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Physical fitness across the life-course and the metabolic syndrome in mid-adulthood

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Background: Low physical fitness, including muscular strength and cardiorespiratory fitness (CRF), is a risk factor for the metabolic syndrome (MetS). However, it is unknown how physical fitness at different life stages contributes to the development of MetS.
Methods: Included were 783 Childhood Determinants of Adult Health Study participants who between 1985 and 2019 had measures of physical fitness (muscular strength: dominant grip strength; CRF: 1.6km run or physical work capacity at 170 beats per minute) at three life stages (childhood=7–15 years, young-adulthood=26–36 years, mid-adulthood=36–49 years) and had their MetS status assessed using the harmonised definition in mid-adulthood. The Bayesian relevant life-course exposure model, a novel statistical analytic technique, quantified associations between physical fitness at each life stage with MetS and estimated the maximum accumulated effect of physical fitness across the life-course.
Results: The contribution of muscular strength at each life stage with MetS in mid-adulthood was equal (childhood=36%, young-adulthood=31%, mid-adulthood=33%), whereas for CRF the greatest contribution was from childhood and mid-adulthood (childhood=41%, young-adulthood=20%, mid-adulthood=39%). A one standard deviation increase in cumulative physical fitness across the life-course was associated with 36–55% reduced odds of MetS (muscular strength: OR = 0.64, 95%Credible Interval=0.40,0.95; CRF: OR = 0.45, 95%Credible Interval=0.30,0.64).
Conclusions: As physical fitness at each life stage was associated with MetS in mid-adulthood, strategies aimed at increasing both childhood and adult physical fitness levels could improve future health.
Key messages: Increased participation in both aerobic and muscle-strengthening activities, beginning in childhood and extending into adulthood, could be encouraged to help prevent MetS.