



Isometric handgrip exercise or beetroot juice does not lower blood pressure in overweight older adults: a randomised controlled trial

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Raised blood pressure (BP) is the leading risk factor for global disease burden. (1) More physical activity may reduce BP but the efficacy of different types of exercise is uncertain. In addition, increased consumption of fruits and vegetables may reduce BP through greater nitrate intake.

Here we aimed to examine the efficacy of isometric handgrip exercise and beetroot juice (a rich source of nitrate) consumption for reducing resting and 24-hour ambulatory (24-hA) blood pressure (BP) in overweight older adults who are at higher risk of raised BP.

Thirty overweight (BMI mean = 30, SD = 5 kg/m²), older adults (mean = 62, SD = 5 years of age) were randomised to a 7-day intervention involving; a) completing four two-minutes bouts of bilateral isometric handgrip exercise (IHGE) at 50% of maximal voluntary contraction per day; b) consuming 140 ml/day of concentrated beetroot juice; or c) a control group following a low-nitrate diet. Resting and 24-hA BP were assessed before and after intervention.

At baseline, there were no significant differences between treatment groups in age, hand grip strength, resting or 24-hrA BP, BMI, waist circumference, fat mass, fat-free mass or total body water estimated by bioimpedance. The participants reported good compliance with both IHGE and beetroot juice consumption interventions. After 7-days intervention, BP measurements were lower than at baseline but there were no significant effects of either intervention on resting or 24-hA systolic and diastolic BP.

BP mmHg	Baseline BP					Post intervention BP*				
	Control	Beetroot	IHGE	SE	P	Control	Beetroot	IHGE	SE	P
Resting	Least square means					Least square means				
Systolic	143.9	146.9	142.3	7.3	0.906	137.1	136.0	131.7	5.6	0.765
Diastolic	77.9	79.4	78.9	3.5	0.953	76.3	73.3	76.1	2.7	0.689
MAP	104.3	106.7	103.5	4.8	0.896	100.9	99.0	99.5	3.2	0.638
24-h A										
Systolic	129.7	125.7	130.6	4.3	0.697	126.5	127.7	126.7	1.9	0.895
Diastolic	79.6	77.1	78.8	2.9	0.822	77.3	78.9	79.7	1.3	0.425
MAP	102.6	99.3	102.5	3.2	0.721	99.7	100.8	101.2	1.5	0.751

MAP = mean arterial BP

* Adjusted for baseline values

In conclusion, isometric handgrip exercise or beetroot juice consumption for 7-days did not affect resting or ambulatory 24-hour blood pressure in overweight older adults.

International Standard Randomised Controlled Trial Number Register (ISRCTN90266095).