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Estimation of alcohol intake from laboratory results

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SUMMARY Subjects with abnormalities in a number of laboratory tests were shown to have higher than usual probabilities of being heavy drinkers. Quantitative estimates have been made of the probabilities of heavy drinking from the results of the following tests: gamma-glutamyl transpeptidase, mean corpuscular volume, uric acid, triglyceride, and aspartate aminotransferase. In men, but not in women, there was a clear increase in this probability with increasing test results for these five tests, which may prove useful in the detection of individuals who are at risk from their drinking habits.

In the previous paper (Whitfield *et al.*, 1978) we showed the effects of drinking habits on some biochemical and haematological test results. It was pointed out that it might be possible to use these results to detect individuals at high risk of damage (physical or psychosocial) from alcohol abuse. Even though there are no clear biochemical cut-off points between heavy drinkers and others, the probability of danger can be estimated from the results of the five tests: gamma-glutamyl transpeptidase (GGT), mean corpuscular volume (MCV), triglycerides, uric acid, and aspartate aminotransferase (AsT).

It should be emphasised that these results are based on data from a population of well people who attended a health screening centre in Sydney, and they cannot be applied directly to hospital patients or to populations from elsewhere as the prior probability of alcohol abuse and of other diseases affecting the results will differ. We hope to demonstrate, however, the practicability of such an approach.

Subjects and methods

These were described previously. The results were analysed in the following way: for each of the five tests the results were grouped into about 12 to 20 categories, according to the values of the measured parameter. For each group the proportion of people saying that they drank either six to eight drinks, or nine drinks or more, every day or most days were calculated. This proportion was plotted against the analyte concentration for each of the five tests. The results for men are shown in Figs 1-5, and for women for GGT in Fig. 6. In each case the prior probability, which is the chance of an individual being a heavy drinker if he or she is in this population and no other information is available, is shown as a horizontal line. This probability is 14% for men and 3% for women.

Discussion

The results for men show some significant and possibly useful trends, but this is not so for women. The

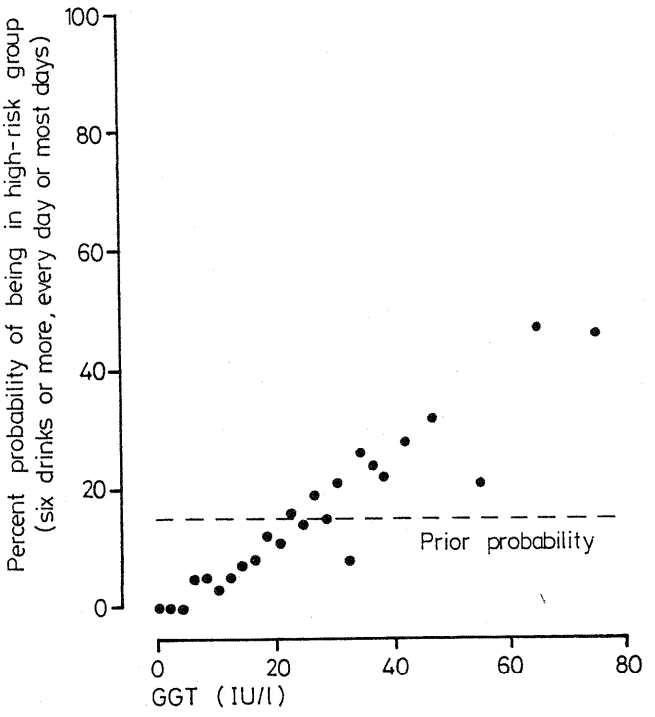

Fig. 1 *Relationship between plasma gamma-glutamyl transpeptidase and probability of heavy drinking, in men.*

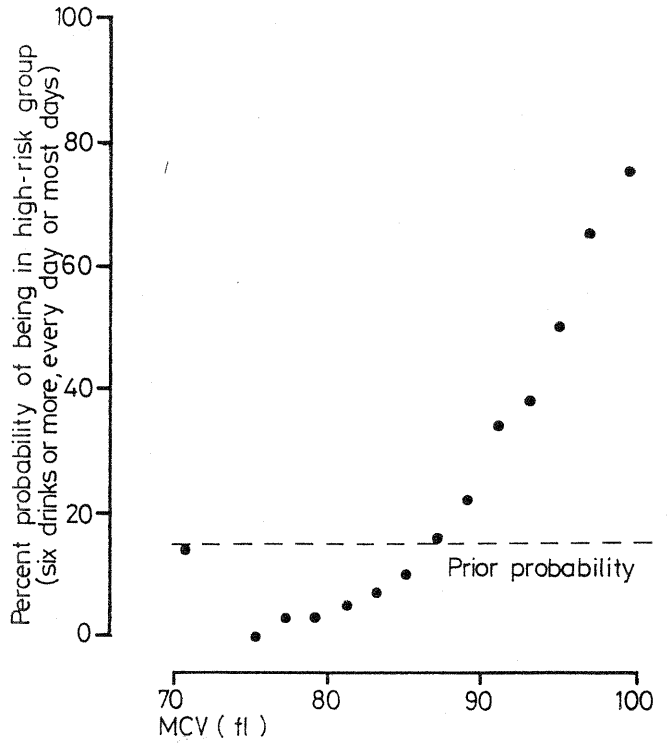

Fig. 2 *Relationship between erythrocyte mean corpuscular volume and probability of heavy drinking, in men.*

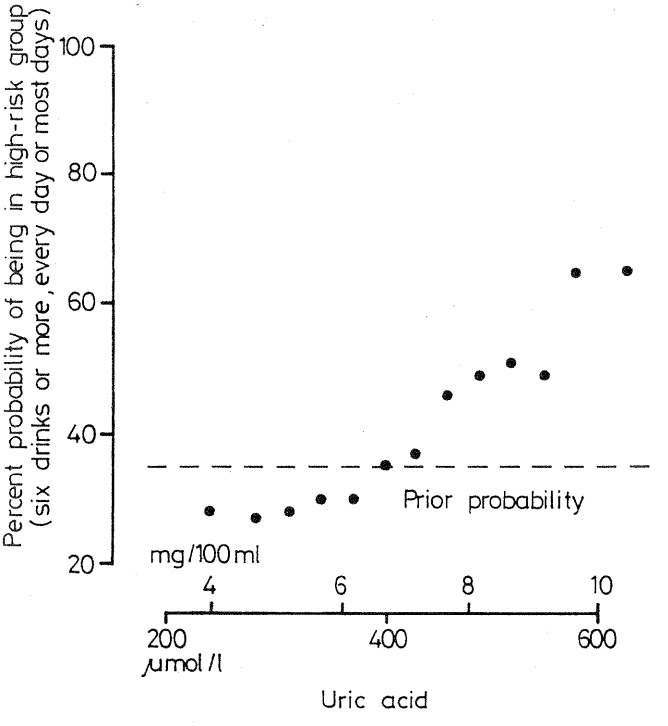

Fig. 3 *Relationship between plasma uric acid and probability of heavy drinking, in men.*

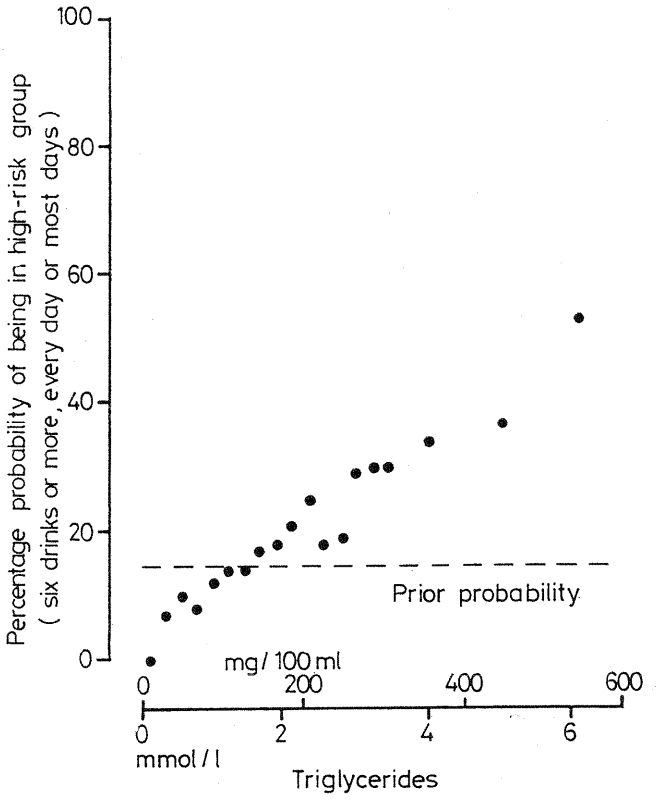

Fig. 4 *Relationship between plasma triglyceride and probability of heavy drinking, in men.*

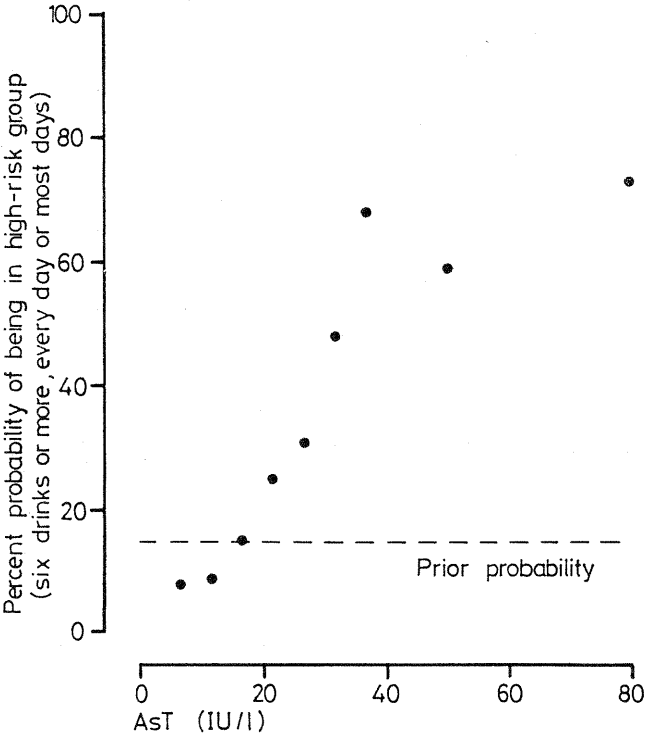

Fig. 5 *Relationship between plasma aspartate aminotransferase and probability of heavy drinking, in men.*

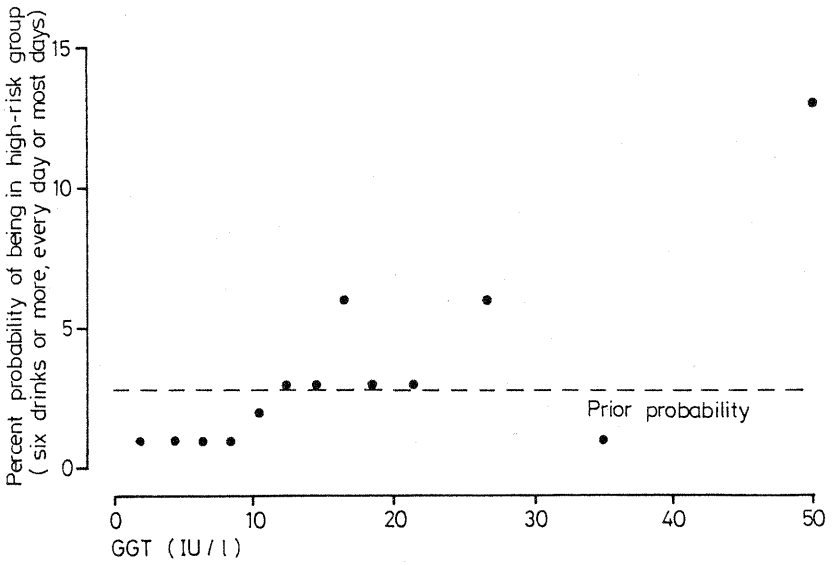

Fig. 6 *Relationship between plasma gamma-glutamyl transpeptidase and probability of heavy drinking, in women.*

prior probability for women is low, and it will be seen from Fig. 6 that the points are rather widely scattered. For men, however, each of the five tests showed a strong trend, the probability of heavy drinking being progressively greater with increasing test values. This was so even within the conventionally accepted 'normal range'. For example, if the plasma GGT in a man is 5 IU/1, the probability is only about 2%, and if it is 35 IU/1, it is about 25%. Similarly, an AsT of 10 IU/1 gives a probability about 7% and one of 25 IU/1 about 27%.

It should be pointed out that these probabilities strictly relate not to the risk of heavy drinking but to the chance of admitting to heavy drinking. However, it seems reasonable to assume that the true probability is higher than the admitted one.

The question obviously arises whether these calculated probabilities are clinically useful, and two points arise. Firstly, if the discovery of dangerous drinking habits does not lead to their modification, then little will be gained. However, if the situation remains unrecognised by the individual and his physician, then there would seem no hope of improvement. The awareness of alcohol problems in this population is very low: it has been found from analysis of other questions asked of the subjects that only 10% of these heavy drinkers considered that they had a drinking problem (Reynolds *et al.*, 1976), and that far fewer had ever been told by a doctor that they had such a problem. Therefore we would advocate that if biochemical tests are to be carried out on large numbers of people, as is the case in a number of situations nowadays, the attem on of the recipients of the results should be drawn to the possibility that abnormalities are due to heavy drinking, and the calculation of these probabilities or a combined index from all the results would be a good way of doing this.

References

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