



The Journal of the American Medical Association

Vol. 296 No. 23, December 20, 2006

[TABLE OF CONTENTS >](#)

Original Contribution

Serum 25-Hydroxyvitamin D Levels and Risk of Multiple Sclerosis

Kassandra L. Munger, MSc; Lynn I. Levin, PhD, MPH; Bruce W. Hollis, PhD;
Noel S. Howard, MD; Alberto Ascherio, MD, DrPH

JAMA. 2006;296:2832-2838.

Context Epidemiological and experimental evidence suggests that high levels of vitamin D, a potent immunomodulator, may decrease the risk of multiple sclerosis. There are no prospective studies addressing this hypothesis.

Objective To examine whether levels of 25-hydroxyvitamin D are associated with risk of multiple sclerosis.

Design, Setting, and Participants Prospective, nested case-control study among more than 7 million US military personnel who have serum samples stored in the Department of Defense Serum Repository. Multiple sclerosis cases were identified through Army and Navy physical disability databases for 1992 through 2004, and diagnoses were confirmed by medical record review. Each case (n = 257) was matched to 2 controls by age, sex, race/ethnicity, and dates of blood collection. Vitamin D status was estimated by averaging 25-hydroxyvitamin D levels of 2 or more serum samples collected before the date of initial multiple sclerosis symptoms.

Main Outcome Measures Odds ratios of multiple sclerosis associated with continuous or categorical levels (quantiles or a priori-defined categories) of serum 25-hydroxyvitamin D within each racial/ethnic group.

Results Among whites (148 cases, 296 controls), the risk of multiple sclerosis significantly decreased with increasing levels of 25-hydroxyvitamin D (odds ratio [OR] for a 50-nmol/L increase in 25-hydroxyvitamin D, 0.59; 95% confidence interval, 0.36-0.97). In categorical analyses using the lowest quintile (<63.3 nmol/L) as the reference, the ORs for each subsequent quintile were 0.57, 0.57, 0.74, and 0.38 ($P = .02$ for trend across quintiles). Only the OR for the highest quintile, corresponding to 25-hydroxyvitamin D levels higher than 99.1 nmol/L, was significantly different from 1.00 (OR, 0.38; 95% confidence interval, 0.19-0.75; $P = .006$). The inverse relation with multiple sclerosis risk was particularly strong for 25-hydroxyvitamin D levels measured before age 20 years. Among blacks and Hispanics (109 cases, 218 controls), who had lower 25-hydroxyvitamin D levels than whites, no significant associations between vitamin D and multiple sclerosis risk were found.

Conclusion The results of our study suggest that high circulating levels of vitamin D are associated with a lower risk of multiple sclerosis.

JAMA

- [Online Features](#)

This Article

- [Full text](#)
- [PDF](#)
- [Send to a friend](#)
- [Save in My Folder](#)
- [Save to citation manager](#)
- [Permissions](#)

Citing Articles

- [Citation map](#)
- [Citing articles on HighWire](#)
- [Citing articles on ISI \(15\)](#)
- [Contact me when this article is cited](#)

Related Content

- [Related articles](#)
- [Similar articles in JAMA](#)

Topic Collections

- [Immunologic Disorders](#)
- [Neurology](#)
- [Alert me on articles by topic](#)

Author Affiliations: Departments of Nutrition (Ms Munger and Dr Ascherio) and Epidemiology (Dr Ascherio), Harvard School of Public Health, and Channing Laboratory, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School (Dr Ascherio), Boston, Mass; Division of Preventive Medicine, Walter Reed Army Institute of Research, Silver Spring, Md (Dr Levin); Departments of Pediatrics, Biochemistry, and Molecular Biology, Medical University of South Carolina, Charleston (Dr Hollis); and Department of the Navy, Secretary of the Navy Council of Review Boards, Washington, DC (Dr Howard).

RELATED ARTICLES

This Week in JAMA

JAMA. 2006;296(23):2767.

[FULL TEXT](#)

Multiple Sclerosis

Sarah Ringold, Cassio Lynn, and Richard M. Glass

JAMA. 2006;296(23):2880.

[EXTRACT](#) | [FULL TEXT](#)

THIS ARTICLE HAS BEEN CITED BY OTHER ARTICLES

A longitudinal study of serum 25-hydroxyvitamin D and intact parathyroid hormone levels indicate the importance of vitamin D and calcium homeostasis regulation in multiple sclerosis

Soilu-Hanninen et al.

J. Neurol. Neurosurg. Psychiatry 2008;79:152-157.

[ABSTRACT](#) | [FULL TEXT](#)

Associations of diet, supplement use, and ultraviolet B radiation exposure with vitamin D status in Swedish women during winter

Burgaz et al.

Am. J. Clin. Nutr. 2007;86:1399-1404.

[ABSTRACT](#) | [FULL TEXT](#)

Higher serum vitamin D concentrations are associated with longer leukocyte telomere length in women

Richards et al.

Am. J. Clin. Nutr. 2007;86:1420-1425.

[ABSTRACT](#) | [FULL TEXT](#)

Association of the Vitamin D Metabolism Gene CYP27B1 With Type 1 Diabetes

Bailey et al.

Diabetes 2007;56:2616-2621.

[ABSTRACT](#) | [FULL TEXT](#)

Can Vitamin D Reduce Total Mortality?

Giovannucci

Arch Intern Med 2007;167:1709-1710.

[FULL TEXT](#)

Vitamin D and autoimmunity: new aetiological and therapeutic considerations

Arnson et al.

Ann Rheum Dis 2007;66:1137-1142.

[ABSTRACT](#) | [FULL TEXT](#)

Novel Biomarkers in Autoimmune Diseases: Prolactin, Ferritin, Vitamin D, and TPA Levels in Autoimmune Diseases

ORBACH et al.

Ann. N. Y. Acad. Sci. 2007;1109:385-400.

[ABSTRACT](#) | [FULL TEXT](#)

Anti-Vitamin D, Vitamin D in SLE: Preliminary Results

CARVALHO et al.

Ann. N. Y. Acad. Sci. 2007;1109:550-557.

[ABSTRACT](#) | [FULL TEXT](#)

Vitamin D Deficiency

Holick

NEJM 2007;357:266-281.

[FULL TEXT](#)

High Circulating Levels of Vitamin D Associated with Reduced MS Risk

JWatch Neurology 2007;2007:4-4.

[FULL TEXT](#)

High serum vitamin D may protect against multiple sclerosis

BMJ 2007;334:13-13.

[FULL TEXT](#)

Vitamin D: Protective Effect Against Multiple Sclerosis?

JWatch General 2006;2006:1-1.

[FULL TEXT](#)

[HOME](#) | [CURRENT ISSUE](#) | [PAST ISSUES](#) | [TOPIC COLLECTIONS](#) | [CME](#) | [SUBMIT](#) | [SUBSCRIBE](#) | [HELP](#)
[CONDITIONS OF USE](#) | [PRIVACY POLICY](#) | [CONTACT US](#) | [SITE MAP](#)

© 2006 American Medical Association. All Rights Reserved.