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Letter to the Editor

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Vitamin D deficiency among healthy children in developing countries: an epidemic being recognized

Madam

We read with interest the recently published article 'Vitamin D status in pre-school children in rural Nepal' by Avagyan *et al.*[1] and would like to make few important comments. The authors noted a high prevalence (91·1 %) of vitamin D deficiency (VDD; defined as serum 25-hydroxyvitamin D (25(OH)D) level <50 nmol/l) among pre-school children in rural Nepal. Their study contributed significantly to the limited literature on VDD in apparently healthy children in the South-East Asia region[2–6].

Currently, both developed and developing countries are facing an unrecognized and untreated pandemic of VDD. Several studies from India also reported a high prevalence (in the range of 36–90 %) of VDD in healthy children[2–5]. Most of these studies defined VDD as 25(OH)D level <50 nmol/l[3–5]. Among them, only a few studies also studied clinical signs suggestive of VDD (such as rachitic rosary, frontal bossing, Harrison's sulcus, wrist widening, wide anterior fontanelle, double malleolus, craniotabes and bowing of the legs)[4,5].

Tiwari and Puliyel[2] demonstrated that the prevalence of 25(OH)D level <35 nmol/l was 84 % in slum children from three areas in Delhi. Marwaha *et al.*[3] assessed the vitamin D status in 5137 healthy schoolchildren aged 10–18 years in northern India. They noticed that 10·8 % of children had clinical evidence of VDD. 25(OH)D level <50 nmol/l was found in 92·6 % of children in the lower socio-economic group and 84·9 % in the upper socio-economic group. Puri *et al.*[4] evaluated clinical and laboratory evidence of VDD among 3127 apparently healthy Delhi schoolgirls aged 6–18 years and demonstrated that 11·5 % of the girls had clinical evidence of VDD and 90·8 % of them had biochemical VDD. We assessed the prevalence of VDD in 338 apparently healthy children in the age group of 3 months–12 years (mean age 3·31 years) belonging to the upper socio-economic group in Chandigarh and found that 8·53 % of them had clinical signs of VDD and 40·24 % had biochemical VDD[5]. We also noticed on univariate analysis that VDD was associated with relatively younger age group, female sex, failure to thrive, exclusive breast-feeding, inadequate sun exposure and no vitamin D supplements[5]. A few of these findings were in contrast to those by Avagyan *et al.*[1] who found that VDD was not related to gender, sun exposure or nutritional status. Recently, Reesukumal *et al.*[6] found that VDD prevalence (25(OH)D <75 nmol/l) was 79·2 % among 159 healthy children aged 6–12 years in Bangkok, Thailand.

Avagyan *et al.*[1] enrolled children over a period of 3 months (i.e. from September to November, rainy and winter season). As we know that VDD is season dependent with lower 25(OH)D levels in winter[7], this might not be representative of the vitamin D status throughout the year and this may have overestimated the actual prevalence of VDD in rural Nepal. Also, the authors did not discuss the clinical features of VDD, children receiving vitamin D and Ca supplements, and the adequacy of sun exposure (definition). Serum Ca, P, alkaline phosphatase, parathyroid hormone and 1,25-dihydroxyvitamin D levels were not studied, which could have given more insight into VDD. It was not mentioned how deficient children were treated.

Different studies have observed varied prevalence of VDD among healthy children. This could be due to differences in populations studied, sunlight exposure, latitude of residence, skin colour, sunscreen use, environmental pollution, weather, dietary intake, vitamin D supplementation, different methods used to measure 25(OH)D level and different cut-off values[5]. The American Academy of Pediatrics recommends a daily vitamin D intake of 10 μg/d (400 IU/d) for all infants, children and adolescents, beginning in the first few days of life[8]. In India and other South-East Asian countries, there are no such regulations regarding fortification of food products or routine supplementation with vitamin D. Now various studies demonstrating high prevalence of VDD from different countries in this region advocate for routine vitamin D supplementation throughout childhood.

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