The relationship between alcohol consumption and coronary risk factors in the CORIS study

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Summary

The cross-sectional relationship between reported alcohol consumption and coronary risk factors was investigated in the three-community Coronary Risk Factor Study (CORIS) population, consisting of 7188 participants. Among drinkers of both sexes, the lowest level of systolic and diastolic blood pressure, serum cholesterol, tobacco use, body mass index, total daily energy expenditure, uric acid and Bortner score were found at the lower end of the alcohol consumption range. Non-drinkers had higher mean values for most of these risk factors than light drinkers. An increase in alcohol consumption was associated with a progressive increase in almost all the risk factors. Although men used more alcohol than women, at comparable alcohol consumption levels women generally had lower levels of risk factors than men.

Results

The mean ages and the mean weekly alcohol consumption of the non-users and of each of the user quintile groups are summarised in Table I, which shows a small and insignificant increase in age from the 1st to the 5th quintile groups. Differences in mean levels of risk factors among different categories were therefore unlikely to be due to age-clustering within certain quintile groups.

Mean values of systolic and diastolic blood pressure, serum cholesterol, number of cigarettes smoked per day and BMI (in men) were higher in non-drinkers than in the 1st quintile group of drinkers. With increasing alcohol consumption these mean values showed a general progressive increase. In women the BMI decreased from non-drinkers to the 1st quintile group, remained relatively unchanged to the 4th quintile and then decreased in the 5th quintile group. The means of HDL-C (and HDL-C/TC ratio) as well as the Bortner score increased sharply thereafter more gradually with increased consumption. Total daily energy expenditure, based on activities reported in the questionnaire and on uric acid level in the male 5th quintile group.

Discussion

More than three-quarters of the men and half of the women in this study reported the consumption of alcohol, indicating a widespread social habit in the study population. Although the alcohol consumption of women was lower than that of men,
### TABLE I. AGE (MEAN ± SD) AND WEEKLY CONSUMPTION (MEAN ± SD) OF THE STUDY POPULATION

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstainers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Age (yrs)</td>
<td>Alcohol (g/wk)</td>
</tr>
<tr>
<td>785</td>
<td>38.1 ± 17.4</td>
<td>0</td>
</tr>
<tr>
<td>User quintiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>520</td>
<td>37.0 ± 16.3</td>
</tr>
<tr>
<td>2nd</td>
<td>524</td>
<td>40.1 ± 13.7</td>
</tr>
<tr>
<td>3rd</td>
<td>503</td>
<td>40.9 ± 13.4</td>
</tr>
<tr>
<td>4th</td>
<td>511</td>
<td>42.3 ± 12.3</td>
</tr>
<tr>
<td>5th</td>
<td>514</td>
<td>43.7 ± 11.8</td>
</tr>
</tbody>
</table>

**Fig. 1.** Coronary risk factor values of the abstainers and user quintile groups in relation to the alcohol consumption of each group (\(\bar{X}_{\text{mean} ± \text{SEM}}\)).
the relationship of alcohol consumption with coronary risk factors remained, with few exceptions, the same in both sexes. Non-drinkers were by no means the healthiest group in respect of coronary risk factors. Their mean values of risk factors were invariably less favourable than that of the lightest drinkers (1st quintile group). This may be due to the heterogeneous nature of the group of non-drinkers, which includes those who do not drink for health reasons as well as those who do not drink for ill-health reasons. Although non-drinkers may include ex-drinkers who gave up because of ill-health, it has also been reported that lifetime abstainers have a higher mortality than current drinkers. Non-drinkers as a reference group should therefore be viewed with caution.

Alternatively, from Fig. 1 it appears that the lightest drinkers, i.e. the 1st quintile group, may be more suitable as a reference group. On the basis of their low weekly alcohol consumption, this group may be seen as the occasional drinkers. Quantitatively their consumption did not differ much from that of the non-drinkers, but qualitatively they fell into an entirely different group with a markedly better risk factor profile.

The message conveyed by the relationship between different levels of alcohol consumption and coronary risk factors is clear. Light drinking is generally associated with a more favourable coronary risk factor profile, relative to the other categories of drinkers and to non-drinkers. Heavy drinking in men in our community study is associated with a cluster of adverse coronary risk factors. The heaviest male drinkers (5th quintile group) had the highest systolic and diastolic blood pressure, serum TC level, tobacco use, BMI, uric acid level and Bormer score of all the subjects. The form of the graphs, with low levels of most of the risk factors in light drinkers and high levels in heavy drinkers, suggests a positive dose-response relationship, which is potentially reversible, between alcohol intake and the level of coronary risk factors.

Both the systolic and diastolic blood pressures were positively associated with increasing alcohol consumption among the drinkers, more so in men than in women. Not only did the mean systolic and diastolic blood pressure increase in male drinkers by 8.7 and 7.8 mmHg respectively from the 1st to the 5th quintile group, but the prevalence of hypertension (≥160/95 mmHg) also increased from 15.6% to 36.1% in these quintile groups. Klatsky et al. reported that this relationship was independent of smoking, coffee use, salt use, blood group, educational attainment and adiposity. A reduction in alcohol consumption could therefore justifiably be recommended to hypertensive persons who are heavy drinkers.

Occasional or light drinkers had the lowest smoking rate in both sexes. This situation progressively worsened to a twofold increase in both men and women in the 5th quintile group.

Our data therefore confirm the positive association between smoking and drinking. The slightly elevated BMI in the male heavy drinkers and markedly lower BMI in the female 5th quintile group indicate that other dietary changes, which differed for the sexes, may have accompanied the drinking pattern in these categories.

The heaviest drinkers in both sexes had higher mean Bortner scores than non-drinkers and light drinkers, indicating that coronary-prone behaviour is increased among heavier drinkers and is decreased among non-drinkers and light drinkers.

An elevated HDL-C level in both sexes and a markedly lower BMI in women were the only beneficial characteristics in the heaviest drinkers compared with the non-drinkers or light drinkers. Physical activity and alcohol consumption are independently and positively associated with increased levels of HDL-C, which, in turn, may protect against coronary heart disease. However, some doubt still exists whether alcohol increases the anti-atherogenic HDL₂ fraction or the neutral HDL₃ fraction. The elevated HDL-C was largely responsible for the increase in TC in male heavy drinkers.

Our data do not allow us to recommend the use of alcohol by non-drinkers. It is risky to extrapolate future health from cross-sectional associations, but it can be said that, overall, the most desirable risk factor profile appears to be found in those consuming the equivalent of 1 - 2 drinks daily.

REFERENCES