



**Libyan International Medical University  
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**The relation between Vitamin D deficiency and Multiple sclerosis**

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## Abstract

The risk of MS is determined by genetic and environmental factors. One of the latter is vitamin D deficiency, which has attracted increased attention in the last decade. The first study show that the birth month is correlated with MS risk, and the second study concluded that vitamin D status affect the risk of MS and the third study show the association between maternal dietary vitamin D intake and risk of MS.

## Introduction

Multiple sclerosis (MS) is a chronic, inflammatory, and demyelinating disorder that affects the CNS. Multiple sclerosis is a common neurologic disorder; the estimated number of individuals with MS has increased from 2.1 million in 2008 to 2.3 million in 2013. The risk of MS is determined by genetic and environmental factors. One of the latter is vitamin D deficiency, which has attracted increased attention in the last decade. Vitamin D can be obtained from food, such as fatty fish, fortified foods, and vitamin supplements. However, the diet provides only a small percentage of human vitamin D intake, and the main source is skin exposure to sunlight. Vitamin D receptor expression has been reported in most immune cells, as well as in CNS tissues. Additionally, the rate-limiting enzyme for vitamin D synthesis, 25(OH)D3-1 $\alpha$ -hydroxylase is expressed in immune cells. These cells are therefore, able to synthesize and secrete active vitamin D, indicating that vitamin D plays a role in the immune system. The in vitro addition of 1,25-dihydroxyvitamin D3 (1,25(OH)2D3) to antigen-presenting cells (namely, monocytes, macrophages, and dendritic cells) inhibits the surface expression of major histocompatibility complex II-complexed antigens, and of costimulatory molecules, leading to reduced T cell stimulatory capacity. Additionally, 1,25(OH)2D3 directly exerts its immunomodulatory effects on T lymphocytes by inhibiting the production of Type 1 helper T cell cytokines and stimulating the production of Type 2 helper T cell cytokines, which have immunoregulatory functions<sup>(1)</sup>.

## Discussion

. A study show that the birth month is correlated with MS risk; individuals born in the fall (namely, whose mothers were exposed to summer sunlight) have a low MS risk, whereas individuals born in the spring have a higher risk of MS. This observation indicates the presence of an association among maternal sunlight exposure during pregnancy, vitamin D status, and the risk of MS. In 2013, a systematic review<sup>27</sup> analyzed published data on the effects of birth month for 151,978 MS patients born in the Northern Hemisphere. The results of this analysis demonstrated a significant increase of MS risk among individuals who were born in April and a reduction in risk in people who were born in October and November<sup>(2)</sup>.

. A recent study concluded that vitamin D status affect the risk of MS. Vitamin D intake and the risk of developing MS were assessed in a study that included approximately 200,000 women. In this study, the incidence of MS was 41% lower among women with a vitamin D intake of  $\geq 400$  IU/day, compared with women who did not take supplements<sup>(3)</sup>.

. Another study show the association between maternal milk intake, maternal dietary vitamin D intake, and predicted maternal serum 25(OH)D during pregnancy. The study showed that the relative risk of MS was significantly lower in women whose mothers had high milk or vitamin D intake during pregnancy than in women born to low-intake mothers<sup>(4)</sup>.

## Conclusion

We conclude that high circulating levels of vitamin D are associated with a lower risk of multiple sclerosis.

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**Bibliography (References)**

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