Diet and regular soft drinks linked to increase in risk factors for heart disease

Drinking more than one soft drink daily — whether it's regular or diet — may be associated with an increase in the risk factors for heart disease, Framingham researchers reported in Circulation: Journal of the American Heart Association.

"We were struck by the fact that it didn't matter whether it was a diet or regular soda that participants consumed, the association with increased risk was present," said Ramachandran Vasan, M.D., senior author of the Framingham Heart Study and professor of medicine at Boston University School of Medicine. "In those who drink one or more soft drinks daily, there was an association of an increased risk of developing the metabolic syndrome." Metabolic syndrome is a cluster of cardiovascular disease and diabetes risk factors including excess waist circumference, high blood pressure, elevated triglycerides, low levels of high-density lipoprotein (HDL "good" cholesterol) and high fasting glucose levels. The presence of three or more of the factors increases a person's risk of developing diabetes and cardiovascular disease.

Prior studies linked soft drink consumption to multiple risk factors for heart disease. However, this study showed that association not only included drinking regular calorie-laden soft drinks, but artificially sweetened diet sodas as well, researchers said.

"Moderation in anything is the key," said Ravi Dhingra, M.D., lead author of the study and an instructor in medicine at Harvard Medical School. "If you are drinking one or more soft drinks a day, you may be increasing your risk of developing metabolic risk factors for heart disease."

The Framingham study included nearly 9,000 person observations made in middle-aged men and women over four years at three different times.

In a "snapshot in time" at baseline, the researchers found that individuals consuming one or more soft drinks a day had a 48 percent increased prevalence of the metabolic syndrome compared to those consuming less than one soft drink daily.

In a longitudinal study of participants who were free of metabolic syndrome at baseline (6,039 person observations), consumption of one or more soft drinks a day was associated with a 44 percent higher risk of developing new-onset metabolic syndrome during a follow-up period of four years.

The researchers also observed that compared to participants who drank less than one soft drink daily, those who drank one or more soft drinks a day had a:

-- 31 percent greater risk of developing new-onset obesity (defined as a body mass index [BMI] of 30 kilograms/meter2 or more);
-- 30 percent increased risk of developing increased waist circumference;
-- 25 percent increased risk of developing high blood triglycerides or high fasting blood glucose;
-- 32 percent higher risk of having low HDL levels.
-- A trend towards an increased risk of developing high blood pressure that was not statistically significant.

Researchers then analyzed a smaller sample of participants on whom data on regular and diet soft drink consumption was available from food frequency questionnaires. Participants who consumed one or more drinks of diet or regular soda per day had a 50 to 60 percent increased risk for developing new-onset metabolic syndrome, said Dhingra, who is also an attending physician at Alice Peck Day Memorial Hospital in New Hampshire. "It didn't matter whether it was a diet or regular soft drink."

“Results also don’t appear to be driven by the dietary pattern of soft drink users, i.e, by other food items that are typically consumed along with soft drinks,” Vasan said. “We adjusted in our analyses for saturated fat and trans fat intake, dietary fiber consumption, total caloric intake, smoking and physical activity, and still observed a significant association of soft drink consumption and risk of developing the metabolic syndrome and multiple metabolic risk factors.”

One explanation is that the fructose corn syrup in regular soft drinks causes weight gain, and can lead to insulin resistance and diabetes, Vasan said. “But then you would expect to see an association with regular soft drinks, but not diet soft drinks. Our findings suggest that this is not the case.” Another possible explanation is that consuming more liquids is associated with a lesser degree of dietary compensation. Usually if you eat a large meal, then you’re inclined to eat a smaller amount at the next meal, Vasan said. But liquids don’t have the same degree of compensation as solids. If you drink a large amount of liquids at a meal, you are more likely to eat a larger amount at the next meal (compared to what you would eat had you consumed more solids at the prior meal).

Other theories are that the high sweetness of diet and regular soft drinks makes a person more prone to eat sweet items, or the caramel content in soft drinks may promote development of advanced glycation end products, complexes of sugars that can result in insulin resistance and can cause inflammation in experimental studies.

“These are all theories, and experts debate their importance,” Dhingra said. “Our study was observational, and so right now all we demonstrate is an association. We have not proven causality.”

Dhingra and Vasan called for further studies to replicate the results and to understand the mechanisms driving this association before recommendations can be made.

Source: American Heart Association