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Adequate vitamin D status and adiposity contribute to bone health in peripubertal nonobese children

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The dietary reference intake (DRI) of vitamin D for Korean children wasreduced from 400IU/day in 2005 to 200IU/day in 2010. We evaluated the risk factors for low vitamin D status and itsrelationships with bone health in peripubertalnonobese children living in Seoul or Gyeonggi-do. One hundred children (9.3 ±1.9 years, 71 prepubertal, 45 boys) participated in the winter (n = 38, December through March) and summer (June through September). Bone mineral content (Z_BMC), fat mass (Z_FM), lean mass (Z_LM), and bone mineral density for the total body (Z_TB) and lumbar spine (Z_L1–4) were measured using dual-energy X-ray absorptiometry. Twenty-nine percent of children (47.4% in winter, 17.7% in summer) were vitamin D deficient (25-hydroxyvitaminD level of <20 ng/mL). In winter, low vitamin D intake (P = 0.019) and fewer daylight hours (P = 0.015) were associated with low 25-hydroxyvitaminD level. The 25-hydroxyvitamin D level correlated positively with Z_BMC (P = 0.023), Z_TB (P = 0.018), and Z_L1–4 (P = 0.043) independently of sex, puberty, Z_FM, Z_LM, physical activity level, and calcium intake. Z_FM correlated independently with Z_BMC (P< 0.001), Z_TB (P = 0.037), and Z_L1–4 (P < 0.001). In conclusion, almost half of peripubertalnonobese children were vitamin D deficient in winter. Considering the beneficial effects of adequate vitamin D status and adiposity on bone health, the current DRI of vitamin D should be upgraded to prevent vitamin D deficiency.

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