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Neighborhood linking social capital as a predictor of drug abuse: A Swedish national cohort study

Jan Sundquist [a,b,*], Cecilia Sjöstedt [a], Marilyn Winkleby [a,b], Xinjun Li [a], Kenneth S. Kendler [c], Kristina Sundquist [a,b]

[a] Center for Primary Health Care Research, Lund University/Region Skåne, Malmö, Sweden
[b] Stanford Prevention Research Center, Stanford University School of Medicine, Stanford, CA, USA
[c] Virginia Commonwealth University, Richmond, VA, USA

HIGHLIGHTS

- Linking social capital exerts an independent effect on risk of drug abuse.
- These results remained after taking potential confounders into account.
- The key findings are important for clinicians and decision-makers.

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ABSTRACT

Aims: This study examines the association between the incidence of drug abuse (DA) and linking (communal) social capital, a theoretical concept describing the amount of trust between individuals and societal institutions.
Methods: We present results from an 8-year population-based cohort study that followed all residents in Sweden, aged 15–44, from 2003 through 2010, for a total of 1,700,896 men and 1,642,798 women. Linking social capital was conceptualized as the proportion of people in a geographically defined neighborhood who voted in local government elections. Multilevel logistic regression was used to estimate odds ratios (ORs) and between-neighborhood variance.
Results: We found robust associations between linking social capital and DA in men and women. For men, the OR for DA in the crude model was 2.11 [95% confidence interval (CI) 2.02–2.21] for those living in neighborhoods with the lowest vs. highest level of social capital. After accounting for neighborhood level deprivation, the OR fell to 1.59 (1.51–1-68). The ORs remained significant after accounting for age, family income, marital status, country of birth, education level, and region of residence, and after further accounting for comorbidities and family history of comorbidities and family history of DA. For women, the OR decreased from 2.15 (2.03–2.27) in the crude model to 1.31 (1.22–1.40) in the final model, adjusted for multiple neighborhood-level, individual-level variables, and family history for DA.
Conclusions: Our study suggests that low linking social capital may have significant independent effects on DA.

1. Introduction

Drug abuse (DA) has been a recognized public health concern for decades with the recognition that the development of DA is caused by a constellation of individual and neighborhood-level factors. One important aspect of research on the social context of DA has been on the relationship between neighborhood-level deprivation and individual-level DA.

In general, many studies have examined the contribution of neighborhood social deprivation effects on DA after "adjustment" for potential confounding factors including individual-level socioeconomic status (SES) (Boardman, Finch, Ellison, Williams, & Jackson, 2001; Hoffmann, 2002; Schroeder et al., 2001). However, a recent review found only a significant neighborhood effect on DA in 19.4% of 64 studies. In addition, 6.5% was significant in the opposite direction and 74.1% was not significant (Karriker-Jaffe, 2011). This is possibly due to methodological limitations, such as small and/or too homogeneous samples, cross-sectional designs, use of imprecise boundaries or large geographic

* Corresponding author at: Center for Primary Health Care Research, Lund University/Region Skåne, CRC, building 28, floor 11, Jan Waldenströms gata 35, Skåne University Hospital, 205 02 Malmö, Sweden.
E-mail address: Jan.sundquist@med.lu.se (J. Sundquist).

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areas, and single (vs. composite) indicators of area-level deprivation. Although linking social capital is the main focus in this study it is important to adjust for the social deprivation effect as a potential confounder.

Kawachi and Berkman (I Kawachi & Berkman, 2000) described social capital as a clean collective characteristic, an attribute of the neighborhood to which the individual belongs. It has been associated with democracy (Putnam, 1993, 2000), economic wealth (Holzmann & Jorgensen, 1999; Woolcock & Narayan, 2000), violent crime (Sampson, Raudenbush, & Earls, 1997), self-rated health (Kawachi, Kennedy, & Glass, 1999; Sundquist & Yang, 2007), coronary heart disease (Sundquist, Johansson, Yang, & Sundquist, 2006), mental health (Hamano et al., 2010; Lofors & Sundquist, 2007) and other health outcomes (Green et al., 2000; Hyyppä & Mäki, 2001; Kawachi, Kennedy, & Lochner, 1997; Sundquist et al., 2006).

One aspect of social capital is linking social capital, a rather new theoretical concept introduced in 2004 (Szreter & Woolcock, 2004). It emphasizes the importance of social ties between individuals and political institutions in a society, including norms of trust across power and authority gradients in building and maintaining community health. As conceptualized this way, low linking social capital may be linked to people's health and wellbeing.

The process of social and emotional literacy is a social and behavioral development of skills by which children learn vertical trust from parents, teachers, and other adults how to participate in a honest and trustful way in social life (Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996). Attitudinal and behavioral defiance of basic rules of conduct is related to later drug use. Theories of social control emphasize that low bonding to school predicts later violence among youth (Catalano et al., 1996). A community that is characterized of a lower level of linking social capital is according to this theoretical framework also more disorganized because such pathologic developmental social processes may contribute to a higher availability of drugs. The social development model is grounded in criminological theory that incorporates research on the etiology of different forms of antisocial behavior and is a general theory of human behavior that hypothesizes similar developmental processes leading to antisocial outcomes.

We hypothesized that linking social capital, that is a collective neighborhood characteristic, is associated with DA. We examined the association between linking social capital and DA after accounting for potential confounding factors, such as neighborhood-level deprivation, individual-level sociodemographics, comorbidities and family history of DA.

2. Methods

2.1. Study participants

This 8-year population-based cohort study included all residents in Sweden aged 15–44, i.e., a total of 1,700,896 men and 1,642,798 women. These individuals were followed from 2003 until death, emigration, or the end of the study (31 December 2010). Individuals born between 1960 and 1990 were included in the analysis. As our objective was to analyze the neighborhood impact on first recorded DA events, we excluded individuals who were not registered in Sweden in 2003. We also excluded individuals previously registered with DA.

2.2. Data sources

We used linked data from multiple Swedish nationwide registries. Data were linked using the unique 10-digit personal identification numbers assigned at birth or immigration to all Swedish residents. These personal identification numbers were replaced with serial numbers to ensure anonymity. The following sources were used to create our unique DA dataset: the Total Population Register, which contains annual data on socio-demographic characteristics, such as education and marital status; the Multi-Generation Register, which provides information on family relationships; the Swedish Hospital Discharge Register, which contains data on all hospitalizations (including those for DA) for all Swedish residents; the Swedish Prescribed Drug Register, which contains details of all prescriptions in Sweden picked up by patients between 2005 and 2010; the Outpatient Care Register, which contains information from all outpatient visits for the period 2001–2010; the Crime Register, which contains information on all crimes, including those related to DA, for 1998–2007; the Swedish Mortality Register, which contains information on causes of death; and the Longitudinal Integration Database for Health Insurance and Labor Market Studies (LISA), containing annual information on socio-economic factors for all individuals from 16 years of age.

2.3. Outcome variables

Our outcome variable was first recorded event of registration for DA during the study period. Individuals were deemed to have their first recorded event of DA if they fulfilled any of the criteria below. DA patients (1/31/2003–12/31/2010) diagnosed with DA before 2003 were excluded to enhance the likelihood of enrolling "true" incident cases.

Incident cases of DA were identified in the Swedish Hospital Discharge, Swedish Mortality, and Outpatient Care Registers using the following codes from the tenth revision of the International Classification of Disease: ICD-10 codes for mental and behavioral disorders due to psychoactive substance use (F10-F19), except for those due to alcohol (F10) or tobacco (F17).

Cases of DA in the Crime Register were identified by codes 5011 and 5012 which reflect crimes (drug holding) related to DA. Crimes relating only to alcohol abuse or the trafficking of illicit drugs were excluded.

Individuals who picked up more than four defined daily doses (DDDs) of hypnotics or sedatives (Anatomical Therapeutic Chemical [ATC] Classification System codes N05C and N05BA) or opioids (ATC Classification System code N02A) over a 12-month period were identified using the Prescribed Drug Register. There is no established definition for pathological intake of hypnotics/sedatives or opioids. In order to minimize false positive cases of DA, we chose a relatively high cut-off and excluded individuals diagnosed with cancer (ICD 10 codes C00–C99, D00–D48) as they may have a high use of opioids.

The greatest numbers of individuals with DA were identified in the Crime Register, followed by the Outpatient Care Register, Hospital Discharge Register, and Prescribed Drug Register.

2.4. Neighborhood of residence

To examine the effect of the exposure (neighborhood level of linking social capital), all individuals were geocoded to their neighborhoods of residence. Small area market statistics (SAMS)—small administrative areas in Sweden whose average population is 2000 in Stockholm and 1000 in the rest of Sweden—were used to define neighborhoods. The boundaries of SAMS include similar types of housing construction, meaning that SAMS neighborhoods are comparatively homogeneous in terms of socioeconomic structure. Data on SAMS covering the whole of Sweden ($n = 9119$) were obtained from the Swedish government-owned statistics bureau, Statistics Sweden.

2.5. Predictor variable

Neighborhood linking social capital was conceptualized as the number of people in the neighborhood (SAMS) who voted in local government elections divided by the number of people in the neighborhood who were entitled to vote. Neighborhoods were divided into the following three groups based on the proportion of residents who voted: (Boardman et al., 2001) low, (Boydell, McKenzie, van Os, & Murray, 2002) intermediate, and (Callas, Pastides, & Hosmer, 1998) high. Group 1 comprised the 20% of neighborhoods with the lowest proportions of voters (≤74.0%); group 2 comprised the 60% of neighborhoods