

Impact of vitamin-D supplementation in pre-diabetes: Glycemic outcomes and delay in progression to type 2 diabetes mellitus

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Statement of the Problem: Pre-diabetes is characterized by elevated glucose and/or HbA1c levels that do not meet the criteria for diabetes but heighten the risk of progression. The International Diabetes Federation estimates an increase in global cases from 537 to 643 million by 2030. Preventive strategies, including lifestyle modifications and pharmacological treatments, can mitigate complications but face challenges such as adherence, maintenance, and costs. Given the high prevalence and burden of diabetes, exploring additional interventions is vital. This study assesses the impact of vitamin D supplementation on glycemic outcomes and the delay of type 2 diabetes progression in prediabetic individuals.

Methodology and Theoretical Orientation: A systematic review adhered to PRISMA guidelines, analyzing randomized clinical trials from PubMed and Scopus over the past 10 years. The PICO strategy guided the research, utilizing MeSH terms: “Vitamin D” AND “Prediabetic State.” From 345 retrieved articles, selection was based on predefined inclusion and exclusion criteria. Vitamin D's role as a steroid hormone influencing insulin secretion and sensitivity forms the basis of the theoretical orientation.

Findings: Thirteen randomized trials were included, involving diverse populations with varying baseline vitamin D levels. The studies varied in vitamin D doses, follow-up duration, and additional interventions. Results showed either positive effects or no significant impact on fasting glucose, HbA1c, HOMA-IR, and diabetes progression.

Conclusion and Significance: The heterogeneity of the studies limits definitive conclusions. Some trials suggest vitamin D improves glycemic parameters and reduces diabetes risk, while others show no significant effect. Variations in dosage, follow-up duration, and baseline vitamin D levels may account for these discrepancies. The absence of standardized methodologies further complicates interpretation. Nonetheless, findings suggest a potential protective role of vitamin D, particularly in individuals with low initial levels. Future robust trials with standardized baseline vitamin D levels, doses, and follow-up periods are necessary for clearer clinical insights.