



5.3 Sex Differences in Blood Pressure in Young Adults: Is It All About Body Size?

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ABSTRACT

Background: In young adults, systolic blood pressure (SBP) and hypertension rates are significantly lower in females than males, although the extent to which this is due to differences in body size (body surface area; BSA) is unclear. Cardiac output (CO), a key haemodynamic determinant of SBP in young adults, is tightly linked with body size, and typically lower in females. Therefore, we hypothesized that in young adults, CO mediates the association between BSA and SBP, and contributes to sex-related differences in SBP in young adults.

Methods: Complete data were available in 3145 healthy young adults (1558 males, 23 ± 6 years). Linear regression analyses were performed, followed by propensity score matching for BSA to investigate sex-related differences.

Results: BSA was significantly associated with SBP (BSA: β male = 0.337; β female = 0.286; $p < 0.001$ for both). The regression coefficients did not differ statistically ($p = 0.8$). Addition of CO to the regression models attenuated, but did not remove these associations (β male = 0.279; β female = 0.234, $p < 0.001$ for both). Matching males and females for BSA resulted in equivalent values of mean pressure between males and females (83 ± 9 vs 84 ± 12 mmHg, $p = 0.8$). Despite this sex differences in SBP (121 ± 11 vs 114 ± 13 mmHg), CO (7.8 ± 2.0 vs 6.9 ± 1.5 L/min) and peripheral vascular resistance (PVR, 926 ± 325 vs 1026 ± 275 dynes.sec.cm⁵) still remained ($p < 0.001$ for all).

Conclusion: CO partially mediates the association between BSA and SBP in healthy young adults. However, sex differences in SBP and its haemodynamic determinants remain after accounting for differences in body size. In particular, for a given level of body size and mean BP, PVR is disproportionately higher, and CO disproportionately lower, in females, which warrants further investigation.

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