Review: soft drink consumption is associated with increased energy intake and body weight

Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *Am J Public Health* 2007;**97**:667–75.

Q Is soft drink consumption associated with increased energy intake, increased body weight, displacement of nutrients, and an increased risk of chronic disease?

METHODS

Data sources: Medline, PsycINFO, Web of Science database, bibliographies of identified articles, and authors of included articles.

Study selection and assessment: articles that assessed the relation between soft drink consumption and the 4 primary outcomes listed below. 88 articles (cross-sectional studies, longitudinal studies, and randomised controlled trials) were included in the analysis

Outcomes: main outcomes were energy intake, body weight, milk intake, and calcium intake. Secondary outcomes were nutrition and health. Effect sizes were calculated and interpreted as follows: ⩽0.10 was considered a small effect size, 0.25 as medium, and ⩾0.40 as large.

MAIN RESULTS

Only the results of meta-analyses of randomised controlled trials and longitudinal studies are reported here. Soft drink consumption was associated with increased energy intake and body weight and reduced milk and calcium intake (table). The associations between soft drink consumption and intake of various nutrients and various health conditions were not presented by study type and so are not reported here.

CONCLUSION

Soft drink consumption is associated with increased energy intake and body weight and reduced milk and calcium intake.

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Commentary

The review by Vartanian *et al* adds to our knowledge of the negative effects of soft drink consumption on nutrition and health. Overall, this review of 88 randomised controlled trials, longitudinal, and cross-sectional studies was strong. The authors considered variables such as funding sources, and the results of the review are strengthened by greater associations found among those studies with more robust designs. Limitations of the review include failure to provide readers with a table of characteristics of the included studies and a description of how the quality of these studies was assessed. In addition, there remained significant heterogeneity in the effect sizes observed, despite performing meta-analysis by different design and moderating variables. The findings regarding nutrient intake and health outcomes are further limited by the small number of included studies. For example, the conclusion of an association between soft drink consumption and type 2 diabetes is based on a single, albeit large, cohort study.

Vartanian *et al* used effect size as a measure of association; the closer the effect size to 1.0 or −1.0, the larger the positive or negative association. The results indicate positive associations between soft drink consumption and energy intake and body weight and negative associations with milk and calcium intake. The recommendation by Vartanian *et al* for reduced soft drink consumption remains within the scope of their review and follows from the strongest finding of their review: the greater the soft drink consumption, the greater the food energy intake. Using clinical expertise, most practitioners would agree that the benefits of limiting soft drink consumption outweigh the risks. Thus, the review by Vartanian *et al* provides practitioners with evidence to recommend limiting soft drink consumption to their clients.

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Associations between soft drink consumption and various outcomes*

Outcomes	Number and type of studies	Mean effect size (p value)
Energy intake	5 longitudinal studies	0.24 (p<0.001)
	4 long-term randomised controlled trials (consumption over 3–10 wks)	0.30 (p<0.001)
	12 short-term randomised controlled trials (consumption over a meal or single day)	0.21 (p=0.004)
Body weight	{10}† longitudinal studies	0.09 (p<0.001)
	7 randomised controlled trials	0.24 (p<0.001)
Milk intake	5 longitudinal studies	−0.21 (p<0.001)
Calcium intake	5 longitudinal studies	−0.13 (p=0.004)

*Effect sizes ⩽0.10 were considered to be small, 0.25 to be medium, and ⩾0.40 to be large.
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