NOT-SO-HEALTHY SUGAR SUBSTITUTES?

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Not-so-healthy sugar substitutes?

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Abstract

Replacing sugar-sweetened beverages with diet soft drinks containing sugar substitutes that provide few or no calories has been suggested as one strategy for promoting improved public health outcomes. However, current scientific evidence indicates that routine consumption of beverages with non-nutritive sweeteners not only fails to prevent disease, but is associated with increases in risks for the same health outcomes associated with sugar-sweetened beverages, including type 2 diabetes, cardiovascular disease, hypertension and stroke. Results from pre-clinical studies have provided plausible biological mechanisms that could promote these counterintuitive negative health effects of artificial sweeteners. Taken together, scientific studies currently indicate that public health will be improved by reducing intake of all sweeteners, both caloric and non-caloric.

Introduction

Recent dramatic increases in sugar consumption documented across the globe, particularly in the form sugar-sweetened beverages, are considered to play a significant role in elevating risks for a variety of negative health outcomes including type 2 diabetes, cardiovascular disease, hypertension and stroke, 3 of top causes of death in the United States [1]. It has been estimated that over 10 years, sugar sweetened beverage consumption could contribute to up to 2.6 million cases of type 2 diabetes in the U.S. alone [2], and up to 180,000 deaths per year worldwide [3]. Short-term and long-term evidence also indicates that reducing intake of sugar-sweetened beverages could promote a variety of healthy outcomes. In the UK, an estimated 14-25% reduction in risk of development of type 2 diabetes could be achieved by replacing one serving/day of a sugar-sweetened drink with an unsweetened beverage [4]. A growing scientific consensus indicates that public health would be improved by reducing consumption of sugar-sweetened beverages [5].

One seemingly logical approach to achieve this goal would be to switch from sugar-sweetened beverages to versions sweetened with high-intensity sweeteners (sometimes called non-caloric sweeteners, low calorie-sweeteners, or artificial sweeteners), such as

Conflict of interest
Nothing declared.

Objectives

Explain how Artificially-sweetened beverages are also associated with metabolic dysfunction.

Describe the effect of sweetened beverages in weight of the body.

Illustrate the mechanisms that effects of artificial sweeteners.

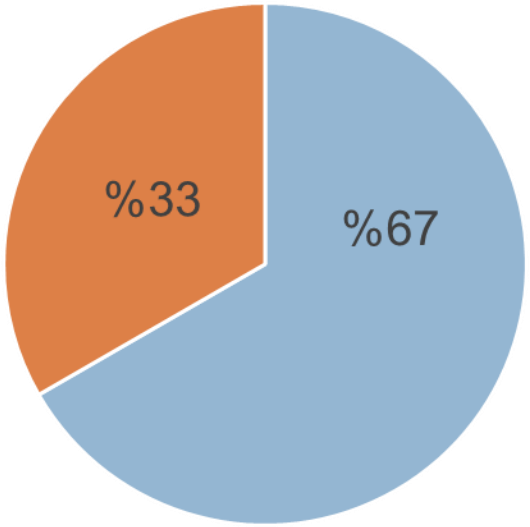
Discuss people who drink diet soft drinks?

Introduction

- Recent dramatic increases in sugar consumption documented across the globe, particularly in the form sugar-sweetened beverages, are considered to play a significant role in elevating risks for a variety of negative health outcomes including type 2 diabetes, cardiovascular disease, hypertension and stroke.

- Short-term and long-term evidence also indicates that reducing intake of sugar-sweetened beverages could promote a variety of healthy outcomes. Achieved by replacing one serving/day of a sugar-sweetened drink with an unsweetened beverage.

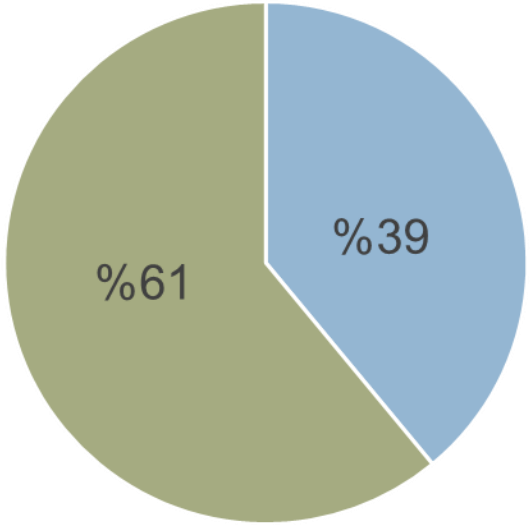
increasing numbers of people appear to be choosing to consume beverages sweetened with high-intensity sweeteners



USA

adults

children



UK

Consumar aged 11 years

non-consumar aged 11 years

Artificially-sweetened beverages are also associated with metabolic dysfunction

- In fact, an overwhelming majority of studies indicate that over the long term artificially-sweetened beverages do not promote improved health outcomes.

- Another study of close to 25,000 people in the Uk documented significantly elevated risk of type 2 diabetes among diet soft drink consumers compared to non-consumers.

- Through a meta-analysis indicating that artificially sweetened beverages were associated with a 25% increase in type 2 diabetes.

"How the consumption of soft drinks is associated with a significant increase in the risk of diseases"

Type 2 diabetes

Cardiovascular disease

High blood pressure & stroke

- A prospective study of a cohort of individuals aged 65 and older documented increases in waist circumference (a marker of abdominal fat closely linked to cardiovascular disease).

- A recent study in post-menopausal women also indicated elevated risk for cardiovascular disease events, cardiovascular disease mortality and overall mortality among women who consumed 2 or more diet soft drinks daily.

- A recent meta analysis indicated that artificially-sweetened beverages are associated with ~ 15% increase in the risk of hypertension.

But what about weight?

- Studies indicate that weight loss outcomes are similar when sugar-sweetened beverages were replaced by either water or artificially sweetened beverages.

- Studies that have followed people over longer time periods provide little support for better weight outcomes with diet soft drinks.

- A prospective study that examined children between 7 and 11 years of age indicated that daily consumption of artificially-sweetened beverages promoted both increased BMI and increased adiposity.

- Artificial sweeteners are designed to provide little or no energy

Other studies

in children aged 4-11 indicated that substituting daily consumption of an artificially-sweetened beverage for daily consumption of a sugar-sweetened beverage did lead to lower weight gain.

in adolescents indicated that reducing sugar sweetened beverage intake resulted in less weight gain.

Two recent studies

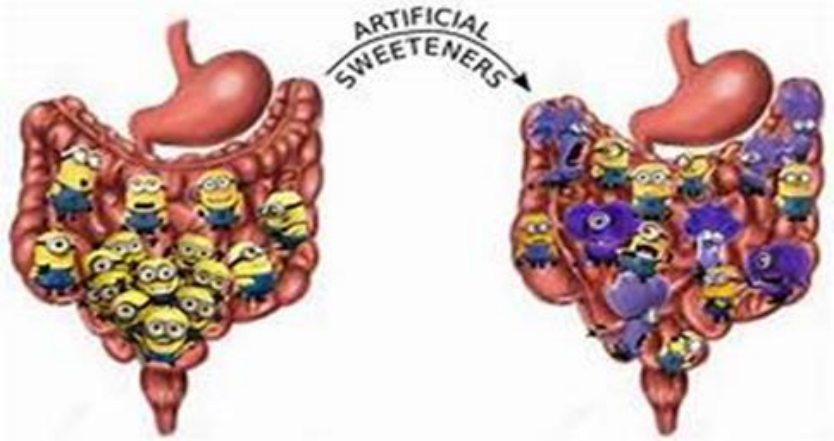
Have shown conflicting results with regard to the effect of soft drinks compared to water in individuals who deliberately restrict their calorie intake.

However, in both studies, it seems that subjects or experimenters have not been blinded to hypotheses, suggesting that the effects of expectation regarding the effect of using soda or water can have a significant role in the results. Moreover, both studies recruited individuals who were already consuming soft drinks and had a stable weight for the previous 6 months. This suggests that among those who regularly consume diet soda in the real world, weight loss is not given.

Mechanisms underlying counterintuitive effects of artificial sweeteners

- Artificial sweeteners can stimulate excess weight gain, particularly when diets high in fat and sugar are consumed along with the sweeteners ,In addition, artificial sweeteners have been demonstrated to cause deficits in glucose homeostasis.

- Artificial sweeteners may also promote dysregulation of weight and glucose homeostasis by altering the balance of bacteria that colonize the gut.



What does this mean for people who drink diet soft drinks?

- Animal studies have provided evidence for potential mechanisms that may underlie the counter-intuitive effects of artificial sweeteners, but it has been argued that the animal work does not mimic the use of artificially-sweetened products by people.

- And when use of artificial sweeteners by people in the real world is considered, there's minimal evidence that they are healthy options.

- Over the short term, sugar-sweetened beverages do appear to be worse choices than their artificially-sweetened alternatives especially if consumed in large quantities, but that doesn't mean that the "diet" versions are healthy.

- The public health messages should be clear; drinking sweetened beverages on a daily basis is not a healthy choice.

Public health must be improved by reducing the intake of all localities, including sugar and its non-food alternatives. But to be clear, the consumption of excess sweetening alone is not the only reason.

Conclusion

- Artificially-sweetened beverages are linked to increased risk for negative health outcomes in clinical cohorts.
- Little scientific evidence supports a role for diet soft drinks in reducing risk of overweight or obesity.
- Multiple biologically plausible mechanisms have been supported by experimental models in pre-clincial studies.
- Reduced intake of beverages sweetened with sugar or sugar-substitutes may improve public health outcomes.

Reference

Swithers, Susan E. (2016). “Not-so-Healthy Sugar Substitutes?” *Curr Opin Behav Sci.* 9: 106- 110.

THANK YOU FOR lISTENING