Why do poor people have more alcohol related deaths than rich people?

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Discuss whether it is true that higher socioeconomic class is associated with higher alcohol intake but with less alcohol-related health harm than lower socioeconomic class and possible reasons for this.

MCA Legacy Essay Competition

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Introduction

Alcohol affects all of us. Whether through consumption ourselves or through contact with others, alcohol is widely ingrained in our society. However, studies have shown internationally that its effects are not felt equally throughout society and lower socioeconomic communities are more vulnerable even with similar or lower consumptions. Various hypotheses exist as to why this may be the case, however the reason behind this trend is unlikely to be simple or singular.

In this essay I will look to describe the well-established effects of alcohol and demonstrate the imbalance in different socioeconomic groups. I will discuss what I consider to be the main possible reasons behind this trend including variance in drinking patterns, the role of other life style factors, differences in healthcare and the social context of the individual. I will conclude with a discussion including commenting on the future implications of the existence of such a trend.

Alcohol

Alcohol plays a part in many of our lives. Ethanol, the alcohol in alcoholic beverages, is defined as "*a colourless, volatile, flammable liquid, which is produced by the natural fermentation of sugars and is the intoxicating constituent of wine, beer, spirits, and other drinks*" (1). Once consumed, approximately 20% is absorbed into the bloodstream through the stomach with 80% absorbed through the small intestine (2,3). In the bloodstream, the alcohol is free to circulate to the rest of the body including the liver, heart, brain and the nervous system (4). Its resulting effects can be categorised into short and long term.

Alcohol is classed as a sedative meaning it has a depressant effect on the central nervous system (2). In small amounts, alcohol may cause mild euphoria, relaxation and increased self-confidence (2). In general, these are the desired effects of drinking alcohol. However, alcohol is a psychoactive drug and in moderate doses can cause various disturbances such as becoming emotionally irrational, decreased reactions and a loss of sensory motor skills (2). At high doses, alcohol may cause anaesthesia leading to stupor, respiratory depression and eventually coma or death (2).

As a psychoactive drug, alcohol has dependence producing properties which can lead to chronic alcohol abuse. It is widely established that regular, excessive drinking can have catastrophic long-term effects on the body including the liver, cardiovascular system and the central nervous system (2). The World Health Organisation (WHO) has reported that alcohol abuse is a component cause of over 200 types of diseases and injuries (5).

As well as damage to the individual, alcohol can cause significant harm to others (6). This includes physical harm (drink driving) as well as social harm (crime, family adversities and economic costs). A paper published on behalf of the Independent Scientific Committee on Drugs found that alcohol had significantly more harmful effects when compared to other illicit drugs (6).

WHO published a report in 2014 showing that harmful alcohol use was responsible for 3.3 million deaths each year, accounting for 5.9% of deaths worldwide (5). Alcohol

abuse and its related mortality remains a global issue and a significant burden to healthcare institutions globally.

Patterns of consumption

Alcohol consumption in the UK has increased since the Second World War, doubling between the mid-1950s and the late 1990s (7). It reached its peak in 2004 (11.5 litres per capita for those aged 15+) and has since fallen slightly (7). There has also been an increase in the proportion of alcohol purchased through off-licenses rather than in licensed places such as pubs or bars (7).

Over the years, much research has been undertaken into the relationship between socioeconomic status and alcohol. In general, the literature has identified a paradoxical relationship between consumption and related mortality.

It has been widely reported that a low socioeconomic status is associated with lower or similar alcohol consumption compared to a high socioeconomic status (8-11). A recent publication showed that this difference was stable through the ages 23-42 years and that abstinence was greatest in the lowest educational levels (12). This suggests that those of lower socioeconomic status consume less alcohol and would therefore be less inclined to experience alcohol related problems.

However, paradoxically it has been shown that the levels of alcohol mortality and morbidity are significantly higher in populations with low socioeconomic statuses (8,9,13,14). One study that compared alcohol related mortality to occupational classification showed that there was an inverse class gradient to alcohol-related mortality (14). The results of this study can be seen in Figure 1 in which the greatest alcohol-related mortality was seen in the unskilled manual class (14).

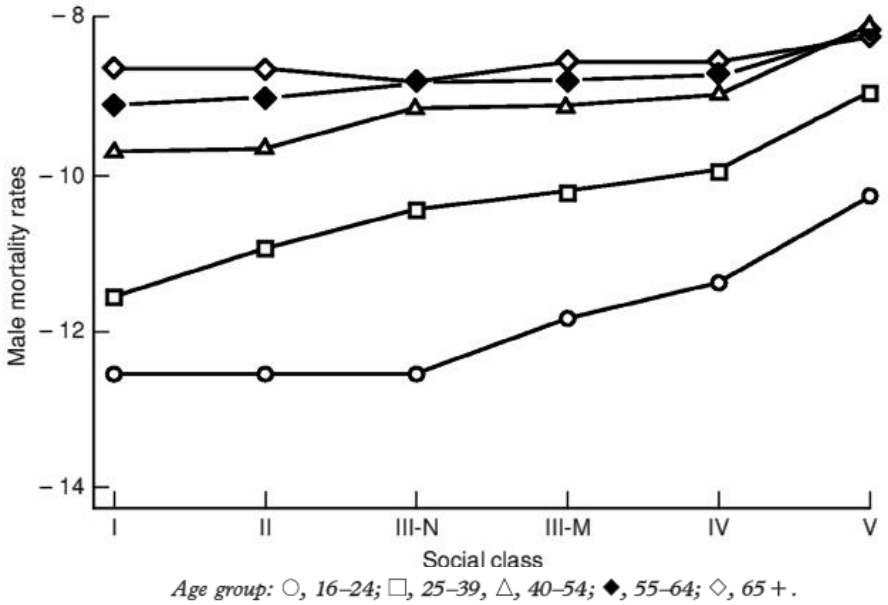

Figure 1: *Logarithms of male mortality rates against social class (I= professional; II= intermediate; III-N =skilled non-manual; III-M= skilled manual; IV= partly skilled; V= unskilled manual)* (14).

Further research compared the annual alcohol-related mortality rates in England and Wales with measures of socioeconomic deprivation (8). They stratified the population by quintile with 1 being the least deprived and 5 being the most deprived (8). As evidenced by Figure 2, alcohol related mortality was greatest in those most deprived for both sexes (8). Figure 3 from a similar study using information from the Scottish government shows an increase in alcohol-related deaths with increasing levels of deprivation (15). A recent meta-analysis published in 2015 was able to show a positive association between low socioeconomic status and alcohol-attributable conditions including head and neck cancer, stroke, hypertension and liver disease (11).

It appears that there is a disproportionate effect of alcohol consumption affecting populations of low socioeconomic status as research is able to consistently show that given similar or lower levels of consumption, they experience greater alcohol-related consequences. This makes these alcohol-related deaths unusual, as normally there is a positive relationship between exposure and consequence. In this essay I have tried to establish what reasons may contribute to this alcohol harm paradox.

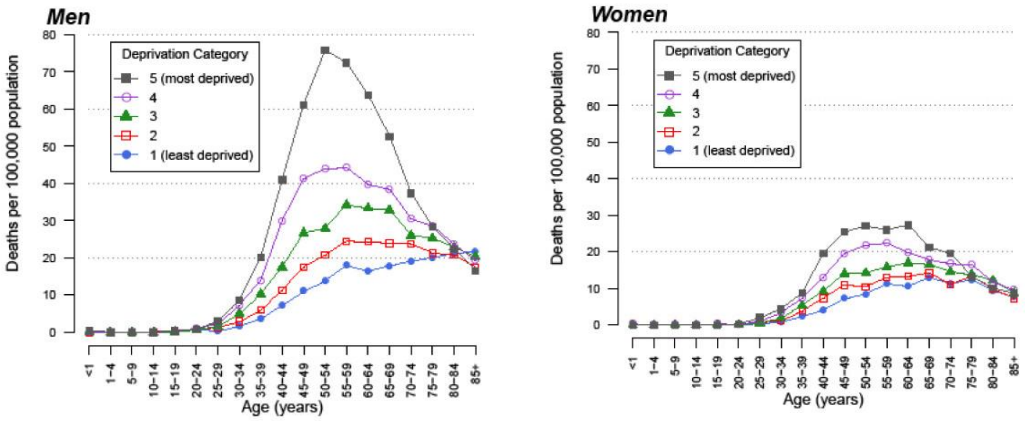

Figure 2: *Annual alcohol-related mortality rates in England and Wales based on deaths from 1999-2003 by sex, age and socioeconomic deprivation quintile (1 = least deprived, 5 = most deprived)* (8)

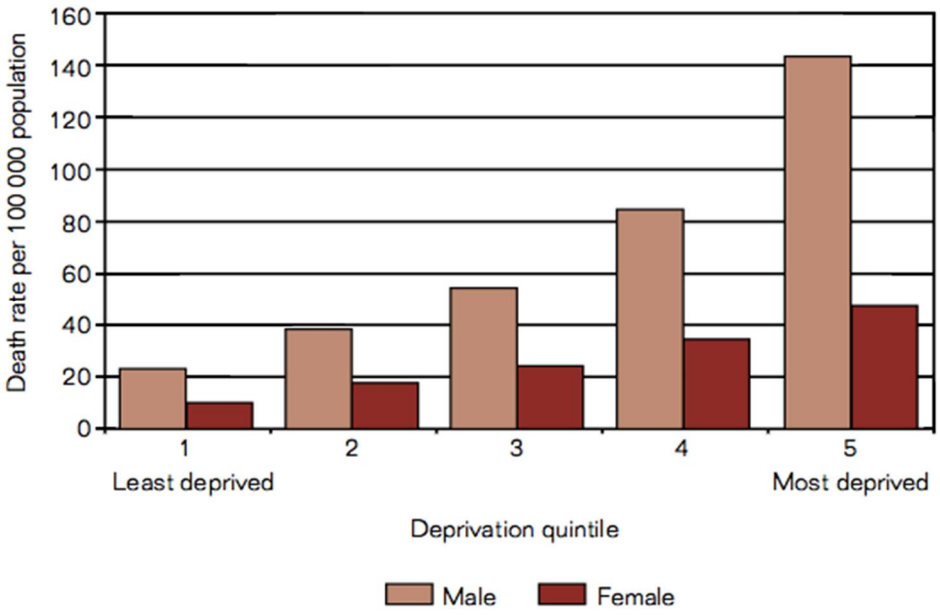

Figure 3: *Alcohol-related death rate by Scottish Index of Multiple Deprivation, 2005* (15)

Drinking patterns

As previously mentioned, studies have shown higher alcohol consumption in the high socioeconomic populations. However, this does not reveal the whole story and therefore examination of patterns of consumption, particularly abstinence and heavy episodic drinking (binge drinking), is needed.

Abstinence from alcohol is a self-enforced decision not to consume it. Research has shown that there is a correlation between socioeconomic status and the prevalence of abstinence (14,16,17). It was shown that the prevalence of abstinence was greatest in groups with lower socioeconomic indicators. These findings are consistent with previous descriptions that lower socioeconomic groups have a lower consumption of alcohol. However, the abstinent population are by definition not contributing to the disproportionately high alcohol-related mortality.

Due to the higher level of drinkers in the higher socioeconomic groups, a higher prevalence of binge drinking may be expected. However this is not the case. Various studies have identified that there is a significant increase in binge drinking in groups of low socioeconomic status (18-21). This is important as heavy episodic drinking that exceeds the recommended limits has a greater detrimental impact on health than consistent moderate drinking (22). Due to abstainers, the average consumption in low socioeconomic groups may be lower. However, having more binge drinkers may concentrate the effects of alcohol in low socioeconomic groups resulting in higher levels of alcohol-related mortality.

Interestingly, research has shown that moderate consumption, relative to abstinence, has been associated with reduced ischaemic heart disease risk (22). This pattern is shown in Figure 4 in which there appears to be some beneficial effects with non-heavy drinking episodes. This positive benefit, seen in the moderate drinking high socioeconomic groups, may be lost with the binge drinking pattern seen in the low socioeconomic groups (23). As a result, the drinking pattern in low socioeconomic groups is not only detrimental to their health but will also negate any possible beneficial effects.

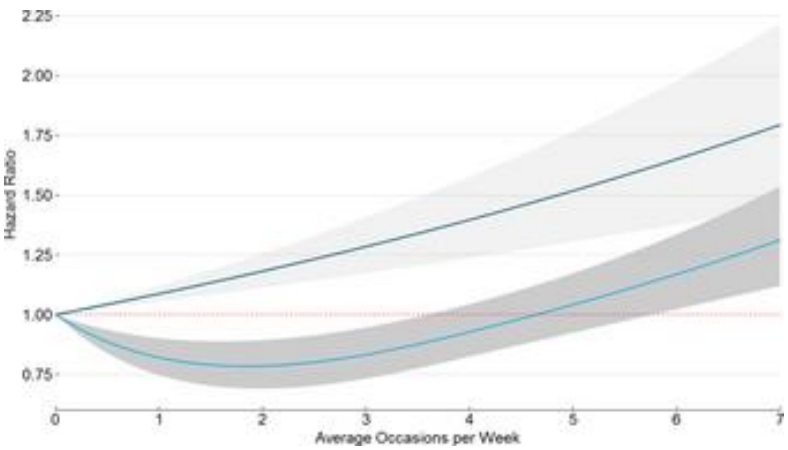

Figure 4: *Mortality risk by frequency of heavy (5+ drinks; dark line) and non-heavy (<5 drinks; light line) drinking occasions per week. Hazard ratio, with 95% CI, is plotted separately for the frequency of each behaviour. Data based on the 1997 to 2001 waves of the National Health Interview Survey* (22)

Lifestyle factors

Although there is evidence for different drinking patterns between the socioeconomic classes, this is not enough to explain the vast gap in alcohol related mortality. There may be factors that contribute to making low socioeconomic groups more susceptible to the damaging effects of alcohol, for example smoking, diet and exercise.

The effects of alcohol on the liver are well established, however more recent research suggests that cigarette smoking may also play a role. Clinical research has demonstrated that cigarettes contain numerous toxins that are able to alter the enzymatic and inflammatory pathways in the liver (24). Through these changes, smoking has been shown to increase the risk of liver cancer, cirrhosis and other chronic liver diseases (25-27). In particular, examination of liver enzymes suggests that smoking does not directly cause liver injury but rather enhances the effects of alcohol on liver cell injury in heavy drinkers (28).

This synergistic effect of alcohol and smoking is not limited to the liver. With reference to mouth and throat cancer, it was found that its prevalence was 7 times greater with tobacco use, 6 times greater with alcohol use but 38 times greater for those using both tobacco and alcohol (29). From these studies, it is clear that using both alcohol and cigarettes carries a far greater risk of developing alcohol-related problems.

A study by Bonevski *et al*. in 2014 looked into patterns of alcohol and smoking use with socioeconomic status (30). In concurrence with other studies, abstinence was associated with lower socioeconomic groups and moderate drinking was associated with higher socioeconomic groups. They showed that the characteristics associated with concurrent heavy alcohol consumption and tobacco use included being less educated, an income

less than $50,000pa and living in lower-socioeconomic areas (30). These are features associated with lower socioeconomic status. This may be a possible reason behind the discrepancies in alcohol-related mortality as whilst high socioeconomic groups are more likely to consume alcohol, lower socioeconomic groups have higher rates of combined alcohol and tobacco consumption. This would mean that the lower socioeconomic groups are at a much higher vulnerability for alcohol-related problems.

On a similar vain, it has been suggested that different socioeconomic groups have different attitudes towards their own health. Individuals of higher socioeconomic groups with better education are more aware of the consequences and therefore more likely to make healthier choices with diet and exercise and avoid the synergistic effects of alcohol and cigarettes (31). This can be seen by comparing factors such as blood pressure, cholesterol and BMI which are often higher in the low socioeconomic groups (32).

Bellis *et al*. compared the distribution of various health challenges in the deprived (low socioeconomic) and non-deprived (high socioeconomic) populations. They found that in both increased risk drinkers (21-50 units in males, 14-35 units in females) and higher risk drinkers (>50 units in males, >35 units in females), the deprived populations had a greater proportion of respondents that reported at least one other health challenge (21). Figure 5 shows that less than 1% of non-deprived increased risk drinkers had all three health challenges (overweight, smoking and unhealthy lifestyle) compared to 9% of their deprived counterparts (21). This means that high socioeconomic groups may be able to offset their increased alcohol consumption through healthier lifestyles and therefore be less vulnerable to its destructive effects. This could explain why high socioeconomic groups have lower alcohol-related mortality compared to low socioeconomic groups.

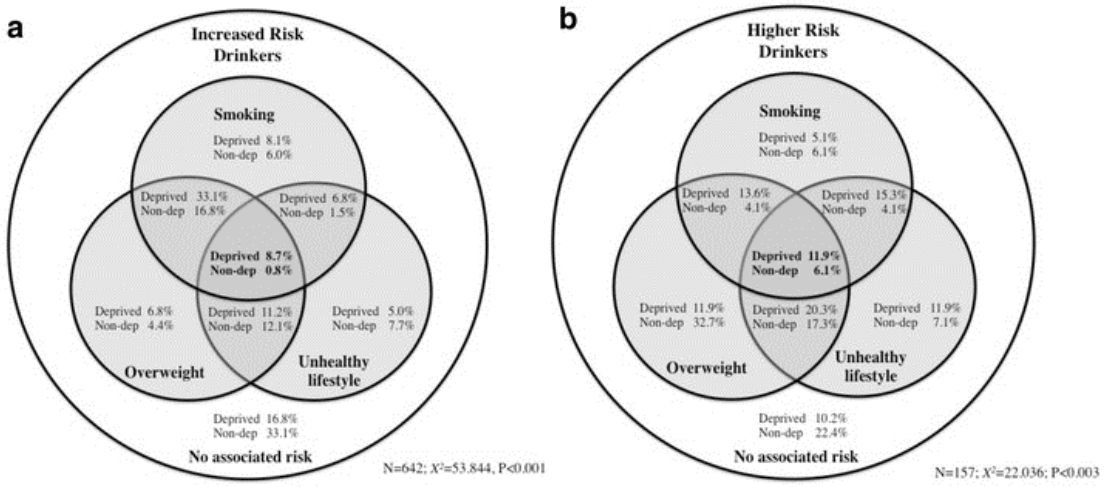

Figure 5: *Venn diagram to show overlap between smoking, unhealthy lifestyle and being overweight in (**a**) increased risk drinkers and (**b**) higher risk drinkers, stratified by deprivation* (21)

Health care access

Discrepancies in mortality between social classes are not limited to alcohol related deaths. A recent publication looked at inequalities in non-communicable diseases and effective responses (32). They found that the incidence of non-communicable diseases (NCDs) was higher in the disadvantaged and marginalised population. Furthermore, NCD mortality was higher with lower education, income and social class (32).

A possible reason for this trend may be inequality in the access and quality of healthcare. Low socioeconomic groups may face extra challenges in obtaining healthcare or may receive inferior services. In the USA, universal health insurance is generally given to those over 65 years of age with a resulting lower discrepancy in blood pressure, cholesterol and diabetes control (33). This shows that by removing barriers to healthcare, inequality can be reduced.

However, inequality also extends to universal health care systems. In Finland, where everyone is insured, high-income stroke patients had a greater chance of having a CT or MRI scan and to be seen by a neurology specialist than low-income patients (34). Possible reasons for this discrepancy may be a lower quality or lower density of health care facilities in low-income communities. Therefore low-income patients were not able to access the same facilities as the high-income patients. As a result, low-income patients may have a lower prognosis following their stroke.

Whilst these cases do not directly relate to alcohol disease, if there is an imbalance in the health services available to different socioeconomic groups, then there could be a difference in the timely diagnosis and treatment of alcohol-related diseases. Therefore the disadvantaged may have a poorer prognosis from similar conditions and a greater alcohol-related mortality.

Not only may there be a difference in the availability of quality health services but evidence shows that some groups are more likely to utilise services than others (35). People of lower socioeconomic status come into contact with primary care services less frequently meaning identification of potentially harmful alcohol consumption is delayed and early intervention less likely. As a result, when alcohol-related conditions are diagnosed in the lower socioeconomic groups they are already at a later stage meaning the prognosis is worse.

It is important to note that the implementation of interventions, such as screening, in a primary health care setting, may reduce alcohol-related complications overall but could actually widen the alcohol-mortality gap. This is because primary care interventions are more likely to benefit high socioeconomic status groups as they utilise this service more frequently.

Social context

Another potentially important factor to consider is social context. People of higher socioeconomic status are more likely to have various social supports that can help protect them from alcohol-related problems. For example, being able to afford a taxi home will help to avoid drink driving and its associated dangers. Furthermore, it has

been suggested that social support from employers could also play a role as they may tolerate or help solve alcohol-related problems of their high socioeconomic workers (9). Poorer people, such as the homeless, have fewer coping mechanisms and are more likely to be imprisoned for being drunk or disorderly (15).

In men, an important source of social support is the presence of a spouse and family. Research into this phenomenon has shown that men of a higher socioeconomic status are more likely to be married with a family and that their spouse is an important social control on heavy drinking (36,37). This has also been linked to alcohol-related deaths and a study published in Finland found that alcohol-related deaths were 2.6-2.7 times higher in men who never married, were divorced or widowed compared to married men (38).

Conclusion

I began this essay by explaining the phenomenon that an inequality of alcohol-related mortality exists in our society. We see that the lower socioeconomic classes suffer greater levels of alcohol-related health harm compared to their higher socioeconomic counterparts for a similar or lower intake of alcohol. This trend is not new and was identified many years ago, yet the reasons behind it remain complex and intertwining. In my essay I have identified and discussed some reasons that could help to explain this trend.

Firstly, I described how people's use of alcohol is complex and cannot simply be measured through consumption alone. In lower socioeconomic groups, alcohol use is polarised with higher levels of both abstinence and binge drinking. I discussed how the phenomenon might be an artefact of the presence of abstainers masking higher drinking in low socioeconomic individuals. I explained how binge drinking has more destructive effects and negates the cardio-protective benefits of more moderate drinking. By analysing drinking patterns we can see that the low socioeconomic groups drink similar or less alcohol than the higher socioeconomic groups but within the group the alcohol is consumed by fewer individuals. Therefore, this leads to more concentrated damage with these individuals and a higher alcohol-related mortality.

Secondly, I discussed how other lifestyle factors could influence the trend. The human body is very complex and there are many compounding factors that could influence alcohol-related harm. I discussed how smoking and other lifestyle factors might influence the damage of alcohol. As low socioeconomic populations tend to have more health challenges they are more vulnerable to the damaging effects of alcohol. As a result, they may experience more alcohol-related mortality than their high socioeconomic counterparts. This is important as it shows that in order to reduce alcohol-related mortality, we may need to target other lifestyle factors rather than alcohol consumption alone. For instance, we could look to help individuals to stop smoking in order to counter its multiplicative effect with alcohol and reduce alcohol-related mortality.

Thirdly, I discussed the imbalance in health care access. It seems that in low socioeconomic populations there may be a lack of quality health care services. This may be through extra challenges to the individual or that the services are simply not

available. This is an important challenge to tackle in order to close the mortality gap as alcohol-related complications will only be equal if the services available to the patients are equal as well.

Finally, I described how the social context of alcohol consumption could have an effect. Individuals of high socioeconomic status are more likely to have support systems in place at home or in the workplace that can help to protect them from alcohol-related harm. This may be through avoiding dangers or through support when needed. Although imbalance in these support mechanisms cannot be controlled, it may be possible to ensure that alternative support mechanisms are in place for those of lower socioeconomic status.

Through this essay I have demonstrated that low socioeconomic groups suffer a disproportionate amount of alcohol-related mortality. Identification of inequalities in health and their reasons is important because pinpointing vulnerable target groups can help improve the overall health of the population. For example, if most of the alcohol-related harm is felt in the low socioeconomic community then policy interventions should target this group as they stand to benefit the most.

References

(1) *alcohol - definition of alcohol in English from the Oxford dictionary.* Available from: http://www.oxforddictionaries.com/definition/english/alcohol [Accessed 3/22/2016].

(2) *Effects on the Body | Alcohol Awareness.* Available from: http://publichealth.hsc.wvu.edu/alcohol/effects-on-the-body/ [Accessed 3/22/2016].

(3) Holt S. Observations on the relation between alcohol absorption and the rate of gastric emptying. *Canadian Medical Association Journal* 1981;124(3): 267.

(4) Karadayian AG, Cutrera RA. Alcohol hangover: type and time-extension of motor function impairments. *Behavioural brain research* 2013;247165-173.

(5) World Health Organization. *Global status report on alcohol and health 2014.* 2014.

(6) Nutt D, King L, Phillips L. **Drug harms in the UK: a multicriteria decision analysis**. *Lancet* 2010;376(9752): 1558.

(7) *Alcohol consumption Factsheet.* Institute of Alcohol Studies; 2013.

(8) Erskine S, Maheswaran R, Pearson T, Gleeson D. Socioeconomic deprivation, urban-rural location and alcohol-related mortality in England and Wales. *BMC Public Health* 2010;1099-2458-10-99.

(9) Makela P, Paljarvi T. Do consequences of a given pattern of drinking vary by socioeconomic status? A mortality and hospitalisation follow-up for alcohol-related causes of the Finnish Drinking Habits Surveys. *Journal of epidemiology and community health* 2008;62(8): 728-733.

(10) Grittner U, Kuntsche S, Graham K, Bloomfield K. Social Inequalities and Gender Differences in the Experience of Alcohol-Related Problems. *Alcohol and Alcoholism (Oxford, Oxfordshire)* 2012;47(5): 597-605.

(11) Jones L, Bates G, McCoy E, Bellis MA. Relationship between alcohol-attributable disease and socioeconomic status, and the role of alcohol consumption in this relationship: a systematic review and meta-analysis. *BMC public health* 2015;15400-015-1720-7.

(12) Jefferis BJMH, Manor O, Power C. Social gradients in binge drinking and abstaining: trends in a cohort of British adults. *Journal of epidemiology and community health* 2007;61(2): 150-153.

(13) van Oers JA, Bongers IM, van de Goor LA, Garretsen HF. Alcohol consumption, alcohol-related problems, problem drinking, and socioeconomic status. *Alcohol and Alcoholism (Oxford, Oxfordshire)* 1999;34(1): 78-88.

(14) Harrison L, Gardiner E. Do the rich really die young? Alcohol-related mortality and social class in Great Britain, 1988-94. *Addiction (Abingdon, England)* 1999;94(12): 1871-1880.

(15) Loring B. *Alcohol and inequities: guidance for addressing inequities in alcohol-related harm.* Copenhagen: World Health Organisation Regional Office for Europe: 2014.

(16) Knupfer G. The prevalence in various social groups of eight different drinking patterns, from abstaining to frequent drunkenness: analysis of 10 U.S. surveys combined. *British journal of addiction* 1989;84(11): 1305-1318.

(17) Marmot M. Inequality, deprivation and alcohol use. *Addiction (Abingdon, England)* 1997;92 Suppl 1S13-20.

(18) Batty GD, Deary IJ, Macintyre S. Childhood IQ and life course socioeconomic position in relation to alcohol induced hangovers in adulthood: the Aberdeen children of the 1950s study. *Journal of epidemiology and community health* 2006;60(10): 872-874.

(19) Batty GD, Lewars H, Emslie C, Benzeval M, Hunt K. Problem drinking and exceeding guidelines for 'sensible' alcohol consumption in Scottish men: associations with life course socioeconomic disadvantage in a population-based cohort study. *BMC Public Health* 2008;8302-2458-8-302.

(20) Yang S, Lynch JW, Raghunathan TE, Kauhanen J, Salonen JT, Kaplan GA. Socioeconomic and psychosocial exposures across the life course and binge drinking in adulthood: population-based study. *American Journal of Epidemiology* 2007;165(2): 184-193.

(21) Bellis MA, Hughes K, Nicholls J, Sheron N, Gilmore I, Jones L. The alcohol harm paradox: using a national survey to explore how alcohol may disproportionately impact health in deprived individuals. *BMC Public Health* 2015;1610.1186/s12889-016-2766-x.

(22) Plunk AD, Syed-Mohammed H, Cavazos-Rehg P, Bierut LJ, Grucza RA. Alcohol Consumption, Heavy Drinking and Mortality: Re-Thinking the J-Shaped Curve. *Alcoholism, Clinical and Experimental Research* 2014;38(2): 471-478.

(23) Roerecke M, Rehm J. Alcohol consumption, drinking patterns, and ischemic heart disease: a narrative review of meta-analyses and a systematic review and meta-analysis of the impact of heavy drinking occasions on risk for moderate drinkers. *BMC Medicine* 2014;1210.1186/s12916-014-0182-6.

(24) Avti PK, Kumar S, Pathak CM, Vaiphei K, Khanduja KL. Smokeless tobacco impairs the antioxidant defense in liver, lung, and kidney of rats. *Toxicological sciences : an official journal of the Society of Toxicology* 2006;89(2): 547-553.

(25) Chen ZM, Liu BQ, Boreham J, Wu YP, Chen JS, Peto R. Smoking and liver cancer in China: case-control comparison of 36,000 liver cancer deaths vs. 17,000 cirrhosis deaths. *International journal of cancer* 2003;107(1): 106-112.

(26) Liu B, Balkwill A, Roddam A, Brown A, Beral V, Million Women Study Collaborators. Separate and joint effects of alcohol and smoking on the risks of cirrhosis and gallbladder disease in middle-aged women. *American Journal of Epidemiology* 2009;169(2): 153-160.

(27) Bataller R. Time to ban smoking in patients with chronic liver diseases. *Hepatology (Baltimore, Md.)* 2006;44(6): 1394-1396.

(28) Wannamethee SG, Shaper AG. Cigarette smoking and serum liver enzymes: the role of alcohol and inflammation. *Annals of Clinical Biochemistry* 2010;47(Pt 4): 321-326.

(29) Zacny JP. Behavioral aspects of alcohol-tobacco interactions. *Recent developments in alcoholism : an official publication of the American Medical Society on Alcoholism, the Research Society on Alcoholism, and the National Council on Alcoholism* 1990;8205-219.

(30) Bonevski B, Regan T, Paul C, Baker AL, Bisquera A. Associations between alcohol, smoking, socioeconomic status and comorbidities: evidence from the 45 and Up Study. *Drug and Alcohol Review* 2014;33(2): 169-176.

(31) Kenkel D. Health Behavior, Health Knowledge, and Schooling. *Journal of political economy* 1991;99(2): 287--305.

(32) Di Cesare M, Khang YH, Asaria P, Blakely T, Cowan MJ, Farzadfar F, et al. Inequalities in non-communicable diseases and effective responses. *Lancet (London, England)* 2013;381(9866): 585-597.

(33) McWilliams JM, Meara E, Zaslavsky AM, Ayanian JZ. Differences in control of cardiovascular disease and diabetes by race, ethnicity, and education: U.S. trends from 1999 to 2006 and effects of medicare coverage. *Annals of Internal Medicine* 2009;150(8): 505-515.

(34) Jakovljevic D, Sarti C, Sivenius J, Torppa J, Mahonen M, Immonen-Raiha P, et al. Socioeconomic status and ischemic stroke: The FINMONICA Stroke Register. *Stroke; a journal of cerebral circulation* 2001;32(7): 1492-1498.

(35) Mulia N, Schmidt LA, Ye Y, Greenfield TK. Preventing Disparities in Alcohol Screening and Brief Intervention: The Need to Move Beyond Primary Care. *Alcoholism, Clinical and Experimental Research* 2011;35(9): 1557-1560.

(36) Koskinen S, Martelin T. Why are socioeconomic mortality differences smaller among women than among men? *Social science & medicine (1982)* 1994;38(10): 1385-1396.

(37) Holmila M, Raitasalo K, Knibbe R, Selin K. Country variations in family members' informal pressure to drink less. *Contemporary drug problems* 2009;36(1/2): nihpa126808.

(38) Martikainen P, Martelin T, Nihtila E, Majamaa K, Koskinen S. Differences in mortality by marital status in Finland from 1976 to 2000: analyses of changes in marital-status distributions, socio-demographic and household composition, and cause of death. *Population studies* 2005;59(1): 99-115.