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Study links drinking pattern to alcohol's effect on heart health

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For the first time, new research shows that patterns of alcohol consumption – a drink or two every night, or several cocktails on Friday and Saturday nights only – may be more important in determining alcohol's influence on heart health than the total amount consumed.

In the journal *Atherosclerosis*, scientists found that daily moderate drinking – the equivalent of two drinks per day, seven days a week – decreased atherosclerosis in mice, while binge drinking – the equivalent of seven drinks a day, two days a week – increased development of the disease. Atherosclerosis, or the hardening and narrowing of arteries, is a serious condition that can lead to a heart attack or stroke.

While population studies support an association between alcohol and cardiovascular disease, they've relied on self-reported data, which is not always accurate or reliable. According to study authors, this is the first study to provide concrete evidence linking drinking patterns to the development of vascular disease, and the nearly 15 percent of Americans who binge drink – as estimated by the Centers for Disease Control and Prevention – should take note.

"People need to consider not only how much alcohol they drink, but the way in which they are drinking it," said lead study author John Cullen, Ph.D., research associate professor in the Department of Surgery at the University of Rochester Medical Center. "Research shows that people have yet to be convinced of the dangers of binge drinking to their health; we're hoping our work changes that."

Scientists don't yet understand how moderate alcohol consumption benefits cardiovascular health or how heavy drinking episodes hurt it.

The National Institute on Alcohol Abuse and Alcoholism defines binge or "at-risk" drinking as consuming more than four drinks on any day for men, and more than three drinks on any day for women. Understanding how much alcohol is in a "standard" drink is also critical, something the institute is promoting through its new "Rethinking Drinking" campaign.

Health care professionals also need to be aware that drinking style matters and should address the issue when discussing alcohol consumption with patients, especially those who are at higher risk of atherosclerosis or who have suffered a heart attack in the past, added Cullen.

"This evidence is very interesting because it supports a pattern of drinking that is emerging in clinical studies as both safe and seemingly most protective against heart disease – frequent consumption of limited amounts of alcohol. This certainly backs up widespread clinical guidelines that limit drinking to one drink daily for non-pregnant women and two drinks daily for men," said Kenneth Mukamal, M.D., M.P.H., Associate Professor of Medicine at Harvard Medical School who studies the role of dietary and lifestyle factors, particularly alcohol consumption, on the incidence of cardiovascular and neurovascular disease.

In the study, mice in the "daily-moderate" group were fed ethanol equivalent to two drinks every day of the week, mice in the "weekend-binge" group were fed approximately seven drinks on two days of the week and mice in the control group were fed a non-alcoholic cornstarch mix. All mice were put on an atherogenic diet, which Cullen equates to a high-fat Western diet – think fried food every day – to encourage the development of atherosclerosis, which forms when fatty deposits or plaque collect on the inner walls of the arteries, causing them to narrow.

Levels of LDL or "bad" cholesterol plummeted 40 percent in the daily-moderate drinking mice, but rose 20 percent in the weekend-binge drinking mice, compared to the no-alcohol controls. High levels of bad cholesterol increase the risk of heart disease, and past studies show that every 10 percent increase in LDL results in a 20 percent increase in atherosclerosis risk.

Surprisingly, levels of HDL or "good" cholesterol went up in both the moderate and binge drinking groups, which Cullen speculates is an acute or short-term effect.

The volume of plaque, as well as the accumulation of immune cells that promote inflammation and consequently contribute to the narrowing of arteries, decreased in the moderate mice compared to no-alcohol mice. The opposite occured in the binge-drinking mice: Plaque volume and the number of inflammatory immune cells grew.

Another unexpected yet noteworthy finding was that the binge drinking mice gained significantly more weight than the moderate and control mice. Though all mice started at approximately the same weight and consumed similar amounts of food over the course of the study, the binge mice gained more than three times as much weight as the moderate mice and about twice as much weight as the control mice.

Building on this study, Cullen is investigating genes that are turned on or off following moderate and binge drinking episodes to determine if they influence outcomes.

Provided by University of Rochester Medical Center

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