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A Comparison between Five Indices of Overweight and Their Association with Myocardial Infarction and Death, 28-Year Follow-Up of 1000 Middle-Aged Swedish Employed Men

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Abstract : Introduction: Overweight (BMI 25-30) and obesity (BMI 30+) have consistently been associated with cardiovascular (CV) risk and death since the Framingham heart study in 1948, and BMI was included in the original Framingham risk score (FRS). Background: Myocardial infarction (MI) poses a serious threat to the patient's life. In addition to BMI, several other indices of overweight have been presented and argued to replace FRS as more relevant measures of CV risk. These indices include waist circumference (WC), waist/hip ratio (WHR), sagittal abdominal diameter (SAD), and sagittal abdominal diameter to height (SADHtR). Specific research question: The research question of this study is to evaluate the interrelationship between the various body measurements, BMI, WC, WHR, SAD, and SADHtR, and which measurement is strongly associated with MI and death. Methods: In 1993, 1,000 middle-aged Caucasian, randomly selected working men of the Swedish Volvo-Renault cohort were surveyed at a nurse-led health examination with a questionnaire, EKG, laboratory tests, blood pressure, height, weight, waist, and sagittal abdominal diameter measurements. Outcome data of myocardial infarction over 28 years come from Swedeheart (the Swedish national myocardial infarction registry) and the Swedish death registry. The Aalen-Johansen and Kaplan–Meier methods were used to estimate the cumulative incidences of MI and death. Multiple logistic regression analyses were conducted to compare BMI with the other four body measurements. The risk for the various measures of obesity was calculated with outcomes of accumulated first-time myocardial infarction and death as odds ratios (OR) in quartiles. The ORs between the 4th and the 1st quartile of each measure were calculated to estimate the association between the body measurement variables and the probability of cumulative incidences of myocardial infarction (MI) over time. Double-sided P values below 0.05 will be considered statistically significant. Unadjusted odds ratios were calculated for obesity indicators, MI, and death. Adjustments for age, diabetes, SBP, and the ratio of total cholesterol/HDL-C and blue/white collar status were performed. Results: Out of 1000 people, 959 subjects had full information about the five different body measurements. Of those, 90 participants had a first MI, and 194 persons died. The study showed that there was a high and significant correlation between the five different body measurements, and they were all associated with CVD risk factors. All body measurements were significantly associated with MI, with the highest (OR=3.6) seen for SADHtR and WC. After adjustment, all but SADHtR remained significant with weaker ORs. As for all-cause mortality, WHR (OR=1.7), SAD (OR=1.9), and SADHtR (OR=1.6) were significantly associated, but not WC and BMI. However, after adjustment, only WHR and SAD were significantly associated with death, but with attenuated ORs.

Keywords : BMI, death, epidemiology, myocardial infarction, risk factor, sagittal abdominal diameter, sagittal abdominal diameter to height, waist circumference, waist-hip ratio
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