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Racial Differences in Heart Rate, Cardiac Autonomic Modulation and Physical Activity in Children

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A “Cardiovascular Conundrum” exists between Black and White individuals in which Black individuals have increased cardiac parasympathetic activity but are at a greater risk for cardiovascular disease compared to White individuals. This conundrum may begin in childhood and manifest as decreased heart rate (HR) and increased heart rate variability (HRV) in Black children. The cause of increased parasympathetic activity in Black individuals is unknown. Physical activity (PA) is associated with higher levels of parasympathetic activity and may contribute to greater parasympathetic activity in Black children. **PURPOSE:** To examine if lower HR and higher HRV in Black children is related to possible racial differences in PA. **METHODS:** One-hundred sixty-eight children (Black: n=102, White: n=66) ages 10.5 ± 0.9 years underwent cardiac-autonomic assessment. HR and HRV were measured using a polar HR monitor. Normalized high frequency (HF) power of HRV was taken as a measure of parasympathetic modulation and the low frequency-to-high frequency (LF/HF) ratio as a measure of sympathovagal balance. PA (log PA) was objectively measured for 7 days using an accelerometer. Analysis of variance determined group differences in HR, HRV, and PA between Black and White children. Analysis of covariance controlled for the influence of log PA for group differences in HR, HFnu, and LF/HF ratio. **RESULTS:** HR trended to be lower in Black children than White children (Black: 73 ± 11 bpm, White: 76 ± 10 bpm; $F=3.70$, $p=0.056$). Black children had higher HFnu (Black: $65.50 \pm 14.83\%$, White: $58.67 \pm 13.12\%$; $F=9.29$, $p=0.003$) and lower LF/HF ratio than White children (Black: 0.62 ± 0.47 , White: 0.80 ± 0.48 ; $F=5.85$, $p=0.017$). Log PA was not different between groups (Black: 5.62 ± 0.12 counts/day, White: 5.60 ± 0.15 counts/day; $F=1.85$, $p=0.188$). Co-varying for PA had no effect on group differences in HR ($F=2.90$, $p=0.091$), HFnu ($F=8.85$, $p=0.003$), or LF/HF ratio ($F=5.54$, $p=0.020$). **CONCLUSION:** Black children exhibit increased parasympathetic modulation and lower sympathovagal balance that likely contributes to a lower resting HR. Racial differences in HR and HRV are not likely due to PA levels. Therefore, other factors may contribute to increased cardiac parasympathetic activity in Black children.

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