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SURİYE ve IRAKLI GÖÇMEN ÇOCUKLARDA D VİTAMİNİ EKSİKLİĞİ

Vitamin D Deficiency in Syrian and Iraqi Immigrant Children

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ÖZ

GİRİŞ ve AMAÇ: Son yıllarda yapılan çalışmalarda çocuklarda D vitamini eksikliğinin yaygın olarak gözlendiği özellikle de göçmenlerde bu oranın daha fazla olduğu bildirilmiştir. Biz de bu çalışmada Suriye ve Iraklı göçmen çocukların D vitamini düzeyleri ve yaş, cinsiyet, tanı ve uyruklarının D vitamini eksikliğiyle ilişkilerini belirlemeyi amaçladık.

YÖNTEM ve GEREÇLER: 1 Ocak 2015 ile 31 Aralık 2018 tarihleri arasında Ankara ili içerisindeki hastanelerde kan 25(OH)D vitamini seviyesi bakılan Irak ve Suriyeli göçmen çocuklar retrospektif olarak incelendi. 25 (OH) D vitamin seviyeleri <12 ng / mL eksikliği, 12-20 ng / mL yetersizliği,> 20 ng / mL normal olarak sınıflandırıldı.

BULGULAR: Çalışmaya yaş ortalaması 10.1±5.3 olan, toplam 171 göçmen çocuk dahil edildi. Çocukların %25. 7' sinin normal (>20 ng/mL) 25(OH)D vitamini kan seviyesine sahip olduğu gözlenirken, %31.2 sinde hafif eksiklik, (12-20 ng/mL), %40.9 unda tedavi gerektiren D vitamini eksikliği (< 12 ng/mL) tespit edildi. Çocuklar cinsiyet, yaş grupları ve uyruklarına göre D vitamini seviyeleri karşılaştırıldığında kız çocukların (p=0.003) ve 10 yaş ve üzerindekilerin (p=<0.001) 25(OH)D vitamini seviyelerinin daha düşük olduğu gözlendi.

TARTIŞMA ve SONUÇ: Çalışmamız göçmen çocuklarda özellikle 10 yaş üstü ve kız çocuklarında yüksek oranda tedavi gerektiren D vitamini eksikliği olduğunu göstermektedir. Ciddi olumsuz sonuçları olabilecek D vitamini eksikliği ve yetersizliği açısından yüksek risk altında olan göçmen çocukların D vitamini takviyesi ve beslenme desteğine ihtiyaçları olduğunu düşünüyoruz.

Anahtar Kelimeler: Göçmen çocuklar, Vitamin D, Vitamin D Eksikliği

ABSTRACT

INTRODUCTION: Recent studies have suggested that vitamin D deficiency in immigrant children is widespread.The aim of this study was to establish the correlation between vitamin D levels, age, gender, diagnosis, and nationality of Syrian and Iraqi immigrant children with vitamin D deficiency.

MATERIALS and METHODS: Syrian and Iraqi immigrant children whose blood 25(OH)D levels were checked in hospitals in the province of Ankara in Turkey between the dates of 1 January 2015 and 31 December 2018. Vitamin levels of 25(OH)D were classified as <12 ng/mL deficiency, 12-20 ng/mL insufficiency, >20 ng/mL normal.

RESULTS: A total of 171 immigrant children with a mean age of 10.1±5.3 years were included in the study. Of these children, while 25.7% were observed to have normal (>20 ng/mL) 25(OH)D blood level, 31.2% were established to have mild deficiency (12-20ng/mL), and 40.9% were found to have vitamin D deficiency requiring treatment (<12ng/mL). When compared the vitamin D levels of children according to their gender, age groups, and nationalities, girls (p=0.003) and children at the age of 10 and above (p≤0.001) were observed to have lower 25(OH)D vitamin levels.

CONCLUSIONS: The high frequency of vitamin D deficiency in immigrant children (especially girls older than 10 years) indicates a need for supplementation and nutritional support.

Key words: Immigrant Children, Vitamin D, Vitamin D Deficiency

INTRODUCTION

Vitamin D is also important for calcium and phosphate metabolism necessary for bone mineralization, and without vitamin D, only 10-15% of dietary calcium can be absorbed (1). In addition, it is of vital importance for the development, growth, and care of a healthy skeleton from birth until death (2). Bone tissue is constantly replenished for skeletal growth during childhood and adolescence both in terms of size and mineral density, and since bone mineral mass is reduced with ageing, studies underlined the importance optimal bone mineralization during childhood and adolescence (2,3). Therefore, it is very important to meet vitamin D and calcium needs at critical ages (3).

Vitamin D deficiency can cause growth retardation and skeletal deformations during childhood, and it may increase the risk of hip fracture later in life (1). The use of circulating 25-hydroxyvitamin D [25 (OH) D] is recommended to assess vitamin D status in patients at risk of vitamin D deficiency, and it is well associated with the vitamin D stores of the body (4). Rickets, osteomalacia, and vitamin D and calcium deficiencies were reported as preventable global public health problems in infants, children, and adolescents by the consensus group representing 11 international scientific organizations (5).

Civil wars in Syria and Iraq in recent years have led to an immigrant crisis in a variety of countries, specifically in Turkey (6). According to the latest figures obtained from the Directorate General of Migration Management, there are more than 3.9 million foreign nationals seeking international protection in Turkish soil. Most of these individuals are Syrian nationals that have gained temporary protection status, and to a lesser extent they are asylum seekers and immigrant s from Iraq, Afghanistan, and Iran (7).

Immigrant children are a population at risk of various health problems, and they face developmental retardation and numerous health problems due to poor living conditions, nutritional problems, and lack of access to health services (8,9). Studies report that vitamin D deficiency is common in children and is even more prevalent among immigrants (10-12). In a study conducted by the Oslo Immigrant Health Profile on 5 immigrant groups from Turkey, Sri Lanka, Iran, Pakistan, and Vietnam, the prevalence of vitamin D deficiency was reported as high (13).

In this study, we aimed to establish the correlation between vitamin D levels, age, gender, diagnosis, and nationality of Syrian and Iraqi immigrant children between the ages of 1 and 18 with vitamin D deficiency.

METHODS

Study design, setting and participants: The study was approved by the Clinical Research Ethics Committee of Ankara Oncology Health Services Practice and Research Center (SUAM) dated 19.05.2019 date and approval No: 2019-05/296. All procedures were applied in accordance with the principles of the Declaration of Helsinki.

Children under the age of 18 who migrated to Turkey from Iraq and Syria that underwent blood 25 (OH) D vitamin levels test in hospitals in Ankara were included in the study. Data were collected retrospectively, between January 2015 and 31 December 2018, the hospital information management system (HBYS-Alpdata Company, Ankara, Turkey) records of hospitals in Ankara. Age, sex, diagnosis, 25(OH)D levels and nationality of patients were recorded. Children with missing file records were excluded from the study. They were divided into 3 groups according to their ages, namely, under 3 years, between 3 and 10 years, and over 10 years. Vitamin D treatment requirement was divided into three groups based on the recommendation of the American Academy of Pediatrics (AAP) (5).

Values lower than 12ng/mL were accepted as deficiency requiring treatment, 12ng/mL to 20 ng/mL were considered as mild deficiency and values above 20 ng/mL were accepted as normal patients.

Vitamin D measurement of 25(OH)D in hospitals included in the research was studied by tandem mass spectrometry (LC-MS/MS) using API 3200 (Applied Biosystem Sciex, Concord, Canada, L4K4V8) from venous blood samples. Based on the Global Consensus Recommendations on Prevention and Management of Nutritional Rickets, Vitamin D levels of 25(OH)D were classified as <12ng/mL deficiency, 12-20ng/mL insufficiency, and >20ng/mL normal (5).

Statistical analysis: The obtained data were transferred anonymously to and a spreadsheet Excel table (MS-Excel 2007). The prepared data tables were used to conduct statistical calculations using SPSS Statistics 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0, Armonk, NY: IBM Corp.). Cross tables were prepared for demographic data and analysed by chi-square test. Whether the numerical values matched normal distribution was calculated using Shapiro-Wilk test. Since age and vitamin D levels were not normally distributed, Mann-Whitney U test was used to compare the two groups, and Wilcoxon Sign test was used for the comparison of the 3 groups.

RESULTS

With the exclusion of 17 children with missing data, a total of 171 immigrant children were included in the study. The mean age of the children comprising 92 (53.2%) female and 79 (46.8%) male was 10.1±5.3 years . Children were between 1 and 17 years old, median age was 9.9 years. The average of 25(OH)D levels of the children, 110 of whom were Syrian and 61 from Iraq was 16.9±14.1ng/mL (Table 1).

Table 1. Demographic Characteristics of Immigrant Children

Ages (Years) *		10.1±5.3	
Gender**	Male	79	46.2%
	Female	92	53.8%
Nationality**	Syria	110	64.3%
	Iraq	61	35.7%
Vit D level (ng/mL) *		16.9±14.1	

**Values are presented as the mean±standard deviation;*
***Values are presented as n (%).*

It was observed that 11.15% of the children were under 3 years of age, 39.2% were between 3-10 years, and 49.7% were over 10 years of age. When checked the 25(OH)D vitamin levels according to age groups, it was established that children aged 3 and below had 25.3±14.9ng/mL, aged between 3 and 10 had 19.4±18.3ng/mL and aged above 10 had 13.0±7.6ng/ml. When evaluated the treatment requirement depending on the vitamin D level, while 25.7% of the patients were observed to have normal (>20ng/mL) 25(OH)D blood level, 31.2% were established to have mild deficiency (12-20 ng/mL), and 40.9% were found to have vitamin D deficiency requiring treatment (<12ng/mL). Upon comparing the distribution of gender and age groups of children from both nationalities with their 25(OH) D levels, a significant difference was not established (Table 2).

Table 2. Comparison of demographic data and vitamin D deficiency levels of children according to nationality included in the study.

		Syria	Iraq	Total	p*
Age Group	≤ 3 Years	13 (11.8)	6 (9.8)	19 (11.1)	0.895
	>3, <10 years	42 (38.2)	25 (41.0)	67 (39.2)	
	>=10 years	55 (50.0)	30 (49.2)	85 (49.7)	
Gender	Male	46 (41.8)	33 (54.1)	79 (46.2)	0.123
	Female	64 (58.2)	28 (45.9)	92 (53.8)	
Deficiency Level	Deficiency Requiring treatment	48 (43.6)	24 (39.3)	70 (40.9)	0.148
	Mild deficiency	30 (27.3)	25 (41.0)	55 (32.2)	
	Normal	32 (29.1)	12 (19.7)	44 (25.7)	

*Values are presented as n (%); * chi-square test at p<0.05;*
Normal: 25(OH)D level at >20ng/mL, Deficiency requiring treatment; 25(OH)D level at <12ng/mL; Mild deficiency: 25(OH)D level at 12-20 ng/mL.

When compared the vitamin D levels of children according to their gender, age groups, and nationalities, girls (p=0.003) and children at the age of 10 and above (p≤0.001) were established to have lower 25(OH)D levels (Table 3).

Table 3. Comparison of serum 25 (OH) D levels according to the demographic characteristics of the children

		Mean± SD (ng/mL)
Nationality	Syria	17.8±16.2
	Iraq	15.3±9.2
Gender	Male	18.9±12.1
	Female	15.2±15.5
Age Group	≤ 3 Years	25.3±14.9
	>3, <10 years	19.4±18.3
	>=10 years	13.0±7.6

25 (OH) D: 25-hydroxyvitamin D; SD: standard deviation
** mann-whitney U test*
***Kruskal–Wallis test. p-value <0.05 was accepted as statistically significant.*

When examined the distribution of the reasons for presenting to the hospital, it was observed that they applied to the Endocrinology and Neurology outpatient clinics most frequently (Table 4).

Table 4. Distribution of children included in the study according to their reasons for presenting to the hospital,

	n	%
Endocrinology and Metabolism	47	27.4%
Nervous system	37	21.6%
Hematology	28	16.4%
Dermatology	23	13.5%
Otolaryngology	22	12.9%
Musculoskeletal system	16	9.4%
Respiratory System	12	7.0%
Urogenital	12	7.0%
Gastroenterology	10	5.8%
Infection	3	1.8%
Other	24	14.0%

Some patients applied more than one reason for presenting to the hospital,

DISCUSSION

To the best of our knowledge, this study is the first of its kind that investigates the vitamin D levels of Syrian and Iraqi immigrant children aged 1-18 and living in Turkey. These findings of our study are consistent with the study conducted on East African immigrant children living in Melbourne, Australia, and of 232 children, 103 (44%) were observed to have 25(OH)D levels of <25 nm/L (14). In another study conducted on immigrant children aged 3-17, 29% of boys and 31% of girls were reported to have moderate vitamin D deficiency (12). Our data show that serum 25 (OH) D levels are lower in children of 10 years and older in both nationalities. It was observed that 25(OH)D levels were 25.3±14.9 ng/mL in children aged 3 and younger, 19.4±18.3 ng/mL in children between the ages of 3 and 10, and 13.0±7.6 ng/mL in children above the age of 10, and that 25 (OH)D levels dropped as the children grew older.

It's reported that vitamin D deficiency was higher among adolescents and the prevalence of vitamin D deficiency increased as children grew older(12,16).

Our study was consistent with previous studies, and Mansbach et al. established that mean serum 25 (OH) D levels of children aged between 1 and 11 were 68 nmol/L, and that it was lower in children aged 6-11 (66 nmol/l) compared to children aged 1-5 (70 nmol/L) (15). In another study, it was

reported that children aged 2 or above, specifically adolescents, had higher vitamin D deficiency, and that vitamin D deficiency prevalence increased as they grew (16). In a study conducted on 440 non-immigrant children and adolescents aged 0-16 years living in Ankara, it was found that 25 (OH) D levels in 40% of children were lower than 20 ng/mL. Similar to our results, vitamin D deficiency was found to be higher in girls, especially in the adolescent age group, compared to boys, and it was noted that this may result from the clothing preferences of Turkish girls and from spending less time in outdoor activities (17). Similarly, Hu et al (18) reported that children aged 12–14 and 15–17 had an increased risk of vitamin D deficiency, possibly due to the gradually increased schoolwork which occupied the time for outdoor activities. They found that there was a 1.31 times increase in vitamin D deficiency in girls compared to boys. In previous studies, it was reported that vitamin D deficiency risk may increase due to the fact that girls are exposed to sunlight less because of their clothing preferences due to cultural reasons (18). We believe that vitamin D deficiency is higher in Syrian and Iraqi refuge girls since they are exposed to sun less compared to boys for cultural and religious reasons.

We observed that immigrant children in our study group were mostly referred to the Endocrinology and Neurology outpatient clinics (27.4%, 21.6%, respectively). Similar to our results, in a study investigating vitamin D levels in children admitted to the Endocrinology outpatient clinic, it was established that 23 (13.4%) of 171 patients had normal 25 OH D levels, while 25 OH D levels were lower in girls compared to boys and in pubertal children compared to pre pubertal children (19). Vitamin D deficiency is known to cause symptoms such as growth retardation, convulsions, bone deformities, muscle weakness, or joint pain in children (3,11). In addition, there are studies in the literature showing that vitamin D deficiency is associated with increased prevalence of metabolic syndrome, especially hypertension and insulin resistance, regardless of obesity or abdominal fat status . Previous studies showed that vitamin D deficiency is closely related to such common chronic diseases as metabolic disorders, cardiovascular diseases, and diabetes in addition to deformities in bone structure, and they also reported that 25 OH D deficiencies is also a risk factor for neuropsychiatric disorder and autoimmune diseases (20,21). Due to risks imposed by vitamin D deficiency, that children in our study had higher numbers of applications to Endocrinology and Neurology outpatient's clinics is an expected outcome.

Study Limitations: Since the study was retrospective, in addition to vitamin D levels of healthy children that did not present to hospital not being determined, that whether patients received vitamin D and their levels of exposure to sun were not known.

Our study shows that the immigrant children, specifically girls over the age of 10 had the higher incidence of vitamin D deficiency requiring treatment. We believe that immigrant children under high risk in terms of vitamin D deficiency and insufficiency that would pose serious negative outcomes need vitamin D supplementation and nutritional support.

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