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RESEARCH ARTICLE

THE FREQUENCY OF VITAMIN D DEFICIENCY AMONG IRANIAN CHILDREN

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ABSTRACT

Background
Iran is a tropical country and yet there is widespread vitamin D deficiency among our infants and children. Ourstudy was conducted toassess the Vitamin D statusinchildren in and around Iran.
Methods
This cross sectional study was conducted in196children from the newborn period to 18 ears of age. Under strict aseptic precautions 2 ml of blood was takenfrom each childand serum levels of 25(OH) Dlevels were measured by the direct ELISA method.
Results
Median age was 59 months (range 2–161); 3.1% were vitamin D deficient, 19.4% insufficient. There was no significant difference in mean 25 (OH)D level between Indigenous (93.2, standard deviation (SD) 21.9, n = 82) and non-Indigenous (97.3, SD 27.9, n = 112) children (P = 0.32).Median number of hospitalizations/year were similar (P = 0.319) between vitamin D sufficient (0.34, range 0–12, n = 152) and insufficient (0.22, 0–6, n = 44) children. There was no significant difference between the number of infective admissions per year between vitamin D sufficient/insufficient groups (P = 0.119).
Conclusion
Suboptimal vitamin D status is common among otherwise healthy young children. Predictors of vitamin D status vary in infants vs toddlers, information that is important to consider in the care of these young patients. More information is needed about the optimum level of vitamin D for non-bone-related health in children.

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INTRODUCTION

It is now generally accepted that vitamin D deficiency is a worldwide health problem (Hossein-Nezhad *et al.,* 2013). It has onlyrecently been recognized that vitamin D plays an important role in up regulating immunity (Kamen and Tangpricha, 2010). Spanning many continents and including all ages, genders and racial/ethnic groups (Lappe, 2011) and are highly prevalent among children worldwide (Thornton *et al.,* 2013).

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It has been reported to have spread in many Asian countries (Fraser, 2004) and even, to have increased in its prevalence in North America, Europe, Australia, and New Zealand (Au *et al*., 2012). Several studies have shown a high prevalence of vitamin D deficiency in Middle East countries (Fields *et al.,* 2011); the figures for suboptimal levels from several countries in this region were reported between 20% and 80% (El-Hajj Fuleihan, 2009). In order to obtain a better estimation of the vitamin D status in Iran, studies encompassing different populations in various age and sex groups are required. Few studies have been performed on vitamin D status in this country, focused mainly on pregnant or elderly women (Maghbooli *et al.,* 2007). The prevalence of vitamin D deficiency is reported to be higher in

school age children. In Iran, different studies have shown a high prevalence of vitamin D deficiency, which is present in 86% of school-age children in Tehran (Neyestani *et al.,* 2012) and in 46.2% between 14 - 18 years old children in Isfahan (Moussavi *et al.,* 2005). Since it is possible to easily prevent complications arising from vitamin D deficiency by nutritionally enriched vitamin D supplements. The present study was carried out to assess the level of vitamin D in the newborn period to 18 years of age in Iran in 2015.

METHODS

Detection of 25 OH vitamin D by ELISA

Vitamin D level was determined in serum by Enzyme Linked Immune Sorbent Technique (ELISA) using OH vitamin D ELISA kit; Catalog No.EIA-4696 (DRG International, Inc.), CA, U.S.A. the status of 25OH vitamin D was evaluated as follows:According to Endocrine Society Clinical Practice Guidelines,vitamin D deficiency was defined as a 25 (OH)D < 20ngl/L (50nmol/l), and insufficiency as a 25 (OH)D between 21and 29ng/l (52.5and72.5nmol/L), and 25(OH) Dlevel ≥30ng/l (75nmol/l) as the optimal level (Holick *et al.,* 2012).

Definition of vitamin D deficiency

Mild, moderate and severe vitamin D deficiencies were defined as 25-OHD values of 20-30 ng/ml, 10-20 ng/ml, and <10 ng/ml respectively.There is also another classification for vitamin D deficiency inthe literature. In this classification, the combination of moderate and severe vitamin D deficiencies are considered vitamin D deficiency (25-OHD <20 ng/mL) and mild vitamin Ddeficiency(25-OHD 20-30 ng/mL) as vitamin D insufficiency (Holick *et al.,* 2009). We used the first classification. However, the second classification was used after stating its usage.

Statistical analyses

The results were analysed using Microsoft Excel (Microsoft Corp., Redmond, WA, USA) and SPSS 18.0 (PASW Statistics 18; SPSS Inc., Chicago, IL, USA). Data conforming to a normal distribution were assessed for significance using a t-test; otherdata were analysed using a Kruskal–Wallis test, two-tailed P-value of <0.05 were considered significant.

RESULTS

Over the 24-month period, 200 children were recruited, and sufficient blood for vitamin D analysis was obtained in196 children. No children were excluded as none had previously been diagnosed with vitamin D deficiency or were on vitamin D supplements. The median age of the cohort was 56 months (range 2–161). Other demographics of the children are outlined in Table 1. Of the 196 children in whom sufficient blood was collected foranalysis, three children (3.1%) were found to be vitamin D deficient. Of these, two were mildly deficient (25–50 nmol/L), and oneseverely deficient (<12.5 nmol/L). Two of the three childrenidentified as being deficient had risk factors for vitamin D deficiency;the severely vitamin D deficient child was a 10-year-old boy admittedwith nephrotic syndrome. Of the mildnessvitamin D deficient children, one was an Indigenous child hospitalised with sepsis requiringan intensive care unit admission, and the second child had noknown risk factors for vitamin D deficiency and had a normal level onrepeat testing. Nineteen children (19.4%) were vitamin D 'insufficient' (50–75 nmol/L), and the rest (*n* = 152, 77.6%) were deemed 'sufficient'. Of the 38 children who were vitamin D insufficiency, 48% wereIndigenous and 52% non-Indigenous.

Table 1. Socio-demographics of the children (*n* = 200)

Ethnicity	Non-Indigenous	57%
	Indigenous	43%
Sex	Male	65%
	Female	35%
Age group	Infant	8%
	1–5 years	43%
	5–18 years	48%
Gestation	Term	76%
	Preterm	7%
	Unknown	17%
Place of recruitment	Wards/ED	38%
	Daycase procedure unit	33%
	HRCT/bronchoscopy list	16%
	Healthy blood drive	13%
Mean weight z-scores (n = 132)	Indigenous	−0.6
	Non-Indigenous	0.2
	Overall	−0.3

There was no significant difference (*P* = 0.33) in the mean 25 (OH)D (nmol/L) among Indigenous children (*n* = 84, Mean 92.2) and non-Indigenous children (*n* = 128, mean 97.3).

DISCUSSION

This study shows vitamin D level of serum in children, which is low and particularly critical in 0 – 18 years old girls. Where the prevalence of vitamin D deficiency was found to be 91.7% in 9 - 2 years old students in Tehran. In another study in 7 - 18 years old students in Tehran, 52% were vitamin D deficient, of whom 26% suffered vitamin D insufficiency (Moussavi *et al.,* 2005). Also, vitamin D deficiency was 65.2% between 14 - 18 years old students in a similar study from Isfahan (Rabbani *et al.,* 2009). Bener A *et al* revealed that the prevalence of vitamin D deficiency in Qatari children <5 years of agewas 9.5%, 5-10 years was 28.9%, 11-16 years was 61.6% (Maghbooli *et al.,* 2007). Large prevalence study of children aged 1–11 years was carried out in the USA, showing that <1% of children had levels <25 nmol/L, 18% <50 nmol/L and 95% had levels <75 nmol/L.1 A similar study in the UK found that 35.1% of children aged 4–17 years had 25(OH)D levels <50 nmol/L.12 As the main source of vitamin Dis sunlight, the most likely major reason for the lower prevalence of vitD deficiency /insufficiency in Darwin is its higher average number of hours per year of sunlight; in Darwin it is 8.4 h per Day (approximately 3102 h per year) (AGBM, 2011).We found no significant difference between the numbers ofacute or infective hospitalisations per year depending on vitamin Dstatus.

There have been multiple studies documenting possible associations between clinical rickets and a predisposition toinfection (Yamshchikov *et al.,* 2009). This study was performed during cold seasons in which vitamin deficiency is highly critical. An inverse correlation was found between the levels of 25 (OH) and seasons of respiratory tract infection (Li *et al.,* 2015). There are some reports of a higher occurrence of type one diabetes mellitus T1DM and multiple sclerosis MS during the cold seasons, which was related to the lower vitamin D status (Amital *et al.,* 2010). Vitamin D deficiency is reported to be associated with increased incidence of ear and lung infections in children. Severity of various diseases currently

has a high profile in theliterature, leading to increased vitamin D testing (and thus increasedcost) worldwide. In Australia, the cost of vitamin D testing hasincreased by nearly a hundredfold since the year 2000 (Bilinski *et al.,* 2012). Further, others have expressed concern over the mismatchbetween high quality evidence and causation. (Harvey, 2012) Our pilot study contributes to this debate as our data do not support the routinescreening of children in the NT as it is very unlikely that vitamin Ddeficiency contributes to their high burden of infectious diseasein our setting. Our study does not support aiming for a vitamin D levelof >75 nmol/L in children, we recommend continuing to followthe APEG guideline, aiming for vitamin D levels >50 nmol/L (Munns *et al.,* 2006).

REFERENCES

Amital H, Szekanecz Z, Szucs G, Danko K, Nagy E, Csepany T, *et al.* Serum concentrations of 25-OH vitamin D in patients with systemic lupus erythematosus (SLE) are inversely related to disease activity: is it time to routinely supplement patients with SLE with vitamin D? *Ann Rheum Dis.,* 2010; 69 (6):1155–7

Au LE, Economos CD, Goodman E, Must A, Chomitz VR, Sacheck JM. Vitamin D intake and serum vitamin D in ethnically diverse urban schoolchildren. *Public Health Nutr*., 2012;15(11):2047–53.

Australian Government Bureau of Meteorology. Climate statistics 2011. July 2011. Available from: http://www.bom.gov.au/climate/averages/tables/cw_014015_All.shtml [accessed 10 October 2013].

Bilinski KL, Boyages SC. The rising cost of vitamin D testing in Australia: time to establish guideline for testing. *Med. J. Aust.* 2012; 192: 90.

El-Hajj Fuleihan G. Vitamin D Deficiency in the Middle East and its health consequences for children and adults. *Clin Rev Bone Miner Metab.,* 2009;7(1):77–93.

Fields J, Trivedi NJ, Horton E, Mechanick JI. Vitamin D in the Persian Gulf: integrative physiology and socioeconomic factors. *Curr Osteoporos Rep*., 2011;9(4):243–50.

Fraser DR. Vitamin D-deficiency in Asia. *J Steroid Biochem Mol Biol.,* 2004;89-90(1-5):491–5.

Harvey NC. Vitamin D: some perspective please. *BMJ,* 2012; 345: e4695.

Holick MF. Vitamin D status: measurement, interpretation, and clinical application. *Ann Epidemiol.* 2009; 19:73–8. [PMC free article] [PubMed]

Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Haley DA, Heaney RP: Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline. *The Journal of Clinical Endocrinology & Metabolism,* July 1, vol. 96 no. 7, 1911-1930, 2011.

Hossein-Nezhad A., Holick MF: Vitamin D for Health: A Global Perspective. Mayo Clinic Proceedings, Volume 88, Issue 7, Pages 720-755, July, 2013.

Kamen DL, and Tangpricha V. Vitamin D and molecular actions on the immune system: modulation of innate and autoimmunity. *J Mol Med.,* 88: 441-450, 2010

Lappe JM 2011: The role of vitamin d in human health: A paradigm shiftJournal of Evidence-Based Complementary & Alternative MedicineJanuary, vol. 16no. (1 (58-72,2011.a

Li PL, Tian YJ, Wang YH, Zhang C, Gao J, Li YH, *et al*. The prevalence of vitamin D deficiency among schoolchildren: a cohort study from Xinxiang, China. *J Pediatr Endocrinol Metab.,* 2015;28 (5-6)

Maghbooli Z, Hossein-Nezhad A, Shafaei AR, Karimi F, Madani FS, Larijani B. Vitamin D status in mothers and their newborns in Iran. *BMC Pregnancy Childbirth*., 2007;7:1.

Moussavi M, Heidarpour R, Aminorroaya A, Pournaghshband Z, Amini M. Prevalence of vitamin D deficiency in Isfahani high school students in 2004. *Horm Res.,* 2005;64(3): 144–8.

Moussavi M, Heidarpour R, Aminorroaya A, Pournaghshband Z, Amini M. Prevalence of vitamin D deficiency in Isfahani high school students in 2004. *Horm Res.,* 2005;64(3): 144–8.

Munns C, Zacharin MR, Rodda CP, Batch JA. Prevention and treatment of infant and childhood vitamin D deficiency in Australia and New Zealand: a consensus statement. *Med. J. Aust.,* 2006; 185: 268–72.

Neyestani TR, Hajifaraji M, Omidvar N, Eshraghian MR, Shariatzadeh N, Kalayi A, *et al*. High prevalence of vitamin D deficiency in school-age children in Tehran, 2008: a red alert. *Public Health Nutr.,* 2012;15(2):324–30.

Rabbani A, Alavian SM, Motlagh ME, Ashtiani MT, Ardalan G, Salavati A, *et al*. Vitamin D insufficiency among children and adolescents living in Tehran, *Iran. J Trop Pediatr.,* 2009;55(3):189–91

Thornton KA, Marin C, Mora-Plazas M, Villamor E. Vitamin D deficiency associated with increased incidence of gastrointestinal and ear infections in school-age children. *Pediatr Infect Dis J.,* 2013;32(6):585–93.

Yamshchikov AV, Desai NS, Blumberg HM, Ziegler TR, Tangpricha V. Vitamin D for treatment and prevention of infectious diseases: a systematic review of randomized controlled trials. *Endocr. Pract.,* 2009; 15: 438–49.

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