

No Sex Differences in the Cardiovascular Response to Mental-Stress in Older Adults

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Mental stress elicits increases in blood pressure (BP) and arterial stiffness, the magnitude of which, is subject to sex differences. Women tend to have blunted increases in BP compared to men that are driven by cardiac excitation, rather than changes in peripheral resistance. These sex differences have primarily been documented in younger, pre-menopausal women, and through the measurement of peripheral (i.e. brachial) BP, which may differ from responses in the central vasculature (i.e. carotid artery).

PURPOSE: Investigate sex differences in the cardiovascular response to mental stress among older adults.

METHODS: 91 older adults (n=46 men, 68±6 yrs, BMI 27.1±3.7 kg·m⁻²; n=45 women, 67±7 yrs, BMI 25.3±3.6 kg·m⁻²) underwent cardiovascular measures at rest and during a mental stress protocol. Mental stress was induced using a 4-minute computerized incongruent Stroop task. Brachial and carotid systolic (SP), diastolic (DP) and pulse pressure (PP) were measured via a brachial oscillometric cuff and applanation tonometry, respectively. Carotid waveforms were calibrated to brachial mean pressure and DP. Carotid-femoral pulse wave velocity and common carotid artery (CCA) elastic modulus (Ep, calibrated to carotid SP and DP) were assessed as measures of aortic and carotid stiffness, respectively.

RESULTS: Significant group effects were detected for brachial SP, PP, HR, and PWV, with men having greater PWV, but lower BP than women (p<0.05). Significant time effects were observed for brachial and carotid pressures, HR, PWV, and CCA Ep, which increased during mental stress. No significant sex-by-time interactions were detected, indicating similar responses to mental stress between sexes.

CONCLUSIONS: Mental stress resulted in acute increases in peripheral and central blood pressure and large artery stiffness. Although men had consistently higher PWV and lower brachial BP than women at rest and during mental stress, the magnitude of the cardiovascular responses to mental stress were similar between sexes.

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Table 1: Cardiovascular responses to mental-stress among older men and women. (Mean ± SD)

Variable	Men (n=46)		Women (n=45)		Sex	Effects	
	Rest	Mental-stress	Rest	Mental-stress		Time	SxT
Brachial SP (mmHg)	124 ± 12	139 ± 16	127 ± 14	145 ± 20	0.035	0.001	0.545
Brachial DP (mmHg)	79 ± 7	86 ± 7	79 ± 7	86 ± 9	0.769	0.001	0.677
Brachial PP (mmHg)	45 ± 8	53 ± 12	49 ± 9	59 ± 12	0.004	0.001	0.558
Carotid SP (mmHg)	116 ± 12	129 ± 17	118 ± 13	131 ± 16	0.306	0.001	0.769
Carotid PP (mmHg)	37 ± 9	43 ± 14	39 ± 9	45 ± 10	0.218	0.001	0.903
HR (b·min ⁻¹)	60 ± 10	66 ± 10	63 ± 9	70 ± 13	0.023	0.001	0.735
PWV (m·s ⁻¹)	10.2 ± 2.6	11.2 ± 2.6	9.3 ± 2.7	10.1 ± 3.1	0.020	0.023	0.763
CCA Ep (kPa)	100.58 ± 35.40	125.01 ± 50.23	107.89 ± 46.99	123.64 ± 55.57	0.674	0.005	0.540

SP, systolic pressure; DP, diastolic pressure; PP, pulse pressure; HR, heart rate; PWV, pulse wave velocity; CCA, common carotid artery; Ep, elastic modulus; SxT, sex-by-time interaction.