i.e. Hinds, Rankin, and Madison counties) were recruited via commercially available list of households (17%); volunteers through participant referral or outreach activities (30%); participants in the Jackson field center of the Atherosclerosis Risk in Communities study (31%). In addition, 22% of participants were adult relatives (aged > =21 years) of original participants who enrolled in the JHS Family Sub-Study (Fuqua et al., 2005; Taylor et al., 2005). The sample is approximately representative of the age and sex distribution of the African American population in the geographic target area (Hickson et al., 2011). Visit 1 (baseline 2000–2004) involved a home interview and an on-site examination in which extensive clinical, demographic, social, cultural, and behavioral data were obtained. Participant data were also collected approximately five and nine years later (Visit 2: 2005–2008, Visit 3: 2009–2012). In addition, each year, an annual telephone survey was used to obtain additional data on health status, hospitalizations, medication, etc. All JHS participants' addresses collected at baseline visit and during annual follow-up calls through 2008 were geocoded and assigned to Visit 1 and Visit 2 based on the closest time to the visit dates (Robinson et al., 2010). All participants provided informed consent.

Table 1
Social environment neighborhood survey scales, Jackson Heart Study.

Scales[a]	Items
Social Cohesion	
	This is a close knit neighborhood
	People around here are willing to help their neighbors
	People in this neighborhood generally don't get along
	People in this neighborhood can be trusted
	People in this neighborhood don't share the same values
Neighborhood Violence	
	How often was there a fight in this neighborhood in which a weapon was used?
	How often was there a violent argument between neighbors?
	How often were there gang fights?
	How often was there a sexual assault or rape?
	How often was there a robbery or mugging?
Neighborhood Disorder	
	Excessive noise
	Heavy traffic or speeding cars
	Trash and Litter

[a] Response options for social cohesion were on a 4-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (4). Items 3 and 5 were reverse coded. Response options for neighborhood violence were on a 4-point Likert scale ranging from Never (1) to Often (4). Response options for neighborhood disorder were on a 4-point Likert scale ranging from Not really a problem (1) to Very serious problem (4). All the three neighborhood social environment scales had satisfactory internal consistency: Cronbach's alpha for social cohesion: 0.72; violence: 0.75; disorder: 0.68 and ICCs consistent with the literature: social cohesion, 0.09; violence, 0.12; disorder, 0.20.

2.2. Neighborhood social environments

2.2.1. Survey-based neighborhood social environment

In order to characterize the social environment surrounding each JHS participant, the following steps was taken. First, during the third annual follow-up telephone survey (2004–2008), participants were asked to refer to the area around where they live and provide a one-time report on neighborhood social cohesion, violence and physical disorder. Table 1 shows the survey items. The items/scales have been previously validated (Echeverria et al., 2008; Mujahid et al., 2007). Second, survey data were pooled across multiple participants who resided in the same census tract (participants resided in 108 census tracts with a median of 19 per tract). Pooling responses was done to improve the measurement/robustness of the survey-derived exposures and to avoid same-source bias (Macleod et al., 2002). Consistent with prior work (Mujahid et al., 2008; Savitz and Raudenbush, 2009), for each survey domain we computed empirical Bayes estimates from a 3-level hierarchical model with individual-level random intercept (to account for within person correlation between survey items within a survey domain answered by the same person) and tract-level random intercept (to account for the within tract correlation between survey responses answered by different individuals living in the same neighborhoods). In addition we adjusted the empirical Bayes estimates for survey respondent age and gender. The empirical Bayes estimation adjusted for age and gender is preferable to simple tract averages because it eliminates systematic differences across tracts due to respondents' age or gender and the statistical technique improves estimates for tracts with few observations. Lastly, tract-level neighborhood social environment scores were linked to JHS participants via their addresses during 2000–2008 (Visits 1 and 2). The resultant neighborhood scores were time invariant unless a participant moved (to a different census tract, 14%). Higher scores for social cohesion represented more favorable neighborhood conditions while higher scores for neighborhood violence and disorder represented less favorable neighborhood conditions.