

Fitness and fatness are independently associated with markers of insulin resistance in European adolescents

The HELENA Study

by

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Objective: The purpose of the present study was to examine the association of markers of insulin resistance with total and central body fat after controlling for cardiorespiratory fitness in European adolescents. We also examined the association between markers of insulin resistance and cardiorespiratory fitness at differing levels of total and central body fat.

Research Design and Methods: The present study comprises 1097 adolescents (583 females) aged 12.5-17.5 years from ten European cities participating in the HELENA study. Weight, height, waist circumference and skinfold thickness were measured, and body mass index (BMI) was calculated. Cardiorespiratory fitness was measured by the 20-meter shuttle run test. Markers of insulin resistance were fasting insulin and glucose, and homeostasis model assessment (HOMA).

Results: HOMA and fasting insulin were positively associated with BMI, skinfold thickness and waist circumference in adolescents, except for HOMA which was not significantly associated with skinfold thickness and waist circumference in females. HOMA and insulin were negatively associated with fitness in those adolescents with moderate to high levels of total and central body fat. Likewise, glucose was negatively associated with fitness in those females with moderate to high levels of body fat. In females, glucose was also associated with fitness in those with low waist circumference. In males, fasting glucose was negatively associated with fitness at low fat levels.

Conclusions: HOMA and fasting insulin were associated with total and central body fat in European adolescents. Moreover, cardiorespiratory fitness explained a significant proportion of the HOMA and fasting insulin variance in those adolescents with moderate to high levels of total and central body fat.

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