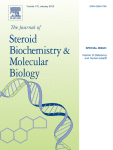
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Vitamin D status among the juvenile population: A retrospective study

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Highlights

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First study cohort among juvenile population in the United Arab Emirates.

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Serum 25(OH)D concentrations of 7883 of the juveniles 1–18 years old were studied retrospectively.

* •

24.6% of these patients had low serum levels of 25(OH)D (<30 nmol/L) and 26.8% had inadequate levels (30–50 nmol/L).

* •

57% of UAE nationals and 43.7% of patients from other nationalities were found to have serum 25(OH)D less than 50 nmol/L.

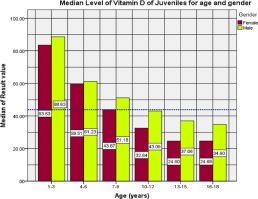
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Age is the most important factor among all the analysed factors affecting the levels of serum 25(OH)D.

Abstract

Vitamin D deficiency is a clinical problem and recently we have shown that 82.5% of our entire study cohort had inadequate serum 25(OH)D levels. In this study, we analysed serum 25(OH)D levels of juvenile patients admitted to the Burjeel Hospital of VPS Health care in Abu Dhabi, United Arab Emirates (UAE) from October 2012 to September 2014. Out of a total of 7883 juvenile patients considered in this study, almost 58.1% of females and 43.3% of males in the age group of 1–18 years were found to have low serum 25(OH)D levels (<50 nmol/L). According to the coefficient of variation, females had significantly higher variability among juveniles (63.8%) than males (49.9%). Among the juveniles group of patients, age appears to be an important determining factor for defining vitamin D deficiency.The risk of deficiency (<30 nmol/L) was found to be present in 31.4% of patients in the age group of 10–12 years, followed by 50.4% of patients in the age group of 13–15 years and 52.9% of patients in the age group of 16–18 years. The analysed age groups of females were found to have lower levels of 25(OH)D than males. It is important and perhaps alarming to note that such high rate of vitamin D deficiency is present in the juvenile age.

Graphical abstract



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Introduction

Recently, we have reported that 82% of 60,979 patients part of our comprehensive study have vitamin D deficiency or insufficiency, of which 26% of females and 18% of males have serum 25 (OH)D levels less than 30 nmol/L [1]. Vitamin D deficiency can cause rickets in children or osteomalacia in adults [2], [3], [4], [5]. According to assessments, individuals with serum 25(OH)D levels between 30 and 50 nmol/L are at risk of developing bone diseases [6] including osteopenia, osteoporosis with increased rate of fractures in adults. Bone diseases related to vitamin D deficiency, particularly in adolescents with eating disorders,can increase the risk of bone disorders [7]. Studies have also claimed that vitamin D deficiency is associated with increasing risk of cancers, autoimmune diseases, hypertension, and infectious diseases [3]. Nurses’ Health Study II provided the evidence on association between higher adolescent serum 25(OH)D level with a lower risk of benign breast disease [8], [9]. In children, inadequate 25(OH)D levels can affect the bone mineralization process and accelerate bone dysfunction, earlier than the expected age. Adequate vitamin D status is essential for maintaining musculoskeletal health and beyond; such beneficial effects of vitamin D are partly exerted by intestinal calcium and phosphorus absorption and by maintaining mineral ion homeostasis [4], [10], [11], [12], [13], [14], [15], [16], [17], [18].

Despite many studies have analysed the status of vitamin D in adults and elderly, sufficient data on the status of serum 25(OH)D levels among juveniles of different age groups is not available from the gulf region. Therefore,the present study was conducted to examine the status of vitamin D among the juvenile population of the United Arab Emirates and other countries.

Section snippets

Subjects

This study was conducted to determine serum 25(OH)D status of juvenile patients admitted to the Burjeel Hospital in Abu Dhabi, UAE from October 2012 to September 2014. The inclusion criteria considered for the patients were juveniles suffering from diseases without any effect on the serum 25(OH)D levels and patients whose parents/guardians provided consent to participate in the study. Analysed dataset consisted of 60,979 patients and out of these patients, 7883 were juveniles. In this analysis,

Study design and methods

According to the Institute of Medicine (IOM) recommendations,the risk of vitamin D deficiency is defined as serum 25(OH)D level below 30 nmol/L and efficacy started at 25(OH)D levels of at least 50–125 nmol/L [2]. By Anderson-Darling test, it is confirmed that there is not a Gaussian distribution in the data on the significance level of alpha 5%, therefore, the median was used to describe the data and non-parametric tests and Spearman correlation coefficient for quantitative variables [age and

Data analysis

Median for 25(OH)D in patients was 47.9 nmol/L. The minimum value of vitamin D in this group of patients was 7.5 nmol/L and maximum 175 nmol/L. 24.6% of patients in the data set had a risk of deficiency of vitamin D (<30 nmol/L) and 26.8% of patients had 30–50 nmol/L. 45.8% of patients had serum 25(OH)D levels within the range of 50–125 nmol/L and the rest of 2.9% had serum 25(OH)D levels greater than 125 nmol/L.

Age and result value of vitamin D were tested by Kruskal-Wallis non-parametric test. By

Levels of serum 25(OH)D analysed for gender

According to bar chart (Fig. 1), it is obvious that male patients have higher median of 25(OH)D than females in all analysed age groups and this difference between gender is increasing with age from 4 years till 15 years. According to the chart both, males and females, had levels of vitamin D decreasing with increasing age, the blue dotted line depicts the median of 25(OH)D (47.9 nmol/L).

Risk of deficiency (<30 nmol/L) was observed more for females (33.1% of females) than males (14.4% of males),

Discussion

Adolescence is a period of rapid growth which necessitates the requirement of vitamin D for skeletal growth and development. Vitamin D deficiency is highly prevalent, even in countries with abundant sunshine, when skin exposure to UVB sunlight is limited by lifestyle and other associated factors. The study was conducted on a total of 7883 juvenile patients in the age group of 1 to 18 years selected from a study cohort of 60,979 patients and out of these patients. The prevalence of severe

Conflict of interest

The authors have declared no conflict of interests.

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