

Body mass index and the risk of cardiovascular disease and all-cause mortality in European primary care databases

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Background

The association between body mass index (BMI) and cardiovascular disease (CVD) and mortality has been previously characterized in cohort studies.

Objectives

We evaluated this association in large routine health care records.

Methods

We extracted records from 18 million adults enrolled for ≥ 1 year in four primary care databases: Health Search Database (HSD, Italy), Integrated Primary Care Information (IPCI, Netherlands), Information System for Research in Primary Care (SIDIAP, Spain), and The Health Improvement Network (THIN, UK). Code lists were harmonized. Patients with a history of CVD or weight-impacting diseases were excluded. We fitted Cox models to estimate the risk of acute myocardial infarction (AMI), stroke, and all-cause of death by BMI categories (using earliest BMI record in adulthood) within databases and pooled results by random effects meta-analyses.

Results

In patients enrolled in 2015, proportions with BMI recorded in the past 3 years ranged from 17.4% in HSD to 50.8% in THIN. Out of a total of 18 408 983 patients ever enrolled across all four databases, 7 050 997 patients had an eligible BMI, with proportion varying from 11.2% of all patients in IPCI to 52.1% in SIDIAP. Median length of follow-up ranged from 1.3 years in IPCI to 4.6 years in HSD. For all-cause mortality, the pooled hazard ratios (HRs) compared with normal BMI (18.5-24.9 kg/m²) and adjusted for age and gender were as follows: underweight 1.49 (95% CI: 0.97; 2.29), overweight 0.99 (0.82; 1.19), and obese 1.20 (0.97; 1.48). HR was non-significant in obese with BMI 25-34.9 kg/m² (HR: 1.13; 0.91-1.41) and became significant in 35-39 kg/m² (1.30; 1.07-1.59) and 40-59.9 kg/m² (1.76; 1.45-2.13) categories. Pooled HRs for risk of CVD versus normal BMI were as follows: underweight 0.52 (0.26; 1.01) for AMI and 0.74 (0.38; 1.45) for stroke; overweight 1.45 (1.21; 1.74) and 1.21 (0.96; 1.53); obese 1.71 (1.43; 2.04) and 1.38 (1.11; 1.72) (significant in all obese subcategories). After adjustment for risk factors, HRs in obese patients became non-significant for stroke but remained significant for AMI. Associations were significantly stronger in HSD compared with the other 3 databases (I²>80%).

Conclusions

Although we observed disparity in recording of BMI in primary care across Europe, magnitudes of associations with mortality and CVD resembled previous meta-analyses of cohort studies. Routine health care records may be used for cardiovascular research; however, more systematic recording of BMI is recommended.