Journal of Steroid Biochemistry & Molecular Biology xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of Steroid Biochemistry & Molecular Biology

journal homepage: www.elsevier.com/locate/jsbmb

Review

Clinical practice guidelines for vitamin D in the United Arab Emirates

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ARTICLE INFO

Article history:
Received 8 July 2016
Received in revised form 23 September 2016
Accepted 27 September 2016
Available online xxx

Keywords:
Vitamin D guidelines
United Arab Emirates
25(OH)D
1,25$(OH)_2$D
Supplementation
Adverse effects

ABSTRACT

In the UAE and the Gulf region in general, there are several intricate public health issues in the context of vitamin D deficiency that needs to be addressed. Changes in lifestyle such as diet, lack of exercise, cultural habits, avoiding sun exposure due to excessive heat, and other risk factors predispose those who live in GULF countries, such as Emiratis likely to becoming vitamin D deficient. Consequently, the prevalence of vitamin D deficiency is high, and new guidelines are needed to overcome this major public health issue. Peer-reviewed papers related to guidelines and those vitamin D-related papers relevant to the Middle-Eastern region were extracted from multiple research databases using key words according to the general guidelines from the Preferred Reporting Items for Systematic Analysis. This guideline was prepared focusing on the United Arab Emirate and the Gulf populations, to overcome the high incidence of vitamin D deficiency and to improve overall health. We recommend the following vitamin D supplementations for different groups of people: (A) Breastfed infants supplement with 400 IU/day up to age 6 months, and 400–600 IU/day between 6 and 12 months, depending on daily intake of total vitamin D and sun exposure; (B) for children and adolescents of age 1–18 years supplement with 600–1000 IU/day depending on the body weight; (C) adults greater than 18 years', supplementation with 1000–2000 IU/day is recommended, while, (D) the elderly (over 65 years) should be supplemented with 2000 IU/day, throughout the year; (E) pregnant and breast feed women, 2000 IU/day from the first trimester of pregnancy. (F) Premature infants, supplementation of 400–800 IU/daystart from the first days of life. (G) For obese, individuals and those with metabolic syndrome, supplementation of 2000 IU/day (H) For individuals with dark skin complexions and for night workers, supplementation of 1000–2000 IU/day (25–50 μg/day), throughout the year, depending on body weight. The goal of supplementation is to achieve and longer term maintenance of serum 25(OH)D concentration of 30–50 ng/mL.

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http://dx.doi.org/10.1016/j.jsbmb.2016.09.021
0960-0760/

1. Introduction

The awareness of the significance of optimal vitamin D status and consequences of vitamin D deficiency for human health at all stages of life must be markedly improved among physicians, health policy makers and the general public health. The research studies that we and others had conducted highlighted the high prevalence of vitamin D deficiency and its implications on general health of the UAE population countrywide [1,2]. Maintaining a good vitamin D status requires adequate sun exposure or sufficient intake from diet and supplements. Biomarkers of vitamin D status are also affected by season and geographic latitude.

We have successfully launched Vitamin D deficiency awareness programs in the form of conducting annual International conferences and seminars where researchers, doctors/scientists, technologists in the field of vitamin D research from all over the world are invited. This awareness program has successfully completed 5 years in continuation under the patronage and support of H.E. Sheikh Nahayan Mabarak Al Nahayan, Minister of Culture and Knowledge Development, Govt. of United Arab Emirates (UAE).

Involvement of the food industry by encouraging private enterprises operating at the national and local level is required. Support in terms of technical expertise pertaining production of fortified food items, availability of standardized vitamin D formulation(s) and information on the marketing potential of the fortified items should be made available. Moreover, affordable and widely accessible testing facilities for vitamin D levels should be made available to individuals who are at risk of clinical vitamin D deficiency with easy accessibility, throughout UAE.

Till this date, effective legislation to ensure good quality and regulation of vitamin D fortified foods at minimal cost to the end consumer is not yet in place within the UAE. To this extent, there is room for remarkable initiatives like mandating the distribution of vitamin D fortified foods at midday meals within schools.

Vitamin D sufficiency status may not be treated as a "feel good status" for the affluent who can afford medical expenses and expensive vitamin D supplements. Vitamin D is prevalent across all socioeconomic strata. It is imperative that policymakers understand the gravity of the situation pertaining to vitamin D status and as a consequence—the untold burden on the healthcare system in the UAE.

This guideline is based on both the recent clinical practice guidelines published by The Endocrine Society [3] and The Institute of Medicine guidelines [4]. It is intended to be used as guidelines for physicians in the UAE and the Gulf Cooperation Council (GCC) member states.

2. Definitions

2.1. Vitamin D

Vitamin D is a steroidal hormone similar to estrogen or testosterone. It stands alone as the only 'vitamin,' the body can produce. Vitamin D is called the "Sunshine Vitamin" because the body naturally produces it through exposure of Ultra Violet B (UVB) rays from the sun through the skin [5,6]. There are two major forms of vitamin D- ergocalciferol (D2) and cholecalciferol (D3). Vitamin D3 can be synthesized under the UVB irradiance or could be absorbed via the intestine from salmon fish and other seas foods and fortified foods or from cholecalciferol containing supplements.

The source of vitamin D2 (ergocalciferol) is mushroom and plants. The 25- hydroxyvitamin D [25(OH)D] level (calcidiol), a biochemical marker of vitamin D status, is used to indicate the sum of 25(OH)D3 and 25(OH)D2 levels, and both compounds are hydroxylated in the liver by 25-hydroxylase [CYP27A1, CYP2R1]. 25(OH)D undergoes further hydroxylation by the enzyme 1α-hydroxylase [CYP27B1] to become the active metabolite 1α,25-dihydroxyvitamin D3 [1α,25 (OH)2D3](calcitriol); this process takes place predominantly in the proximal tubule cells of the kidney, but also in many tissues and organs (extra-renal sites, paracrine pathway).

2.2. Vitamin D deficiency

Vitamin D deficiency is defined as not having enough vitamin D that the body needs to function physiologically. Vitamin D deficiency is a widespread epidemic and is a major preventable health issues, worldwide. While it contributes or aggravates several common chronic diseases such as osteoporosis, autoimmune diseases, certain cancer, cardiovascular diseases (CVD), viral and bacterial infections (e.g., tuberculosis, influenza), and diabetes; it primarily causes rickets in children and osteomalcia in adults [7–11].

Please cite this article in press as: A. Haq, et al., Clinical practice guidelines for vitamin D in the United Arab Emirates, J. Steroid Biochem. Mol. Biol. (2016), http://dx.doi.org/10.1016/j.jsbmb.2016.09.021