

Excessive drinking may lead to poor brain health via obesity

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Prior research has shown that alcohol abuse and dependence are typically associated with higher rates of obesity, as evidenced by a high body mass index (BMI). Findings from a new study of the relationship between BMI and regional measures of brain structure, metabolite concentrations, and cerebral blood flow suggest that alcohol-related brain injuries may result from a complicated fusion of hazardous drinking, chronic cigarette smoking, and even elevated BMI.

Results will be published in the December 2010 issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Although alcohol doesn't contain fat, it contains seven calories per gram, which comes second only to fat, which has nine calories per gram," said Stefan Gazdzinski, who was a researcher at Northern California Institute for Research and Education in San Francisco when the study was carried out but is now a researcher at Jagiellonian University in Poland. "These calories add up over time. In fact, daily consumption of more than 30 grams of ethanol - the amount of alcohol in two to three 12-ounce beers - is associated with risk for abdominal obesity."

"Abdominal obesity has higher health risks than fat deposition in other body areas, for example, legs and hips," added Susan F. Tapert, a professor of psychiatry at the University of California, San Diego and director of Substance Abuse/Mental Illness in the VA San Diego

Healthcare System. "As obesity rates are increasing rapidly among alcoholics and non-alcoholics, these relationships are important to understand."

"Excessive weight is not only a risk factor for cardiovascular disease or diabetes, but it is also a risk factor for developing dementia," said Gazdzinski, also the study's lead author. "Obesity has been shown to be associated with worse decision making and problem solving throughout lifetime. We had previously observed lower concentrations of some [brain](#) metabolites, markers of brain injury, in healthy non-alcohol dependent people with BMIs in the overweight to obese range. Knowing that individuals in developed countries who overuse alcohol are usually heavier than individuals enjoying alcohol in moderation - because of the caloric intake - we wanted to investigate if excess weight accounts for some of the brain injury usually observed in alcoholics."

Gazdzinski and his colleagues retrospectively analyzed data gathered from 54 alcohol-treatment seeking men who had been abstinent from alcohol for about one month. BMI, as well as imaging that assessed volume, blood flow, and metabolite concentrations of the brain were obtained from a 1.5 Tesla magnetic resonance scanner.

"It is commonly believed that it is the large amount of consumed alcohol by itself that leads to brain injury in alcoholics," said Dieter J. Meyerhoff, professor of radiology at the University of California San Francisco and San Francisco Veteran's Affairs Medical Center, and the principal investigator of this study. "This is only partly correct. In previous studies, we have shown that alcoholics who smoke cigarettes have greater brain injury than nonsmoking alcoholics. This new study suggests that a high BMI, independent of drinking and smoking, is also associated with [brain injury](#)."

"In other words, weight also is related to brain health among those with

alcoholism," said Tapert. "BMI may be a very important factor to consider when examining other potential consequences of alcohol use. Since individuals who consume substantial amounts of alcohol are at risk for obesity, it is important to understand the influence of body fat deposition on the measures we are examining. It could be that metabolic changes resulting from or causing obesity cause harm to the brain, at least among alcoholics."

The relationship between alcohol dependence and BMI is complicated, added Gazdzinski. "Alcoholics who drink the most are not necessarily the heaviest," he said. "In our sample, there was no correlation between drinking severity and BMI. Factors such as availability of funds for drinking may play a role, especially in countries where alcohol is heavily taxed. For example, the drinker may have not enough money to eat properly after drinking."

"While it is fortunate that tobacco use, violent crime, and some other unhealthy behaviors have declined in recent years, heavy drinking has remained relatively stable, and obesity rates have greatly increased," said Tapert. "These findings point to another deleterious outcome of becoming overweight: poor brain health. While it may be that poor brain cell functioning has led to the challenges these men faced with overconsumption of food and [alcohol](#), it is also possible that the [obesity](#) itself contributed to poor brain health. If so, weight loss, exercise, and improved self-care in addition to stopping drinking could result in improvements to brain health."

Provided by Alcoholism: Clinical & Experimental Research

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