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Three Metabolic Risk Factors Could Account for Half of Coronary Heart Disease Risk in Overweight Patients

By Kelly Young

Successfully controlling high blood pressure, lipids, and glucose levels could potentially reduce coronary heart disease risk by half and stroke risk by three fourths in overweight patients, according to a *Lancet* study.

Researchers analyzed the results of nearly 100 prospective cohort studies of adults with BMIs over 20.

Over a median follow-up of 13 years, the hazard ratio for coronary heart disease was 1.27 for each 5-unit increase in BMI, and the HR for stroke was 1.18. However, after adjustment for high blood pressure, cholesterol, and glucose, the respective HRs fell to 1.15 and 1.04. The authors calculate that 46% of BMI's excess risk for coronary heart disease and 76% of the excess risk for stroke is mediated by these three metabolic risk factors. Blood pressure was the most significant mediator of the three.

They conclude: "Reliance on control of the metabolic mediators might be only a partial and temporary response to the obesity epidemic. Rather, creative and bold strategies are needed that can curb and reverse rising adiposity."

Lancet article (Free abstract)

ORIGINAL ARTICLE

Metabolic mediators of the effects of body-mass index, overweight, and obesity on coronary heart disease and stroke: a pooled analysis of 97 prospective cohorts with 1·8 million participants

The Global Burden of Metabolic Risk Factors for Chronic Diseases Collaboration (BMI Mediated Effects)*

Background

Body-mass index (BMI) and diabetes have increased worldwide, whereas global average blood pressure and cholesterol have decreased or remained unchanged in the past three decades. We quantified how much of the effects of BMI on coronary heart disease and stroke are mediated through blood pressure, cholesterol, and glucose, and how much is independent of these factors.

Methods

We pooled data from 97 prospective cohort studies that collectively enrolled 1·8 million participants between 1948 and 2005, and that included 57 161 coronary heart disease and 31 093 stroke events. For each cohort we excluded participants who were younger than 18 years, had a BMI of lower than 20 kg/m2, or who had a history of coronary heart disease or stroke. We estimated the hazard ratio (HR) of BMI on coronary heart disease and stroke with and without adjustment for all possible combinations of blood pressure, cholesterol, and glucose. We pooled HRs with a random-effects model and calculated the attenuation of excess risk after adjustment for mediators.

Findings

The HR for each 5 kg/m2 higher BMI was 1·27 (95% CI 1·23—1·31) for coronary heart disease and 1·18 (1·14—1·22) for stroke after adjustment for confounders. Additional adjustment for the three metabolic risk factors reduced the HRs to 1·15 (1·12—1·18) for coronary heart disease and 1·04 (1·01—1·08) for stroke, suggesting that 46% (95% CI 42—50) of the excess risk of BMI for coronary heart disease and 76% (65—91) for stroke is

mediated by these factors. Blood pressure was the most important mediator, accounting for 31% (28—35) of the excess risk for coronary heart disease and 65% (56—75) for stroke. The percentage excess risks mediated by these three mediators did not differ significantly between Asian and western cohorts (North America, western Europe, Australia, and New Zealand). Both overweight (BMI ≥25 to <30 kg/m2) and obesity (BMI ≥30 kg/m2) were associated with a significantly increased risk of coronary heart disease and stroke, compared with normal weight (BMI ≥20 to <25 kg/m2), with 50% (44—58) of the excess risk of overweight and 44% (41—48) of the excess risk of obesity for coronary heart disease mediated by the selected three mediators. The percentages for stroke were 98% (69—155) for overweight and 69% (64—77) for obesity.

Interpretation

Interventions that reduce high blood pressure, cholesterol, and glucose might address about half of excess risk of coronary heart disease and three-quarters of excess risk of stroke associated with high BMI. Maintenance of optimum bodyweight is needed for the full benefits.

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