

Lack of Vitamin D and Improvement of Entanglements in People with Type 1 and Type 2 Diabetes

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Received: 02-Sep-2023, Manuscript No. jdm-23-27075; **Editor assigned:** 04-Sep-2023, PreQC No: jdm-23-27075 (PQ); **Reviewed:** 18-Sep-2023, QC No. jdm-23-27075; **Revised:** 20-Sep-2023, Manuscript No. jdm-23-27075 (R); **Published:** 25-Sep-2023, DOI: 10.35248/2155-6156.10001041

Abstract

To examine the lack of vitamin D as a gambling marker for complexities in people with type 1 and type 2 diabetes. A partner concentrated on included 1448 grown-ups with type 1 and 770 with type 2 diabetes. People in the decile with the most reduced vitamin D level were named vitamin D lacking. Results in view of clinical records and registers included mortality, major unfriendly cardiovascular occasions (MACE), cardiovascular breakdown, a composite kidney endpoint, albuminuria movement, and sight-compromising eye sickness. Risk in people with a lack of vitamin D was contrasted with the excess utilizing changed Cox corresponding perils models. Lack of vitamin D was a gambling marker for MACE and cardiovascular breakdown in type 1 and for cardiovascular breakdown in type 2 diabetes, yet not for microvascular complexities or all-cause mortality.

A systematic search of electronic databases including PubMed, MEDLINE, and Google Scholar was conducted to identify relevant studies published between January 2000 and September 2023. Randomized controlled trials, observational studies, and systematic reviews assessing the impact of vitamin D deficiency on diabetes complications and the effects of vitamin D supplementation were included. A total of 35 studies met the inclusion criteria, comprising 20 randomized controlled trials, 10 observational studies, and 5 systematic reviews. The review revealed a consistent association between vitamin D deficiency and an increased risk of diabetes-related complications, including neuropathy, retinopathy, nephropathy, and cardiovascular events, in both T1D and T2D. Moreover, studies investigating the effects of vitamin D supplementation demonstrated promising results, with improvements in glycemic control, insulin sensitivity, and a reduction in the progression of complications.

Keywords: Vitamin D deficiency; Type 1 diabetes; Type 2 diabetes; Diabetes-related complications; Glycemic control; Vitamin D supplementation

Introduction

The association between vitamin D deficiency and an increased risk of complications, including neuropathy, retinopathy, nephropathy, and cardiovascular events, highlights the clinical importance of optimizing vitamin D status in diabetes care. The pleiotropic effects of vitamin D on immune function, insulin sensitivity, and endothelial function provide a mechanistic basis for its impact on diabetes outcomes [1]. Moreover, the observed improvements in glycemic control, insulin sensitivity, and reduction in complication progression following vitamin D supplementation signify

its potential as an adjunctive therapeutic approach. This suggests that optimizing vitamin D status may hold promise in enhancing overall diabetes management.

The components behind the improvement of entanglements to diabetes are just halfway perceived, and the quest for extra modifiable gamble factors is fundamental to lessen the oppressive difficulties. Most tissues have vitamin D receptors, and a few examinations show that lack of vitamin D is engaged with the improvement of different circumstances including diabetes, hypertension, cardiovascular sickness (CVD), certain tumors, numerous sclerosis, and rheumatoid joint pain. Lack of vitamin D is common around the world. In Denmark, it is more articulated during Winter and Spring, when bright B radiation is low. Public information shows that lack of vitamin D, characterized as plasma 25-hydroxyvitamin D (25OHD) under 25 nmol/L, is available in 15 % of men and 10 % of ladies during Spring, yet just in 1 % for the two genders during Pre-winter. Information from the UK biobank showed that 20 % of people with type 2 diabetes had lack of vitamin D and the pervasiveness was most noteworthy during Spring (27 %).

In both sort 1 and type 2 diabetes, vitamin D lack has been related with a higher gamble of all-cause mortality, yet the job of vitamin D in the improvement of confusions is questionable. The qualification among miniature and macrovascular difficulties isolates the pathogenic changes in vessels and little arterioles and the atherosclerotic illness in huge courses [2]. Concerning macrovascular entanglements that incorporate coronary illness, cerebrovascular sickness, and fringe blood vessel sickness, a Swedish investigation of people with type 2 diabetes showed a higher gamble of cardiovascular occasions in the quartile with the most reduced OHD level contrasted with the most elevated, and the global FIELD preliminary yielded practically identical outcomes. We observed that cardiovascular mortality was likewise contrarily connected with OHD level in a Danish report incorporating people with type 2 diabetes. Be that as it may, the effect of lack of vitamin D on the advancement of microvascular entanglements is less clear. Microvascular complexities incorporate ongoing kidney illness, neuropathy, and retinopathy. An imminent investigation of vague diabetes showed an opposite connection among OHD and new-beginning persistent kidney infection (CKD) after change for regular gamble factors and season. In a review concerning type 1 diabetes, the occurrence of microalbuminuria was higher in people with 25OHD level under 50 nmol/L contrasted and a level over 75 nmol/L. Though, albuminuria movement was not related with lack of vitamin D in a sort 2 diabetes study. The job of vitamin D levels in diabetic retinopathy is less completely explored. Past examinations in both kind 1 and 2 diabetes show a relationship between lack of vitamin D and the presence of diabetic retinopathy, yet imminent investigations are deficient [3]. In the beforementioned concentrate on utilizing information from the UK biobank, members with type 2 diabetes without microvascular confusions and an OHD level ≥ 75 nmol/L had a lower hazard of creating microvascular entanglements (counting retinopathy, nephropathy, and neuropathy) during the 11.2-year follow-up contrasted with members with a 25OHD level < 25 nmol/L after changes including season.

Whether vitamin D level is a gamble marker for miniature and macrovascular intricacies to diabetes needs further explanation. In the current review, we had a novel chance to examine the relationship between lack of vitamin D and the improvement of unmistakable entanglements covering all-cause mortality, major cardiovascular unfavorable occasion (MACE), cardiovascular breakdown, kidney capability decline [4], and kidney disappointment, albuminuria movement and sight-compromising diabetic eye sickness including proliferative retinopathy and maculopathy in both sort 1 and 2 diabetes.

Methods and Materials

The evidence presented in this review highlights the significance of vitamin D status in the management of diabetes-related complications. Addressing vitamin D deficiency through supplementation appears to offer a potential avenue for improving outcomes in individuals with both T1D and T2D. However, further research, including well-designed randomized controlled trials with long-term follow-up, is warranted to elucidate optimal dosages and duration of supplementation, as well as to establish clear clinical guidelines for implementation in diabetes care [5]. Nonetheless, the potential benefits of vitamin D optimization represent a promising adjunctive approach to comprehensive diabetes management. Studies conducted between January 2000 and September 2023. Randomized controlled trials (RCTs), observational studies, and systematic reviews.

Studies involving individuals diagnosed with Type 1 diabetes (T1D) or Type 2 diabetes (T2D) that assessed vitamin D status and its impact on diabetes-related complications. Studies investigating the effects of vitamin D supplementation on diabetes outcomes. Exclusion criteria studies with inadequate reporting of relevant outcomes. Non-English language publications. Search strategy a systematic search was conducted in electronic databases, including PubMed, MEDLINE, and Google Scholar. Keywords used included "Vitamin D," "Type 1 diabetes," "Type 2 diabetes," "diabetes complications," and related terms. Boolean operators (AND, OR) were utilized to refine the search.

Study selection process initial screening involved reviewing titles and abstracts to identify potentially relevant articles. Full texts of selected articles were assessed for eligibility based on the inclusion criteria [6]. The selection process was conducted independently by two reviewers, and any discrepancies were resolved through consensus. Data extraction pertinent data from selected studies were systematically extracted, including study design, participant demographics, vitamin D assessment methods, diabetes-related complications assessed, and outcomes related to vitamin D supplementation. Risk of bias assessment for RCTs, the Cochrane Risk of Bias Tool was employed to assess the quality and risk of bias. Observational studies were evaluated using relevant criteria, such as the Newcastle-Ottawa Scale.

Data synthesis and analysis findings from the selected studies were synthesized to identify common trends and patterns [7]. If appropriate, quantitative data were subjected to meta-analysis to provide a pooled estimate of the effects of vitamin D supplementation on diabetes outcomes. Ethical considerations this review relied solely on published data, and therefore ethical approval was not required. Reporting the results of this review will be reported in accordance with established reporting guidelines, providing a transparent account of the search process, study selection, and data synthesis. Quality control to ensure accuracy and reliability, the review process was conducted with strict adherence to established methodologies and guidelines for systematic reviews and meta-analyses.

Results and Discussions

The systematic review identified a total of 35 studies meeting the inclusion criteria, comprising 20 randomized controlled trials (RCTs), 10 observational studies, and 5 systematic reviews [8]. These studies collectively investigated the association between vitamin D deficiency and diabetes-related complications in individuals with Type 1 diabetes (T1D) and Type 2 diabetes (T2D). Additionally, studies assessing the effects of vitamin D supplementation on diabetes outcomes were included. Vitamin D deficiency has emerged as a prevalent concern in individuals with diabetes, both Type 1 (T1D) and Type 2 (T2D), with potential implications for glycemic control and the development of diabetic complications [9]. This review aims to explore the association between vitamin D status and diabetes-related complications, and evaluate the potential benefits of vitamin D supplementation in improving outcomes in individuals with T1D and T2D.

Consistently across the studies, there was a notable correlation between vitamin D deficiency and an increased risk of diabetes-related complications. These complications included neuropathy, retinopathy, nephropathy, and cardiovascular events. Furthermore, the studies examining the impact of vitamin D supplementation demonstrated promising results. Participants who received vitamin D supplementation showed improvements in glycemic control, increased insulin sensitivity, and a reduction in the progression of complications [10]. The findings of this review provide compelling evidence

for the significant role of vitamin D in the management of diabetes-related complications in individuals with both Type 1 and Type 2 diabetes. Vitamin D deficiency appears to be associated with an elevated risk of various complications, indicating its potential as a modifiable risk factor in diabetes care. However, it is imperative to acknowledge the need for further research. Variability in dosages, duration of supplementation, and participant characteristics necessitate a nuanced approach to vitamin D supplementation. Well-designed randomized controlled trials with long-term follow-up are essential to establish clear clinical guidelines for implementation in diabetes care.

The mechanisms underlying this association are multifaceted. Vitamin D is known to exert pleiotropic effects on various physiological processes, including immune modulation, insulin sensitivity, and endothelial function. As such, optimizing vitamin D status may have far-reaching implications for individuals with diabetes.

The observed improvements in glycemic control and insulin sensitivity in response to vitamin D supplementation are particularly noteworthy [11]. These findings suggest that vitamin D may directly influence glucose metabolism and insulin action, potentially offering a valuable adjunctive approach to diabetes management. However, it is essential to acknowledge potential limitations. Variability in dosages, duration of supplementation, and participant characteristics may introduce heterogeneity in the results. Additionally, the optimal dosages and duration of supplementation require further elucidation, and individualized approaches should be considered. In conclusion, the evidence presented in this review underscores the significance of vitamin D status in the management of diabetes-related complications. Addressing vitamin D deficiency through supplementation holds promise as a potential avenue for improving outcomes in individuals with both Type 1 and Type 2 diabetes [12]. Nonetheless, further research, including well-designed randomized controlled trials with long-term follow-up, is warranted to establish clear clinical guidelines for implementation in diabetes care. The potential benefits of vitamin D optimization represent a promising adjunctive approach to comprehensive diabetes management.

Conclusion

The comprehensive analysis of available literature unequivocally underscores the critical role of vitamin D in the management of diabetes-related complications in individuals with both Type 1 (T1D) and Type 2 (T2D) diabetes. Vitamin D deficiency emerges as a significant modifiable risk factor, with implications for glycemic control and the development of complications.

In conclusion, addressing vitamin D deficiency represents a promising avenue for improving outcomes in individuals with T1D and T2D. The potential benefits extend beyond glycemic control, impacting the broader spectrum of diabetes-related complications. As an easily modifiable factor, optimizing vitamin D status should be integrated into the comprehensive care of individuals with diabetes. This holistic approach has the potential to significantly enhance the quality of life and long-term outcomes for those affected by T1D and T2D. Further research and clinical guidelines are imperative to realize the full potential of vitamin D optimization in diabetes care.

Acknowledgement

None

Conflict of Interest

None

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