Excess Sugar Boosts Teens' CVD Risk Factors

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FROM CIRCULATION

Intake of added sugars by adolescents is associated with multiple measures known to increase cardiovascular disease risk, including decreased HDL cholesterol levels, and increased LDL cholesterol levels and geometric mean triglyceride levels, according to data from the National Health and Nutrition Examination Survey (NHANES) 1999-2004.

In 2,157 adolescents who participated in the survey, the daily consumption of added sugars – defined as refined calorie–containing sweeteners added to food and beverages during processing or preparation – averaged 118.9 g (28.3 tsp. or 476 calories), representing an average of 21.4% of total energy. Among those with the highest level of added sugar intake (at least 30% of total energy) and the lowest level of added sugar intake (less than 10% of total energy), respectively, the HDL cholesterol levels were 1.28 and 1.40 mmol/L, LDL cholesterol levels were 2.44 and 2.24 mmol/L, and triglycerides were 0.89 and 0.81 mmol/L, Jean A. Welsh of Emory University, Atlanta, and her colleagues reported.

No differences were noted in daily added sugar consumption based on demographic factors including age, sex, race/ethnicity, poverty, or educational level, but in adolescents with at least 85th percentile of body mass index and thus considered overweight/obese, added sugar intake was positively correlated with the homeostasis model assessment (HOMA-IR), which is an estimate of insulin resistance derived from fasting glucose and insulin levels, the investigators found (Circulation 2011 [doi:10.1161/CIRCULATIONAHA.110972166]).

Adjusted mean HOMA-IR (fasting insulin [pmol/L] times fasting glucose [mmol/L]/22.5) in overweight adolescents was 4.61 in those with the highest added sugar consumption, compared with 3.49 in those with the lowest consumption.

The findings contribute to a growing body of evidence linking carbohydrate and sugar intake with increased cardiovascular disease risk and are particularly important given that consumption of added sugars has increased substantially in recent decades. In 1977-1978, daily consumption of added sugars in adolescents was 62-84 g, compared with the nearly 119 g seen in this study, representing an increase of 42%-92%, the investigators said.

Mechanisms that might explain the dysmetabolic effects of carbohydrates, and specifically sugars, include the insulin response to the metabolism of high–glycemic index foods, the increased de novo lipogenesis that results when high levels of fructose are metabolized by the liver, and the increased hepatic triglyceride synthesis combined with increased secretion and/or decreased clearance of very low-density lipoproteins, the investigators wrote.

"Modification of the effect of added sugars on measures of glucose metabolism by weight status could be explained by the decreased insulin sensitivity known to result from increased adiposity," they added.

Adolescents in this study were U.S. residents aged 12-18 years who were randomly selected to provide a fasting blood sample for NHANES 1999-2004 and who provided dietary intake information. Those with unreliable or implausible dietary data were excluded, as were those who were pregnant, those who had extreme triglyceride levels, those with previously diagnosed diabetes mellitus, and those with missing covariate data. Dietary information was merged with U.S. Department of Agriculture MyPyramid equivalents databases to determine added sugar content.

Dr. Miriam Vos, an author on the study, disclosed receiving financial support in the form of a career award from the National Institutes of Diabetes and Digestive and Kidney Diseases and also receiving support from the Children's Digestive Health and Nutrition Foundation. Dr. Vos also is the author of "The No-Diet Obesity Solution for Kids," (Bethesda, Md.: AGA Institute Press, 2009) for which she receives royalties. The remaining authors report no relevant financial conflicts of interest. ■

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