Sugar- and Artificially-Sweetened Beverages and Cancer Mortality in a Large U.S. Prospective Cohort

Marjorie McCullough,[1] Rebecca Hodge,[1] Peter Campbell,[2] Mark Guinter[3] and Alpa Patel[1]

[1]American Cancer Society; [2]Albert Einstein College of Medicine and [3]Flatiron Health Inc.

Objectives: Consumption of sugar-sweetened beverages (SSB) may be related to risk of cancer mortality independent of, or indirectly through, its established association with increased body mass, but evidence is inconsistent. We evaluated the association of both SSBs and artificially-sweetened beverages (ASB) with mortality from all cancers combined, BMI-related cancers combined, and 22 individual cancers, with and without adjustment for BMI, among U.S. men and women.

Methods: In 1982,934,777 cancer-free participants in the Cancer Prevention Study-II cohort completed questionnaires including information on usual SSB and ASB consumption. Causes of death were identified through 2016. Multivariable Cox proportional hazards regression models were used to examine associations of both beverage types with cancer mortality.

Results: During follow-up, 135,093 CPS-II participants died from cancer. Consumption of ≥2 SSB drinks/day vs never was associated with obesity-related cancers combined (HR = 1.05, 95% CI 1.01–1.08, $p_{trend} = 0.057$), which became null when BMI was included in statistical models. SSBs were associated with increased risks of colorectal (HR = 1.09, 95% CI, 1.02–1.17, $p_{trend} = 0.011$), and kidney (HR = 1.17, 95% CI 1.03–1.34, $p_{trend} = 0.06$) cancer mortality, even after BMI adjustment, although for kidney cancer the association remained statistically significant only in continuous models. A positive association of ASB consumption with risk of obesity-related cancers combined (HR = 1.05, 95% CI 1.01–1.08, $p_{trend} = .001$) became null after controlling for BMI; however, an increased risk of pancreatic cancer remained after BMI adjustment (HR = 1.16, 95% CI 1.07–1.26, $p_{trend} < 0.0001$).

Conclusions: SSB consumption may increase risk of obesity-related cancers indirectly through excess body fatness, and of colorectal and kidney cancer mortality independent of obesity. Increased risk of obesity-related cancers with greater ASB intake prior to adjustment for body fatness may reflect confounding by BMI, as ASBs are not considered convincingly related to weight gain. An association of ASB consumption and increased risk of pancreatic cancer deserves further study.

Funding Sources: The American Cancer Society funds the creation, maintenance, and updating of the Cancer Prevention Study-II cohort.