

Abstract -

Int J Obes. 1990 Jul;14(7):593-602.

Genetic and behavioral influences on body fat distribution.

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Author information

Abstract

Genetic and environmental influences on four measures of body fat distribution - subscapular/triceps ratio (STR), waist/hip ratio (WHR), and regression-adjusted subscapular skinfold and waist circumference indices - were examined in 265 pairs of white male twins, ages 59 to 70 years, who participated in the third examination of the National Heart, Lung, and Blood Institute's Twin Study. Skinfold indices of fat distribution were not highly correlated with indices based on body circumferences (r = 0.26-0.37 for the four possible correlations). After adjustment for overall obesity, the heritability of the adjusted subscapular skinfold index was substantial (h2 = 0.60, P less than 0.001), as were estimates for both subscapular and tricep skinfolds individually. By contrast, heritability of the STR was low and of borderline statistical significance (h2 = 0.24, P = 0.06). Heritability for the WHR (h2 = 0.31, P = 0.07) was also low. Although higher estimates were observed for the adjusted waist circumference index (h2 = 0.46, P = 0.02) and for the component circumferences, these were not clearly due to genetic influences. Among behavioral influences, cigarette smoking was strongly related to the WHR and adjusted waist circumference index (P less than 0.0001). A crude measure of total physical activity was weakly, inversely related to WHR (P = 0.06), and slightly more strongly related to the adjusted waist circumference index (P = 0.01). Skinfold indices were unrelated to either behavior. We conclude that: (1) skinfold indices measure a different dimension of fat distribution than circumference indices; (2) there is evidence for a genetic influence on subcutaneous fat distribution, but less evidence for such an influence on the WHR; (3) behavioral factors appear to be more important in determining the WHR than subcutaneous fat patterning.

PMID: 2228394 [PubMed - indexed for MEDLINE]







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