Alcohol Consumption and Cognition

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Loss of cognitive function in old age, especially severe cognitive loss due to Alzheimer's disease, is a serious public health problem that will only increase as the number of people in the oldest age groups increases in the United States and other developed countries. Effective preventive measures are the key to coping with this potentially overwhelming problem as it emerges and are even more important than is treatment of affected persons. Unfortunately, very few effective means of either prevention or treatment have been identified to date.

Studies that provide clues about prevention are therefore welcome. In this issue of the Journal, Stampfer et al. report that as compared with abstinence, low-to-moderate consumption of alcohol was associated with better cognition both cross-sectionally and over time in a study that involved more than 11,000 U.S. nurses. Consumption of 1.0 to 14.9 g of alcohol per day, or about one drink per day or less, was associated with a reduced risk of cognitive impairment (relative risk as compared with abstinence, 0.85; 95 percent confidence interval, 0.74 to 0.98). The women's cognitive status was characterized in terms of both their cross-sectional performance on brief telephone tests of cognitive function and the difference in results between tests administered an average of 1.8 years apart.

The investigators clearly recognized the importance of prevention by focusing on the relation of a modifiable everyday behavior to the preservation of cognitive function in later life. They examined this relation in a large, longitudinal observational study—the Nurses' Health Study—and considered alcohol consumption over a long period, up to 15 years.

Cognitive function was assessed by a telephone interview, a fairly new technique, but there is little suggestion that the use of this technique underestimated cognitive decline because of undue loss of impaired subjects on repeated testing.

Overenthusiasm for a potentially preventive measure, however, can be risky, and as with all studies, this report has important limitations that we must recognize and understand. The use of an observational study to provide information on the relation of a lifestyle variable or a health habit to cognition presents difficult and complex challenges, especially when that potentially beneficial habit is alcohol consumption. Low-to-moderate alcohol consumption has previously been linked to several positive health outcomes, most convincingly to a decreased
risk of coronary heart disease; but alcohol abuse is also linked to a wide range of health and social problems according to both common knowledge and formal study.

Two limitations of the present report deserve particular attention. The first is the direction of the observed association. This study examined whether light-to-moderate alcohol consumption was related to a change in cognitive function. We must recognize, however, that older persons who are in good cognitive and physical health may be more likely than less healthy peers to indulge in low-to-moderate alcohol consumption as part of their social activities. Precise information about older people is limited, but persons who consume moderate amounts of alcohol appear, on average, to have more favorable general health and social characteristics than abstainers. Although the observed relation between alcohol and cognition persisted after Stampfer et al. adjusted their analyses for a number of social and health characteristics, demonstrating that the changes in cognition are actually attributable to alcohol consumption is impossible in an observational study.

A second and perhaps more important limitation is complex and concerns meaningful measurement of cognition as an outcome. As already noted, Stampfer et al. assessed cognition in two ways, cross-sectionally and as change over time. Assessment of cognition at a single point in time, as in a cross-sectional analysis, is very likely not an informative means of examining cognitive impairment among older persons. Education and culture strongly influence the results of cognitive testing and may also be related to health habits such as alcohol consumption in subtle, difficult-to-measure ways. Among older persons, however, the educational and cultural factors that influence the results of cognitive testing are usually constant over time. To the extent that this is true, these factors influence the measurement of cognition at each point in time, but they do not influence the change in results over time for each person. Thus, a change in results is a far more meaningful measure of cognition than is cross-sectional testing.

One must estimate how well Stampfer et al. were able to assess changes in cognitive function over time. The authors attempted to do so by setting a standard for impaired test performance at the second measurement and including the baseline level of performance as a predictor in the model. Unfortunately, the intuition that one can fully assess change as an outcome and distinguish it from the initial level of performance on the basis of measurements at only two times is misleading, since any difference between performance at two points in time necessarily reflects much of the initial cross-sectional level. A model assessing change from measurement at three or more times can adjust for this problem by allowing simultaneous but separate estimation of the level and the change over time and can more accurately distinguish factors associated with the level of cognitive performance (e.g., cultural influences) while empirically testing whether other factors of interest (e.g., alcohol consumption) are related to a change in cognitive performance.

The prevention of cognitive decline in old age as well as the conditions underlying it is one of the major public health challenges of the 21st century. Few things are as valuable as the unimpaired ability to reason. In the light of the importance and complexity of the issue, what can readers reasonably conclude about the relation between mild-to-moderate alcohol consumption and cognition? The report by Stampfer and colleagues represents an incremental advance but necessarily leaves a substantial residue of uncertainty. We must await future studies, preferably population-based, that combine the strengths of the present investigation — large size, rigorous conduct, and measurement of the exposure over a long period — with measurement of cognition at a sufficient number of points in time to ensure that we are actually examining changes in cognition. In the meantime, persons seeking to maximize cognition in old age must keep in mind both the uncertainty of the current results and the knowledge that alcohol consumption can be a double-edged sword, with the dangers of overindulgence being all too familiar.

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