

Genetic Predisposition to Vitamin D and Non-communicable Diseases

Troney Mckee*

Department of Biomedicine, George Mason University, Fairfax, VA 22030, USA

Abstract

This systematic review explores the intricate association between a genetic predisposition to vitamin D and the susceptibility to Non-Communicable Diseases (NCDs). By employing a comprehensive approach, we scrutinized the existing literature to identify and analyze studies investigating the genetic links between vitamin D metabolism and various NCDs. A genetic risk score was utilized as a measure to assess the collective impact of multiple genetic variants associated with vitamin D metabolism. Our findings reveal a nuanced and complex relationship, with certain genetic profiles demonstrating heightened susceptibility to specific NCDs. The identification of these genetic predispositions opens avenues for personalized medicine and targeted interventions to mitigate the risk of NCDs in genetically susceptible populations.

Keywords: Vitamin D • Genetic risk score • Genetic variants • Polygenic risk • Non-communicable diseases • Personalized medicine

Introduction

Non-Communicable Diseases (NCDs) pose a substantial global health challenge, contributing significantly to morbidity and mortality [1]. Genetic factors play a crucial role in the predisposition to NCDs, and recent research has focused on understanding the links between genetic variants and the risk of developing these diseases. Vitamin D, a key player in various physiological processes, is synthesized in the skin upon exposure to sunlight and is also obtained through diet [2]. Genetic variations in the metabolism of vitamin D may contribute to an individual's susceptibility to NCDs. This systematic review aims to consolidate the current evidence regarding the genetic predisposition to vitamin D and its potential impact on the risk of developing NCDs [3].

Description

Existing literature demonstrates a growing interest in the interplay between vitamin D genetics and the development of NCDs. Various studies have investigated the influence of genetic variants associated with vitamin D metabolism on the risk of specific NCDs, including cardiovascular diseases, diabetes mellitus, and metabolic disorders. The use of a genetic risk score, encompassing multiple genetic variants, allows for a more comprehensive assessment of an

individual's genetic predisposition [4]. While some studies have identified significant associations, the literature also reveals heterogeneity in results, suggesting that the relationship between vitamin D genetics and NCDs is multifaceted and influenced by various factors, including environmental and lifestyle variables [5-7].

Our systematic review synthesizes current evidence on the genetic predisposition to vitamin D and its implications for NCDs [8-10]. The utilization of genetic risk scores enables a more nuanced understanding of the collective impact of genetic variants associated with vitamin D metabolism. While certain genetic profiles show heightened susceptibility to specific NCDs, the complexity of this relationship requires further exploration. Environmental factors, lifestyle choices, and gene-environment interactions contribute to the intricate web of genetic predisposition to NCDs. Precision medicine approaches tailored to individuals' genetic profiles may offer promising avenues for preventive strategies and personalized interventions [11].

Conclusion

In conclusion, this systematic review underscores the intricate relationship between genetic predisposition to vitamin D and the susceptibility to non-communicable diseases. The evidence suggests that specific genetic profiles may elevate the risk of developing

*Address for Correspondence: Troney Mckee, Department of Biomedicine, George Mason University, Fairfax, VA 22030, USA; E-mail: troneykee@hotmail.com

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Received: 14 November, 2023, Manuscript No. VTE-23-120077; **Editor assigned:** 16 November, 2023, PreQC No. VTE-23-120077 (PQ); **Reviewed:** 30 November, 2023, QC No. VTE-23-120077; **Revised:** 06 December, 2024, Manuscript No. VTE-23-120077 (R); **Published:** 13 December, 2024, DOI: 10.37421/2376-1318.2024.13.197

certain NCDs, highlighting the importance of considering genetic factors in disease prevention and intervention strategies. Moving forward, more extensive and well-designed studies are needed to unravel the complexity of this relationship and to inform personalized medicine approaches aimed at mitigating the risk of non-communicable diseases in genetically susceptible populations.

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How to cite this article: Mckee, Troney. "Genetic Predisposition to Vitamin D and Non-communicable Diseases." *Vitam Miner* 13 (2024): 197.