

Blood Flow and Vascular Conductance Responses to Dynamic Handgrip Exercise in Hispanic American and Non-Hispanic White Women

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ABSTRACT

Hispanic Americans (HA) are the fastest growing ethnic minority in the United States, with disproportionately higher incidence of obesity, hyperlipidemia and type 2 diabetes compared to their non-Hispanic white (NHW) counterparts. As such, the risk of cardiovascular complications is significantly higher in this population, while the underlying mechanisms remain largely unexplored. Alterations in vascular function occur early in cardiovascular diseases and have not been comprehensively studied in the HA population. Previous studies have demonstrated higher flow-mediated dilation (FMD, an index of resting vascular function) in young HA compared to NHW women. However, whether these differences in vasodilation also occur in response to dynamic exercise remains unknown. **PURPOSE:** We tested the hypothesis that during increasing intensities of rhythmic handgrip exercise, young, healthy HA women would demonstrate greater forearm blood flow and vascular conductance responses compared to age- and weight-matched NHW women. **METHODS:** Six HA women (20 ± 2 yr; BMI = 21.45 ± 2.2 kg/m²) and 9 NHW women (20 ± 2 yr; BMI = 21.49 ± 2.2 kg/m²) performed rhythmic handgrip exercise for 3 minutes at 15%, 30%, and 45% of their maximum voluntary contraction (MVC). Each exercise bout was separated by at least 10 minutes of rest. Mean arterial pressure (MAP; finger photoplethysmography), heart rate (ECG), and forearm blood flow (FBF; duplex Doppler ultrasound) was measured at rest and during the last minute of rhythmic exercise. Forearm vascular conductance was calculated as FBF/MAP. **RESULTS:** Baseline FBF (HA: 53.3 ± 7.6 and NHW: 52.4 ± 11.3 ml/min, mean \pm SD, $p = 0.87$), FVC (HA: 0.64 ± 0.09 and NHW: 0.62 ± 0.16 ml/min/mmHg, $p = 0.85$), MAP (HA: 83.3 ± 3.18 and NHW: 84.75 ± 6.85 mmHg, $p = 0.64$), and MVC (HA: 53 ± 13 and NHW: 49 ± 6 kg, $p = 0.36$) were similar between groups. In response to exercise, both groups demonstrated an intensity dependent increase in FBF ($\% \Delta$ FBF during 45%: HA = $437 \pm 90\%$ and NHW = $459 \pm 162\%$, $p = 0.76$) but no significant difference was found between groups (repeated-measures 2-way ANOVA; interaction effect: $p = 0.66$, intensity effect: $p = 0.0001$, ethnicity effect: $p = 0.73$). Similar to FBF, there was no significant difference in FVC responses between groups ($\% \Delta$ FVC 45%: HA = 385 ± 110 and NHW = 393 ± 135 , $p = 0.91$). **CONCLUSION:** Forearm blood flow and vascular conductance responses during increasing intensities of rhythmic handgrip exercise were not different between HA and NHW women.