The risks of alcohol and effective preventive practices
A systematic review

Theodosios Stavrianopoulos

RN, Bsc, Msc, General Hospital of Pyrgos Ilia, Greece

Abstract

Background: Alcohol consumption has been linked to several injuries such as motor vehicle crashes, falls, drowning, fires and burns, and violence. Despite the many efforts and the implementation of health policies at both community and national level, the burden of alcohol-related injuries, especially among young people, is still unacceptably high in many European Union (EU) countries.
Aim: The aim of the present study was review the literature about the risks of alcohol and the effective preventive practices.
Method and Material: Method was used is to search in several databases (MEDLINE, SCOPUS,EMBASE, CINAHL,COHRANE) to identify articles related to the risks of alcohol. We also obtained relevant statistical information from the World Health Organization's internet database and the National Health and Medical Research Council's of Australia internet database.
Results: The risk factors of alcohol classified on demographic risk factors, environmental risk factors, and behavioural risk factors. A higher proportion of deaths due to alcohol are detected in younger people. At an age of death of between 15 and 29 years, 27% of all deaths occurring in men and 11% of all deaths occurring in women are due to alcohol. Although in the EU-15, alcohol is responsible for 29% of all male injuries and 19% of all female injuries, in the central and eastern European countries, the proportions are 38% and 29%, and in the three Baltic states 48% and 42% respectively. The role of alcohol in aggression may differ between the sexes. Additionally, alcohol is a significant contributor to between-partner violence.
Conclusion: Alcohol is a risk factor for many adverse health outcomes, including injuries and deaths. Nevertheless, a considerable body of evidence shows that alcohol policies and interventions can have a protective effect and reduce the overall level of alcohol - related problems.

Key Words: Alcohol, Drinking, Injury, Prevention

Corresponding author:

Theodosios Stavrianopoulos,
Archimidous 4, Pyrgos Ilias, Greece. P.C. 27100
Tel: 2621032528,
E-mail: sakisstav@hotmail.com

Background

As alcohol-related injuries are defined those for which there is epidemiological evidence of an association with alcohol consumption. Alcohol consumption has been associated with an increased risk of injury in a wide variety of settings, including road traffic accidents, falls, fires, injuries related to sports and recreational activities, self-inflicted injuries, and injuries resulting from interpersonal violence.[1] There is also some evidence that the presence of alcohol in the human body at the time of injury may be associated with a greater severity of injury and a less positive outcome.[2] The best estimate suggests that more than one in three road traffic fatalities in the European Union (EU) are due to alcohol consumption.[3] These drink-driving deaths are not equally split between genders, with 15,000 male deaths compared to 2,000 deaths for females. The cost due to alcohol in human lives is even higher for other accidents, with a toll of 27,000 deaths (including alcohol-related drowning, falls, fights, and fires, occupational and recreational injuries).

Over 2,000 homicide deaths per year in the EU are attributable to alcohol. Time-series show that the effect per litre is greater in northern Europe. Nevertheless the higher consumption levels in southern Europe indicate that the estimated share of all homicides that are due to alcohol is slightly higher in southern (61% of all homicides) than in northern Europe (50% of all homicides).[4] Deaths by suicide account for 7%–8% of the total deaths due to alcohol, a toll that is greater for men. The increasing trends in under-age "binge-drinking", along with the high frequency of under-age drinking that have been reported in many European countries[5] , may lead to long-term adverse health and social effects. "Binge-drinking" is a term commonly used to describe a single drinking session that includes consumption above a given cut-off level of alcohol.[6] Excessive alcohol use and a pattern of binge-drinking are associated with increased risk of negative social consequences, reduced work performance, injuries, drink-driving accidents, brain damage, alcohol dependence, suicide, stroke, irregular heart rhythms, coronary heart disease, sexually transmitted diseases, and premature death.[5] Binge-drinking needs to be distinguished from alcohol intoxication, which is defined as a condition that follows the administration of alcohol and results in disturbances in the level of consciousness, cognition, perception, judgement, affect, behaviour, or other psychophysiological functions and responses.[7]

One way of assessing the scale of alcohol use as a public health problem is to examine the entire burden of illness and disease, looking at years of healthy life. The WHO uses Disability-Adjusted Life Years (DALYs) as a measure to estimate the number of healthy years of life lost due to each risk factor. DALYs measure the existing gap in health status between the current position and what could potentially be achieved. Alcohol is responsible for the loss of over 4.5 million DALYs every year in the EU (7.4% of all DALYs). This is principally for men, accounting for 12% of all male ill-health and premature death and a smaller, but still sizeable, 2% of all female ill-health and premature death. Two-fifths of alcohol-related DALYs are due to unintentional and intentional injuries. Based on the results of 21 European studies, the total tangible cost of alcohol to the EU has been estimated at €125bn (€79bn – €220bn) in 2003, equivalent to 1.3% of GDP (0.9% – 2.4%).[3]

Aside from the tangible monetary costs, alcohol causes an intangible cost of €152 bn – €764bn, which incorporates the value people place on pain, suffering and life itself due to crime and lost healthy life due to alcohol. This intangible cost is not an 'economic loss' in the usual/normal sense of the term and cannot be compared to e.g. GDP (nor can it be simply added to the tangible cost, given that both include estimated values for lost life but the estimates are derived in different ways).

However, this cost offers a more accurate estimate of the full economic and

pp: 188-195
E-ISSN:1791-809X

human burden of alcohol to the EU. The age-standardized death rate for external cause, injury and poison declined in the EU from 63/100,000 citizens in 1970 to 43/100,000 in 2005. The decline has been observed in both member states that joined the Union prior to 2004, and in the states that joined the union in 2004 and in 2007. The decline has been more substantial in the older than in the newer member states, and subsequently the gap between the two has widened over time. The increase in death rates that occurred in the newer member states in the early 1990s coincides with the socio-economic transformation that occurred following the break-up of the Soviet Union.

Method and Material

Method was used is to search in several databases (MEDLINE, SCOPUS, EMBASE, CINAHL, COHRANE) to identify articles related to the risks of alcohol. We also obtained relevant statistical information from the World Health Organization's internet database and the National Health and Medical Research Council's of Australia internet database.

Results

Risk Factors

Demographic risk factors

A higher proportion of deaths due to alcohol is detected in younger people. At an age of death of between 15 and 29 years, 27% of all deaths occurring in men (13,000 deaths) and 11% of all deaths occurring in women (2,000 deaths) are due to alcohol.[8]

Environmental risk factors

There is a substantial health gap across Europe, with a difference in life expectancy at birth between EU countries of as much as 10 years. Against this background, it is clear that many of the individual conditions that contribute to the health gap are linked to alcohol. For males dying between the ages of 20 and 64 years, injuries are responsible for nearly half (46%) of the difference in life expectancy between the three Baltic states (Estonia, Latvia and Lithuania) and the EU-15, and for one fifth (22%) of the difference between central and eastern Europe (Poland, Czech Republic, Slovakia, Hungary, Slovenia, Romania, Bulgaria) and the EU-15.[9] Although in the EU-15, alcohol is responsible for 29% of all male injuries and 19% of all female injuries, in the central and eastern European countries, the proportions are 38% and 29%, and in the three Baltic states 48% and 42% respectively. The majority of conditions responsible for health inequalities within countries is strongly linked to alcohol. Research from Finland further suggests that socioeconomic variables act on the collective as well as the individual level. Areas with the most manual workers had 20% higher mortality rates directly attributable to alcohol than areas with the least, even after accounting for the individual relationship of occupation to mortality.[10]

Behavioural risk factors

Alcohol consumption is the most important behavioural risk factor for involvement in an accident, as well as for the severity of the injury. The lifetime risk of death from an alcohol-related accident or injury increases exponentially with alcohol consumption. For a drinker who, on average, drinks every other day between the ages of 18 and 70 years is more than 15% for a man and 10% for a woman if they drink more than 60g alcohol per occasion. Nevertheless, even small amounts of alcohol are found to impair behaviour, judgment, memory, concentration and coordination of movements, indicating that activities requiring high concentration should not be combined / mixed with alcohol consumption.[11]

As blood alcohol concentration increases, cognitive function and psychomotor performance decrease rapidly. Less than two standard drinks may result in cognitive and psychomotor effects that increase injury risk, such as effects on reaction time, cognitive processing, coordination and vigilance.[10]

Alcohol consumption increases also the likelihood and the extent of aggressive behaviour, raising the chance that a conflict or dispute will not be resolved peacefully by verbal means.[12] Injury risk from violence, both physical and sexual, is therefore

increased. Alcohol consumption does not always increase aggressive behaviour, probably due to its interaction with personality. Some studies have indicated that the role of alcohol in aggression may differ between the sexes. Additionally, alcohol is a significant contributor to between-partner violence.

Alcohol also appears to interact with personality characteristics and other factors related to a personal propensity for violence, such as impulsivity.[3] Injuries from violence may also be more closely linked to alcohol dependence than other types of alcohol-related injury. In addition to alcohol consumption and drinking pattern, the social context of drinking is also important for alcohol-related aggression, especially for young people whose drinking behaviour is influenced strongly by their peers. A metaanalysis found that the effects of alcohol were larger in situations characterized by increased anxiety, inhibition, conflict and frustration, while differences between sober and intoxicated persons were smaller in situations involving high provocation or self-focused attention.[13] Furthermore, given sufficient disincentives for aggression the effects of alcohol on aggression can be reduced or even eliminated altogether.

Public drinking establishments are high-risk locations for alcohol-related aggression. However, drinking contexts by themselves do not explain the relationship between alcohol and aggression, since the impact of alcohol also acts independently of the context or setting in which drinking is taking place.[14] The environment for alcohol-related aggression is also not independent of drinking. Although a few incidents that occur in bars involve interpersonal conflict between people that might have occurred even in the absence of facilitating factors, almost all incidents of aggression that occur in bars are sudden, unplanned, emerge from the social interaction and often involve strangers. The Comparative Risk Assessment study of the World Health Organization concluded that it is reasonable to assume that almost all incidents of violence occurring in bars and other environments, where drinking is the main activity, should be considered attributable to alcohol, either directly through the pharmacological effects of alcohol or indirectly through the social norms related to drinking.[15]

The connection between changes in population drinking and mortality has been comprehensively investigated within the ECAS study[16] using time-series analysis in fourteen European countries for the years 1950 to1995. This technique investigates the relationship between yearly changes in consumption and harm, as well as the relative change in mortality for a change in per capita consumption of one litre of pure alcohol. Changes in death rates of accidents, suicide and homicide are strongly related to changes in overall alcohol consumption.

Effective Preventive Practices

Increasing the price of alcohol reduces road traffic accidents and fatalities particularly for younger drivers, intentional and unintentional injuries, rapes and robberies, homicides, crime, violence at universities, and violence related injuries in general.[17] A review of 132 studies, published between 1960 and 1999, found very strong evidence to support that changes in minimum drinking age laws can have substantial effects on youth drinking and alcohol-related harm.[18] A systematic review of minimum legal drinking age (MLDA) laws in the United States found that among 14 studies looking at the effects of raising the MLDA, crash-related outcomes declined a median of 16% for the targeted age groups. On the other hand, among 9 studies looking at the effects of lowering the MLDA, crash-related outcomes increased by a median of 10% within the targeted age groups.[19] The full benefits of a higher drinking age are only realized if the law is enforced.

Finnish studies have found an overall impact on alcohol consumption following changes in the number of outlets. The most dramatic change was observed in 1969, when, beer up to 4.7% alcohol was allowed to be sold by grocery stores, and it also became easier to obtain a restaurant license. The number of off-premise sales points increased from 132 to about 17,600, and that of on-premise sales from 940 to over 4,000.[20]

In the following year, alcohol consumption increased by 46%, whereas in the next five years arrests for drunkenness increased by 80% and 160% for men and women respectively. In Sweden, a time-series analysis found that motor vehicle accidents were significantly reduced in three of four age groups, when the right to sell 4.5% beer in grocery stores was retracted, there was a significant fall in hospital admissions for alcohol-specific diagnoses among those aged under twenty years, but no effect on assaults, suicides and falls.[21]

A number of studies have indicated that, although changing the time and day of alcohol availability at stores can redistribute the times at which many alcohol-related crashes and violent events take place, it does so at the cost of an overall increase in problems.[22] A study in Western Australia showed that extending opening hours from midnight to 1.00 a.m. increased violent incidents at the later night venues by 70% [23]

Licensed drinking environments are associated with drunkenness, drink-driving and problematic behaviours such as aggression and violence, with some licensed premises being associated with a disproportionate amount of harm.[24] Aspects of the bar environment that increase the likelihood of alcohol-related problems include serving practices that promote intoxication, an aggressive approach taken to closing time by bar staff and local police, the inability of bar staff to manage problem behaviour, general characteristics of the environment, such as crowding and permissiveness of bar staff, the general type of bar, and physical comfort, the degree of overall 'permissiveness' in the bar, the availability of public transport, and aspects of the ethnic mix of customers. However, a systematic Cochrane review found no reliable evidence that interventions in the alcohol server setting are effective in reducing injury. Compliance with interventions appears to be a problem; hence mandated interventions may be more effective / efficient.[25] Compliance with interventions appears to be a problem, hence mandated interventions may be more effective / efficient.

Community-based prevention programs can be effective in reducing drinking and driving, alcohol-related traffic fatalities and assault injuries. A review of 10 community-based prevention trials, which have sought to reduce harm from alcohol, found that promising interventions were those that paid particular attention to controls on access, included the environmental contexts of where the products are sold and distributed, and involved enforcement of public health policies.[26] Since 1996, a multi-component program based on community mobilization, training in responsible beverage service for servers and stricter enforcement of existing alcohol laws has been conducted in Stockholm, leading to a 29% reduction in violent crimes in the intervention area, compared with the control area.[27]

A recent review analyzed the results of 14 systematic reviews and found no consistent evidence for the impact of educational initiatives in reducing alcohol-related harm.[28] Based on these reviews, 19 classroom-based programs led by teachers were identified, with only three of them demonstrating evidence of reducing alcohol use in the short-term, and one only demonstrating evidence of long-term effects on alcohol use. Nine classroom-based programs were identified that were taught by external contributors, only one of which (a culturally tailored programme for Native American students) demonstrated evidence of medium- to long-term effects. Nineteen school-based programs that were delivered outside of the lesson format were identified including brief intervention programs, counseling programs, peer support and teacher training, none of which demonstrated medium to longer term effects. Twelve multicomponent programs were identified that combined school-based intervention with family, community and/or media components. Three long-term programs that combined school-based intervention with family and community components showed no consistent effects. Two programs that combined classroom-based intervention with components targeting parental participation, and focusing on wider problem behaviours,

appeared to have more consistent long-term effects.

A systematic review of the evidence of the impact of alcohol warning labels[29] introduced in the United States, found significant increases in the likelihood of respondents reporting having taken part in conversations about risks of alcohol consumption, compared to before the introduction of the labels. No direct impacts of warning labels on consumption or alcohol-related problems have been reported.

Brief advice delivered in emergency departments and trauma centers has been shown to be effective in reducing alcohol-related harm. One systematic review of 23 studies found evidence of reduced motor-vehicle crashes and related injuries, falls, suicide attempts, domestic violence, assaults and child abuse, alcohol-related injuries and injury emergency visits, hospitalizations and deaths, with reductions ranging from 27% to 65%.[30] A second meta-analysis of 13 studies of emergency department interventions revealed that counselling interventions were associated with approximately half the odds of experiencing an alcohol-related injury. 6 or 12 months following their emergency department presentation.[31]

Conclusions

Alcohol is a risk factor for many adverse health outcomes, including injuries and deaths. Nevertheless, a considerable body of evidence shows that alcohol policies and interventions can have a protective effect and reduce the overall level of alcohol-related problems. Adherring to the following preventive messages could make a difference were they to be adopted by each individual and the society at large:

• It is necessary to be realistic about how long alcohol remains in your body informal. Even low levels of alcohol can increase the risk of all types of injury and can also impair child supervision. If you have been drinking, try to avoid activities that could result in potential harm.

• It is useful to apply the same safety rules, as for alcohol, to prescribed or over-the-counter medicines, as well as for drugs that may alter your perception and increase your injury risk. Do not mix alcohol with any medicines, even to over-the-counter ones.

• Excessive drinking can cause alcohol poisoning which can be deadly. Try to avoid binge drinking and keep within the recommended amounts of alcohol consumption.

Bibliography

1. Web Site: National Health and Medical Research Council. Australian alcohol guidelines for low-risk drinking 2007. http://www.nhmrc.gov.au/consult/_files/draft_australian_alcohol_guidelines. Accessed : March 2008
2. Ridolfo B, Stevenson C. The Quantification of Drug-Caused Mortality and Morbidity in Australia, 1998. Canberra: Australian Institute of Health and Welfare, 2001
3. Anderson P, Baumberg B. Alcohol in Europe: A public health perspective.London: Institute of Alcohol Studies, 2006.
4. Rossow I. Drinking and violence: a cross-cultural comparison of the relationship between alcohol consumption and homicide in 14 European countries. Addiction 2001, 96:S77–S92
5. Hibell B, Andersson B, Bjarnason T, Ahlstrom S, Balakireva O, Kokkevi A et al. The ESPAD report 2003: Alcohol and other drug use among students in 35 European Countries. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs (CAN), 2004.
6. Anderson P. Binge drinking and Europe. London: Institute of Alcohol Studies, 2007.
7. International Classification of Diseases and Related Health Problems 10th Vs (ICD-10). Geneva: World Health Organization, 2007.
8. Rehm J. Volume of Alcohol Consumption, Patterns of Drinking and Burden of Disease in the European Region – Implications for Alcohol Policy. 10th meeting of national counterparts for alcohol policy in the WHO European Region, Stockoholm 13-15 April 2005.

9. Zatonski W, Manczuk M. Injuries in Europe: Role of alcohol. Paper presented to Kettil Bruun Society 2006.
10. Blomgren J, Martikainen P, Makela P, Valkonen T. The effects of regional characteristics on alcohol-related mortality a register-based multilevel Analysis of 1.1 Million Men. Soc Sci Med 2004, 58:2523-2535
11. Gawron VJ, Ranney TA. The effects of alcohol dosing on driving performance on a closed course and in a driving simulator. Ergonomics 1998, 31:1219–244
12. Paljarvi T, Makela P, Poikolainen K. Pattern of drinking and fatal injury: a population-based follow-up study of Finnish men. Addiction 2005, 100:1851–1859
13. Ito TA, Miller N, Pollock V. Alcohol and aggression: a meta-analysis on the moderating effects of inhibitory cues triggering events, and self-focused attention. Psychol Bull 1996, 120:60–82
14. Wells S, Graham K, Speechley M, Koval JJ. Drinking patterns, drinking contexts and alcohol-related aggression among late adolescent and young adult drinkers. Addiction 2005, 100:933–944
15. Rehm J, Room R, Monteiro M, Gmel G, Graham K, Rehn T. et al. Alcohol. In: WHO Comparative quantification of health risks: Global and regional burden of disease due to selected major risk factors. World Health Organization, Geneva, 2004
16. Norstrom, T, Hemstrom O, Ramstedt M, Rossow I, Skog OJ. Mortality and Population Drinking. In "Alcohol in postwar Europe: Consumption, drinking patterns, consequences and policy responses in 15 European countries". National Institute of Public Health, European Commission, Stockholm 2001.
17. Chaloupka FJ, Grossman M, Saffer H. The effects of price on alcohol consumption and alcohol-related problems. Alcohol Res Health 2002, 26:22–34
18. Wagenaar AC, Toomey TL. Alcohol policy: gaps between legislative action and current research. Contemporary Drug Problems 2000, 27:681–733.
19. Shults RA, Elder RW, Sleet DA, Nicholas JL, Alao MO, Carandekulis VG, et al. Reviews of evidence regarding interventions to reduce alcohol-impaired driving. Am J Prev Med 2000, 21:66–88.
20. Osterberg E. Recorded consumption of alcohol in Finland, 1950–1995. Helsinki: Social Research Institute of Alcohol Studies, report No 125, 1999
21. Ramstedt M. The repeal of medium strength beer in grocery stores in Sweden: the impact on alcohol-related hospitalizations in different age groups. In: Room R. (ed.) The Effects of Nordic Alcohol Policies: Analyses of Changes in Control Systems Publication No. 42. Nordic Council for Alcohol and Drug Research, Helsinki, 2002.
22. Ragnarsdottir T, Kjartansdottir A, Davidsdottir S. Effect of extended alcohol serving hours in Reykjavik, Iceland. In: Room, R., ed. The Effects of Nordic Alcohol Policies. NAD Publication 42, Helsinki: Nordic Council for Alcohol and Drug Research, 2002:145–154.
23. Chikritzhs T, Stockwell TR. The impact of later trading hours for Australian public houses (hotels) on levels of violence. J Stud Alcohol 2002, 63:591–599.
24. Ker K, Chinnock P. Interventions in the alcohol server setting for preventing injuries. Cochrane Database Syst Rev 2006, Issue 2. Art. No.: CD005244.pub2. DOI: 10.1002/14651858. CD005244.pub2.
25. Giesbrecht N. Alcohol, tobacco and local control. A comparison of several community-based prevention trials. Nordic Studies on Alcohol and Drugs 2003, 20: 25–40.
26. Wallin E, Norstrom T, Andreasson S. Alcohol prevention targeting licensed premises: a study of effects on violence. J Stud Alcohol 2003, 64:270–277.
27. Jones L, James M, Jefferson T, Lushey C, Morleo M, Stokes E et al. A review of the effectiveness and cost-effectiveness of interventions delivered in primary and secondary schools to prevent and/or reduce alcohol use by young people under 18 years old Alcohol and schools: Review of effectiveness and cost effectiveness - Main report (PHIAC 14.3a), 2007. Available at: http://guidance.nice.org.uk/page.aspx?o=427775 Accessed 09/07/08.

28. Stockwell T. A Review of Research into the Impacts of Alcohol Warning Labels on Attitudes and Behaviour. Centre for Addictions Research of BC University of Victoria British Columbia, Canada. 2006: Available at: http://www.carbc.uvic.ca/pubs/AlcWarningLabelsTS.pdf. Accessed 03/07/08
29. Dinh-Zarr T, Goss C, Heitman E, Roberts I, Diguiseppi C. Interventions for preventing injuries in problem drinkers. Cochrane Database Syst Rev 2004, Issue 3: CD001857.
30. Havard A, Shakeshaft A, Sanson-Fisher R. Systematic review and meta-analyses of strategies targeting alcohol problems in emergency departments: interventions reduce alcohol-related injuries. Addiction 2008, 103:368–376.
31. Anderson P. “Know the risks of alcohol”. Arch Hel Med 2008, 25:65-71.

pp: 188-195
E-ISSN:1791-809X www.hsj.gr