Abstract

Background and Objective: Adequate concentrations of leptin, cortisol, and insulin are important for a suitable metabolism and development during adolescence. These hormones jointly with glucose play a major role in fat metabolism and development of childhood obesity. Our main objective was to quantify biomarkers as leptin, cortisol, insulin and glucose status in European adolescents to contribute to establish reference ranges. Methods: A representative sample of 927 adolescents (45% males, 14.9±1.2 years for the overall population) from ten European cities of the HELENA study was used to obtain fasting blood samples for these biomarkers. The percentile distributions were computed by sex and age and percentiles were associated with BMI classification. Results: Serum leptin concentration in adolescents varied significantly according to BMI, sex and age (all p<0.001). Cortisol presented a tendency to increase with age, both for females and males, while insulin and glucose were stable with age. Leptin and insulin were highest in obese adolescents (p<0.001), whilst cortisol and glucose did not vary with BMI. Percentiles 5, 25, 50, 75 and 95, for hormones values were, respectively: 1.27, 4.06, 11.54, 26.70 and 65.33 ng/ml for leptin; 5.00, 8.11, 11.14, 15.00 and 24.51 g/dl for cortisol and 3.65, 6.15, 8.52, 11.90 and 20.53 IU/ml for insulin. Conclusions: In adolescents, leptin, cortisol, insulin and glucose concentrations are differently affected by age, sex and BMI. Establishment of reference ranges (percentiles) of these biomarkers would be of great interest when pediatricians have to assess the trend of an adolescent to develop obesity years after.

Keywords