



Review

Social and socio-demographic neighborhood effects on adolescent alcohol use: A systematic review of multi-level studies



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ABSTRACT

There is growing interest in the role of the neighborhood environment on adolescent alcohol use. Multi-level designs are ideally suited to this investigation due to their ability to examine area-level effects over and above the effects due to neighborhood composition. To date, most research in this area has focused on the physical availability of alcohol in the neighborhood.

We reviewed the multi-level evidence on neighborhood-level risk and protective factors which influence adolescent alcohol use, excluding studies which assessed the impact of neighborhood-level alcohol availability and advertising. Systematic searches in Medline, EMBASE, CINAHL Plus, PsycINFO, Sociological Abstracts and SCOPUS identified 23 studies, examining 11 different neighborhood-level exposures. The majority of studies found no associations with residential mobility, neighborhood disorder or crime, employment or job availability, neighborhood attitudes to drinking, social capital and collective efficacy. For studies examining neighborhood-level socio-economic disadvantage mixed results were found. High levels of both adult and adolescent alcohol use in the community appeared to be associated with alcohol use whilst protective effects were found for enforcement of liquor laws. Methodological limitations within studies were evident.

The dearth of high-quality, multi-level studies indicate that further research is required to inform the development of multi-faceted place-based policy and preventative interventions to reduce adolescent alcohol use. Future studies should consider the neighborhood context from the outset of study design and identify the individual-level control variables to adequately isolate neighborhood effects. Inclusion of moderation and mediation analyses would greatly contribute towards the understanding of causal pathways of neighborhood effects.

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1. Introduction

Adolescent drinking poses significant public health concerns. In comparison to older drinkers young people experience a greater level of harm from their drinking (National Health and Medical Research Council, 2009). Although some countries are experiencing positive declines in overall use of alcohol, the average volume consumed by young people that drink may be increasing (Department of Health, 2010; Johnston et al., 2013; Meier, 2010). To

reduce harm to this vulnerable population practitioners and policy makers need to continue to identify and target the key risk and protective factors for alcohol use.

According to Bronfenbrenner's ecological model (1979), adolescent socialization and consequent development occurs across various social settings or levels, including families, peer groups, schools, and neighborhoods. It is thought that the interactions between these levels are especially important in influencing adolescent behavior. Decades of research has produced a wealth of literature on the salient individual and interpersonal risk and protective factors which influence adolescent alcohol use. However, to achieve more sustainable and equitable reductions in harmful alcohol use it is important that the upstream factors are identified and targeted within harm reduction policies and interventions. The variation in adolescent alcohol use across

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neighborhoods (Jonkman et al., 2014) suggests that there may be factors within neighborhoods which can be targeted to achieve significant population health gains. Shifting the focus away from more proximal factors related to alcohol use will require all sectors in society to consider their role in reducing alcohol-related harm. An upstream approach may also be more conducive than blaming individuals, particularly adolescents whose brains are still developing, for making 'poor decisions' in relation to their drinking.

However, the evidence to guide decision makers and practitioners on the important neighborhood-level exposures is unclear. Previous reviews of neighborhood effects on adolescent alcohol use have found mixed results for most neighborhood-level exposures, including deprivation, income, social disorganization, employment, crime, and alcohol-related social norms (Bryden et al., 2013; Karriker-Jaffe, 2011). Stronger associations have been found in relation to the positive impact of social capital (Bryden et al., 2013) and the negative impact of liquor outlets and exposure to alcohol advertising in the neighborhood (Bryden et al., 2012).

These equivocal findings of neighborhood effects may be partly due to the measurement of exposure within studies. Results from studies which measure 'community-level' factors only at the individual level (e.g. perceptions of community attachment) are likely to differ from results from studies which use multi-level designs to examine the contextual effects of the community-level factors (e.g. aggregated measures of community attachment) over and above the individual-level effects. The former studies are considered to be treating social processes within neighborhoods as individual-level characteristics, rather than as emergent properties of the neighborhoods in which they reside (Sampson et al., 2002). As such, individual-level exposures and their group-level analogue may represent very different constructs which exert independent effects (Diez, 2002; Keyes et al., 2012). For example, the mechanisms of social capital at the individual level may be different when viewed at the collective level (Kawachi et al., 2004).

Results from individual-level studies of community factors can only help to explain inter-individual variation in alcohol use and cannot assist in determining which neighborhood-level factors are associated with group-to-group variability (Diez-Roux, 2009). Drawing group-level inferences from these types of studies is therefore biased, and has been referred to as the atomistic fallacy (Diez-Roux, 1998). As such, individual-level studies are unable to inform place-based interventions as they cannot distinguish whether it is the perceptions of the community context or the community context itself that needs to change to improve health (Chilenski et al., 2010).

Even when exposures are measured at the group or neighborhood level inconsistency in results across studies may reflect the varying ability of studies to take into account the non-independence of individuals nested within neighborhoods. Regression techniques which ignore correlations between individuals within the same cluster may result in incorrect estimation of standard errors of parameters, leading to the detection of significant associations where none exist (Pickett and Pearl, 2001; Subramanian et al., 2003). In contrast, multi-level designs are ideally suited to the analysis of contextual effects by simultaneously analyzing individual and neighborhood-level variables, whilst accounting for the non-independence of individuals (Diez, 2002). However, for these designs to effectively isolate the contextual effects the characteristics relating to the composition of neighborhoods must be controlled (Kawachi and Berkman, 2003; Poortinga, 2006). Omitted variables relevant to neighborhood composition may result in residual confounding or endogeneity bias (Diez-Roux, 2000), resulting in an over-estimation of neighborhood effects.

The influence of neighborhood effects is widely understood to be indirect, operating through more proximal behaviors (Leventhal

and Brooks-Gunn, 2000; Oakes, 2004). Examining causal pathways within multi-level models, by including mediation analyses, will contribute greatly to the evidence on neighborhood effects. In addition, factors at the neighborhood-level may moderate the relationship between individual-level exposures and outcomes, and hence it is also important to consider cross-level interactions in the investigation of neighborhood effects (Macintyre and Ellaway, 2003).

This is the first systematic review that examines the multi-level evidence of neighborhood effects on adolescent alcohol use. It examines the effects of socio-demographic characteristics of neighborhoods (such as deprivation, income, employment) and the social processes (e.g. social capital, informal social control) which may lie behind the neighborhood demography (Raudenbush and Sampson, 1999). Results from studies using mediation and/or moderation analyses are also reported to aid the identification of causal pathways and effect modification of neighborhood effects.

2. Methodology

A systematic review of intervention and observational studies (cross-sectional and longitudinal) was conducted. The PRISMA Statement (Liberati et al., 2009) was utilized to guide the conduct of the review (Appendix 1).

2.1. Inclusion and exclusion criteria

Studies were included if they examined the association between neighborhood-level exposures and adolescent alcohol use. Only studies incorporating a multi-level design, whereby neighborhood-level and individual-level characteristics could be simultaneously examined, were included. The exposure was required to be either aggregated to the neighborhood-level (e.g. aggregated measures of perceived neighborhood attachment) or collected at the neighborhood level (e.g. crime rates) and not combined with other exposures. Individual-level studies which only sought to examine the neighborhood exposure at the individual level were excluded as were ecological designs which assessed group level exposures and outcomes. The effect of commercial alcohol availability and advertising in the neighborhood were excluded as primary exposures due to the number of systematic reviews previously published in these areas. However, results from studies which examine these exposures as potential mediators or moderators were reported. In addition, studies measuring neighborhood levels of immigrant populations or ethnic groups were excluded, as, in agreement with Bryden et al. (2013) these factors are much less amenable to policy or practice interventions.

Adolescents were defined as being between the ages of 10 and 19 years, which is consistent with the World Health Organization's definition of adolescence. Study populations which included both adolescents and young adults (20 years and over) were excluded. Any type of alcohol use was considered, including past week, month or year, ever or lifetime drinking, binge drinking, and drunkenness. Studies which combined alcohol and drug use outcomes or examined alcohol-related consequences were excluded.

2.2. Search strategy

Primary studies were identified by searching six electronic databases including Medline (1946-present), SCOPUS, PsycINFO (1806-present), EMBASE (1980-present), CINAHL Plus (1937-present) and Sociological Abstracts (1952-present). The last search was run on January 9, 2014. A Google search was also conducted to identify grey literature and further studies were identified by searching the reference lists of included studies and relevant

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