



**Public Health +** comes to you via the McMaster Health Knowledge Refinery. Every article from over 120 medical and allied health academic journals is critically appraised to identify those that are methodologically sound. Articles that pass this process are rated (maximum 7) by clinicians for relevance and newsworthiness, and are then sent to this website. The articles are updated weekly and a searchable archive is kept on this website.



For more information on the process or to sign-up as a rater, go to [McMaster PLUS](http://www.mcmasterplus.ca).

## Article Details

**Title:** Effect of cocoa on blood pressure.

**Authors:** Ried K, Fakler P, Stocks NP

**Source:** Cochrane Database Syst Rev. 2017 Apr 25;4:CD008893. doi: 10.1002/14651858.CD008893.pub3.

**Relevance Rating:** 4.00

**Newsworthiness Rating:** 4.00

**Abstract:**

**BACKGROUND:** High blood pressure is an important risk factor for cardiovascular disease, contributing to about 50% of cardiovascular events worldwide and 37% of cardiovascular-related deaths in Western populations. Epidemiological studies suggest that cocoa-rich products reduce the risk of cardiovascular disease. Flavanols found in cocoa have been shown to increase the formation of endothelial nitric oxide which promotes vasodilation and therefore blood pressure reduction. Here we update previous meta-analyses on the effect of cocoa on blood pressure. **OBJECTIVES:** To assess the effects on blood pressure of chocolate or cocoa products versus low-flavanol products or placebo in adults with or without hypertension when consumed for two weeks or longer. **SEARCH METHODS:** This is an updated version of the review initially published in 2012. In this updated version, we searched the following electronic databases from inception to November 2016: Cochrane Hypertension Group Specialised Register, CENTRAL, MEDLINE and Embase. We also searched international trial registries, and the reference lists of review articles and included trials. **SELECTION CRITERIA:** Randomised controlled trials (RCTs) investigating the effects of chocolate or cocoa products on systolic and diastolic blood pressure in adults for a minimum of two weeks duration. **DATA COLLECTION AND ANALYSIS:** Two review authors independently extracted data and assessed the risks of bias in each trial. We conducted random-effects meta-analyses on the included studies using Review Manager 5. We explored heterogeneity with subgroup analyses by baseline blood pressure, flavanol content of control group, blinding, age and duration. Sensitivity analyses explored the influence of unusual study design. **MAIN RESULTS:** Thirty-five trials (including 40 treatment comparisons) met the inclusion criteria. Of these, we added 17 trials (20 treatment comparisons) to the 18 trials (20 treatment comparisons) in the previous version of this updated review. Trials provided participants with 30 to 1218 mg of flavanols (mean = 670 mg) in 1.4 to 105 grams of cocoa products per day in the active intervention group. The control group received either a flavanol-free product (n = 26 treatment comparisons) or a low-flavanol-containing cocoa powder (range 6.4 to 88 mg flavanols (mean = 55 mg, 13 treatment comparisons; 259 mg, 1 trial). Meta-analyses of the 40 treatment comparisons involving 1804 mainly healthy participants revealed a small but statistically significant blood pressure-reducing effect of flavanol-rich cocoa products compared with control in trials of two to 18 weeks duration (mean nine weeks): Mean difference systolic blood pressure (SBP) (95% confidence interval (CI): -1.76 (-3.09 to -0.43) mmHg, P = 0.009, n = 40 treatment comparisons, 1804 participants; Mean difference diastolic blood pressure (DBP) (95% CI): -1.76 (-2.57 to -0.94) mmHg, P < 0.001, n = 39 treatment comparisons, 1772 participants. Baseline blood pressure may play a role in the effect of cocoa on blood pressure. While systolic blood pressure was reduced significantly by 4 mmHg in hypertensive people (n = 9 treatment comparisons, 401 participants), and tended to be lowered in prehypertensive people (n = 8 treatment comparisons, 340 participants), there was no significant difference in normotensive people (n = 23 treatment comparisons, 1063 participants); however, the test for subgroup differences was of borderline significance (P = 0.08; I<sup>2</sup> = 60%), requiring further research to confirm the findings. Subgroup meta-analysis by blinding suggested a trend towards greater blood pressure reduction in unblinded trials compared to double-blinded trials, albeit statistically not significant. Further research is needed to confirm whether participant expectation may influence blood pressure results. Subgroup analysis by type of control (flavanol-free versus low-flavanol control) did not reveal a significant difference. Whether the age of participants plays a role in the effect of cocoa on blood pressure, with younger participants responding with greater blood pressure reduction, needs to be further investigated. Sensitivity analysis excluding trials with authors employed by trials sponsoring industry (33 trials, 1482 participants) revealed a small reduction in effect size, indicating some reporting bias. Due to the remaining heterogeneity, which we could not explain in terms of blinding, flavanol content of the control groups, age of participants, or study duration, we downgraded the quality of the evidence from high to moderate. Results of subgroup analyses should be interpreted with caution and need to be confirmed or



refuted in trials using direct randomised comparisons. Generally, cocoa products were highly tolerable, with adverse effects including gastrointestinal complaints and nausea being reported by 1% of participants in the active cocoa intervention group and 0.4% of participants in the control groups (moderate-quality

The full text may be available from [PubMed](#).