

Association of 25-hydroxy Vitamin D levels with indexes of general and abdominal obesity in Iranian adolescents: The CASPIAN-III study

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Background: This study aimed to determine the association of serum 25-hydroxy Vitamin D (25(OH)D) levels with measures of general and abdominal obesity in Iranian adolescents. **Materials and Methods:** This nationwide cross-sectional study was conducted among 1090 students, aged 10-18 years, living in 27 provinces in Iran. Serum concentration of 25(OH)D was analyzed quantitatively by direct competitive immunoassay chemiluminescence method. Body mass index (BMI) and waist-to-height ratio (WHtR) were considered as measures of generalized and abdominal obesity, respectively. **Results:** Study participants consisted of 1090 adolescents (51.9% boy and 67.1% urban residents) with mean age, BMI, and waist circumference of 14.7 (2.6) years, 19.3 (4.2) kg/m², and 67.82 (12.23) cm, respectively. The median serum 25(OH)D was 13.0 ng/mL (interquartile range: 20.6). Overall, 40% of participants were Vitamin D deficient, and 39% were Vitamin D insufficient. Serum 25(OH)D level was not associated with BMI and WHtR. **Conclusion:** We did not document any significant association between serum 25(OH)D level and anthropometric measures in adolescents. This finding may be because of considerably high prevalence of hypovitaminosis D in the study population.

Key words: 25-Hydroxy Vitamin D, adolescents, obesity

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INTRODUCTION

It is well-documented that overweight and obesity are increasing in both developed and developing countries.^[1-3] It is estimated that in 2030, >2 billion individuals would be overweight, and 1 billion would be obese.^[4] Globally, high amounts of expenditures are allocated for obesity due to its indispensable role in chronic and complicated diseases such as cardiovascular diseases, cancers, hypertension, and type 2 diabetes.^[5-9] Moreover, obesity is associated with inflammation^[10] that may be because of the entrance of macrophages in adipose tissues and their cytokine production,^[11] which in turn would contribute in the development of type II diabetes and other metabolic disorders.^[12]

Different studies show that Vitamin D, as an endocrine hormone, has not only crucial roles in metabolic pathways including glucose metabolism, and insulin secretion and functions, but this hormone might also

modify the immune responses.^[13,14] For instance, the level of 25-hydroxy Vitamin D (25(OH)D), which is the most important form of Vitamin D, inversely correlates with glucose intolerance and type II diabetes;^[15,16] some studies showed direct correlation between 25(OH) D levels and obesity.^[17] The latter collaboration occurs when lipogenesis and inhibition of lipolysis are induced by Vitamin D *in vivo* and *in vitro*, respectively.^[17] Nonetheless, some studies did not document any evidence about the correlation of Vitamin D and obesity.^[18,19]

Different factors might significantly affect Vitamin D level, e.g., demographic variables, gender, aging, ethnicity, dietary habits, sunlight exposure, and season. Vitamin D deficiency is a pandemic problem, even in sunny regions.^[20-24]

Conflicting results exist on the correlations of 25(OH) D with weight status.^[17-30] This study aims to determine

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