

Sugar- and Artificially Sweetened Beverages and the Risks of Incident Stroke and Dementia: A Prospective Cohort Study

Stroke

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Matthew P. Pase, PhD; Jayandra J. Himali, PhD; Alexa S. Beiser, PhD; Hugo J. Aparicio, MD; Claudia L. Satizabal, PhD; Ramachandran S. Vasan, MD; Sudha Seshadri, MD; Paul F. Jacques, DS:

Primary authors are from Boston University School of Medicine.

This Article has 25 references.

This article used the community-based Framingham Heart Study Offspring cohort.

It used 2,888 participants aged >45 years for stroke and 1,484 participants aged >60 years for dementia, and the study extended for 10 years.

The authors looked at these three combinations:

- Intake of total sugary beverages (combining sugar-sweetened soft drinks, fruit juice, and fruit drinks).
- Intake of sugar-sweetened soft drinks (high-sugar carbonated beverages, such as cola).
- Intake of artificially sweetened soft drinks (sugar-free carbonated beverages, such as diet cola).

KEY POINTS FROM THIS ARTICLE:

- 1) "Sugar- and artificially-sweetened beverage intake have been linked to cardiometabolic risk factors, which increase the risk of cerebrovascular disease and dementia."
- 2) Artificially sweetened beverages are typically sweetened with non-nutritive sweeteners, such as saccharin, acesulfame, aspartame, neotame, or sucralose.
- 3) "Greater recent consumption of artificially sweetened soft drinks was associated with an increased risk of stroke, with the strongest associations observed for ischemic stroke."
- 4) "Higher cumulative intake of artificially sweetened soft drinks was also associated with an increased risk of ischemic stroke."
- 5) "In our community-based cohort, higher consumption of artificially sweetened soft drinks was associated with an increased risk of both stroke and dementia."

6) “When comparing daily cumulative intake [of artificial sweeteners] to 0 per week (reference), the hazard ratios were 2.96 for ischemic stroke and 2.89 for Alzheimer’s disease.” **[This means that drinking intake of artificially sweetened soft drinks essentially tripled the risk of suffering both ischemic stroke and Alzheimer’s].**

[The upper end of the risk range was an approximate 700% increased risk].

7) “When examining cumulative beverage consumption, daily intake of artificially sweetened soft drink was associated with an increased risk of both all-cause dementia and AD dementia.”

8) “To our knowledge, our study is the first to report an association between daily intake of artificially sweetened soft drink and an increased risk of both all-cause dementia and dementia because of Alzheimer’s disease.”

9) Diabetes is an important risk factor for both stroke and dementia; importantly, both sugar intake (including sweetened drinks) intake and artificially sweetened drinks intake increase the risk of diabetes. “Diabetes mellitus status was identified as a potential mediator of the association between artificially sweetened beverage intake and the risk of both incident all-cause dementia and AD dementia.”

10) Artificial sweeteners cause glucose intolerance by altering gut microbiota and are associated with dysbiosis and glucose intolerance.

11) “After adjustments for age, sex, education (for analysis of dementia), caloric intake, diet quality, physical activity, and smoking, higher recent and higher cumulative intake of artificially sweetened soft drinks were associated with an increased risk of ischemic stroke, all-cause dementia, and Alzheimer’s disease dementia.”

12) Conclusions: “Artificially sweetened soft drink consumption was associated with a higher risk of stroke and dementia.” “The consumption of artificially sweetened soft drinks is increasing in the community, along with the prevalence of stroke and dementia.” **[Important]**

13) “Sugar-sweetened beverages were not associated with stroke or dementia.”

**THIS ARTICLE GENERATED THIS EDITORIAL:
Sugar-Sweetened and Artificially Sweetened Beverages in Relation to
Stroke and Dementia:
Are Soft Drinks Hard on the Brain?
Editorial**

**Stroke
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Heike Wersching, MD; Hannah Gardener, SCD; Ralph L. Sacco, MD

From the University of Munster, Institute for Epidemiology and Social Medicine, Germany, and the University of Miami Miller School of Medicine, Department of Neurology, FL.

This editorial has 26 references.

- 1) "Sugar-sweetened beverages are the leading sources of added sugars in the US diet and are increasing on a global level."
- 2) "A single can of sugar-sweetened soda contains about the upper limit of the recommended 25 to 50 g per day."
- 3) "The harmful effects of regular sugar-sweetened soda consumption, including weight gain, the metabolic syndrome, and type 2 diabetes mellitus, have been demonstrated in numerous large observational studies."
- 4) "A higher intake of sugar-sweetened soda has been repeatedly associated with increased risks of hypertension, coronary heart disease, and stroke, as well as with adverse changes in lipid levels and inflammatory markers."
- 5) "Artificially sweetened beverages are marketed as healthier alternatives to sugar-sweetened soda. Their consumption is rising in the United States, particularly among children."
- 6) Several large observational studies show a positive association between diet soda consumption and increased risks of the metabolic syndrome and type-2 diabetes mellitus.
- 7) Prior studies have shown diet soda consumption is associated with an increased risk of stroke, myocardial infarction, and vascular death.
- 8) In the present study, "higher recent and cumulative intake of artificially sweetened soft drinks was associated with an increased risk of ischemic stroke, all-cause dementia, and Alzheimer's dementia." "The effects persisted when analyses were adjusted for total caloric intake, diet quality, physical activity, and smoking status."
- 9) "Artificial sweeteners may increase cravings for high glycemic and high-calorie foods, induce glucose intolerance, or impair caloric compensation, thereby increasing calorie intake and body weight." **[Important]**
- 10) Artificially sweetened beverages may increase the risk of vascular disease and dementia by these mechanisms:
 - Advanced glycation end products, which are produced during the process of caramelization used in some artificially sweetened beverages and sugar-sweetened soda are pro-inflammatory and promote insulin resistance. **[Important]**

- They damage the microbiome, increasing insulin resistance.
- They contain phosphoric acid [as do sugar sweetened beverages] which damages the vascular system.

11) “The growing number of epidemiological studies showing strong associations between frequent consumption of artificially sweetened beverages and vascular outcomes suggests that it may not be reasonable to substitute or promote artificially sweetened beverages as healthier alternatives to sugar-sweetened beverages.”

12) “Both sugar-sweetened and artificially sweetened soft drinks may be hard on the brain.” **[Key Point]**

COMMENTS FROM DAN MURPHY

We have reviewed a number of studies pertaining to diet soda consumption. They show that regular consumption of artificially-sweetened beverages is not good for one’s health:

Article Review 16-05:

Aspartame Induces Lymphomas and Leukaemias in Rats; Aspartame, a Leukaemogenic Compound; 2005

Article Review 14-08:

Life-Span Exposure to Low Doses of Aspartame Beginning During Prenatal Life Increases Cancer Effects in Rats; 2007

Article Review 04-13:

Diet Soft Drink Consumption is Associated with an Increased Risk of Vascular Events in the Northern Manhattan Study; 2012

Article Review 15-13:

Fueling the Obesity Epidemic? Artificially Sweetened Beverage Use and Long-term Weight Gain; 2008

Article Review 24-15:

Gain weight by “going diet?” Artificial Sweeteners and the Neurobiology of Sugar Cravings; 2010

Article Review 28-15

Consumption of Artificial Sweetener– and Sugar-containing Soda and Risk of Lymphoma and Leukemia in Men and Women; 2012