Low 25-Hydroxyvitamin D Levels in Adolescents: Race, Season, Adiposity, Physical Activity, and Fitness

WHAT'S KNOWN ON THIS SUBJECT: US adolescents are at risk of low vitamin D status.

WHAT THIS STUDY ADDS: Seasonal variations in 25-hydroxyvitamin D levels in black and white adolescents living in the Southeast were observed, and low 25-hydroxyvitamin D levels were related to adiposity, physical activity, and fitness.

OBJECTIVES: The objectives were to characterize the vitamin D status of black and white adolescents residing in the southeastern United States (latitude: ~33°N) and to investigate relationships with adiposity.

METHODS: Plasma 25-hydroxyvitamin D levels were measured with liquid chromatography-tandem mass spectroscopy for 559 adolescents 14 to 18 years of age (45% black and 49% female). Fat tissues, physical activity, and cardiovascular fitness also were measured.

RESULTS: The overall prevalences of vitamin D insufficiency (<75 nmol/L) and deficiency (≤50 nmol/L) were 56.4% and 28.8%, respectively. Black versus white subjects had significantly lower plasma 25-hydroxyvitamin D levels in every season (winter, 35.9 ± 2.5 vs 77.4 ± 2.7 nmol/L; spring, 46.4 ± 3.5 vs 101.3 ± 3.5 nmol/L; summer, 50.7 ± 4.0 vs 104.3 ± 4.0 nmol/L; autumn, 54.4 ± 4.0 vs 98.8 ± 2.7 nmol/L). With adjustment for age, gender, race, season, height, and sexual maturation, there were significant inverse correlations between 25-hydroxyvitamin D levels and all adiposity measurements, including BMI percentile (r = .02), waist circumference (P < .01), total fat mass (P < .01), percentage of body fat (P < .01), visceral adipose tissue (P = .015), and subcutaneous abdominal adipose tissue (P = .039). There were significant positive associations between 25-hydroxyvitamin D levels and vigorous physical activity (P < .01) and cardiovascular fitness (P = .025).

CONCLUSIONS: Low vitamin D status is prevalent among adolescents living in a year-round sunny climate, particularly among black youths. The relationships between 25-hydroxyvitamin D levels, adiposity, physical activity, and fitness seem to be present in adolescence. Pediatrics 2010;125:1104–1111.