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Magnesium, vitamin D status and mortality: results from US National Health and Nutrition Examination Survey (NHANES) 2001 to 2006 and NHANES III.

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Abstract

BACKGROUND:

Magnesium plays an essential role in the synthesis and metabolism of vitamin D and magnesium supplementation substantially reversed the resistance to vitamin D treatment in patients with magnesium-dependent vitamin-D-resistant rickets. We hypothesized that dietary magnesium alone, particularly its interaction with vitamin D intake, contributes to serum 25-hydroxyvitamin D (25(OH)D) levels, and the associations between serum 25(OH)D and risk of mortality may be modified by magnesium intake level.

METHODS:

We tested these novel hypotheses utilizing data from the National Health and Nutrition Examination Survey (NHANES) 2001 to 2006, a population-based cross-sectional study, and the NHANES III cohort, a population-based cohort study. Serum 25(OH)D was used to define vitamin D status. Mortality outcomes in the NHANES III cohort were determined by using probabilistic linkage with the National Death Index (NDI).

RESULTS:

High intake of total, dietary or supplemental magnesium was independently associated with significantly reduced risks of vitamin D deficiency and insufficiency respectively. Intake of magnesium significantly interacted with intake of vitamin D in relation to risk of both vitamin D deficiency and insufficiency. Additionally, the inverse association between total magnesium intake and vitamin D insufficiency primarily appeared among populations at high risk of vitamin insufficiency. Furthermore, the associations of serum 25(OH)D with mortality, particularly due to cardiovascular disease (CVD) and colorectal cancer, were modified by magnesium intake, and the inverse associations were primarily present among those with magnesium intake above the median.

CONCLUSIONS:

Our preliminary findings indicate it is possible that magnesium intake alone or its interaction with vitamin D intake may contribute to vitamin D status. The associations between serum 25(OH)D and risk of mortality may be modified by the intake level of magnesium. Future studies, including cohort studies and clinical trials, are necessary to confirm the findings.