

# Abstract

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## Effects of vitamin C supplementation on blood pressure: a meta-analysis of randomized controlled trials.

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**BACKGROUND:** In observational studies, increased vitamin C intake, vitamin C supplementation, and higher blood concentrations of vitamin C are associated with lower blood pressure (BP). However, evidence for blood pressure-lowering effects of vitamin C in clinical trials is inconsistent.

**OBJECTIVE:** The objective was to conduct a systematic review and meta-analysis of clinical trials that examined the effects of vitamin C supplementation on BP.

**DESIGN:** We searched Medline, EMBASE, and Central databases from 1966 to 2011. Prespecified inclusion criteria were as follows: 1) use of a randomized controlled trial design; 2) trial reported effects on systolic BP (SBP) or diastolic BP (DBP) or both; 3) trial used oral vitamin C and concurrent control groups; and 4) trial had a minimum duration of 2 wk. BP effects were pooled by random-effects models, with trials weighted by inverse variance.

**RESULTS:** Twenty-nine trials met eligibility criteria for the primary analysis. The median dose was 500 mg/d, the median duration was 8 wk, and trial sizes ranged from 10 to 120 participants. The pooled changes in SBP and DBP were -3.84 mm Hg (95% CI: -5.29, -2.38 mm Hg;  $P < 0.01$ ) and -1.48 mm Hg (95% CI: -2.86, -0.10 mm Hg;  $P = 0.04$ ), respectively. In trials in hypertensive participants, corresponding reductions in SBP and DBP were -4.85 mm Hg ( $P < 0.01$ ) and -1.67 mm Hg ( $P = 0.17$ ). After the inclusion of 9 trials with imputed BP effects, BP effects were attenuated but remained significant.

**CONCLUSIONS:** In short-term trials, vitamin C supplementation reduced SBP and DBP. Long-term trials on the effects of vitamin C supplementation on BP and clinical events are needed.

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