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Low Total Testosterone Levels are Associated With the Metabolic Syndrome in Elderly Men: The Role of Body Weight, Lipids, Insulin Resistance, and Inflammation; The Ikaria Study.

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Abstract
BACKGROUND:

The prevalence of the metabolic syndrome (MetS) increases with age. Among other changes, testosterone levels decline with age. The relationship between testosterone levels and MetS components in older subjects has not been clearly defined until today.
OBJECTIVES:

The aim of this work was to evaluate the relationship between total serum testosterone levels and MetS and its components.
METHODS:

The working sample consisted of 467 elderly individuals (mean age 75 ± 6 years old, n = 220 men) from Ikaria Island, Greece. MetS was defined according to the NCEP ATPIII criteria.
RESULTS:

MetS prevalence was 52% in men and 64% in women. *Those with MetS had lower testosterone levels; a 10 ng/dl increase in testosteronewas associated with a 3% reduction in odds of having MetS in men* (95% CI: 0.95-0.99), *but not in women*. This remained the result after various adjustments had been made, including daily hours of sleep. *Testosterone was inversely associated with
abnormal waist circumference, high-sensitivity C-reactive protein (hs-CRP), insulin, and HDL cholesterol levels in men only*. When lipid categories, hs-CRP, BMI, and insulin resistance levels were taken into account, testosterone lost its significance in predicting MetS ($p < 0.20$), suggesting that these markers possess a mediating effect.
CONCLUSIONS:

In elderly men, low serum testosterone was associated with MetS. Lipids, BMI, inflammation, and insulin resistance levels seem to explain this relationship, suggesting a potential mediating effect. This finding may support a research hypothesis relating serum testosterone to cardiovascular disease, which requires further research.