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Neighbourhood disadvantage and smoking: Examining the role of neighbourhood-level psychosocial characteristics

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ABSTRACT

Purpose: This study aims to determine if neighbourhood psychosocial characteristics contribute to inequalities in smoking among residents from neighbourhoods of differing socioeconomic disadvantage.
Methods: This cross-sectional study includes 11,035 residents from 200 neighbourhoods in Brisbane, Australia in 2007. Self-reported measures were obtained for smoking and neighbourhood psychosocial characteristics (perceptions of incivilities, crime and safety, and social cohesion). Neighbourhood socioeconomic disadvantage was measured using a census-derived index. Data were analysed using multilevel logistic regression random intercept models.
Results: Smoking was associated with neighbourhood disadvantage; this relationship remained after adjustment for individual-level socioeconomic position. Area-level perceptions of crime and safety and social cohesion were not independently associated with smoking, and did not explain the higher prevalence of smoking in disadvantaged areas; however, perceptions of incivilities showed an independent effect.
Conclusions: Some neighbourhood psychosocial characteristics seem to contribute to the higher rates of smoking in disadvantaged areas.

1. Background

While smoking rates have declined significantly in most developed countries, a strong social gradient remains for individual- and area-level socioeconomic characteristics (Hiscock et al., 2012). Inequalities in smoking between socioeconomically advantaged and disadvantaged neighbourhoods exist, independent of the individual socioeconomic position (SEP) of residents (Chuang et al., 2005; Datta et al., 2006; Giskes et al., 2006; Hanibuchi et al., 2015; Migliorini and Siahpush, 2006; Reijneveld, 2002; Sundquist, Malmström, and Johansson, 1999; Tseng et al., 2001). Not only is smoking prevalence higher among people living in more disadvantaged neighbourhoods, there are also additional disparities among the profile of those who smoke; smokers residing in socioeconomically disadvantaged neighbourhoods are more likely to be heavy smokers (Chaix et al., 2004; Chuang et al., 2005) and less likely to quit successfully (Giskes et al., 2006) compared to their counterparts in more advantaged neighbourhoods. Moreover, mortality due to smoking-related causes is consistent with these trends, and is greatest among residents of disadvantaged neighbourhoods (Chaix et al., 2004; Chaix et al., 2007).

Studies that have sought to understand the mechanisms underlying neighbourhood inequalities in smoking show positive associations with tobacco outlet density (Chuang et al., 2005; Pearce et al., 2009), high crime areas (Tseng et al., 2001), neighbourhood stressors (van Lenthe and Mackenbach, 2006) and neighbourhood smoking norms (Ahern, Galea, Hubbard, and Syme, 2009). One of the explanatory pathways articulated in the literature is that more stressful living environments, characterised by psychosocial factors such as high crime, poor aesthetics, low social cohesion, and perceived relative disadvantage, may increase the likelihood of smoking, and reduce motivation and success of quitting (Miles, 2006; Peretti-Watel et al., 2009; Stead et al., 2001). Stressful neighbourhood environments may pose more immediate concerns that supersede smoking cessation (Businelle et al., 2010; Hiscock et al., 2012).

Studies that have found associations between smoking and neighbourhood-level psychosocial characteristics (the influences

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of social factors on an individual's mental health and behaviour (Vizzotto et al., 2013)) often fail to account for neighbourhood-level socioeconomic disadvantage (Ahern et al., 2009; Ellaway and Macintyre, 2009; Shareck and Ellaway, 2011). Given the known associations between these neighbourhood-level psychosocial characteristics and the level of socioeconomic disadvantage, it is difficult to examine the true relationships between these and smoking, without adjustment for neighbourhood socioeconomic disadvantage.

The purpose of this study was to better understand the independent contribution of neighbourhood psychosocial characteristics to individual-level smoking, and to ascertain how neighbourhood psychosocial characteristics may contribute to the association between smoking and neighbourhood disadvantage. The aims of this study were (1) to examine the association between neighbourhood psychosocial characteristics (perceptions of neighbourhood incivilities, crime and safety, and social cohesion) and smoking, before and after adjustment for neighbourhood disadvantage; and (2) examine the association between neighbourhood disadvantage with smoking before and after adjusting for neighbourhood psychosocial characteristics.

2. Methods

2.1. Scope and sample design

Data were collected in 2007 as part of the HABITAT (How Areas in Brisbane Influence HealTh And AcTivity) study. Details about HABITAT's sampling design have been published elsewhere (Burton et al., 2009). Briefly, HABITAT is a multi-level longitudinal study of the determinants of physical activity, sedentary behaviour and health among mid-aged adults (i. e. aged 40–65 years at baseline). A multi-stage probability sampling design was used to select a stratified random sample (n=200) of Census Collector's Districts (CCDs – hereafter referred to as 'neighbourhoods'), the smallest administrative units used by the Australian Bureau of Statistics (ABS); and from within each neighbourhood, a random sample of people aged 40–65 years (n=17000). A maximum of one in-scope adult was sampled per household. All sampled participants were sent an identical 16-page questionnaire in May 2007. A total of 11035 questionnaires with useable data were returned (response rate of 68.9%). The study was conducted among residents of private dwellings in the Brisbane Local Government Area (Australia). The study sample has been shown to be representative of the Brisbane population (Turrell et al., 2010). The HABITAT study was approved by the institution's Human Research Ethics Committee (Ref. no. 3967H).

2.2. Neighbourhood-level psychosocial measures

To assess perceptions of incivilities (rubbish/graffiti), crime and safety, and social cohesion, participants were provided with a number of statements and were asked to respond on a five-item Likert scale, ranging from 'strongly disagree' to 'strongly agree'. The measures were found to have acceptable test-retest reliability (Turrell et al., 2011).

Incivilities: two items assessed perceptions of neighbourhood incivilities. Participants were asked about the presence of litter or rubbish, and graffiti. Using principal components analysis (PCA) with varimax rotation, disorder and incivilities loaded onto one 'incivilities' factor.

Perceptions of crime and safety: these were ascertained from a six-item scale that asked participants about opinions of the level of crime in their neighbourhood, and perceptions of their personal safety in parks, on the streets, and using public transport in their area. Using PCA with varimax rotation, six of these items were found to load on one 'perceptions of crime and safety' factor, with a Cronbach alpha of 0.80. These measures were adapted for the Australian population from the Neighborhood Environment Walkability Scale (NEWS) questionnaire (Cerin et al., 2006); which has shown acceptable validity and reliability for measuring perceived neighbourhood walkability (Cerin et al., 2009).

Social Cohesion: this was measured by a five-item modified version of the Buckner Social Cohesion Scale (Buckner, 1988). Participants were provided with a range of statements about common values, trust and social relationships between themselves and residents of their area. PCA using varimax rotation showed that all five items loaded onto one 'social cohesion' factor, with a Cronbach alpha of 0.82.

Neighbourhood disadvantage: Neighbourhood socioeconomic disadvantage was derived using a weighted linear regression, using scores from the ABS' Index of Relative Socioeconomic Disadvantage (Australia Bureau of Statistics, 2006) (IRSD) from each of the previous six censuses from 1986 to 2011. The derived socioeconomic scores from each of the HABITAT neighbourhoods were then quantised as percentiles, relative to all of Brisbane. The 200 HABITAT neighbourhoods were then grouped into quintiles with Q1 denoting the 20% most disadvantaged areas relative to the whole of Brisbane and Q5 the least disadvantaged 20%.

2.3. Individual-level measures

Smoking status: smoking status was ascertained using a modified question from the Australian National Heart Foundation Risk Factor Prevalence Study (National Heart Foundation of Australia, 1989). Participants were asked, "Which one of the following best describes your cigarette smoking" and the following response categories were provided: I smoke daily, I smoke occasionally, I don't smoke now but used to, and I have never smoked. For analysis, smoking status was re-coded into [1] smoker (I smoke daily), and [0] non-smoker (I smoke occasionally, I don't smoke now but used to, and I have never smoked). The small number of participants (3.2%) who reported being an occasional smoker prevented the use of three smoking categories. A review and meta-analysis of self-reported smoking status has shown that the item has good sensitivity (mean 88%) and specificity (mean 89%) when compared to serum cotinine (Patrick et al., 1994).

Education: participants were asked about their highest level of completed education. A participant's education was subsequently coded as: [1] bachelor degree or higher (including postgraduate diploma, master's degree, or doctorate), [2] diploma (associate or undergraduate), [3] vocational (trade or business certificate or apprenticeship), and [4] no post-school qualifications.

Occupation: participants were asked about their current employment situation. If they were currently employed (i. e. full-time, part-time or casual) they were asked to provide the full title of their current occupation. Responses were coded to the Australian and New Zealand Standard Classification of Occupations (Australian Bureau of Statistics, 1997), and were further recoded into professionals (managers, administrators, professionals, and paraprofessionals), white-collar employees (clerks, salespersons, and service workers) and blue-collar employees (tradespersons, machine operators, drivers, labourers, and related workers). A fourth category 'not in employment' was created for respondents who were retired, studying, unemployed, not looking for work, or permanently unable to work.

Household income: participants were asked to estimate the total pre-tax annual household income using a single question comprising 13 income categories. For analysis, these were re-coded into six categories: [1] ≥ AU$130,000, [2] AU$129,999 – 72,800, [3] AU$72,799 – 52,000, [4] AU$51,999 – 26,000, [5] ≤ AU$25,999, and