

Place Effects on Alcohol Consumption: A Literature Review

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Abstract

Background and purpose of study: Recently, there has been an increasing interest in the ways in which features of residential environments influence health outcomes and health related behaviours. This paper reviews the literature which examines how features of places influence individual alcohol consumption. Gaps for further research are identified.

Method: Research was selected which examined any feature of a residential neighbourhood and how it influenced alcohol consumption including alcohol access. This review was undertaken using search engines and databases including Pubmed, Scopus, Proquest and Web of Science. Of 1,821 articles examined, 64 met the above criterion and were included.

Results: There are a range of social and physical characteristics of neighbourhoods that are associated with alcohol consumption. These include area-level socio-economic status, neighbourhood stress, social capital and cohesion, cultural context, retail outlets and advertising. These place effects are examined at different scales ranging from regional (e.g. state level) to census tracts or meshblocks.

Conclusion: The review provided evidence of how place features influence alcohol consumption and recommended further research. There is a need for focussed attention on a few areas: understanding the mechanism of place effects; deciding on scale of measurement; examining more than one neighbourhood characteristic; and taking greater advantage of natural experiments.

Introduction

There is a growing recognition that numerous features of places in which people live and work exert an independent influence on health behaviour and health outcomes [1]. There are many place features including the physical and social environment that have been considered to influence health behaviour and health outcomes [2]. However, much of the existing literature has focused on the effects of place on outcomes of general health and less on health related behaviours. Moreover, those that have reviewed alcohol consumption concentrate on health and social outcomes including density of outlets and hospital admission, crime, violence, and drink driving. There is no review of place effects on alcohol consumption. It is against this backdrop that a focus on place effects on alcohol consumption is both timely and necessary. This is a review of existing empirical evidence of how features of place influence alcohol consumption.

Over the years, theory has focused on individual health behaviour, including dietary uptake, exercise, smoking and alcohol consumption. There is evidence from studies that health behaviour is an individual trait [3,4]. It is suggested that those who engage in hazardous health behaviour would do so no matter where they lived. Researchers however dispute this and suggest that individual traits only explain part of the variation observed and that place is also important [2,5]. Key among these has been theory of deprivation and how it has influenced health and health behaviour. Research has linked obesity, poor diet and smoking to poverty in the USA ghettos and black neighborhoods [6]. More recently, researchers have developed more

complex theories that question key factors in a deprived area that affect health and health behaviour. They are more concerned with explaining the processes rather than making associations, especially with new evidence that deprived areas expose individuals to poor environmental quality. Contextual explanations suggest that geographical differences in health are a feature of exposure and characteristics of an area where individuals live [2]. Two perspectives have been suggested as being important in explaining the link between place and health. The first, the 'contagion' perspective, states that people copy behaviour that is around them and that there are certain norms and cultures that are followed in the neighborhoods [7-8]. On the other hand, the structural perspective proposes that neighborhoods present their residents with both opportunities in terms of better access to resources or constraints, in terms of lack of access [9-10]. To this end, Ellen et al. suggest that there are four ways in which neighborhoods are hypothesised to influence health through:

- Neighborhood institutions and resources, including differential access to services and amenities, which may have both positive and negative impacts upon health
- Stresses of the physical environment
- Stresses in the social environment
- Neighborhood based networks and norms.

It has been suggested that these influence health independent of individual characteristics.

Despite the existence of a growing literature on places effects on health behaviour, there has been little attention on the effects of environmental factors on alcohol consumption, yet the World Health Organization (WHO) estimates that there are currently two billion people who drink alcohol and about 76.3 million who have drinking disorders. Of these, 63.7 million are male and 12.7 million are female [12]. Alcohol has both positive and negative consequences depending on consumption. On one hand there is an inverse relationship between moderate alcohol consumption and coronary heart disease (CHD) [13-14]. On the other hand, hazardous consumption is associated with oesophageal cancer, epilepsy, unintentional injuries, homicide, motor vehicle accidents, intoxication, alcohol poisoning, pancreatitis and cirrhosis of the liver [15]. Rehm et al. [16] argue that in the last 25 years, alcohol-related harm has increased in many countries especially among younger age groups [15-29 years], who are more likely to consume excessive alcohol in one drinking session [12,17]. The WHO has speculated that there is a probably a new trend where alcohol is consumed to cause intoxication. The rise in harmful drinking amongst younger people is particularly noticeable for women, especially those aged 15-19 years. The rising consumption among younger women is exacerbated by the alcohol industry, especially with the introduction of light beer and alcopops, (a mixture of sweet carbonated juices and spirits) [18]. This increase in excess alcohol consumption by different sub-populations is a significant contributor to ill-health and therefore inequality, especially with an increase in conditions such as pancreatitis amongst the younger age groups, a disease previously more prevalent in old people [19].

Although there is evidence that ill-health is caused by excessive alcohol consumption, contributing to increased social and geographic inequalities in health status, studies have focused more on the dose-response relationship between excessive alcohol consumption hospitalization and negative health outcomes [20,21]. Such studies have also indicated that in any given area alcohol-related mortality is related to deprivation as well as socio-demographic characteristics. While studies for alcohol-related health outcomes have been fairly consistent in their findings, this has not been the case for alcohol consumption.

Alcohol consumption studies have shown some inconsistency, especially in explaining why some groups are more affected than others. For example, when consumption is examined, those of higher socio-economic status (SES) are more likely to drink more frequently than those in less affluent groups. On the other hand, people of a lower SES are more likely to engage in more harmful drinking and exhibit a higher prevalence of risky health behaviours [22,23]. Interestingly, recent research from developing countries, has found that higher, rather than lower SES, was associated with higher rates of alcohol consumption and dependence [24]. The reason for this discrepancy is disputed with traditional researchers focusing on individual determinants and new public health geographers suggesting that the answer lies in contextual or environmental factors.

Such a review is therefore timely for four reasons. First, while recognizing that risk factors at the individual level matters,

commentators suggest that individual factors do not completely explain the reason for consumption, and that the nature of drinking contexts should be considered [25]. Secondly there is a need to identify contextual factors that facilitate alcohol consumption [2,26]. Thirdly, there is no review that has evaluated whether place effects on alcohol consumption follow the same traditional pattern as other neighborhood research, for example, food and diet. Lastly, understanding how place influences alcohol consumption may lead to better targeted environmental interventions, with better outcomes.

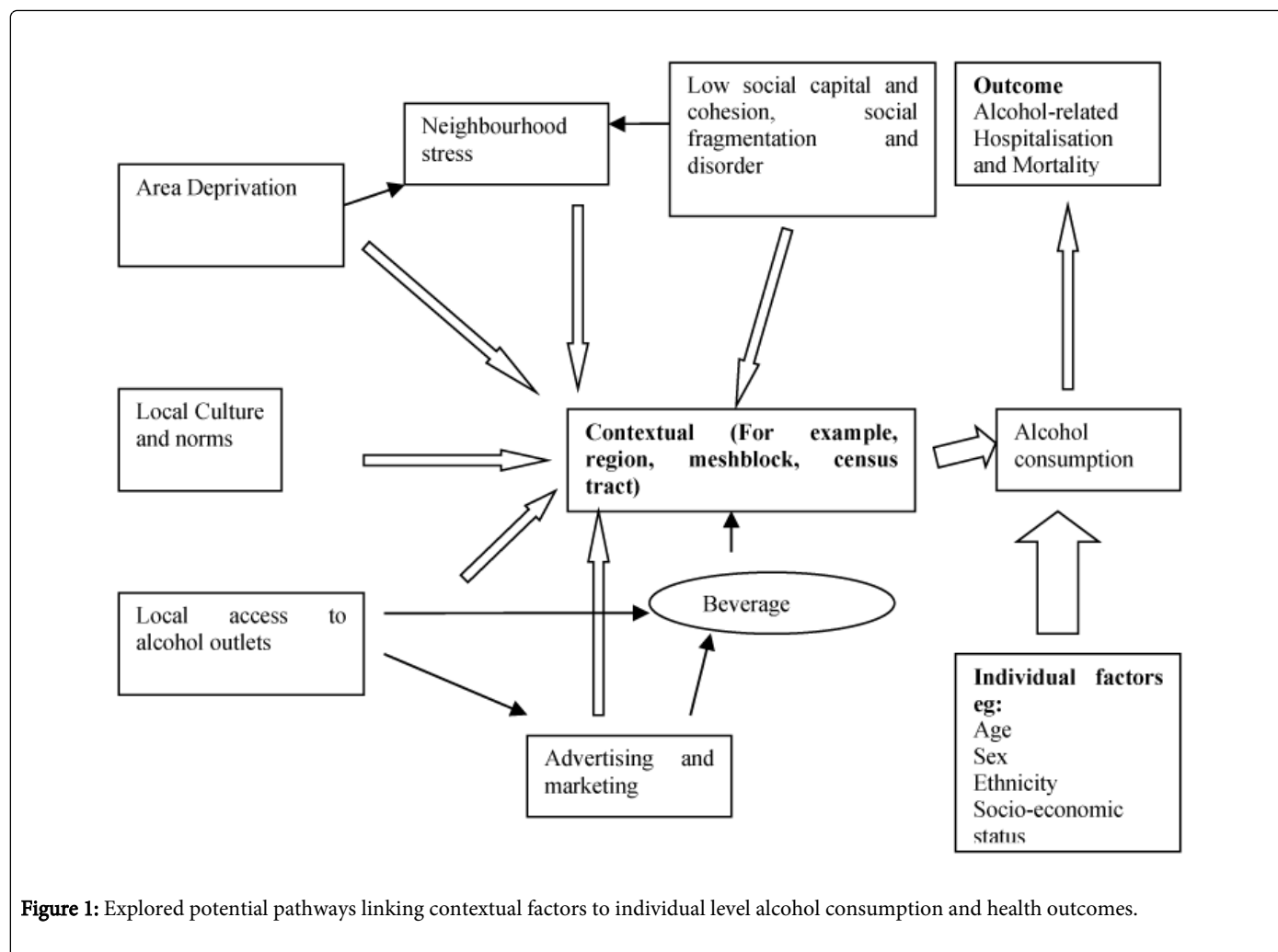
In order to establish place effects on alcohol consumption, the review begins with a discussion of selection criteria. A literature review of place effects on alcohol consumption and access is undertaken and each of the identified place features are discussed independently. The review concludes with identified gaps and recommendation for future research.

Methods

The selection criterion for the literature search was defined as any study that had examined any residential neighborhood effect on alcohol consumption. Search engines Scopus, PubMed, Web of Science and Proquest were used. The search keywords were neighborhood, alcohol, consumption, heavy episodic drinking, social environment, socio-economic status, deprivation, social capital and cohesion, social fragmentation, poverty, alcohol availability, alcohol outlets, and alcohol retail outlets. The search produced 1821 articles with 64 fitting the selection criterion. The potential pathways linking neighborhood characteristics to individual level alcohol consumption and health outcomes are outlined in Figure 1.

Results

Some of the main 'place' effects related to alcohol consumption which were identified include: area-level SES; neighborhood stress; social capital and cohesion; cultural context; retail access; and advertising. McNeil et al. suggest that those who live in areas with fewer services and resources as well as a constraining social and physical environment, tend to suffer worse health outcomes and behaviours. While the list is not conclusive, most alcohol consumption research identified has examined these broad areas as key environmental factors, despite the lack of a clear definition of the environment. All the identified contextual factors operate within a geographical location, which ranges from regions (e.g. state) to meshblock or census tract. There is an interrelation amongst the contextual factors (Figure 1). Researchers using Social cognitive theory as well as social ecological models emphasise the importance of addressing behaviour at multiple levels. For example, individuals without strong social support (social cohesion), may not have stress reduction strategies and could engage in unhealthy behaviour [28]. Neighborhood stress is a therefore a pathway linking deprivation and social capital with alcohol consumption.



Commentators have also suggested that the relationship between neighborhoods and other pathways in alcohol consumption can be understood by taking into account the broader structural dimension of the global and national political economy. The capitalist mode of economy is suggested to generate uneven development and inequalities in wealth between different geographical regions. For example, the economic restructuring of the 1980s and 1990s brought sweeping changes including liberalisation of international trade, domestic deregulation of economic processes and privatisation of key services. The result was increased inequalities between countries and within countries. These processes varied between countries as they adopted different regulation policies but they had an effect on people's economic life [29]. In Russia, following the dissolution of the Soviet Union, there was a period of political, social, economic and ideological change that resulted in increased poverty as levels of unemployment increased. Many turned to alcohol to cope and there was an increase in the demand for and supply of cheap alcohol [30]. Increasingly, national political economies have a direct effect on an area's SES.

Area level Socio-Economic Status (SES)

Traditional research into health inequalities has consistently shown that most of the deprived areas have the worst health outcomes and self-reported health status [31]. For example, in the US, Sorlie et al.

found that regardless of race, people with lower incomes have higher mortality rates than those with higher income. Gatrell and Elliot examined data from ONS and found that life expectancy varied from 75.8 in richer areas to 71.7 in poor areas in England. They further add that heart diseases and mental illness were much higher in areas that were traditionally industrial compared to areas that were prosperous. It is suggested that the effects of social deprivation on the general population may be compounded by possible health and social problems related to heavy drinking. People of lower SES are more likely to engage in unhealthy behaviours than those of higher SES and their uptake of health promoting behaviour as well as reduction in risky behaviour is less than their affluent counterparts [27]. Measures for deprivation have varied in studies and include unemployment, car ownership and income. Sometimes these are combined to form a deprivation index. Many studies have examined deprivation at different geographic levels.

There is evidence that deprivation has an independent effect on alcohol consumption. At a much smaller scale, for example, at mesh block level in New Zealand, there is a social gradient, with the population in deprived areas most at risk for alcohol consumption [34]. Differences in deprived areas are further modified by differences in age and gender. In Finland, neighborhoods with high rates of unemployment had increased risk for male (1989-1995), but not female alcohol consumption over a six year period [35]. In New

Zealand, Ayuka et al. found that hazardous alcohol consumption was prevalent amongst 15-24 year old Maori and Pacific males with better access to alcohol outlets, further emphasising that deprivation has an effect on some groups but not everyone. In the UK, the NHS reports that young people aged 16-24 who were living in the most deprived areas had a higher prevalence of hazardous alcohol consumption [37]. Moreover, the highest rates are in the North East of England in Yorkshire and Humberside where younger people are most likely to have consumed two times more alcohol than the rest of England [38]. This shows that deprived areas influence or enhance consumption compared to the affluent areas. Of further interest, 33 per cent of a sample of young adults living in deprived communities in UK did not know the definition of heavy episodic drinking, yet 39 per cent fell into this category while 15 per cent were hazardous consumers [39]. The risks maybe exacerbated by advertisements and alcohol outlets concentrated in deprived neighborhoods, encouraging young people to consume more alcohol.

In contrast to the New Zealand and English surveys, a study in the Russian Federation reported that material deprivation was not related to alcohol consumption [40]. Similar evidence from Scotland, the Netherlands and Taiwan, after controlling for a range of individual/household characteristics, reported no neighborhood SES effect on excess alcohol consumption [5,41-45]. These results were surprising since most studies find health and health behaviour to be worse in deprived areas.

Whilst alcohol consumption studies showed inconsistent results, other health behaviours have an independent association with deprivation. In New Zealand, Barnett, after controlling for a range of factors, found that smoking rates were higher in the most deprived areas. Similarly, in Britain, Duncan et al. using multilevel modelling found that neighborhood deprivation had an independent effect on individuals' smoking habits. Other health behaviour studies show an association between area SES and unhealthy diet patterns and obesity [41], and reduced physical activity levels [46]. These studies have been able to demonstrate that after controlling for a range of confounding variables, area deprivation has a significant relationship with health behaviour.

In some cases research has indicated that for alcohol, consumption is actually higher in the least deprived neighborhoods in the USA [47]. Scientific discourse suggests that the difference observed in small areas between 'place' affects and alcohol consumption arises as a result of differing definitions of alcohol consumption and methodologies used. Against this backdrop other researchers suggest that deprivation is a proxy measure for other area affects and it would be prudent to have direct measures of what are the physical and social constraints in these deprived neighborhoods in relation to alcohol consumption behaviour. However, not many studies have engaged with these contextual factors. The few that have been undertaken have suggested some pathways linking neighborhoods to alcohol consumption. These are discussed in the following section.

Neighborhood stress

People living in poor neighborhoods are more vulnerable to stress because they have fewer psychological support resources to help them cope. Heavy drinking is suggested to be a way of coping especially if alcohol is available nearby [48-50]. In the USA Linsky et al. examined 50 states and used 15 measures of stress varying from rates of divorce

to community disasters, and found that increased stress levels are associated with an increase in alcohol consumption.

There are features of a neighborhood that can increase stress such as unemployment. A high rate of unemployment increases stress because neighborhoods lack necessary social and economic resources. Such neighborhoods report an increase in violence, crime as well as poor housing conditions. People living in such neighborhoods have a perceived lack of social control and which is thought to lead to more alcohol consumption [52]. For example, in the USA, after controlling for psychosocial characteristics and life events, there is evidence that among the urban African American and Hispanic youth, perceived neighborhood stress is associated with alcohol consumption [53]. Similarly, disorganisation and lack of informal social control in neighborhoods also has an effect on adolescents in the USA [53]. Lambert et al. [54] reported that adolescents are more susceptible to heavy drinking when they are living in unsafe neighborhoods with higher rates of violence and drug use. Similar results were observed in youth aged 12-17, who were at more risk of alcohol use and dependence because of living in disorganized neighborhoods [55], possibly because they saw that norms of disorganisation were accepted and tolerated.

Another suggested cause of stress is incivility, which is common in areas of poor SES. According to Warr et al. there are two types of incivility; social and physical. Social incivility is defined as behaviours that are in contrast to widely held norms and beliefs, for example public drinking, vandalism, blatant drug use, street fights or criminality. Physical incivility includes abandoned buildings, graffiti, litter on the streets, broken windows, etc [56]. When such incivilities exist in an area they are likely to increase stress because people who live in such areas may be afraid to walk out of their house for fear of being robbed. Such residents tend to have a bad perception about their areas thus increasing stress which can lead to excess alcohol consumption. For example, in Illinois, USA people living in areas of low SES have worse health than people of affluent neighborhoods and this was influenced by perceived neighborhood disorder and fear. Stress associated with disorder was suggested to be one of the reasons for ill health [57]. As such if incivility is common in deprived areas, it may be a reason for poorer health experienced by those living in them.

As discussed earlier, being poor increases your chances of stress, depression and anxiety and is suggested to trigger a harmful biological process that could lead to mental illness, cardiovascular disease and, in some cases, suicide [51,58]. To cope, people may turn to excessive alcohol consumption. Neighborhood stress is therefore an important pathway linking features of 'place' with alcohol consumption and is associated with social deprivation, income inequality, low social capital and cohesion.

Social Capital and Cohesion

Social capital and cohesion are core social environmental factors that influence the association of socially deprived areas with hazardous health behaviours [2,59]. These influences can be positive or negative, but socially integrated societies tend to experience better health outcomes than poorly integrated ones [60]. Lack of social capital may result in higher rates of smoking [61] and alcohol consumption [62]. Questions abound as to how social capital and cohesion influence health and commentators have suggested that underlying mechanisms include 'bridging' and 'bonding' social capital. Bonding social capital is a network of members who have similar beliefs and includes diffusing

of behavioural norms to friends and members of a family [63]. Bonding social capital is therefore important for establishing and maintaining healthy norms as well as controlling deviant behaviour and protecting the vulnerable.

Researchers have suggested that the bonding construct of social capital and cohesion has an association with individual alcohol consumption through differing levels of social participation, norms and trust. The first suggestion, social participation, can contribute to an increase or decrease in consumption. Low levels of social participation result in individuals who are socially isolated, who tend to over-drink and engage in other health damaging behaviours [63]. Evidence from Taiwan shows that more males were consuming more alcohol because of social isolation [64]. Using multi-level modelling, this study found that neighborhood social participation was associated with male drinking after controlling for individual differences. The authors suggest that the structural dimension of social capital may increase opportunities for alcohol consumption by forming the social contexts that enhances drinking norms. Suffice to note that alcohol consumption was defined by frequency of consumption, with those not drinking or drinking occasionally as one group of moderate consumers. The other group consisted of those who drink often but rarely get drunk or those who get drunk as high consumers. Consumption measurements differ in various studies. Other researchers have argued that neighborhood disadvantage inhibits the specific forms of social capital and in turn places constraints on the ability of local residents to check on each other's drinking, leading to a lack of collective efficacy [65]. Individuals who are socially isolated may not be able to cope with stress and are therefore susceptible to increased alcohol consumption and other substance abuse [66]. Alcohol becomes a form of coping mechanism as it confers some relaxation [67].

Alternatively, when social participation is high there are better social networks which help in reinforcing healthy norms, social ties and offer some protection [68]. Weitzman and Kawachi [69] found that area-level social capital, measured by volunteerism, had a protective effect against heavy episodic drinking amongst college students in the USA. Berkman et al. suggest that having supportive social relationships might enforce good behaviour. Other researchers dispute this theory and suggest that a high level of social participation can actually lead to more consumption and that the effect of social capital can be both negative and positive. A study in Los Angeles, which examined 2620 adults in 65 census tracts found a high level of neighborhood support, measured using a range of variables, is associated with higher odds of heavy episodic drinking [70]. Similar results were reported in Sweden, after controlling for a range of socio-demographic characteristics, high levels of social participation and low trust led to excessive alcohol consumption among men [71]. This latter study suggested that low levels of trust were a more viable explanation for alcohol consumption. Associations between social participation and increased consumption have also been observed for smoking [72].

Whilst the research on trust was inconclusive, there is evidence that lack of trust in both informal and formal institutions is a pathway to increased consumption levels [73]. It is suggested that informal institutions, such as social groups, contribute to an increase in social capital because of stronger social ties. Such groups may gather and/or relay relevant health information quickly and reduce negative perceptions about neighborhoods [71,74] by, for example, participating in crime reduction. However, when people lack trust in these informal institutions, they may become socially isolated and

stressed and more at risk for high alcohol consumption [74]. Trust in formal institutions, such as the health care system and political institutions, is the other pathway. Evidence from Sweden shows that lack of trust in health care and political institutions are associated with an increased likelihood of illegal purchases and harmful alcohol consumption [73].

The second mechanism, 'bridging social capital', relates to individuals who are not similar in terms of their social identity and include civic non-participation or lack of trust in political institutions [63]. An example is a civil society which represents the voiceless who protests can result in a change in public policies. 'Bridging' social capital is therefore seen to provide opportunities for disadvantaged groups to access material resources through connection to socially advantaged groups. Studies have linked civic participation to moderate alcohol consumption in England [75] while those not engaging in civic participation were hazardous consumers. Different studies use different measurement, and for this research alcohol intake was directly reported by the respondents and was divided into three groups. Those not drinking at all, those drinking less than 2 units (classified as moderate consumers) or more than 2 units a day (classified as hazardous consumers). Researchers have suggested that lack of political trust, in common with socio-economic deprivation, can be linked to the economic restructuring deployed by many governments in the 1990s. This restructuring resulted in an increase in unemployment and economic upheaval, including the privatisation of services which led to the introduction of hospital charges [76]. This uncertainty took a heavy toll on social relations, hence the loss of social capital. Examples are cited of many eastern European countries [58,75-77] and especially Russia when the Soviet Union collapsed [78].

It is worth noting that communities strong in social capital are more likely to oppose the location of bars in their neighborhood and have neighborhood norms restricting excessive consumption. Neighborhoods with weaker social capital would likely see the reverse effect on alcohol outlets and consumption. Hazardous consumption, in and of itself, can also lead to lower social capital and poorer social cohesion and their consequences. With a loss of social capital and a lack of norms to regulate people's behaviour, perceptions about neighborhoods may become negative because of the low level of informal social control [22]. Individuals may adopt unhealthy behaviours such as smoking or alcohol consumption when stressed as a result of poverty or deprivation. Having supportive social relationships, on the other hand, brings the probability of reducing such behaviour [28]. Lack of strong social capital in deprived areas which have many alcohol outlets can further worsen the situation. These neighborhood variables are therefore intertwined.

Research has found it difficult to measure social capital especially since it has two distinct components. On one hand, social capital is a function of individuals and their social interactions within social networks; while on the other hand, it is a collective attribute of communities and societies [79-81]. Researchers suggest that to unpack social capital, empirical studies on health should be analysed using a multi-level modelling technique which can examine both individual and contextual level mechanisms, since both components are complementary [82]. Different studies have used varying measurements such as collective efficacy, volunteerism, reciprocity or even political participation. It is difficult to choose which of these variables is most important. Teasing out how each of the measurements is related to consumption is difficult and although Weitzman et al. [69] reported that volunteerism resulted in a

reduction in the amount of beer consumed, there was no explanation given about why this should be. One suggested explanation was that maybe the time for drinking was reduced or that strong social ties and societal norms controlled behaviour and were related to culture.

Culture

One way that 'place' influences alcohol consumption is through cultural context. This includes norms and beliefs of the society which can facilitate or inhibit health behaviour [2]. Culture can be understood as a shared way of life for particular social groups in particular places. It includes behavioural norms and ways of seeing the world. Beliefs and norms are strongly related to social capital and cohesion, and may be used to either encourage people into responsible behaviour or promote irresponsible behaviour [83]. Kawachi and Berkman [28] contend that communities that exhibit strong social capital may enforce social norms for promoting health behaviours. For example, religion is an integral part of culture, and can be used to impose sanctions. Culture is, however, dynamic and changes with time and new cultures emerge [84]. Culture can therefore be divided into two types; cultures that protect against excessive alcohol consumption and those that increase the risk of heavy alcohol consumption.

Cultures that impact on alcohol consumption either moderate or facilitate the quantity consumed. Room and Makelacite examples of Mediterranean alcohol cultures, which have been widely characterized by moderate daily consumption of wine, whereas the Nordic countries have been noted for sporadic bouts of heavy spirit consumption. Other Examples cited include Swedish alcohol culture where, while fewer people consume alcohol, there has been an increased level of heavy episodic drinking [86-87]. In the 1980s, Finnish adolescents adopted and maintained a culture of drinking to get drunk [88]. While these cultural differences are at a broad international level, there are subtle cultural differences in much smaller geographical units. Neighborhood norms about drinking and drunkenness are associated with heavy episodic drinking [85,89]. There are community contexts that encourage alcohol consumption including gatherings for ethnic food, music, traditional ceremonies and general socialisation including home parties [90,91]. In New Zealand, alcohol consumption is often associated with watching and participating in sport, particularly but not exclusively for younger people [92].

Cultures that protect against immoderate consumption include religion. Religion is an integral part of a culture, and can create norms that impose sanctions against drinking. Religion can also provide individuals with an opportunity to seek and gain social support as a coping mechanism when dealing with painful emotions and feelings [93]. Regions such as the Central and Northern Ostrobothnia in Finland, where religion is an important part of life, people are low alcohol consumers because the Laestadian religious movement does not allow the use of alcohol [94] as well as providing support for other members as a coping mechanism. Studies in the USA among college students have shown that religious affiliation reduces alcohol consumption; however, there is no consensus on the level that confers protection. Religious commitment was a better predictor of protective factors than a simple measure of religious membership. Baer et al. found that students who were committed to religion were more likely to drink less, as they were provided with opportunities for other activities rather than alcohol consumption. Additionally, religion is a communal affair and everyone is watching each other, especially their behaviour, and offering support to those who may stray. Many

mainstream churches restrain their members from consuming alcohol completely through collective social responsibility Olencko et al. found that frequent attendance at religious services was associated with reduced drinking. Furthermore, states in the USA which have a higher proportion of Catholics, have higher rates of alcohol consumption compared to states with more Protestants [97], since for Catholics, drinking is allowed and not prohibited.

In the USA, migration can be either a protective or a risk factor. There are suggestions that some ethnic groups migrate from areas of high alcohol consumption to areas of low consumption and change their drinking behaviour as a result. Others however migrate to other areas and become acculturated and adopt new, less moderate behaviours. Those living in rural areas are suggested to be moderate consumers, because of social control, which is lacking in urban areas [84]. Acculturation has a big influence on changing consumption patterns, and minority ethnic groups that adopt a liberal attitude to alcohol tend to consume more alcohol. In New Zealand, Māori and Pacific Island people's drinking culture can be attributed to their acculturation to the European Irish or Scottish culture of whisky and heavy consumption, historically adopting the culture of incoming migrants.

Migration is not necessarily across international borders, it can also be from urban to rural areas or vice versa. According to Smith and Hanham, urbanism has a positive relationship with increased alcohol consumption. Smith and Hanham argue that the highest consumption for both men and women is in urban areas with most abstainers from the rural areas. It is suggested that there are strong cultural norms in the rural areas that control hazardous consumption but such controls are generally lacking in urban areas. Culture is therefore intertwined with social cohesion as well as location (urban or rural), and other individual factors.

New emerging cultures, associated with modern lifestyles include new drinks that are mild or sweetened and are mostly targeted at women, mostly promoted by alcohol selling companies. These new trends encourage non-traditional consumers to consume more while at the same time indicating that such drinking is trendy and in keeping with the times. As mentioned earlier, these emerging cultures promote the consumption of alcohol in certain places and with their own set of 'laws', customs and values [98]. The environment where consumption occurs, including the retail outlets, is important in terms of understanding such new cultural trends.

Retail access

Table 1 shows some of the mentioned studies in retail access and whether they controlled for individual or contextual factors. Research has shown that those living in deprived areas are more likely to consume alcohol hazardously. Recently there has been increased attention on the role of access and availability, especially whether there is social gradient upon consumption and supply. Most studies globally and locally have shown that more alcohol outlets are located in deprived neighborhoods [99-100]. This, however was not the case in Glasgow [101]. Similar results are observed in USA, where areas inhabited by African American communities are particularly at risk, since most outlets are located there, different from most low income urban communities [102-104]. Such evidence raises question on the reason why alcohol outlets locate in such areas [105-120].

Study	Population-Target Group And Geographic Level	Variables Controlled For	Results
Ayuka et al. [36]	General Population at meshblock level	Controlling for individual level and socio-demographics and neighborhood deprivation	At the national level there was no evidence for an association between hazardous consumption and alcohol outlet access. However, there was evidence of associations with neighborhood retailing for younger Māori and Pacific peoples males; younger European females; middle-aged European men; and older men. The findings provide evidence that 'alcogenic' environments are associated with excessive drinking in New Zealand, albeit that the associations are restricted to particular vulnerable groups.
De Lint et al. [106] Rush et al. [107]	General Population at State level	None	Increase in number of outlets per capita was associated with an increase in consumption
Harford et al. [109]	General Population at State level	None	States with high rates of on-premise alcohol outlets tended to have higher rates of alcohol consumption
Godfrey [122]	Econometric study in England	None	An econometric study in England investigated the effect of gradual change in alcohol density on consumption using time series data from 1956 to 1980 and found that there was an association between licensing and beer consumption, but none for wine and spirits.
La Veist et al. [103]	African American Communities at census tract level	Controlling for census tract socio-economic status	More outlets located in African American neighborhoods .
Scribner et al. [111]	General population at Census tract level in New Orleans (24 census tracts)	Controlling for individual level and socio-demographics and neighborhood deprivation	Neighborhood level outlet density was significantly related to drinking norms and consumption, but not individual measures of accessibility.
Weitzman et al. [62]	University students in Public universities in different geographic regions in United states and set in different communities for example small town, urban, suburban.	None	Outlet density has been found to be closely related to heavy and frequent drinking and drinking related problems among college students' drinkers as well as in different sub groups, such as females.
Weitzman et al. [69]	University students in 140 colleges across the US, mostly first year freshers	None	Most college binge drinkers reported that they were exposed to 'wet' environment when compared to non-binge drinkers. Wet environments included social, residential, and market surroundings in which drinking is prevalent and alcohol cheap and easily accessed.
Pollack et al. [100]	General population living in four cities in California (82 census tracts)	Controlling for individual level and socio-demographics and composite SES measures	No association between distance to alcohol outlets and consumption.
Kunstche et al.	9th graders in schools in Switzerland aged between 12-18	Controlling for level of urbanization	Areas with higher density, despite having a low perception from school masters had higher drinking rates
Dent et al.	Students AGED 16-17 in 92 communities in Oregon	None	There is an association of youth drinking and commercial access
Kunstche et al.	8th and 9th graders in 254 communities in Switzerland	None	Community-level perceived availability and the density of on-premises but not off-premises outlets were related to volume drinking but not to the frequency of risky drinking occasions
Truong [110]	General Population at Census tract level in California	Controlling for individual level and socio-demographics and neighborhood deprivation	On-license outlets within a radius of one mile were associated with excessive consumption
Romley et al. [104]	Alcohol outlets within African Americans neighborhoods at census tract level	Controlling for census tract socio-economic status	Higher density of alcohol outlets in African American neighborhoods
Huckle et al. [18]	12-17 year old young drinkers in Auckland at Meshblock level	Controlling for individual level (and deprivation for some analysis).	Alcohol outlets were associated with quantity of consumption and also associated with deprivation in New Zealand
Kypri et al. [118]	Six university campuses in New Zealand	Controlling for gender, age, ethnicity and high school binge drinking frequency, and adjustment for campus-level clustering.	There was a positive relationship between outlet density and individual drinking as well as for personal problems

Scribner et al. [120]	17, 500 students in 32 colleges in the United States of America	Controlling for individual predictors of college drinking	On-Licenses located off campus have a strong association with college drinking outcomes.
Pearce et al. [99]	Alcohol outlets in New Zealand urban areas	None	Most deprived areas have disproportionately better access and higher densities of alcohol outlets, measured both by distance and buffers of 800 and 3000 metres.
Hay et al. [123]	Neighborhood deprivation and access to alcohol outlets	None	Most deprived areas have better access to alcohol outlets

Table 1: Studies on access to alcohol retails in association with alcohol consumption and variables controlled for.

Evidence from the pioneer US studies conducted in the 70's and 80's showed that consumption increases as number of alcohol outlets increased [106,107]. Similarly, at state level, states with higher rates of on-license alcohol outlets tended to have increased rates of consumption when compared to other states with lower rates of on-licenses [108,109]. These studies however were criticized for examining wider geographical areas, not controlling for confounders such as socio-economic factors.

More recently, to analyse both population surveys with aggregate community level data, studies have begun using a combination of Geographic Information System (GIS), multi-level modelling and other regression techniques. Interestingly, such studies have produced inconsistent results. For example, while on one hand a study in California found that, after controlling for individual and neighborhood socio-demographics, on-license outlets within a radius of one mile were associated with excessive consumption [110]. On the other hand, Pollack et al. found that better access to outlets in 82 deprived neighborhoods in California did not result in excessive alcohol consumption. Pollack et al. used measures of distance to outlets and suggested that higher consumption may actually be in the least deprived areas. Pollack et al. calculated proximity to alcohol outlets and classified distances as either far or close. Another measure used was density of alcohol outlets generally and also within a buffer of 0.5 miles, classified as high or low density. Ayuka et al. using logistic regression, also found that there was no association with hazardous consumption at the national level, however the relationship was confined to certain socio-demographics. Pollack et al. found that higher consumption may actually be in the least deprived areas. These studies emphasised the difficulty of measuring 'place effects' accurately. In one study, having outlets closer may increase consumption while for the other the opposite was true. Other studies have used measures of density to alcohol outlets and found that in 24 New Orleans census tracts, neighborhood level outlet density has an association with consumption, probably because those living closer to alcohol outlets have drinking norms that encourage excessive consumption [111].

While the above studies focused on the general population, research on adolescents and university students has produced fairly consistent results showing that that increased availability increases the risk of alcohol consumption. For example, In New Zealand, alcohol availability, measured by density of alcohol outlets at the meshblock level, is associated with the quantity of teenage consumption [112]. Huckle et al. used driving distance of 10 minutes and delineated neighborhoods within that range. Similar results were found in Switzerland, where perceived availability and on-premises density was associated with volume of increased drinking [114]. Internationally, research on college and university students in different parts of the

world found that the presence of outlets was associated with heavy episodic drinking [62,115-120].

There are other studies that have undertaken natural experiments and time series while examining changes in availability in relation to consumption patterns. Most natural experiments examined changes brought about by introducing beer and wine into supermarkets and location of a new store where there was none. For example, in Finland and Norway, there were contrasting results when a natural experiment was undertaken with heavy alcohol consumption noted in Finland when new outlets were opened. This however was not the case for Norway [121]. In England meanwhile, there were increase beer consumption with opening of new outlets but not for wine and spirits [122].

The studies reported above show that the effect of retail access on hazardous consumption is mixed; however, there are limitations to these studies. Questions are raised whether the differences observed between access patterns, availability and consumption are because of the distance measures used or the population surveyed. For example, a study in California [100] examined the general population and used geometric centroids to calculate the distance to alcohol outlets, while in a study of adolescents in New Zealand [112] used population centroids. Geometric centroids calculate distances from the middle of a census tract or meshblock while population centroids calculate distances from where the population are concentrated. In addition, Huckle et al., study was conducted in Auckland amongst a small sample of adolescents and also and whether such results could be replicated in another city is a matter of conjecture. Other criticisms include studies not controlling for enough individual and contextual variables to validate their results, as well as using different definition of hazardous and/or moderate consumption.

Hay et al. and Pearce et al. recommend the use of population weighted centroids to calculate proximity to alcohol outlets since both of their studies found that access was better in deprived neighborhoods. Hay et al. and Pearce et al. recommendation on use Population Weighted Centroid was adopted by Ayuka et al., Huckle et al. used driving distance within 10 minutes and delineated 'realistic' neighborhoods, since most young people reported a travel time of 10 minutes to obtain alcohol. One benefit of this method is adjusting for speed limits which are different in rural and urban areas (113-131). These New Zealand studies highlighted different ways of calculating access.

Advertising and cost are suggested to be the mediating factors in the link between alcohol outlets and consumption. Since most outlets are concentrated in deprived areas, there is stiff competition and outlets need to create a demand to have a niche in the market. There are aggressive marketing strategies including dropping alcohol prices, [16] as well increasing promotions and advertisements. Promotions can

include 'buy one get one free' or competitions where alcohol is won [125]. There is a need to examine whether access to alcohol outlets with advertising and cost as a mediating factor in low income areas results in an increase in consumption.

Advertising

Advertisement and marketing have been used over a long period of time to attract more people to engage in smoking, alcohol consumption and even the uptake of fast food. It is suggested that advertising may be one explanation for the patterns of alcohol consumption in deprived areas. The main targets for advertising are people living in deprived areas, as well as non-traditional consumers such as adolescents and women. There is evidence that disproportionately higher levels of advertising occur in deprived neighborhoods where there are more alcohol outlets. African-American and Hispanic neighborhoods have proportionally more billboards advertising alcohol than do white or Asian neighborhoods [126], essentially encouraging the low income communities to purchase alcohol. Similar results were observed by a longitudinal study which examined alcohol advertising around schools. There were 931 alcohol advertisements within 1500 metres of 63 schools [127], presumably in low income neighborhoods.

Apart from concentrating on low income neighborhoods, most advertising also portray their brand/type of drinks as the best and the cheapest in the market. They frequently encourage promotions like 'happy hour' where drinks are relatively cheap. To make people identify with the advertisements, the marketing strategies use modern, 'eye catching', and relevant themes to attract more consumers. Some of themes may have gender connotations, or denote camaraderie, conformity, 'masculinity', 'femininity', recreation and friendship [128]. A qualitative study in New Zealand found that alcohol advertising and marketing strongly influenced alcohol consumption for young people aged 14-17 years [128]. These advertisements shaped the beliefs, attitudes and behaviours of the target group [125,129-131].

While advertising is linked to consumption, measurement is often difficult because advertisements keep changing and sometimes people do not remember them. Advertising tends to use colloquial terms that resonate well with the young people, especially females, and thus encourages consumption. There are suggestions that advertisements, especially of alcopops, a mixture of soft drink and spirits, is a major factor in the steep rise in young women's alcohol consumption [12]. In addition, because of lack of social cohesion in most deprived and African American neighborhoods, most advertisements are located in these areas, further exacerbating the health behaviours [126].

Discussion

Six key findings emerge from this review.

First, the issue of scale is important because the effect of contextual factors is evident at different geographical scales ranging from regional to local. Secondly, similar to other health inequality research, there is a social and spatial patterning of alcohol consumption which cannot be wholly explained by individual factors. Features of 'place' are important in explaining some of the observed differences.

Thirdly, there is evidence that social capital and cohesion are associated with both positive and negative influences on alcohol consumption. Positive influences are protective against developing

immoderate alcohol consumption when social participation is higher or there is trust in both informal and formal institutions. The strongest of the effects occurred among homogenous groups such as university students, and it has been questioned whether such influences can be extrapolated to the general community.

Fourthly, cultural context determines how, where and what one drinks. Cultures that tolerate consumption are seen to contribute to excessive consumption. Examples are cited of different drinking cultures, such as Finish culture which has strongly encouraged adolescents' consumption. Other features of culture, such as religion, are found to be a deterrent to consumption through the imposition of sanctions and norms and the provision of social support.

Fifthly, an examination of the access to and density of alcohol outlets showed a consistent social gradient with more outlets and greater access in most deprived and African American neighborhoods. The evidence regarding the effect of outlet density and access upon consumption was inconsistent. Studies that examined homogenous groups such as university students and adolescents produced consistent results that easy availability resulted in more consumption. However, the studies on the general population showed inconsistent results with one possible explanation being the use of different techniques and methodologies, as well as different definitions and measurement of alcohol consumption patterns.

Sixth, advertising, marketing and pricing are found to be important facilitators for alcohol consumption since they are mostly targeting the aspirations and interests of those living in areas of high deprivation and high outlet density.

However, it is worth noting that some of these studies did not meet the criteria stated 100%, one limitation for this paper, and were mostly used as supporting evidence for the studies that met the criteria.

Summary

The contextual review has explored existing evidence of how 'place' features might contribute to alcohol consumption after controlling for the socio-demographic characteristics of individual. Considering that individual factors remain important, alcohol consumption behaviour cannot be fully understood unless examined within the broader social and economic context. Such social processes include stress, availability of alcohol outlets culture, deprivation and social capital and cohesion. Much remains to be done if interventions targeting alcohol consumption are to be effective. There is a need to improve our understanding of the features of places that influence alcohol consumption and the mechanisms that link these features to individual health. Evaluating and understanding these mechanisms, through experimental studies offers an opportunity for better targeted interventions in the future [105]. More research will eventually improve our understanding of alcohol consumption and subsequent health outcomes, and in the process aid in the development of a theory underpinning 'place' studies.

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