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Associations of Muscle Strength and Fitness with Metabolic Syndrome in Men

JURCA, RADIM; LAMONTE, MICHAEL J.; CHURCH, TIMOTHY S.; EARNEST, CONRAD P.; FITZGERALD, SHANNON J.; BARLOW, CAROLYN E.; JORDAN, ALEXANDER N.; KAMPERT, JAMES B.; BLAIR, STEVEN N.

Abstract

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Purpose: To examine the associations for muscular strength and cardiorespiratory fitness with the prevalence of metabolic syndrome among men.

Methods: Participants were 8570 men (20-75 yr) for whom an age-specific muscular strength score was computed by combining the body weight adjusted one-repetition maximum measures for the leg press and the bench press. Cardiorespiratory fitness was quantified by age-specific maximal treadmill exercise test time.

Results: Separate age and smoking adjusted logistic regression models revealed a graded inverse association for metabolic syndrome prevalence with muscular strength ($\beta = -0.37$, $P < 0.0001$) and cardiorespiratory fitness ($\beta = -1.2$, $P < 0.0001$). The association between strength and metabolic syndrome was attenuated ($\beta = -0.08$, $P < 0.01$) when further adjusted for cardiorespiratory fitness. The association between cardiorespiratory fitness and metabolic syndrome was unchanged ($\beta = -1.2$, $P < 0.0001$) after adjusting for strength. Muscular strength added to the protective effect of fitness among men with low (P trend = 0.0002) and moderate (P trend < 0.0001) fitness levels. Among normal weight (BMI < 25), overweight (BMI 25-30), and obese (BMI ≥ 30) men, respectively, being strong and fit was associated with lower odds (73%, 69%, and 62% respectively, $P < 0.0001$) of having prevalent metabolic syndrome.

Conclusions: Muscular strength and cardiorespiratory fitness have independent and joint inverse associations with metabolic syndrome prevalence.