Dietary sugars and cardiometabolic risk: systematic review and meta-analyses of randomized controlled trials of the effects on blood pressure and lipids.

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Abstract

BACKGROUND: Dietary sugars have been suggested as a cause of obesity, several chronic diseases, and a range of cardiometabolic risk factors, but there is no convincing evidence of a causal relation between sugars and risk factors other than body weight.

OBJECTIVE: We conducted a systematic review and meta-analysis of randomized controlled trials that examined effects of the modification of dietary free sugars on blood pressure and lipids.

DESIGN: Systematic searches were conducted in OVID Medline, Embase, Scopus, Cumulative Index to Nursing and Allied Health Literature, and Web of Science databases (to August 2013) to identify studies that reported intakes of free sugars and at least one lipid or blood pressure outcome. The minimum trial duration was 2 weeks. We pooled data by using inverse-variance methods with random-effects models.

RESULTS: A total of 11,517 trials identified were included. 37 trials reported lipid outcomes, and 12 trials reported blood pressure outcomes. Higher compared with lower sugar intakes significantly raised triglycerides (95% CI = 0.07, 0.15 mmol/L; P = 0.0001), total cholesterol (MD = 0.15 mmol/L; 95% CI = 0.12, 0.18 mmol/L; P = 0.02 mmol/L; 95% CI = 0.00, 0.03 mmol/L; P = 0.03). Subgroup analyses showed lipids in studies in which efforts were made to ensure an energy balance and Potential explanatory factors, including a weight change, in most instances except 36-70%: The effect of sugar intake on blood pressure was greatest in trials in which the intervention was 5.9 mmol/L (95% CI: 3.4, 10.3 mmol/L; P = 0.001) for systolic blood pressure and 5.6 mmol/L (95% CI: 2.5, 8.8 mmol/L; P = 0.005) for diastolic blood pressure.

CONCLUSIONS: Dietary sugars influence blood pressure and lipids. The relationship is independent of effects of sugars on body weight. Protocols for this review were registered separately for effects of sugars on blood pressure and lipids in the PROSPERO international prospective register of systematic reviews as PROSPERO 2012: CRD42012002379 and 2012: CRD42012002437, respectively.