

# Does cardiorespiratory fitness attenuate the adverse effects of severe/morbid obesity on cardiometabolic risk and insulin resistance in children? A pooled analysis

Nyström C.D.

Henriksson P.

Martínez-Vizcaíno V.

Medrano M.

Cadenas-Sanchez C.

Arias-Palencia N.M.

Löf M.

Ruiz J.R.

Labayen I.

Sánchez-López M.

Ortega F.B.

**OBJECTIVE** To investigate 1) differences in cardiometabolic risk and HOMA of insulin resistance (HOMA-IR) across BMI categories (underweight to morbid obesity), 2) whether fit children have lower cardiometabolic risk/HOMA-IR than unfit children in each BMI category, and 3) differences in cardiometabolic risk/HOMA-IR in normal-weight unfit children and obese fit children. **RESEARCH DESIGN AND METHODS** A pooled study including cross-sectional data from three projects (n = 1,247 children aged 8-11 years). Cardiometabolic risk was assessed using the sum of the sex- and age-specific z scores for triglycerides, HDL cholesterol, glucose, and the average of systolic and diastolic blood pressure and HOMA-IR. **RESULTS** A significant linear association was observed between the risk score and BMI categories (P trend £0.001), with every incremental rise in BMI category being associated with a 0.5 SD higher risk score (standardized b = 0.474, P < 0.001). A trend was found showing that as BMI categories rose, cardiorespiratory fitness (CRF) attenuated the risk score, with the biggest differences observed in the most obese children (-0.8 SD); however, this

attenuation was significant only in mild obesity (-0.2 SD,  $P = 0.048$ ). Normal-weight unfit children had a significantly lower risk score than obese fit children ( $P < 0.001$ ); however, a significant reduction in the risk score was found in obese fit compared with unfit children (-0.4 SD,  $P = 0.027$ ). Similar results were obtained for HOMA-IR. CONCLUSIONS As BMI categories rose so did cardiometabolic risk and HOMA-IR, which highlights the need for obesity prevention/treatment programs in childhood. Furthermore, CRF may play an important role in lowering the risk of cardiometabolic diseases in obese children. © 2017 by the American Diabetes Association.