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Original article

The Association of Alcohol Outlet Density With Illegal Underage Adolescent Purchasing of Alcohol

Bosco Rowland, Ph.D. [a,*], John W. Toumbourou, Ph.D. [a], and Michael Livingston, Ph.D. [b,c]

[a] Prevention Sciences, Centre for Mental Health and Wellbeing Research and School of Psychology, Deakin University, Burwood, Victoria, Australia
[b] Drug Policy Modelling Program, National Drug and Alcohol Research Centre, University of New South Wales, Sydney, New South Wales, Australia
[c] Centre for Alcohol Policy Research, Turning Point Alcohol and Drug Centre, Fitzroy, Victoria, Australia

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A B S T R A C T

Purpose: Although previous studies have suggested that greater community densities of alcohol sales outlets are associated with greater alcohol use and problems, the mechanisms are unclear. The present study examined whether density was associated with increased purchasing of alcohol by adolescents younger than the legal purchase age of 18 in Australia.
Methods: The number of alcohol outlets per 10,000 population was identified within geographic regions in Victoria, Australia. A state-representative student survey (N = 10,143) identified adolescent reports of purchasing alcohol, and multilevel modeling was then used to predict the effects for different densities of outlet types (packaged, club, on-premise, general, and overall).
Results: Each extra sales outlet per 10,000 population was associated with a significant increase in the risk of underage adolescent purchasing. The strongest effect was for club density (odds ratio = 1.22) and packaged (takeaway) outlet density (odds ratio = 1.12). Males, older children, smokers, and those with substance-using friends were more likely to purchase alcohol.
Conclusions: One mechanism by which alcohol sales outlet density may influence population rates of alcohol use and related problems is through increasing the illegal underage purchasing of alcohol.

IMPLICATIONS AND CONTRIBUTION

The number of alcohol outlets per population in a given area is known to be associated with a greater level of alcohol use and problems. However, the mechanism through which this actually occurs is unclear. This study demonstrated support for one potential mechanism involving increased illegal underage sales of alcohol to adolescents.

In Australia and most countries in Europe, national drinking guidelines recommend that minors, that is, those younger than 18 years of age (the legal age for purchasing alcohol in these countries) should refrain from consuming alcohol [1]. Despite this recommendation, 61% of Australian children between 12 and 17 years of age have reported they have consumed alcohol in their lifetime. For most adolescents, adults are often the primary supplier of alcohol [2,3]. However, some children do purchase alcohol for themselves [3–5]. Discouraging underage youth from purchasing alcohol is important, because an early age of adolescent consumption of alcohol is longitudinally associated with harmful patterns of consumption as an adult [6], poor academic outcomes [7], and possibly an adverse impact on brain development [8].

A greater density of alcohol sales outlets (the number of outlets per capita of a geographic population) in a community has been associated with greater rates of adult consumption of alcohol and related harms [9,10]. Greater alcohol outlet densities also have been associated with greater rates of adolescent alcohol consumption. This relationship has been found to exist in Australia [11], the United States [12], Switzerland [13], Taiwan [14], and New Zealand [15]. However, the mechanism by which alcohol outlet density impacts population consumption and

* Address correspondence to: Bosco Rowland, Ph.D., Prevention Sciences, Centre for Mental Health and Wellbeing Research and School of Psychology, Deakin University, Burwood, Victoria, VIC 3125, Australia.
E-mail address: bosco.rowland@deakin.edu.au (B. Rowland).

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related harms is unclear [16], particularly for adolescent populations [12].

It is logical that the density of alcohol outlets may be linked to the ability of adolescents to purchase alcohol. As the number of outlets increases, outlet vendors experience competition and thus greater pressure to be lenient with liquor licensing standards, as one way of ensuring that sales and income do not decrease [17]. Greater density could also mean that there are greater environmental factors—advertising, access, and the promotion of more liberalized social norms—influencing adolescents to purchase alcohol [18]. Social cognitive theory purports that environmental cues, like the number of alcohol outlets, can act as a cue, or may also act to reinforce existing or developing alcohol use behavior [19].

That underage adolescents are able to purchase from alcohol outlets receives support from "purchase observation" studies. These studies send confederates (individuals that look younger than the legal age of purchase) to purchase alcohol from packaged outlets and record whether these individuals were able to purchase alcohol. Australian observation studies suggest that a large proportion (between 54% and 77%) of underage individuals are able to purchase alcohol, even though they have been judged by an expert panel to look younger than the legal age to purchase alcohol [20,21]. Purchase observation studies outside Australia suggest between 34% [22] and 86% [23] of underage adolescents are able to purchase alcohol. Alcohol is sold to underage adolescents as the result of age identification not being requested and, in some cases age, identification details being ignored [23].

To date, only two studies have examined the association between the density of alcohol outlets and adolescent purchasing of alcohol. The first study, in the United States, where the legal age of purchasing is 21, observed that there are greater rates of successful underage purchasing in outlets when there is another outlet in the same block compared with outlets that have a competitor more than two blocks away [17]. In contrast, a study of children in Taiwan, where the legal age of purchase is 18 years, identified that the number of outlets within a kilometer radius of a child's school did not predict adolescent purchasing of alcohol [24]. Given the conflicting results, and the different cultural and political contexts of the studies, it is clear additional research is required to better understand the link between the density of alcohol outlets and adolescent purchasing of alcohol.

Using a representative sample of Australian secondary school children across the State of Victoria, in Australia, we examined whether the density of alcohol sales outlets was associated with greater levels of adolescent alcohol purchasing. The study controlled for a variety of risk factors that may show elevations in areas with greater alcohol outlet densities and are known to influence adolescent alcohol consumption (e.g., low socioeconomic status, perceived alcohol availability, and peer alcohol use [11,25,26]). The hypothesis was that a greater density of outlets would predict greater rates of underage alcohol purchasing.

Methods

Design

Data were collected in 2009 through the HowRU secondary student survey that was designed to provide representative epidemiological estimates of adolescent health and wellbeing indicators for all metropolitan local government communities and nonmetropolitan regions across the state of Victoria in Australia [27]. The survey instrument was developed under the guidance of a steering committee convened by the State Government Department of Education and Early Childhood Development.

The instrument was designed to provide data for key adolescent health and wellbeing indicators that could not be addressed through other sources of data. Scales that had been validated in national and/or international studies for use in adolescence were chosen to address each indicator whenever possible. A two-stage cluster sample design was used to recruit students. In the first stage, schools were selected randomly based on a probability proportional to each community's grade-level size from a stratified sampling frame of all schools in Victoria (government, Catholic, and independent).

In the second stage of the sampling, whole classes in school years 7, 9, and 11 were chosen at random. Survey procedures were approved through the Royal Children's Hospital Ethics Office and relevant school authorities. Of the 13,501 eligible students, 10,273 (76.1%) consented and participated. The analysis sample for this paper included only those who were younger than the age of 18, the legal purchase age of alcohol in Victoria. There were 108 students aged 18 or older who were excluded from the analysis. There were also 19 individuals who were 11 years of age. As this was a very small group, these individuals also were excluded from the analysis. Three respondents did not provide their age and were excluded. Thus, the total sample used in the analyses was 10,143.

Community sampling was based on the school location within the 36 local government areas (GAs) across metropolitan Melbourne. Outside metropolitan Melbourne, sampling was based on five Education Department Regions, reflecting the major community units responsible for youth services. The average number of residents in the metropolitan areas was 101,500 (min: 46,100; max: 174,900) The average number of residents in the regions outside Melbourne was 223,700 (min: 173,700; max: 289,500). The number of participating student in each region/local GA ranged from 117 to 322, with a mean of 219 respondents.

Measures

Dependent variable

Adolescent alcohol purchasing. The dependent variable was a binary variable created to identify whether the adolescent reported having bought alcohol (1) or not (0) in the last 12 months. Respondents were asked whether they had consumed alcohol in the last 12 months and those reporting they had were asked how they obtained their alcohol, the last time they consumed alcohol. Among the options that could be selected was "I bought it." Respondents who bought alcohol for themselves were asked to identify where it was purchased: hotel, pub, or tavern; licensed store or supermarket; walk-in bottle-shop; club, restaurant; disco or dance; sporting event, online (internet sales); or other. To ensure respondents who had not consumed alcohol in the last 12 months did not drop out of the analysis as missing, these individuals were coded as not purchasing alcohol in the last 12 months.

Independent variable

Alcohol outlet density. Density was measured as the number of outlets per 10,000 residents of a given local GA/region. A youth-specific population denominator was not used because it would ignore the overall environmental influence of alcohol availability