

# Associations Between Smoking, Components of the Metabolic Syndrome, and Lipid Composition

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## Background

The clustering of metabolic and cardiovascular risk factors is known as the metabolic syndrome (MetS). This study aimed to examine the association between smoking, MetS and its components, and levels of apolipoproteins (apo's) in different body mass index (BMI) classes.

## Methods

We included 24.762 men and 35.558 women from the LifeLines Cohort Study, of whom respectively 6.058 and 7.469 were current smokers. Participants were categorized in different BMI-classes (BMI<25; BMI 25-29.9; BMI≥30kg/m<sup>2</sup>). To define MetS standardized criteria were used (NCEP ATP III). The association between smoking and the MetS components and apo's was tested with linear regression, stratified by gender and age- adjusted.

## Results

There was a trend of greater prevalence of MetS with higher BMI levels. Among obese men and women respectively 62% and 41% had MetS. Current smoking was associated with increased risk for MetS in both genders and all BMI-classes (OR's 1.7-2.4 for men, 1.8-2.3 for women, all Ps<0.001). Current smokers had lower levels of HDL-cholesterol and apoA1, and higher levels of triglycerides, waist, and apoB than non-smokers (all Ps<0.001). Smoking had no consistent association with blood pressure or fasting blood glucose. In all BMI-classes, there was a dose-dependent association between daily tobacco consumption and prevalence of MetS as well as with lower levels of HDL-cholesterol, higher triglyceride levels and lower HDL-cholesterol/apoA1 (all Ps<0.001) and LDL-cholesterol/apoB ratio.

## Conclusions

Smoking is associated with an increased risk for MetS (all BMI-classes). This increased risk was mainly related to lower HDL-cholesterol, changes in particle composition, and increased triglycerides and waist.

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