ALCOHOL RESEARCH UK

Understanding the alcohol harm paradox

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Key findings

- There is good evidence that people with low individual or neighbourhood socioeconomic status (SES) show a greater susceptibility to the harmful effects of alcohol, but a lack of evidence means that it is not possible to conclude what mechanisms and pathways might underlie this difference in risk.
- Lower SES is associated with an almost two fold greater risk of alcohol related death compared with individuals in higher SES classifications.
- Relative to high SES, low SES is associated with an increased risk of head and neck cancers, strokes, hypertension, liver disease and pre-term birth. These findings are independent of a number of other known risk factors for these conditions such as diet and smoking.
- Although people in different SES groups do not differ in the unit amount and frequency of alcohol drunk across the week, there are important differences in 'binge drinking', beverage choice, and patterns of heavy drinking.
- There is underreporting of alcohol use in general population surveys of alcohol use, and this differs by alcohol risk rather than SES.
- The use of alternative survey methodologies captures a greater amount of population alcohol use. This also leads to more people being classified as at increasing and higher risk from their alcohol use.

Research team

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Background

Policy makers, health and social care professionals, and researchers have long been interested and concerned about the apparent relationship between health and socioeconomic status (SES). Previous research has shown a gradient in the risks of ill health by SES such that those with low personal or neighbourhood SES are much more likely to die or suffer from a range of diseases, including those related to alcohol (e.g. Makela et al., 1999). For example, males and females in the most socioeconomically deprived neighbourhoods of the UK have been estimated to be two to three times as likely to die from an alcohol-related condition than their counterparts living in the least deprived (Deacon et al., 2011). However, analysis of alcohol use behaviours suggests that there is little difference in consumption between these types of areas.

We have termed the observation that deprived populations that apparently consume the same or less alcohol than more affluent populations suffer far greater levels of harm the alcohol harm paradox. A number of explanations are hypothesised as to why this might occur, including:

1. Under-reporting or inaccurate reporting of alcohol use in low SES groups, or by heavy drinkers in low SES groups, compared to less deprived groups.
2. Differences in drinking patterns between SES groups, rather than differences in intake (e.g. 'bingeing' and heavy episodic use; drink-type preference).
3. Compounding due to clustering of unhealthy behaviours and associated risk factors in more deprived neighbourhoods.
4. Differential access to, and quality of, health services and other neighbourhood resources such as alcohol outlets.
5. A poverty gradient through which unhealthy heavy drinkers move into poverty through loss of employment.
6. Psychosocial distress arising from living in a deprived area, leading to 'self-medication' with alcohol.

This research explored some of these explanations in order to determine whether the alcohol harm paradox was robust, and to try and understand how it arises.

Methods

The research proceeded through a number of interlinked activities:

1. Literature reviews: Firstly, we undertook a systematic reviews and meta-analysis of evidence in order to examine the relationship between SES factors and alcohol-related harm. Review questions focused on i) alcohol related disease; ii) alcohol related mortality and morbidity. We then reviewed relevant evidence in order to try and develop Alcohol Attributable Fractions (AAF; the proportion of a disease or injury that could be prevented if exposure to alcohol was eliminated) for specific drinking patterns and SES.
2. Secondary analysis of existing data: After reviewing a number of existing population surveys we chose to reanalyse the 2008-2010 General Lifestyle Survey (GLF) in order to explore the relationship between i) drinking behaviours, individual SES, and neighbourhood SES; ii) heavy drinking, individual SES, and neighbourhood SES; iii) beverage preference, individual SES and neighbourhood SES; and iv) drinking behaviour, self-rated health, health service use, and neighbourhood deprivation.
3. Development of a new method to assess self-reported alcohol use in general population surveys: As existing methods of collecting self-reported data on alcohol use (including the GLF) are known to produce underestimates, we developed a new questionnaire that in addition to including quantity and frequency questions common to household surveys such as the GLF (which we termed our 'typical estimate' of alcohol use), also included questions about special occasions such as birthdays or the Christmas period, and occasions where the respondent might have drunk more or less than usual (which we termed our 'combined estimate'). We subsequently undertook a telephone survey of the English adult population. Data was obtained from 6833 individuals (64.5% female, mean age 56.8 ± 17.2 (range 16-97)) and was weighted to ensure it was nationally representative. By comparing estimates of typical and combined alcohol use we were able to determine whether underreporting was related to SES and other factors. The survey was also repeated via individual administration in student (n=508,

56.7% female, mean age 21.3 ± 4.6) and hostel service user (n =200, 68.5% male, mean age 35.7 ± 12.6) samples in order to better understand the utility of the new methodology for determining alcohol use in sub-groups typically under-represented in household surveys.

Findings

Our systematic literature review showed differing relationships between a range of alcohol-attributable conditions and socioeconomic indicators. A key consideration of the review was the small number of published studies available that had explored the interaction between alcohol-attributable disease, socioeconomic status, and alcohol use. However, it was possible to conclude that low, relative to high socioeconomic status, was associated with an increased risk of head and neck cancers, strokes, hypertension, and in individual studies, with liver disease and preterm birth. Conversely, risk of female breast cancer tended to be associated with higher socioeconomic status. These findings remained after controlling for a number of known risk factors for these diseases and other potential confounding factors. In studies that controlled for alcohol use, addition of this variable to the statistical models explained a substantial proportion of the difference in risk between high and low SES groups for stroke risk, preterm birth, and in combination with smoking, head and neck cancer risk. This suggested that for these conditions at least, alcohol use was an important contributory factor in the association between SES and disease.

Our meta-analysis examined the association between SES, alcohol related deaths and hospital admissions. We found that when SES was determined on the basis of occupation or education, individuals of lower SES were almost twice as likely to experience alcohol related death or hospitalisation. Examining men and women separately, compared to those of higher SES classification, men in lower SES classifications were also almost twice as likely to experience alcohol-related death or hospitalisation as women.

Unfortunately, due to a scarcity of published evidence it was not possible to estimate SES-specific Alcohol Attributable Fractions (AAFs). This would have allowed a better understanding of whether the alcohol harm paradox was partly due to differences in AAF coefficients between SES groups. In other words, whether, for a particular condition (e.g. hypertensive disease) partly attributable to alcohol use, the proportion of the disease or injury that could be prevented if exposure to alcohol was eliminated is different between SES groups. This would have helped in understanding the impact of interventions and policy options that aim to reduce health inequalities caused by alcohol.

Secondary analysis of the GLF suggested that lower neighbourhood SES (measured using index of multiple deprivation (IMD) of residence) did not appear to be associated with weekly alcohol consumption frequency and level of risk in men. Women residing in more deprived neighbourhoods were more likely to be classed as lower risk drinkers (i.e. men who drink ≤ 21 units, and women ≤ 14 per week), and less likely to be frequent drinkers (e.g. drinking on 5 days a week). However, once individual level SES (i.e. education, occupation, income, employment status, housing tenure) was controlled for, this relationship no longer remained, suggesting that neighbourhood factors were important, but only for some types of women. Examining individual level SES, lower incomes and education were associated with fewer alcohol drinking days in both men and women.

In contrast to the findings for weekly alcohol use, individual level SES was associated with an increased risk of 'binge' drinking (defined as males who consumed > 8 units, and females who consumed >6 units on at least one day a week), and this was more likely to occur in those who reported lower levels of education (not having a degree or diploma in both men and women), and who were either social (men and women)

or private housing renters (women only), compared to house owners. Furthermore, living in the most deprived neighbourhoods was associated with an increased likelihood of being a regular 'binge drinker' in both men and women, and this finding was independent of individual SES level factors.

The next stage of the analysis looked at patterns of heavy drinking only. Individual level SES was associated with the highest levels of heavy weekly alcohol consumption (>75 units in men; > 50 units in women). Our analysis suggested that this was related to level of education, rather than social class, income, or housing tenure. Regarding neighbourhood level deprivation, although we initially identified an association between the highest level of deprivation and the heaviest use of alcohol in men, this was not independent of individual level SES.

We also looked at the relationship between beverage choice and deprivation. This was because previous studies have suggested that the risk of adverse drinking outcomes such as liver cirrhosis might be associated with use of particular types of drink (e.g. spirits). In men, beer or cider was the preferred drink, whilst in women it was wine. Men and women with a preferred drink type of normal strength beer or cider were significantly more likely to report low individual SES, or reside in a deprived area. Men and women who preferred wine tended to be less deprived. The likelihood of being a regular binge drinker was significantly higher among participants with a primary drink type of normal beer or cider compared with wine drinkers. This association was consistent across different age groups, i.e. bingeing on beer or cider was not exclusively a youthful practice. In contrast, wine drinkers were much more likely to exceed recommended weekly unit intake guidelines than beer and cider drinkers. Finally, we only found an association between drinking spirits and bingeing in 45-54 year old men; younger female spirit drinkers were much less likely to report bingeing compared to drinkers of other types of beverage.

In the final analysis of the GLF we examined the association between neighbourhood level deprivation, self-rated health, recent health service use and relationships with alcohol use. We failed to identify any consistent patterns in the data that were independent of individual level factors such as marital status, or individual SES indicators. However, amongst lower risk drinkers, we did find a robust association between increased neighbourhood deprivation and poorer self-reported health in men. Unfortunately the data could not tell us whether these men had always been lower risk drinkers, or whether ill health (related to alcohol consumption) had led to a reduction in alcohol use. In women, female alcohol abstainers who were living in the most deprived quintile were the most likely to self-report bad or very bad health after controlling for other variables.

Finally, our alternative telephone survey methodology captured 25.1% additional alcohol units, which, if applied nationally would lead to a higher proportion of the population being classified in increasing (16.6% > 21.7% for men; 13.3% > 18.7% for women) and higher risk (5.9% > 8.9%; 2.6% > 4.9%) drinking categories, with a corresponding decrease in the proportion of lower risk drinkers (77.5% > 69.4%; 84.1% > 76.3%). Women typically underestimated drinking to a greater extent across all three drinking risk categories. Whilst there was no difference in underreporting on the basis of SES, those classed as being at higher risk underreported to a greater extent than lower and increasing alcohol risk groups. In keeping with secondary analysis of the GLF we found a robust association between self-reported health/health service use, and alcohol use risk, but not SES. Of importance to future research, we were able to successfully use this revised methodology in student and hostel service user samples.

Implications

Overall, this research supports the hypothesis that the alcohol harm reduction paradox is genuine and is not a result of methodological biases. Precise mechanisms remain to be determined, although the research identified useful further avenues of investigation. Our systematic reviews showed there is good evidence to conclude low individual and neighbourhood SES (relative to less deprived SES) is related to a range of alcohol related health outcomes and alcohol related mortality. Analysis of high quality survey data (for England and Great Britain as a whole) suggested that there are differences between SES groups in patterns of alcohol use, but these are unrelated to self-reported health quality and use of health services. It is therefore important to conduct further data linkage activities to examine the relationship between patterns of alcohol use reported in surveys with records held in individual and neighbourhood data sets, such as Hospital Episode Statistics, NHS Health Check Data, and neighbourhood level alcohol profiles (e.g. local alcohol profiles for England; LAPE).

It is therefore not yet possible to recommend interventions targeted at specific mediators of the paradox. In the absence of such evidence, population level policies such as alcohol Minimum Unit Pricing, which have been shown to target hazardous and harmful drinkers in lower socio economic groups without financially penalising moderate drinkers may be beneficial (Holmes et al., 2015). Whilst public health licensing objectives have been introduced in Scotland, work is still underway to ensure local data systems are able to respond to licensing applications and monitoring of existing licences in a useful manner (Gillan et al., 2014). It is recommended that once evidence systems are sufficiently robust, health objectives are included in licensing decisions in the rest of the UK.

Conclusions and Final Remarks

Our systematic literature reviews, and review of other cohort and case controlled studies show that differences in alcohol use explains some, but not all of, the variation in disease risk between high and low SES groups. Although our methodology was robust, and literature review comprehensive, one of the main limitations was the lack of data to conduct a meta-analysis in order to fully explore the interaction between patterns of alcohol use and SES in the risk for alcohol-attributable disease. We were therefore unable to estimate the overall size of the association between SES, alcohol consumption, and alcohol-attributable disease risk.

A lack of data prevented us from calculating SES-specific AAFs. Most of the existing literature identified only presented information on alcohol prevalence rather than weekly consumption data, and therefore would have led to an underestimate of alcohol attributable deaths (Jones et al., 2014). To derive SES-specific relative risks for alcohol-attributable conditions, systematic data on how the impact of proximate risk factors differs by SES is required. Individual patient data (IPD) meta-analysis is one approach that might address this as it is based on original 'raw' research data (Stewart et al., 2002). However, IPD meta-analyses are large collaborative projects and are more time consuming and costly than traditional approaches to meta-analysis, and it is uncertain whether the academic data infrastructure currently exists for secure data sharing.

In addition to individual level factors, our reviews identified the potential role for systemic and structural determinants of health and risk such as gross national income and quality of life; access to universal healthcare and treatment processes; social networks and norms; environmental stress and neighbour/community institutions and resources. All these areas require further investigation. For example, previous

work from our group (Xhang et al., 2013) suggested that geographically relative deprivation was important in understanding health risks; areas that were deprived compared to their geographic neighbours tended to report higher rates of poor health and life limiting long term illnesses, even after controlling for the absolute deprivation of the area itself.

As highlighted by our systematic reviews there was inconsistency between studies in definitions of SES and the indicators used to measure it. In our cross sectional survey analyses we included a number of both individual and neighbourhood indicators of SES, but other authors have argued that the relative importance of these indicators with respect to alcohol harms may change across the life course and that it is also important to consider social mobility, as persistent deprivation may be associated with greater adverse health outcomes than acute experiences (Caldwell et al., 2008). Alternative conceptualisations of SES such as human and social capital may also be useful to consider in this regard (e.g. Rocco et al., 2012).

The majority of previous studies have focused on the health effects of alcohol and alcohol related mortality, but there is also a need to quantify the social and secondary harms of alcohol consumption to the self and others, including interpersonal problems with family, finances and work, and involvement in public disorder and violence (Babor et al., 2010). Whilst alcohol use is related to many social outcomes, the evidence available to establish causal relationships is scarce, and few studies have examined if there is a differential relationship between SES and these types of harm as there is with health. This is particularly important with regards to the development, monitoring, and communication of alcohol policy and licensing objectives, which include strong public order themes (Hadfield, 2007; Nicholls, 2012).

Further longitudinal studies and secondary analysis are required to examine whether a poverty gradient exists. For the purposes of the current study we examined data from three consecutive years of the GLF, but this is an insufficient time period in which to understand the impact of loss of employment, or sustained periods of under- and unemployment. Furthermore, data is emerging that the global economic recession, which began in 2007/08, and is still affecting many countries, led to changes in alcohol consumption and broader health outcomes. Analysis from the USA suggests that the recession was associated with an increase in alcohol abstention but also a rise in frequent binge drinking in those that drank (Bor et al., 2013). In certain demographic subgroups, experiences of job or housing loss, or a change in economic prosperity, was associated with an increase in negative alcohol-related outcomes (Mulia et al., 2014). Similarly, recent work conducted in the UK (Harhay et al., 2014) specifically examining the impact of the recession on white adults (using the Health Survey for England) found that although population levels of alcohol use decreased, and lower income was associated with lower risk of binge drinking, unemployed drinkers were significantly more likely to binge drink after the onset of the recession, indicating important individual level SES effects.

Further Information

Please contact Harry Sumnall at the Centre for Public Health for further information on this work.

References

Babor TF, Caetano R, Casswell S, Edwards G, Giesbrecht N, Graham K, Grube J, Gruenewald P, Hill L, Holder H, Homel R, Livingston M, Österberg E, Rehm J, Room R, Rossow I (2010) Alcohol: no ordinary commodity. Research and public policy. Oxford University Press: New York.

Bor J, Basu S, Coutts A, McKee M, Stuckler D (2013) Alcohol use during the great recession of 2008-2009. Alcohol and Alcoholism 43:343-348.

Caldwell TM, Rodgers B, Clark C, Jefferis BJMH, Stansfeld SA, Power C (2008) Lifecourse socioeconomic predictors of midlife drinking patterns, problems and abstention: Findings from the 1958 British Birth Cohort Study. Drug and Alcohol Dependence 95:269–278.

Deacon L, Morleo M, Hannon KL, Cook PA, Tocque K, Perkins C, Bellis MA (2011) Alcohol consumption: segmentation series report 2. North West Public Health Observatory, Liverpool John Moores University: Liverpool.

Gillan E, Mahon L, MacNaughton P, Bowie L, Nicholls J (2014) Using licensing to protect public health: from evidence to practice. Alcohol Research UK: London.

Hadfield P (2007) A hard act to follow: assessing the consequences of licensing reform in England and Wales. Addiction 102:177-180.

Harhay MO, Bor J, Basu S, McKee M, Mindell JS, Shelton NS, Stuckler D (2014) Differential impact of the economic recession on alcohol use among white British adults, 2004-2010. European Journal of Public Health 24:410-415.

Holmes J, Meng Y, Meier PS, Brennan A, Angus C, Campbell-Burton A, Guo Y, Hill-McManus D, Purshouse RC (2015) Effects of minimum unit pricing for alcohol on different income and socioeconomic groups: a modelling study. The Lancet 383:1655-1664.

Jones L, Bellis MA (2014) Updating England-Specific Alcohol-Attributable Fractions. Centre for Public Health, Faculty of Education, Health & Community, Liverpool John Moores University: Liverpool.

Makela P (1999) Alcohol-related mortality as a function of socioeconomic status. Addiction 94:867–886.

Mulia N, Zenmore SE, Murphy R, Liu H, Catalano R (2014) Economic loss and alcohol consumption and problems during the 2008 to 2009 U.S. recession. Alcoholism: Clinical and Experimental Research 38:1023-1034.

Nicholls J (2012) Time for reform? Alcohol policy and cultural change in England since 2000. British Politics 7:250-271.

Rocco L, Suhrcke M (2012) Is social capital good for health? A European perspective. WHO Regional Office for Europe: Copenhagen.

Stewart LA, Tierney JF (2002) To IPD or not to IPD? Advantages and disadvantages of systematic reviews using individual patient data. Evaluation and the Health Professions 25:76-97.

Xhang Z, Cook PA, Lisboa PJ, Jarman IH, Bellis MA (2013) The effects of deprivation and relative deprivation on self-reported morbidity in England: an area-level ecological study. International Journal of Health Geographics 12.

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