Endocrinol Nutr. 2015;62(7):314–321

Endocrinología y Nutrición

www.elsevier.es/endo

ORIGINAL ARTICLE

Vitamin D deficiency among healthy Egyptian females

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Received 13 January 2015; accepted 30 March 2015
Available online 10 June 2015

KEYWORDS
Vitamin D deficiency;
Pregnancy;
Sun;
Parathyroid disease;
Calcium metabolic disease

Abstract
Background: Vitamin D deficiency is becoming endemic in many parts of the world.
Aim: To study vitamin D status in Egyptian females of different age groups.
Subjects and methods: A cross-sectional study was conducted on 404 females, who were categorized into group 1 (51 nursing females); group 2 (50 pregnant females); group 3 (208 females of childbearing age); group 4 (38 elderly females); and group 5 (57 geriatric females). Females completed a questionnaire regarding dietary calcium and vitamin D intake, sun exposure, and clothing habits, and performed laboratory tests including calcium, PO_4, alkaline phosphatase, intact PTH, and 25-OH vitamin D levels.
Results: Median and IQR of vitamin D levels across groups 1, 2, 3 and 5 were in the deficient range, being lowest in groups 3, 5, and 1, respectively. Vitamin D deficiency was found in 72.6% of the nursing group, 54% of the pregnant group, 72% of the childbearing age group, 39.5% of the elderly group, and 77.2% of the geriatric group. Vitamin D was significantly higher in non-veiled females [23 ng/dl] as compared to veiled females [16.7 ng/dl]. Vitamin D levels with poor, fair, and good sun exposure were 14.1, 14, and 37 ng/dl, respectively.
Conclusion: These results show a high prevalence of vitamin D deficiency among healthy Egyptian females.

PALABRAS CLAVE
Déficit de vitamina D;
Embarazo;
Sol;
Enfermedad paratiroidea;
Enfermedad metabólica del calcio

Déficit de vitamina D en mujeres Egipcias sanas

Resumen
Introducción y objetivo del estudio: El déficit de vitamina D es ya una enfermedad endémica en muchas partes del mundo. El objetivo de este estudio era investigar el estado de la vitamina D en mujeres de distintos grupos de edad.
Sujetos y métodos: Se realizó un estudio transversal en 404 mujeres, que se clasificaron en grupo 1 (51 mujeres lactantes); grupo 2 (50 mujeres embarazadas); grupo 3 (208 mujeres

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http://dx.doi.org/10.1016/j.endonu.2015.03.010

en edad fértil; grupo 4 (38 mujeres de edad avanzada), y grupo 5 (57 mujeres ancianas). Se les sometió a un cuestionario sobre la ingesta de calcio y vitamina D en la dieta, la exposición al sol y los hábitos de vestir. Se les practicaron además análisis de laboratorio que incluyeron calcio sérico, fósforo en suero PO4, fosfatasa alcalina, PTH intacta y 25-OH vitamina D.
Resultados: La mediana y el IIC de los niveles de vitamina D en los grupos 1, 2, 3 y 5 estaban dentro del intervalo deficitario, siendo los más bajos los del grupo 3, 5 y 1, respectivamente. Se halló déficit de vitamina D en el 72,6% del grupo lactante, el 54% del grupo de embarazadas, el 72% del grupo en edad fértil, el 39,5% del grupo de edad avanzada y el 77,2% del grupo de ancianas. La concentración de vitamina D era significativamente mayor en las mujeres que no usaban velo [23 ng/dl] que en las mujeres con velo [16,7 ng/dl]. Se hallaron valores de 14,1 ng/dl, 14 ng/dl y 37 ng/dl en las mujeres con exposición baja, media o buena al sol, respectivamente.
Conclusión: Estos resultados demuestran una alta prevalencia del déficit de vitamina D en las mujeres egipcias sanas.

Introduction

Over the past two decades, vitamin D deficiency has emerged as a major worldwide health concern encompassing all age groups. This issue also affects those residing in countries of low latitude, who were previously thought to be protected.[1] Even with the implementation of vitamin D fortification policies in industrialized countries, it has been estimated that 20–100% of US, Canadian and European elderly men and women are vitamin D deficient. Additionally, children, young adults and the middle aged are also at risk of vitamin D deficiency.[1,2]

In many countries, data pertaining to vulnerable populations, such as pregnant women, adolescents and the geriatric, are still lacking.[1] For example, vitamin D deficiency is a common problem among Egyptian adolescent girls,[3] for whom contributing factors include inadequate sun exposure possibly related to cultural/social factors, and insufficient dietary calcium.[3] Several risk factors are implicated in vitamin D deficiency, including lack of sun exposure, extreme age, seasonal variations, being female, dark skin pigmentation, clothing style and obesity.[4] A paucity of dietary sources of vitamin D, such as fatty fish, liver, eggs, milk and dairy products, renders skin synthesis of vitamin D as the main source and determinant of a person's vitamin D status. Vitamin D photosynthesis in turn depends upon latitude, time of day, season and UVB intensity.[4]

Skeletal manifestations of hypovitaminosis D present clinically as bone and muscle pain, poor muscle strength and low bone mineral density (BMD). Extraskeletal effects have been implicated in cancer, cardiovascular risk, type 2 diabetes, autoimmune diseases, infectious diseases and respiratory diseases such as asthma.[2,4,5] The most recent Endocrine Society guidelines recommend the use of the 25-OH vitamin D test for the screening and diagnosis of vitamin D deficiency.[2] Other parameters, such as low serum calcium and phosphate levels or elevated alkaline phosphatase, can also indicate vitamin D deficiency.[6] Based on the most recent Endocrine Society guidelines, vitamin D deficiency has been defined as a 25-OH vitamin D_3 level below 50 nmol/L (20 ng/dl), while an insufficiency is considered to exist at levels of 51–74 nmol/L (21–29 ng/dl). Females, especially those pregnant or lactating, are at a higher risk of vitamin D deficiency or insufficiency, as highlighted by several studies in the Middle East.[2,7] Accumulating data on the vitamin D status of Egyptians over the last two decades indicate a resurgence of vitamin D deficiency among otherwise healthy members of the population.[8–11] As such, it became prudent to study vitamin D statuses across all age groups of healthy Egyptian females in order to detect possible effectors, which will help policy makers develop prevention and treatment strategies.

Aim

1. To obtain data on the vitamin D status of Egyptian females at different age groups and in relation to pregnancy and lactation.
2. To define the determinants of vitamin D status in this population sample.

Subjects and methods

A cross-sectional study was conducted during spring and summer in the period from 2013 to 2014, targeting otherwise healthy Egyptian females of different age groups in Cairo (30.0500 N°, 31.2333 E° latitude) and Port Said (31.2600 N°, 32.2900 E° latitude); this study was approved by the local ethical committee. Healthy females accompanying inpatients and females visiting Ain Shams University and Port Fouad General Hospital outpatient clinics for otherwise minor intercurrent problems were invited to participate in the study. The aim of the study was explained to them and their consent requested. Pregnant and lactating females were recruited from the Obstetric Outpatient Clinic and Maternity Unit at Ain Shams University Hospital.

After obtaining a signed consent, a questionnaire regarding dietary calcium and vitamin D intake, vitamin D and calcium supplements, sun exposure and clothing habits was given to the volunteers to answer. In addition, a detailed clinical history was taken and an examination conducted on each volunteer. Volunteers with a history of renal disease, malabsorption syndrome, malignancy, musculoskeletal diseases, fractures, steroid therapy, hepatic diseases or long-term intake of anticonvulsants, glucocorticoids,