

from the International Scientific Forum on Alcohol Research - **Critique 101: A review of the association of alcohol consumption with the risk of developing hypertension — 22 January 2013**

Briasoulis A, Agarwal V, Messerli FH. Alcohol consumption and the risk of hypertension in men and women: A systematic review and meta-analysis. *J Clin Hypertens* 2012;14:792-798.

Authors' Abstract

Heavy alcohol intake increases the risk of hypertension, but the relationship between light to moderate alcohol consumption and incident hypertension remains controversial. The authors sought to analyze the dose-response relationship between average daily alcohol consumption and the risk of hypertension via systematic review and meta-analysis. Electronic databases were searched for prospective control studies examining quantitative measurement of alcohol consumption and biological measurement of outcome. The primary endpoint was the risk of developing hypertension based on alcohol consumption. The level of alcohol consumption from each study was assigned to categorical groups based on the midpoint of their alcohol consumption classes to make possible the comparison of heterogeneous classification of alcohol intake. A total of 16 prospective studies (33,904 men and 193,752 women) were included in the analysis.

Compared with nondrinkers, men with alcohol consumption with <10 g/d and 11 to 20 g/d had a trend toward increased risk of hypertension (relative risk [RR], 1.03; 95% confidence interval [CI], 0.94–1.13; P=.51) and (RR, 1.15; 95% CI, 0.99–1.33; P=.06), respectively, whereas a significantly increased risk of hypertension was found with heavy alcohol consumption of 31 to 40 g/d (RR, 1.77; 95% CI, 1.39–2.26; P<.001) and >50 g/d (RR, 1.61; 95% CI, 1.38–1.87; P<.001). Among women, the meta-analysis indicated protective effects at <10 g/d (RR, 0.87; 95% CI, 0.82–0.92; P<.001) and a trend toward decreased risk of hypertension with alcohol consumption 11 to 20 g/d (RR, 0.9; 95% CI, 0.87–1.04; P=.17), whereas a significantly increased risk of hypertension was indicated with heavy alcohol consumption of 21 to 30 g/d (RR, 1.16; 95% CI, 0.91–1.46; P=.23) and 31 to 40 g/d (RR, 1.19; 95% CI, 1.07–1.32; P=.002).

In men, heavy alcohol consumption is associated with increased risk of hypertension, whereas there is a trend toward increased risk of hypertension with low and moderate alcohol consumption. The relationship between alcohol consumption and hypertension is J-shaped in women. Limiting alcohol intake should be advised for both men and women.

Forum Comments

Most previous studies, especially cross-sectional studies, have shown that moderate to heavy drinkers tend to have higher levels of blood pressure, and are more likely than non-drinkers or light drinkers to have hypertension. This paper presents a meta-analysis based on 16 prospective studies that evaluated the risk of developing hypertension according to the level of alcohol consumption previously recorded.

Specific comments on paper: The paper's main results are that among men, there is little effect of alcohol consumption up to 30 grams of alcohol per day (the equivalent of about 2 ½ "typical drinks" by US standards or more than 3 drinks by UK standards), but evidence of an increased risk of hypertension for the intake of greater amounts of alcohol. For women, light drinking appears to be associated with a slightly lower risk of hypertension, but more than 20 grams/day of alcohol may increase the risk. Thus, the results of this study indicate that people who

consume alcohol according to most current drinking guidelines do not show an increase in their risk of hypertension, but heavier drinking appears to increase the risk.

Some Forum reviewers were concerned that some studies had not adjusted for potentially important confounders. Said one, "I am concerned about the lack of correction for other factors that probably affect blood pressure such as smoking and obesity." Another stated: "This publication is well balanced, but more emphasis should be put on genetic alterations (such as APO-E4 polymorphisms) and enzyme deficiencies in individual patients. One size does not fit all!"

Another Forum member stated: "The authors conclude that there is a linear relationship between alcohol consumption and blood pressure; I do not find it linear. The relationship between heavier consumption and risk of developing hypertension is more clear. In Limitations described in the paper, the authors have listed no data of drinking pattern, type of beverages, and co-factors. The authors should have been more careful making their conclusions from this study, as only a trend is observed for many comparisons."

Stated a reviewer: "Overall, the results are what previous publications have led us to expect.

The most interesting result is the difference between the sexes. We need more intricate information on drinking regarding many facets of health, including blood pressure effects associated with patterns of drinking, what people drink, and so on."

Forum reviewer Keil commented: "I am concerned with blood pressure measurement and the definition of 'hypertension.' To categorize a continuous variable like blood pressure into hypertension or not is not a wise decision. Once upon a time Sir George Pickering said 'Medicine can count only to two' when he wanted to criticize that doctors did not understand that blood pressure is a continuous variable with no threshold for the risk of CHD or stroke. But I understand that the prospective cohort studies had selected the more or less artificial category 'hypertension,' which was also defined differently in different studies. For me it is much more important that in large prospective cohort studies with outcome variables such as total mortality and CHD morbidity/ mortality, the amount of alcohol carrying the lowest total risk is about 30 gr of alcohol/per day for men." Reviewer Keil added: "In my own cross sectional studies in Munich and Lübeck, blood pressure increased from the intake category 40 gr of alcohol/per day onward, with a 2 mmHg systolic and a 1 mmHg diastolic increase per increment of 10 gr per day."

Inconsistencies between data presented and conclusions of authors: Forum reviewer Skovenborg had serious concerns about the conclusions of the authors: "It is worrying that the conclusions of the authors are not in agreement with their own data; he gives the following illustrations:

"(1) While the authors state that 'heavier alcohol consumption >20 g/d is associated with the risk of development of hypertension in both women and men,' their data show that for men and women a significant increased risk of hypertension occurs only with an intake of 31 – 40 grams of alcohol per day.

"(2) With regards to light to moderate alcohol consumption (<20 g/d), the authors state that 'women had a potentially reduced risk of hypertension, while men had an increased risk of hypertension.' In the data presented within the text, an increase in risk for men at these levels is not statistically significant.

"(3) The authors state: 'Among men, the relationship was more linear up to a dose of 40 g/d.' This is not consistent with the data presented.

"(4) 'Even for light drinkers, vigilant blood pressure monitoring is necessary.' This is an unusual

warning considering that light intake in women is associated with a lower risk of hypertension while an intake of alcohol below 30 grams per day has no significant association with hypertension in men. It makes you wonder whether the authors have read and understood their own paper.”

### Forum Summary

A meta-analysis from investigators at Columbia University in New York evaluated the risk of developing hypertension according to the level of alcohol consumption previously recorded. The analyses were based on data from 16 prospective studies. The paper’s main results are that among men, there is little effect of alcohol consumption up to 30 grams of alcohol per day (the equivalent of about 2 ½ “typical drinks” by US standards or more than 3 drinks by UK standards), but evidence of an increased risk of hypertension for the intake of greater amounts of alcohol. For women, light drinking appears to be associated with a slightly lower risk of hypertension, but more than 20 grams/day of alcohol may increase the risk.

While Forum members thought that the analyses were done well, they had some concerns about the conclusions of the authors, some of which appear to not be in line with the data they presented. For example, their statement that “heavier alcohol consumption >20 g/d is associated with the risk of development of hypertension in both women and men” is not consistent with their findings of a significant increased risk of hypertension only with an intake of 31 – 40 grams of alcohol per day.

Similarly, the authors conclude: “Even for light drinkers, vigilant blood pressure monitoring is necessary,” which may not be appropriate given that their data show that intake below 30 grams per day has no significant association with hypertension in men and may actually reduce the risk of hypertension in women.

Overall, the results of this study, in line with findings from most previous research, indicate that people who consume alcohol according to most current drinking guidelines (no more than 2 typical drinks/day for men or 1/day for women) do not show an increase in their risk of hypertension, but heavier drinking appears to increase the risk. Not discussed in this paper, but especially important in terms of health, is that light drinking is associated with a significant and rather large decrease in the risk of the most serious sequelae of hypertension: coronary heart disease and ischemic stroke.

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The following members of the International Scientific Forum on Alcohol Research provided comments included in this critique:

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