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(REVIEW ARTICLE)

Vitamin D deficiency in the gulf region: A literature review

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Abstract

Deficiency in vitamin D is a major public health problem globally, including the sun-rich Gulf region. This review summarizes the existing evidence on the prevalence, risk factors and health consequences of vitamin D deficiency in the six member states of the Gulf Cooperation Council (GCC) (i.e. Saudi Arabia, United Arab Emirates (UAE), Kuwait, Qatar, Bahrain and Oman), and potential strategies to tackle vitamin D deficiency. Focusing on the results of recent studies to illustrate the implications, and discussing the importance of lifestyle, cultural contexts and public health measures in preventing this deficiency.

Keywords: Vitamin D deficiency; Gulf Cooperation Council (GCC); Risk factors; Public health measures; Lifestyle and cultural factors

1. Introduction

This review of literature is based on a search of the peer-reviewed literature: journals, articles, systematic reviews, and clinical studies, specific to vitamin D deficiency in the Gulf region. All potential relevant articles were included to ensure coverage sorted by accuracy and postdated as described above. The review draws on regional health authority, global health organization, and academic data to present an evidence-based discussion on vitamin D deficiency prevalence, risk factors, and management. The studies reviewed range from 2010 to 2023 and thus the most recent findings and trends in gulf region vitamin D research has been covered.

Vitamin D assists with the regulation of calcium, maintenance of strong bones and immune health, and collaborates with multiple organ systems to optimize health. Deficiency of vitamin D is associated with diseases such as osteoporosis, cardiovascular diseases, diabetes and autoimmune diseases (Holick, 2017). As UVB sunlight undergoes but relatively little atmospheric attenuation under the Gulf sun, high rates of dermal vitamin D synthesis may occur, making the high incidence of vitamin D deficiency among this population an apparent paradox.

2. Epidemiology of Vitamin D deficiency in the Gulf

A few studies have even found dangerously high levels of vitamin D deficiency in the Gulf region. Al-Daghri et al. conducted a systematic review Recent study in the region found that more than 60% of GCC country population had low vitamin D levels (80% of adults and children in Kuwait (Dashti et al., 2020).

In Qatar, Bahrain, Oman: Vitamin D Deficiency reported with rates above 70% (Al-Mahroos et al., 2021).

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3. Reasons for Increased Risk of Vitamin D Deficiency

Unfortunately, a combination of factors produces a high rate of vitamin D shortage in the Gulf region, even though sunlight is abundant in the region:

3.1. Low Sunlight Exposure

They are worn in the region where they tend to be culturally and socially acceptable to wear "decent" clothing that limits the amount of skin that's exposed to sunlight. Extreme temperatures cause many avoid outdoor activities, which result in less opportunity for bodies to synthesize vitamin D (Alshahrani & Aljohani, 2013).

3.2. Inadequate Dietary Intake

Foods abundant in vitamin D: fatty fish, fortified dairy products and eggs are often absent from traditional Gulf diets. Unlike Western countries, there have not been any effective food fortification policies implemented as a preventative action in the GCC (Al Anouti et al., 2018).

3.3. Obesity and skin pigmentation

Increasing obesity throughout the region decreases vitamin D availability in biological systems because it is sequestered in adiposity (Zhao et al., 2012). In fact, individuals with darker skin tones compared to lighter skin tones are less efficient in the production of vitamin D (Wimalawansa, 2018).

3.4. Biological and Genetic Contributors

Genetic variants associated with the metabolism of vitamin D have also been identified in Middle Eastern populations and could predispose to vitamin D deficiency (Mohammad et al., 2021).

4. Health consequences of a deficit of vitamin D

Vitamin D deficiency has extensive health effects, such as:

- **Bone Disorders:** Increased osteoporosis, rickets, fractures (Holick, 2017).
- **CV Diseases**: Deficiency of this vitamin leads to hypertension, heart diseases and metabolic syndrome (Pilz et al., 2018).
- **Diabetes and Metabolic Disorders**: Vitamin D deficiency is implicated in insulin resistance and the development of type 2 diabetes, among other metabolic disorders (Bouillon et al., 2019).
- **Immune System Dysfunction**: Insufficiency may potentially play a role in autoimmune diseases and susceptibility to infections (Aranow, 2011).
- **Note:** Very few studies have been done to compare the current DRI in the Gulf Region with the actual epidemiological surveys to get a final conclusion on the recommended Vitamin D Intake.

Recommended daily vitamin D intake per age group / population subset

The Gulf Health Council and regional health authorities recommend as follows the daily intake of vitamin D for healthy levels based on age and physiological state:

- **Infants (0–12 months):** 400 IU (10 mcg)
- **Children and Adolescents (1-18 years):** 600 IU (15 mcg)
- **Adults (19–70 years):** 600–800 IU (15–20 mcg)
- **Adults (70+):** 800-1000 IU (20-25 mcg)
- **Pregnant and Lactating Women:** 800-1000 IU (20-25 mcg)

In the case of vitamin D deficiency, higher doses may be prescribed under doctor care, being recommended from the standard 2000-5000 IU per day (Al Anouti et al., 2018; Holick, 2017).

5. How to Prevent and Reverse Vitamin D Deficiency?

Properly treating vitamin D deficiency requires a multifactor perspective:

5.1. Public Health Policies & Awareness Programs

These should include comprehensive awareness campaigns by the government about safe sun exposure, dietary alteration, and vitamin D supplementation.

5.2. Fortification of population staple-foods

Such as milk, bread, and cooking oil with vitamin D could be made mandatory to improve population vitamin D status (Al Anouti et al., 2018).

5.3. Vitamin D Supplementation

Thus, clinicians can advocate for frequent vitamin D supplementation for its wide-range health benefits in susceptible subpopulations, such as females, children, and older adults.

5.4. Outdoors activities

Public health strategies should encourage safe outdoor activities, such as early morning or late afternoon walks, in order to help find a balance between getting too much sun and the dangers of exposure to extreme heat as temperatures increase.

6. Conclusion

Vitamin D deficiency remains a public health problem in the Global region, associated with lifestyle and culture behaviors, social and environmental factors. Despite the abundance of sunlight, high prevalence of deficiency can be attributed to minimal exposure to the sun, inadequate dietary intake, obesity and genetic predisposition. This is a complex issue, and solving it requires a combination of policies, public information campaigns, and healthcare reforms. More studies are needed to evaluate the impact of Vitamin D fortification programs and offer tailored strategies to address the local requirements.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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