Usefulness of waist-to-height ratio in screening incident metabolic syndrome among Japanese community-dwelling elderly individuals

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Abstract

This study examined a range of anthropometric indices and their relationships with metabolic syndrome (MetS). Despite recommendations that central obesity assessment should be employed as a marker of metabolic health, there is no consensus regarding the protocol for measurement. The present study included 720 men aged 71 ± 8 years and 919 women aged 71 ± 7 years from a rural village. We examined the relationship between anthropometric indices {e.g., body mass index (BMI), waist-to-height ratio (WHtR), waist-to-hip ratio (WHpR)}, and MetS based on the modified criteria of the National Cholesterol Education Program's Adult Treatment Panel (NCEP-ATP) III report in a cross-sectional (N = 1,639) and cohort (N = 377) data. A receiver operating curve (ROC) analysis was performed to determine the optimal cut-off value and best discriminatory value of each of these anthropometric indices to predict MetS. In the cross-sectional study, WHtR as well as BMI and WHpR showed significantly predictive abilities for MetS in both genders; and WHtR showed the strongest predictive ability for the presence of MetS. Also in the cohort study, WHtR as well as BMI and WHpR showed significantly predictive abilities for incident MetS in both genders, and in men WHtR showed the strongest predictive ability for incident MetS, but in women BMI showed the strongest predictive ability. In the cross-sectional study, the optimal WHtR cutoff values were 0.52 (sensitivity, 71.0%; specificity, 77.9%) for men and 0.53 (sensitivity, 79.8%; specificity, 75.7%) for women. In the cohort study, the optimal WHtR values were 0.50 (sensitivity, 60.7%; specificity, 73.2%) for men and 0.50 (sensitivity, 75.0%; specificity, 56.1%) for women. Increased WHtR was significantly and independently associated with prevalence of MetS in both genders. These results suggest that WHtR is a useful screening tool for determining metabolic risk in Japanese elderly community dwelling individuals.

Cross-sectional study

Men — WHtR: 0.812 (0.780-0.844), p<0.001; BMI: 0.801 (0.767-0.834), p<0.001; WHpR: 0.805 (0.772-0.837), p<0.001; Reference

Women — WHtR: 0.832 (0.806-0.859), p<0.001; BMI: 0.801 (0.772-0.829), p<0.001; WHpR: 0.788 (0.759-0.818), p<0.001; Reference

Cohort study

Men — WHtR: 0.698 (0.600-0.797), p=0.001; BMI: 0.679 (0.580-0.778), p=0.003; WHpR: 0.645 (0.541-0.749), p=0.015; Reference

Women — WHtR: 0.681 (0.591-0.772), p=0.001; BMI: 0.684 (0.597-0.771), p=0.001; WHpR: 0.656 (0.564-0.747), p=0.003; Reference