

## THE INFLUENCE OF VITAMIN D ON METABOLIC SYNDROME

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**Introduction.** Metabolic syndrome (MS) is a major public health concern, characterized by a combination of central obesity, dyslipidemia, hypertension, and insulin resistance. In recent years, increasing evidence has highlighted the crucial role of vitamin D in metabolic homeostasis and its association with MS development. Beyond its well-known role in bone metabolism, vitamin D is involved in insulin secretion, insulin sensitivity, and lipid metabolism.

**Aim of study.** The purpose of the study is to elucidate and describe the impact of vitamin D deficiency on the pathogenesis of metabolic syndrome and the effects of vitamin D supplementation in preventing and managing MS.

**Methods and materials.** Medscape, PubMed, Hinari, Google Scholar. Published between 2013-2025. Keywords: metabolic syndrome, vitamin D, insulin resistance, dyslipidemia, cardiovascular risk, obesity.

**Results.** Vitamin D deficiency is frequently observed in obese individuals, primarily due to its sequestration in adipose tissue, which acts as a reservoir, leading to decreased bioavailability and lower circulating levels. Hypovitaminosis D contributes to insulin resistance by decreasing intracellular calcium levels and reducing GLUT-1 and GLUT-4 glucose transporter expression in peripheral tissues. Moreover, low vitamin D levels are associated with increased total cholesterol, LDL, and triglycerides, promoting atherosclerosis. Vitamin D supplementation in MS patients has shown beneficial effects, including improved insulin sensitivity, reduced dyslipidemia and cardiovascular risk.

**Conclusion.** Vitamin D deficiency plays a significant role in the pathogenesis of metabolic syndrome, affecting both glucose homeostasis and lipid metabolism. Supplementing vitamin D in MS patients may help alleviate symptoms and prevent metabolic complications. Further studies are required to fully understand the underlying mechanisms and optimize vitamin D-based therapeutic strategies.