Original article:

Evaluation of the Prevalence of Vitamin D Deficiency Among Young School Going Children

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ABSTRACT

Background: During childhood and adolescence, vitamin D is important for calcium absorption and bone growth and accretion. The present study was conducted for assessing the prevalence of Vitamin D deficiency among young school going children.

Materials & Methods: The present study was conducted for assessing the prevalence of Vitamin D deficiency among young school going children at Department of Paediatrics, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India. A total of 300 school going children were enrolled in the present study. A 25(OH)D level <27.5 nmol/l was considered "deficient" because of its association with rickets. Blood samples were obtained from all the subjects and were sent to laboratory. Auto-analyser was used for evaluation of serum vitamin D levels.

Results: Out of these 300 children, vitamin D deficiency was seen in 27 percent of the children. Among these 81 subjects with presence of vitamin D deficiency, 44 were boys while 37 were girls. In 49 subjects, the age group was 8 to 10 years.

Conclusion: Considerable school going population is affected with Vitamin D deficiency; especially among males.

Key words: Vitamin D, Deficiency, Children.

INTRODUCTION

During childhood and adolescence, vitamin D is important for calcium absorption and bone growth and accretion. In addition to skeletal effects, including maintenance of normal bone turnover, mineralization during adulthood, and prevention of rickets in children, vitamin D may confer protection against health problems such as type 1 diabetes mellitus, hypertension, multiple sclerosis, and cancer.[1] There are growing data from studies of young adults, elderly persons, and youth in other countries that vitamin D deficiency is an unrecognized and prevalent health problem. Despite milk fortification in this country, subclinical vitamin D deficiency has been noted, with a high prevalence in adult medical inpatients, homebound elderly individuals, postmenopausal women presenting with hip fracture, and healthy young adults.[2- 5]

Elevated PTH is seen in infants with rickets and has previously been associated with biochemically defined vitamin D deficiency, although there is not a consensus as to whether elevated PTH values in infants are as

reliable an indicator of altered calcium metabolism as in adults.[6-8] In agreement with our findings, breastfeeding without supplementation has previously been reported as a risk factor for vitamin D deficiency in the USA. Despite the small number of breastfed subjects enrolled in the study, all of the deficient subjects identified were currently or had recently been breastfed. Nearly all of the subjects (80%) who were frankly deficient.[9] Hence; the present study was conducted for assessing the prevalence of Vitamin D deficiency among young children.

MATERIALS & METHODS

The present study was conducted for assessing the prevalence of Vitamin D deficiency among young school going children at Department of Paediatrics, Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha, India. A total of 300 school going children were enrolled in the present study. A 25(OH)D level <27.5 nmol/l was considered "deficient" because of its association with rickets. These cutoffs have been used in previous studies with infants and children.[2- 5] Blood samples were obtained from all the subjects and were sent to laboratory. Auto-analyser was used for evaluation of serum vitamin D levels. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

A total of 300 children were enrolled. Mean age of the children population in the present study was 11.8 years. Out of these 300 children, vitamin D deficiency was seen in 27 percent of the children (table 1). Among these 81 subjects with presence of vitamin D deficiency, 44 were boys while 37 were girls. In 49 subjects, the age group was 8 to 10 years (table 2).

Table 1: Prevalence of Vitamin D deficiency

Vitamin D levels	Number of subjects	Percentage
Deficient	81	27
Normal	119	73
Total	300	100

Table 2: Age and gender wise distribution of subjects with vitamin D Deficiency

Variable		Number of subjects
Age group (years)	**8 to 10**	49
	11 to 15	32
Gender	**Boys**	44
	Girls	37

DISCUSSION

Vitamin D deficiency causes rickets in infants and young children. However, rickets can be considered only the tip of the vitamin D deficiency iceberg. The vitamin D receptor is present in the small intestine, colon,

osteoblasts, activated T and B lymphocytes, β islet cells, mononuclear cells and most organs in the body including the brain, heart, skin, gonads, prostate, and breast. Many studies over the last 2 decades have suggested important role vitamin D plays in decreasing the risk of many chronic diseases, including cancers, autoimmune diseases, infectious diseases, and cardiovascular diseases.[6- 8]

Hence; the present study was conducted for assessing the prevalence of Vitamin D deficiency among young children. A total of 300 children were enrolled. Mean age of the children population in the present study was 11.8 years. Out of these 300 children, vitamin D deficiency was seen in 27 percent of the children.

Gordon CM et al determined the prevalence of vitamin D deficiency and to examine whether 25-hydroxyvitamin D (25OHD) concentration varies as a function of skin pigmentation, season, sun exposure, breastfeeding, and vitamin D supplementation. The prevalence of vitamin D deficiency (< or =20 ng/mL) was 12.1% (44 of 365 participants), and 146 participants (40.0%) had levels below an accepted optimal threshold (< or =30 ng/mL). The prevalence did not vary between infants and toddlers or by skin pigmentation. There was an inverse correlation between serum 25OHD and parathyroid hormone levels. In multivariable models, breastfeeding without supplementation among infants and lower milk intake among toddlers were significant predictors of vitamin D deficiency. In vitamin D-deficient participants, 3 participants (7.5%) exhibited rachitic changes on radiographs, whereas 13 (32.5%) had evidence of demineralization. Suboptimal vitamin D status is common among otherwise healthy young children.[9]

Among these 81 subjects with presence of vitamin D deficiency, 44 were boys while 37 were girls. In 49 subjects, the age group was 8 to 10 years. In a previous study conducted by Liang L et al authors assessed risk factors for vitamin D deficiency among healthy infants and young children. The median age of the 173 subjects was 12 months (range, 6–19); 49% were female. The median 25(OH)D was 85 nmol/l (range, 9–198); five subjects (2.9%) had <27.5 nmol/l, indicative of deficiency; 14 (8.1%) had <50 nmol/l, and 49 (28.3%) had <75 nmol/l. Most subjects (154; 89%) received some vitamin-D-fortified cow's milk or formula while 19 (11%) received breast milk as the only milk source. Breastfeeding was associated with risk of vitamin D deficiency ($p < 0.001$). Subjects with 25(OH)D <27.5 nmol/l had elevated PTH ($p = 0.007$). Only four of 35 breastfed infants (11%) consuming <500 ml/day vitamin-D-fortified formula or milk received vitamin D supplements. Plasma interleukin (IL)-1β was significantly higher ($p = 0.036$) in infants in the highest vs. lowest 25(OH)D decile. In conclusion, this study demonstrates that vitamin D deficiency with elevated PTH remains a risk for breastfed subjects not receiving supplemental vitamin D even in a region with a sunny, temperate climate.[10]

Turer CB et al determined the prevalence of vitamin D deficiency (defined as 25-hydroxyvitamin-D <20 ng/mL) in a sample of 6- to 18-year-old children who were enrolled in a cross-sectional study (the 2003–2006 National Health and Nutrition Examination Survey) in which body weight and height were measured directly. The prevalence of vitamin D deficiency in healthy-weight, overweight, obese, and severely obese children was 21% (20%–22%), 29% (27%–31%), 34% (32%–36%), and 49% (45%–53%), respectively. The prevalence of vitamin D deficiency in severely obese white, Latino, and African-American children was 27% (3%–51%), 52% (36%–68%), and 87% (81%–93%), respectively. Compared with healthy-weight children, overweight, obese, and severely obese children had significantly greater adjusted odds of vitamin D deficiency. Modifiable factors associated with vitamin D deficiency in overweight/obese children were identified. Vitamin D deficiency is highly prevalent in overweight and obese children.[11]

CONCLUSION

Considerable school going population is affected with Vitamin D deficiency, especially among males.

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