'Alcohol and diet drinks' may increase intoxication more than 'alcohol and regular drinks'

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An individual's breath alcohol concentration (BrAC) following alcohol intake is influenced by several factors, including food. While it is known that food delays the stomach emptying, thus reducing BrAC, only recently has the role of nonalcoholic drink mixers used with alcohol been explored as a factor influencing BrAC. A new comparison of BrACs of alcohol consumed with an artificial sweetener versus alcohol consumed with a sugared beverage has found that mixing alcohol with a diet soft drink can result in a higher BrAC.

Results will be published in the April 2013 issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"More attention needs to be paid to how alcohol is being consumed in the 'real world,'" said Cecile A. Marczinski, assistant professor of psychology at Northern Kentucky University. She referenced an earlier field study of bar patrons. "Researchers found that, one, individuals who reported consuming alcohol with diet beverages had the highest BrACs, as compared to all other bar patrons, and two, that women tended to be more frequent consumers of diet mixers with their alcohol. These good naturalistic observations give researchers many ideas to explore in a controlled laboratory setting."

Dennis L. Thombs, professor and chair of the department of behavioral and community health at UNT Health Science Center, was the author of

the field study referenced by Marczinski. "Research on artificially sweetened drink mixers is new," he said. "I believe this might be only the third study published to date on this issue, and the findings are quite consistent with ours."

"I am really interested in drinking and driving as a problem, so I wanted to know if the simple choice of mixer could be the factor that puts a person above or below the legal limit," added Marczinski. "I also wanted to determine if any BrAC difference would be something that subjects would notice, since this has implications for safe drinking practices, including decisions to drive."

Study authors had 16 participants (8 females, 8 males) attend three sessions where they received one of three doses – 1.97 ml/kg vodka mixed with 3.94 ml/kg Squirt, 1.97 ml/kg vodka mixed with 3.94 ml/kg diet Squirt, and a placebo beverage – in random order. The participants' BrACs were recorded, as well as their self-reported ratings of subjective intoxication, fatigue, impairment, and willingness to drive. Their objective performance was assessed using a cued go/no-go reaction time task.

"Alcohol consumed with a diet mixer results in higher BrACs as compared to the same amount of alcohol consumed with a sugar-sweetened mixer," said Marczinski. "The subjects were unaware of this difference, as measured by various subjective ratings including feelings of intoxication, impairment, and willingness to drive. Moreover, their behavior was more impaired when subjects consumed the diet mixer."

When asked why mixing alcohol with a diet drink appears to elevate BrACs, Thombs explained that the stomach seems to treat sugar-sweetened beverages like food, which delays the stomach from emptying. "The best way to think about these effects is that sugar-sweetened alcohol mixers slow down the absorption of alcohol into

bloodstream," he said. "Artificially sweetened alcohol mixers do not really elevate alcohol intoxication. Rather, the lack of sugar simply allows the rate of alcohol absorption to occur without hindrance."

Both Marczinski and Thombs were concerned about the risk that diet mixers can pose for alcohol-impaired driving. "In this study, subjects felt the same whether they drank the diet or regular mixed alcoholic beverage," said Marczinski. "However, they were above the limit of .08 when they consumed the diet mixer, and below it when they drank the regular mixed beverage. Choices to drink and drive, or engage in any other risky behavior, often depend on how people feel, rather than some objective measurement of impairment. Now alcohol researchers who are interested in prevention have something new to consider when developing or modifying intervention programs."

Thombs agreed. "Research on alcohol mixers is critically important for improving serving practices in on-premise drinking establishments," he said. "About one-half of all drinking and driving incidents are estimated to occur in persons leaving these settings. This type of research can provide guidance to policy-makers interested in improving the safety of bars and nightclubs."

"We have an obesity crisis in this country," added Marczinski. "As such, individuals tend to be conscious about how many calories they are consuming, and they might think that mixing alcohol with diet drinks is a healthy choice. Yet the average reader needs to know that while mixing alcohol with a diet beverage mixer may limit the amount of calories being consumed, higher BrACs are a much more significant health risk than a few extra calories."

"In natural drinking settings, such as bars and nightclubs, young women are significantly more likely than young men to order drinks mixed with diet cola," said Thombs. "I suspect this occurs because young women

tend to be more weight conscious than young men. Thus, from a public health perspective, artificially sweetened alcohol mixers may place young women at greater risk for a range of problems associated with acute alcohol intoxication."

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