



Are Fruit Juices Just as Unhealthy as Sugar-Sweetened Beverages?

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In the past few years, the health effects of sugar-sweetened beverages (SSBs) have been a matter of scientific and public interest. Sugar-sweetened beverages include any beverage with added sugar or other sweetener, such as carbonated and noncarbonated soft drinks, fruit punch, fruit juice concentrates, powdered drink mixes, and energy drinks. Sugar-sweetened beverages typically contain 140 to 150 kcal and 35 to 37.5 g of sugar per 12-oz serving, and they are the largest source of added sugars in the US diet.¹ Substantial efforts have been devoted to discourage the consumption of SSBs, including policies for taxation and restrictions on marketing to children.

Fruit juices are still widely perceived as a healthier option than SSBs. However, they often contain as much sugar and as many calories as SSBs. Although the sugar in 100% fruit juices is naturally occurring rather than added, once metabolized, the biological response is essentially the same.

It is widely accepted that SSBs are implicated in weight gain and adverse cardiometabolic health, but the evidence regarding fruit juices is less abundant. Using findings from the Reasons for Geographic and Racial Differences in Stroke (REGARDS) study, Collin et al² evaluated the associations of SSBs and 100% fruit juices with coronary heart disease (CHD) mortality and all-cause mortality.² Among a cohort of 13 440 US adults (4174 black adults and 9266 white adults), 168 died of CHD and 1000 died of any cause after 6 years of follow-up. Compared with participants who consumed less than 5% of their daily calories as sugary beverages (ie, SSBs and fruit juices), participants who consumed 10% or more of their daily calories as sugary beverages had a hazard ratio (HR) of 1.44 (95% CI, 0.97-2.15) for CHD mortality and 1.14 (95% CI, 0.97-1.33) for all-cause mortality after adjusting the models for cardiovascular risk factors. With each additional 12 oz of sugary beverages or of fruit juice alone, risk-adjusted all-cause mortality HRs were 1.11 (95% CI, 1.03-1.19) and 1.24 (95% CI, 1.09-1.42), respectively. Collin et al² concluded that fruit juice consumption contributed to the association of increased risk of all-cause mortality with sugary beverage consumption in the study population and suggested that well-powered and longer-term studies are needed to evaluate the associations of fruit juice consumption with CHD mortality risk. In addition to the small number of CHD-related deaths, another limitation of this study was that the analyses used self-reported intake only at baseline, which did not reflect long-term dietary intakes.

This is one of the first studies examining the associations of SSBs and 100% fruit juices with mortality outcomes in a multiethnic cohort, to our knowledge. Although the evidence from the REGARDS study is only suggestive, the study by Collins et al² brings attention to potential adverse effects of SSB vs fruit juice consumption on health. There is compelling evidence that higher intakes of SSBs are associated with a wide range of health consequences, including tooth decay, weight gain, type 2 diabetes, fatty liver disease, and cardiovascular disease. In a 2014 prospective analysis using data from the National Health and Nutrition Examination Survey,³ higher intake of added sugar and SSBs was associated with increased risk of cardiovascular mortality among US adults after a median 14.6 years of follow-up. These findings were consistent with a 2019 study⁴ that included 36 436 deaths. Comparing extreme categories of SSBs intake, the relative risk of cardiovascular mortality was 31% (95% CI, 15%-49%) higher in participants who consumed more than 2 servings of SSBs per day after adjusting for major diet and lifestyle factors.⁴

The evidence for an association of intake of fruit juices with health outcomes is much less abundant and consistent. Results from a 2013 prospective cohort study⁵ that included 187 382

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participants who were observed for up to 24 years (dietary intake information was updated every 4 years) showed that greater whole-fruit consumption was significantly associated with a lower risk of type 2 diabetes, whereas greater consumption of fruit juices was associated with a higher type 2 diabetes risk.⁵ In a 2015 meta-analysis of 17 prospective cohort studies,⁶ each additional daily serving of SSBs was associated with 13% (95% CI, 6%-21%) greater risk of diabetes, while each additional daily serving of fruit juices was associated with 7% (95% CI, 1%-14%) greater risk.

There is some evidence that moderate consumption of fruit juices is associated with lower risk of cardiovascular disease, especially stroke, and cognitive decline.^{7,8} Findings from the European Prospective Investigation Into Cancer and Nutrition-Netherlands study⁷ showed that moderate consumption of 100% fruit juice (≤ 7 five-oz glasses per week) was associated with 17% (95% CI, 5%-27%) lower risk of cardiovascular disease and 24% (95% CI, 6%-39%) lower risk of stroke. In a 2019 study,⁸ compared with less than 1 serving per month, daily consumption of orange juice was associated with substantially lower odds of poor subjective cognitive function among men middle-aged and older (odds ratio, 0.53; 95% CI, 0.43-0.67). The potential underlying mechanisms for the observed inverse associations may be related to the high antioxidant and bioactive substance (including vitamins, minerals, and polyphenols) content in some 100% fruit juices. These nutrients are hypothesized to reduce oxidative stress and improve inflammatory markers, endothelial function, and cognitive performance.^{7,8} However, the question is whether polyphenols and other phytochemicals in fruit juices can counteract the effects of sugars on weight and type 2 diabetes. The same polyphenols can also be obtained from whole fruits, which have higher amounts of dietary fiber and more satiating effects; thus, consumption of whole fruit is preferable because the evidence for their health benefits is strong.⁵ In addition, other beverages, such as coffee and tea, that are high in antioxidants and may have cardiometabolic benefits should be considered as healthier options.⁹ Finally, the amount of polyphenols and sugars differs greatly depending on the type of fruit juice, eg, apple juice vs orange juice, and their effects on health outcomes may also vary. Clearly, more research is needed to examine the association of consumption of fruit juices with risk of cardiovascular disease and with cognitive function.

What are the practical recommendations for fruit juice consumption? According to the American Academy of Pediatrics and the Dietary Guidelines for Americans, the recommendations for children aged 1 to 6 years are to limit fruit juice consumption to a maximum of 4 to 6 oz per day, and for children 7 years and older, adolescents, and adults to limit fruit juice consumption to 8 oz per day. If juices are consumed, they should be 100% fruit juices, not other fruit drinks with added sugar (eg, fruit punch or juice cocktail). Other popular beverages such as fruit-based smoothies are commonly perceived as healthier options; however, their ingredients can vary substantially, and there is limited research on their health effects. Unless made with blended whole fruit, they are lower than whole fruits in dietary fiber and can contribute extra calories and sugars when consumed in excess.

In summary, the deleterious effects of SSBs are well established, and individual efforts and policy solutions are needed to reduce consumption levels. Although fruit juices may not be as deleterious as SSBs, their consumption should be moderated in children and adults, especially for individuals who wish to control their body weight. Further research is needed to examine the health risks and potential benefits of specific fruit juices.

ARTICLE INFORMATION

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