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Vitamin B6 and B12 levels linked to mental function and depression

By Stephen DANIELLS, 02-Jul-2012

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Low levels of vitamins B6 and B12 are associated with an increased risk of impaired cognition, says a new study that adds support to links between B vitamin intake and cognitive function.

Data from an epidemiological study with over 2,000 participants also indicated that low level of vitamin B12 were associated with increased risk of depression.



The findings are a correlation, and do not prove causation. In other words, they do not show that increased B12 and B6 intakes would improve cognition and lower the likelihood of depression.

While this study reported beneficial links between B vitamin status and cognitive function, others have not.

A recent intervention study by scientists from Oxford University in England found that daily supplements of folic acid, B6 and B12 were associated with a 30% reduction in levels of the amino acid homocysteine, and improvements in a range of mental tests, including global cognition and episodic memory (*International Journal of Geriatric Psychiatry*, doi: 10.1002/gps.2758).

Folate and homocysteine

The new study, led by scientists from the Jean Mayer USDA Human Nutrition Research Center on Aging, Tufts University and published in *The Journal of Nutrition*, did not find a link between folate and homocysteine levels and cognition or depression.

This observation challenges a well-cited hypothesis that increased concentrations of the amino acid are linked to a higher rate of wasting in the brain, or atrophy, and therefore mild cognitive impairment.

Other epidemiological studies have reported that high levels of homocysteine are associated with suspected or confirmed dementia. Indeed, the Framingham study reported that people with homocysteine levels above 14 micromoles per liter of serum had twice the risk of dementia.

Tissue and plasma concentrations of homocysteine are known to be determined by vitamin B status, as they are cofactors for enzymes involved in homocysteine metabolism.

The researchers also did not find any association between cognition/depression scores when they considered a specific form – or polymorphism – of the gene

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Study details

The Tufts scientists and their co-workers analyzed data from two ethnically diverse study populations, or cohorts: The Boston Puerto Rican Health Study and the Nutrition, Aging, and Memory in Elders study.

Questionnaires were used to assess dietary and health factors, and the Mini-Mental Status Exam (MMSE) was used to cognitive outcomes and the Center for Epidemiological Studies Depression Scale was used to asses depression.

Results indicated that low vitamin B12 concentrations were associated with higher depression scores and lower MMSE scores, while low B6 concentrations were linked to lower MMSE scores.

"The current study did not find evidence of an association between the MTHFR C677T TT genotype and impaired cognition or depression in a population with adequate folate status and a high prevalence of cognitive impairment and depression."

Source: *Journal of Nutrition*

Published online ahead of print, doi: 10.3945/jn.112.161828

"Status of Vitamins B-12 and B-6 but Not of Folate, Homocysteine, and the Methylenetetrahydrofolate Reductase C677T Polymorphism Are Associated with Impaired Cognition and Depression in Adults"

Authors: D. Moorthy, I. Peter, T.M. Scott, L.D. Parnell, et al.

Keywords: vitamin B6, B12, cognition

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