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Relationship between aerobic fitness and cardio-metabolic disease risk in South African children

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This study investigated the relationship between the aerobic capacity (VO_2 peak) and cardio-metabolic disease (CMD) risk in South African children and adolescents. A total of 1361 (boys: $n=678$; girls: $n=683$) primary school children (Mean age: 10.9 ± 1.28 years), whose parents gave signed informed consent, participated in the study. Anthropometric (height, weight, circumference of the hip and waist), physiological (systolic blood pressure-SBP); diastolic blood pressure-DBP), and cardiorespiratory fitness (CRF) (20-meters Multistage Shuttle Run (MSR) measurements were taken using standardized protocols. To examine the relationship between aerobic fitness and CMD risk factors, bivariate correlation analysis was undertaken. Boys had significantly higher VO_2 peak (25.8 ± 6.79) compared to girls (21.9 ± 6.95) ($p<0.05$). There were low negative correlations between VO_2 peak and BMI (Body Mass Index) ($r=-0.054$, $p=0.04$), WHR (Waist-hip ratio) ($r=-0.110$, $p<0.001$), and WHtR (Waist-to-height ratio) ($r=-0.055$, $p=0.041$), while DBP ($r=0.097$, $p<0.001$) yielded low positive association. Multiple linear regression analyses also showed that BMI ($\beta=-0.165$, $p=0.000$), SBP ($\beta=-0.066$, $p=0.03$), DBP ($\beta=0.132$, $p=0.000$), WHR ($\beta=-0.182$, $p=0.000$), and WHtR ($\beta=-0.118$, $p=0.012$) significantly predicted VO_2 peak. Substantial evidence exists that an increase in the prevalence of cardio-metabolic diseases are intensified by low aerobic fitness (VO_2 peak). Aerobic fitness could be a significant predictor of cardio-metabolic disease risk among South African children.

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