Vitamin D Deficiency: A Growing Global Health Concern

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Key points:

- Introduction
- Risk Factors and Causes of Vitamin D Deficiency
- Signs and Symptoms
- Diagnosis
- Prevalence of Vitamin D Deficiency

Introduction

Vitamin D is one of the most important vitamins in our body. The skin primarily synthesizes vitamin D, a fat-soluble vitamin, after being exposed to ultraviolet-B (UVB) radiation. It appears in two main forms, ergocalciferol (vitamin D2) and cholecalciferol (vitamin D3), both of which aid in maintaining appropriate levels of vitamin D in the body.[1] Vitamin D deficiency is typically diagnosed when the level of 25-hydroxyvitamin D in the blood is less than 20 ng/ml. Levels between 20 and 30 ng/ml are considered insufficient. A lack of vitamin D is a recognized global health problem, and it has been linked to a higher risk of developing non-communicable diseases.[2]

Risk Factors and Causes

Reduced dietary intake of vitamin D like lower consumption of sea fish and decreased skin synthesis due to lower levels of the 7-dehydrocholestrol contributes to deficiency in the elderly, especially women in moderate climates. Elderly people are more at risk due to sociodemographic factors such as poor environmental conditions, poor income, lack of education, smoking, and many more. Chronic renal disease can decrease the conversion of vitamin D into its active forms, while gastrointestinal disorders might hinder the absorption or transformation of vitamin D.[3]

Rickets and osteomalacia are two bone mineralization disorders that can result from a vitamin D deficiency.[4] Studies indicate that inadequate amounts of vitamin D are linked to higher heart disease risk. One study discovered that the following cardiovascular risk variables were negatively correlated with 25-hydroxyvitamin D levels: blood pressure higher than 140/90 mm Hg, a blood glucose level greater than 125 mg/dL (6.95 mmol/L), and a body mass index of at least 30 kg/m. [2,5]

Signs and Symptoms

Many people, especially children and adolescents, may be asymptomatic, but vitamin D deficiency can present with a variety of clinical characteristics across different age groups. When symptoms do manifest, they may include anomalies of the neurological system and movement difficulties. Reported manifestations include endocrine and gastrointestinal symptoms, along with generalized body aches, musculoskeletal pain, muscle weakness, fatigue, chest and lower spinal pain, depression, and a waddling gait.

Diagnosis

Vitamin D is traditionally used to treat secondary hypothyroidism, prevent falls and fractures, and cure

metabolic bone disease. However, the most prevalent purpose for vitamin D prescriptions is to address asymptomatic vitamin D deficiency. But just like any diagnosis, it must be considered before it can be made. The doctor must then use a history, physical examination, and laboratory evaluation to confirm the diagnosis or rule it out, just like with any other diagnosis. Metabolic bone disease in adults and rickets in children, with or without hypocalcaemic tetany, are the typical manifestations of severe vitamin D insufficiency.[6]

Prevalence

To accurately assess how common vitamin D deficiency is in the general population, we need to use recent, nationally representative surveys. Standardizing serum 25-hydroxyvitamin D measurements, like those used in the Vitamin D Standardization Program (VDSP) led by the National Institutes of Health, can help reduce differences in lab results.[7] Vitamin D deficiency affects around 20% to 80% of men and women in the United States, Canada, and Europe. Approximately 32% of the US population had serum 25(OH)D levels less than 20 ng/ml. A study of Australian adults found that 31% had vitamin D deficiency (25[OH]D <20 ng/mL) (22% in men and 39% in women), while 73% had levels below 30 ng/ml.[8,9]

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