

Development of the multiple metabolic syndrome in the ARIC cohort: joint contribution of insulin, BMI, and WHR

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**Purpose:** The natural history of the multiple metabolic syndrome (MMS) and its predictors has rarely been addressed in population samples. This study evaluated the predictive role of fasting serum insulin, body mass index BMI, and waist-to-hip ratio (WHR) on the development of incident MMS components (diabetes, hypertension, and dyslipidemias) over the course of three years.

**Methods:** The study population comprised the cohort of middle-aged African American and European American men and women of the Atherosclerosis Risk in Communities Study (1987-1992).

**Results:** Among 6113 individuals free of MMS components at baseline, high insulin (greater than 14 U/ml) was independently predictive of the development of one or more MMS components (OR:1.5, 95% CI:1.2-1.8), as was a BMI greater than or equal to 30 (OR:1.7, 95% CI:1.4-2.0), and a high WHR (greater than 0.98) (OR:1.5, 95% CI:1.3-1.8) adjusting statistically for age, gender, and ethnicity/center. These associations were markedly stronger for combinations of MMS components (two or more) than for isolated components.

**Conclusions:** The findings confirm earlier reports on the predictive role of insulin, BMI, and WHR, and suggest that these antecedent factors may be an integral part to the development of combinations of disorders, i.e., the particular clustering identified as the MMS.

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