

Abstract

Cardiorespiratory fitness in postmenopausal women: relationship with indirect markers of arterial stiffness and cardiovascular stress

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The impairment of cardiorespiratory fitness associated with arterial stiffness has been related to excessive physiological changes, being considered important predictors of risk of cardiovascular diseases (Albin et al., 2020). Evidence on the interaction between cardiorespiratory fitness, arterial stiffness and cardiovascular stress in postmenopausal women remains limited. This relationship analysis proves to be important in developing better practices for stratifying cardiovascular risks in this population. In this sense, the aim was to investigate the relationship between cardiorespiratory fitness and indirect markers of arterial stiffness and cardiovascular stress in postmenopausal women. The sample comprised 75 postmenopausal women of the “Meno(s)pausa+movimento” program (age=56.3 ± 6.5 years old; Body mass index [BMI] = 27.32 ± 3.63 kg/m²; Systolic blood pressure [SBP]= 127.34 ± 14.99 mmHg; Diastolic blood pressure [DBP]= 83.84 ± 7.94 mmHg; Resting heart rate [HRr]= 66.17 ± 7.36 bpm). SBP, DBP and HRr were evaluated using an electronic blood pressure monitor (M6

Confort, OMRON, Japan) after a 10-minute rest period in the lying position. The rate pressure product (RPP) was determined by $SBP * HR/100$, mean arterial pressure (MAP) by $DBP + 1/3*(SBP-DBP)$, and pulse pressure (PP) by the difference between SBP and DBP. The cardiorespiratory fitness ($VO_{2\max}$) was estimated through the indirect and sub-maximal YMCA protocol on a cycle ergometer (Monark 839E, Vansbro, Sweden). The results related to cardiorespiratory fitness reveal that the $VO_{2\max}$ was classified as poor ($25.07 \pm 5.85 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$). The indirect markers of arterial stiffness RPP were classified as normal ($8.5 \pm 1.37 \text{ mmHg/bpm}$), and the PP is near the optimal value ($43.50 \pm 1.49 \text{ mmHg}$). However, the MAP as a cardiovascular stress marker ($98.34 \pm 9.02 \text{ mmHg}$) is near the alert threshold pre-established risk criteria. The Pearson correlation coefficient reveals that $VO_{2\max}$ was inversely correlated with the indirect markers of arterial stiffness and cardiovascular stress, such as DBP ($r = -0.303$; $p < 0.01$), HRr ($r = -0.273$; $p = 0.018$), RPP ($r = -0.314$; $p < 0.01$) and MAP ($r = -0.264$; $p = 0.022$). The PP results did not show a correlation with $VO_{2\max}$ in postmenopausal women. Our data reveal that the indirect markers of arterial stiffness and cardiovascular stress are within the normal range in this group of postmenopausal women, and there is an indirect relationship between the level of cardiorespiratory fitness and the increased risk of arterial stiffness and cardiovascular stress. This markers analysis in postmenopausal women plays an essential role in monitoring cardiovascular risk factors.

Keywords: climacteric, cardiorespiratory stress test, arterial ageing, cardiovascular diseases.

Reference

Albin, E. E., Brellenthin, A. G., Lang, J. A., Meyer, J. D., & Lee, D. C. (2020). Cardiorespiratory Fitness and Muscular Strength on Arterial Stiffness in Older Adults. *Medicine and science in sports and exercise*, 52(8), 1737–1744. <https://doi.org/10.1249/MSS.0000000000002319>.