Waist circumference adjusted for body mass index and intra-abdominal fat mass.

BACKGROUND: The association between waist circumference (WC) and mortality is particularly strong and direct when adjusted for body mass index (BMI). One conceivable explanation for this association is that WC adjusted for BMI is a better predictor of the presumably most harmful intra-abdominal fat mass (IAFM) than WC alone. We studied the prediction of abdominal subcutaneous fat mass (ASFM) and IAFM by WC alone and by addition of BMI as an explanatory factor.

METHODOLOGY/PRINCIPAL FINDINGS: WC, BMI and magnetic resonance imaging data from 742 men and women who participated in clinical studies in Canada and Finland were pooled. Total adjusted squared multiple correlation coefficients (R(2)) of ASFM and IAFM were calculated from multiple linear regression models with WC and BMI as explanatory variables. Mean BMI and WC of the participants in the pooled sample were 30 kg/m(2) and 102 cm, respectively. WC explained 29% of the variance in ASFM and 51% of the variance in IAFM. Addition of BMI to WC added 28% to the variance explained in ASFM, but only 1% to the variance explained in IAFM. Results in subgroups stratified by study center, sex, age, obesity level and type 2 diabetes status were not systematically different.

CONCLUSION/SIGNIFICANCE: The prediction of IAFM by WC is not improved by addition of BMI.