

## Are measures of adiposity associated independently with incident cardiovascular disease in individuals with newly diagnosed type 2 diabetes?

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**Background and Aims:** Obesity is associated with an increased risk of cardiovascular disease (CVD) and of type 2 diabetes (T2DM). The prevalence of obesity has tripled in most European countries in the past twenty years. We investigated whether measures of adiposity are associated with incident CVD in people with newly-diagnosed T2DM.

**Materials and Methods:** Of the 5102 patients with newly-diagnosed T2DM recruited into the UK Prospective Diabetes Study, 4478 did not have CVD and had the requisite data available for these analyses. Discrete time survival models were used to examine time to the first occurrence of CVD, defined as any of fatal or non-fatal myocardial infarction, ischaemic heart disease, fatal or non-fatal stroke, coronary revascularization or fatal peripheral vascular disease. At diagnosis 59% of patients were male, 82% White caucasian, 30% current smokers and 1.1% had atrial fibrillation (AF). Their mean (SD) age was 52 (9) years, systolic blood pressure 136 (20) mmHg, total cholesterol 5.4 (1.0) mmol/l, HDL-cholesterol 1.11 (0.25) mmol/l, total to HDL ratio (Tot:HDL) 5.1 (1.4) and median (IQR) HbA1c 6.5 (5.8-7.5) %. Measures of adiposity were weight 80.9 (16.4) kg, body mass index (BMI) 28.9 (5.6) kg/m<sup>2</sup>, waist circumference (WC) 94.9 (13.2) cm and hip circumference (HC) 87.0 (17.6) cm.

**Results:** 787 first CVD events occurred over median (IQR) 10 (8-13) years. All measures of adiposity were associated univariately ( $p < 0.001$ ) with an increased risk of CVD but none remained significant after adjusting for traditional CVD risk factors (weight  $p = 0.258$ , BMI  $p = 0.255$ , waist circumference  $p = 0.266$ , waist:hip  $p = 0.850$ ). Correlations between these measures of adiposity and traditional CVD risk factors were:

	Age	Sex	Ethnicity	Smoker	HbA1c	SBP	Tot:HDL	AF
BMI	-0.065	0.223	-0.054	-0.053	0.023	0.148	0.145	0.022
Weight	-0.117	-0.181	-0.060	-0.003	-0.018	0.144	0.092	0.041
WC	-0.025	-0.117	-0.080	-0.007	0.035	0.123	0.199	0.017
WC:HC	-0.007	0.500	0.039	-0.065	0.028	-0.024	-0.200	0.013

None of these measures of adiposity correlated significantly with any of the traditional CVD risk factors.

**Conclusion:** The increased risk of CVD seen with increased adiposity in the general population is not evident in individuals with newly-diagnosed T2DM. Although the measures of adiposity examined here are associated individually with future risk of CVD, the survival analysis suggests their effects are absorbed by the combined effects of the traditional CVD risk factors. The correlation patterns between these adiposity measures and the traditional CVD risk factors are, however, not significant. Although increased adiposity at diagnosis does not affect future CVD risk in this cohort, weight reduction after diagnosis may well influence CVD risk and should remain an important focus in the management of diabetes.