Supplementary

Anthropometric-related measures

The Neale Lab conducted the most up-to-date genome-wide association analysis (round 2) on 4,236 phenotypes with a sample size of 361,194 persons of White British ancestry from UK Biobank. UK Biobank is a population-based cohort that provides biological samples and comprehensive clinical information from over 500,000 participants of White British ancestry aged 40–69 years in 2006–2010.[1].

The anthropometric-related measures were collected from UK Biobank participants by trained staff at a baseline assessment centre visit. The participants' height was obtained using the Seca 240 cm height measure. BMI was estimated as weight in kilograms (kg) divided by height in metres squared (m^2). The participants' weight and body composition data were collected using the Tanita BC-418 MA body composition analyser (Tanita, Tokyo, Japan). This device measures bioelectrical impedance in the body and produces a print-out of segmental readings of fat mass, non-fat mass and fat percentage for the whole body, limbs and trunk.

The association summary statistics between the genetic variants and the anthropometric measures were generated using a linear regression model that included the first 20 principal components, age, sex, age2, sex∗age and sex∗age2 as covariates to adjust for both sexes [2].

Equations

Equation 1to estimate the mean *F*-statistics [3,4] .

$$\text{mean F=} \quad \frac{1}{L}\sum_{1=j}^{L}\frac{\gamma\text{^}2_j}{\sigma 2_{xj}}$$

Where $\gamma\text{^}2_j$ = the effect estimate of the SNP-exposure, $\sigma 2_{xj}$ = the standard error of the SNP-exposure, L = the total number of SNP-exposure, SNP = single nucleotide polymorphism (genetic variants).

Equation 2 to estimate the proportion of variation in the exposure variable explained by the selected genetic variants (R^2) [5] .

$$R^2 = \sum_{j=1}^{k} R_j^2$$

Where R_j^2 = 2 ×EAF ×(1 − EAF)×Beta^2× Var, EAF = effect allele frequency, beta = beta coefficient for the SNPs, var = the variance of exposure, which is equal to one because the beta coefficient refers to a change in 1 standard deviation.

References

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