

# Critique 110: Divergent effects of regular moderate and binge drinking – 30 April 2013

Graff-Iversen S, Jansen MD, Hoff DA, Høiseth G, Knudsen GP, Magnus P, Mørland J, Normann PT, Næss ØE, Tambs K. Divergent associations of drinking frequency and binge consumption of alcohol with mortality within the same cohort. *J Epidemiol Community Health* 2013;67:350-357. doi:10.1136/jech-2012-201564.

## Authors' Abstract

**Background** Observational studies show beneficial effects of moderate alcohol drinking on all-cause and cardiovascular disease (CVD) mortality, while binge drinking has been linked with increased mortality. The aim of this study was to assess the associations of alcohol use with mortality in a population with a hybrid of drinking patterns.

**Method** Participants in a population based cardiovascular health survey in Finnmark county in 1987–1988, aged 20–62 years, constituted the study cohort. Alcohol use was self-reported by use of questions on frequency of beer, wine and liquor intake, and one question on intake of around five drinks or more per occasion (binge drinking). Information on education, income and use of alcohol in an earlier and in a later survey was linked to the file. Mortality was assessed throughout 2009 by Cox regression, with adjustment for potential confounding factors. In the analysis of mortality by frequency of any alcohol use, we adjusted for binge consumption and vice versa.

**Results** Two opposite trends appeared: a higher all cause mortality in both sexes, and higher CVD mortality in men, with increasing frequency of binge drinking, compared with non-bingers. Second, in both sexes low frequent use of any alcohol was associated with lower all-cause and CVD mortality, compared with abstention. The combination of any use of alcohol at least weekly and binge consumption at least monthly was common, particularly in men.

**Conclusions** Questions on drinking frequency and a specific question on binge drinking capture different effects of alcohol use on all-cause and CVD mortality.

## Forum Comments

The present study relates alcohol consumption during middle age to mortality over more than 20 years among a large cohort of subjects in Norway. In this study, the alcohol drinking pattern most commonly reported was heavy drinking on infrequent occasions. Previous research has

demonstrated that a very different drinking pattern – the frequent consumption of small amounts of alcohol – is generally considered to be the pattern associated with most health benefits.

Specific comments on the present study: This paper from Norway has some unusual aspects, as it appears that most alcohol consumption in the subjects in this follow-up study occurred once a week or less frequently, but with the consumption of large amounts of alcohol on each drinking day. Only about 11% of men and 3% of women consumed alcohol more than once a week. Further, of 5,811 men who consumed alcohol, 4,411 (76%) reported binge drinking ( $\geq 5$  drinks/occasion) at least once during the preceding year; among the 6,123 women in the study, 36% reported binge drinking “a few times last year” or more frequently.

In the present study, both men and women who reported consuming alcohol up to twice a month had about 20% lower mortality than did abstainers. All groups reporting binge drinking had higher mortality than non-binge drinkers (which was statistically significant for men and similar in estimated effect among women). The effects of alcohol intake on the risks of cardiovascular and ischemic heart disease mortality were similar to the risk of total mortality, being lower among drinkers but higher among those who reported binge drinking.

Despite the drinking pattern among these subjects, the authors found that mortality was lower among drinkers than among abstainers, but mortality was higher among binge drinkers. Thus, from this population with an “unfavorable” drinking pattern, the results of this study nevertheless support results typically found in more moderately drinking populations, with the “most favorable” drinking pattern being more frequent consumption but without binge drinking. The results for this study may relate to a typical Northern European pattern of drinking (not frequent but heavy on each occasion), but may not apply directly to other European or North American populations, where drinking is more frequent but binge drinking less common.

Comments of Forum reviewers: Reviewer Skovenborg stated: “The paper is based on data from inhabitants of Finnmark, a binge-drinking county *par excellence*. The external validity of the study is limited to populations with similar social conditions (high rate of unemployment, unpredictable income levels, and binge drinking traditions).” Reviewer Skovenborg had several other comments: “The authors state that among the strengths of the study are a high participation rate and complete follow up. However, only about 80% of the invited Finnmark inhabitants chose to take part in the Finnmark Cardiovascular Health surveys ( $n = 17,823$ ), and for the present study a total of 5,308 persons (29.8%) had to be excluded because of non-response to the alcohol questionnaire. At follow up in 2007 only 40.3% of the study group responded to a postal questionnaire including questions on alcohol use.

“Secondly, it is hard to suggest what biological mechanisms would be able to bestow a reduced all-cause mortality risk for women consuming alcohol only twice a month or less. The authors admit that under-reporting is the likely explanation of low-frequent consumption. The lack of assessment of the number of alcohol units per week is a considerable weakness of the study.”

Skovenborg continues: “Once again we are left with the question of where the boundary lies between protective and hazardous drinking. Most studies do not assess drinking patterns over the whole spectrum of total alcohol intake and it is difficult to differentiate between the influence of total alcohol intake and of drinking pattern. Another problem is the confounding effects of smoking. As the criterion for binge drinking increases, there is an increase in the proportion of drinkers who smoke (*Murray RP, Tyas ST, Snow W, Ekuma O, Bond R, Barnes GR. Exploring the boundary between health protective and hazardous drinking in a community cohort. Addictive Behaviors 2010;35:278-281*). In the present study heavy smoking was strongly associated with binge drinking: in men 65.3% of participants who reported binge drinking  $\geq 3$  times/week were heavy smokers. Finally, this complexity makes the issue of binge drinking within the light-to-moderate alcohol range an important area for further investigation.

“Unlike the subjects in the present study, combining moderate drinking with occasional binges is a very common drinking pattern in Denmark, and the civil registry number, which is unique to every Danish citizen, makes follow up of study participants complete and reliable. Among the 26,786 men and women from the Danish National Cohort Study, 10,870 men (83.7%) and 12,465 women (90.4%) were light-to-moderate drinkers, defined as drinking  $\leq 21$  drinks/week for men and  $\leq 14$  drinks/week for women (1 Danish unit = 12 grams of alcohol = 1.5 UK units). Among participants with a binge pattern, the median number of drinks per binge occasion was nine drinks for men and seven drinks for women. Among light-to-moderate drinkers reporting only occasional binge drinking, the risk of coronary heart disease and total mortality was not different from that of light-to-moderate drinkers reporting no binge drinking (*Skov-Ettrup LS, et al. Binge drinking, drinking frequency, and risk of ischaemic heart disease: A population-based cohort study. Scand J Publ Health 2011;39:880-887*). (There was a strong correlation between binge drinking and the total amount of alcohol consumed, but the authors controlled for total alcohol intake when comparing binge and non-binge drinkers.) In that Danish study, drinking frequency did not appear to be an important determinant of the risk of heart disease and all-cause mortality.”

Reviewer Lanzmann-Petithory points out that the data do not permit exact estimates of effect for different types of beverages. She adds: “I do note that wine is less related to binge drinking than other beverages. As stated by the authors: ‘In men, the frequency of binge drinking was

correlated with intake of liquor (0.58) and beer (0.52), and weaker with wine (0.26), and in women the correlations were 0.47 for liquor, 0.49 for beer and 0.36 for wine (all  $p < 0.001$ ).”

Reviewer Svilaas pointed out that “The drinking pattern reported is as expected in this Northern region of Norway. However, as said in the paper, during the last few decades, wine consumption has increasingly replaced liquor consumption.”

In commenting on the results of the present study, Forum reviewer Ursini quoted Quintus Flaccus (known in the English-speaking world as Horace) and Epicurus, descending from the ethics of Aristotle, suggesting that we should “Escape from extremes.” He added Mark Twain’s support of this premise: “Moderation is necessary, also in moderation.” In comparing abstinence and binge drinking, one could also quote Sir Walter Raleigh: “It is the nature of men having escaped one extreme, which by force they were constrained long to endure, to run headlong into the other extreme, forgetting that virtue doth always consist in the mean.”

As the authors state, this study adds to previous knowledge the need for assessment of binge drinking in studies on alcohol and mortality, as detrimental effects do not seem to be captured adequately by the usual measurement of the average alcohol intake only.

### **Forum Summary**

The present study relates alcohol consumption measured in young to middle-aged adults to mortality over a follow-up period of 20 years. The analyses are based on data from a large population in a region of Norway where the alcohol drinking pattern most commonly reported was binge drinking on infrequent occasions. Previous research has demonstrated that a very different drinking pattern – the frequent consumption of small amounts of alcohol – is generally considered to be the pattern associated with most health benefits.

In the present study, both men and women who reported consuming alcohol up to twice a month had about 20% lower mortality than did abstainers. All groups reporting binge drinking had higher mortality than non-binge drinkers (which was statistically significant for men and had a similar estimated effect among women). Cardiovascular and ischemic heart disease mortality had similar patterns as total mortality, being lower among drinkers but higher among those who reported binge drinking.

The key finding of this study is that there are divergent effects on mortality of the frequency of drinking and the amount of alcohol consumed per occasion. While the results for this study

may reflect a certain Northern European pattern of drinking (not frequent but heavy on each occasion), they may not apply to other European or North American populations, where drinking is more frequent but binge drinking less common. Nevertheless, the results of this study support results typically found in more moderately drinking populations: more frequent drinking, but smaller amounts per occasion, is the pattern of alcohol consumption associated with the lowest risk of mortality. Both aspects of drinking must be considered when studying the relation of alcohol to mortality.

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*Comments on this critique by the International Scientific Forum on Alcohol Research were provided by the following members:*

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