Dynamic Chiropractic

SENIOR HEALTH

B Vitamins May Hold Key to Better Memory, Cognitive Function in Seniors

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The results of several research studies suggest that consuming adequate amounts of folic acid and vitamins B_6 and B_{12} throughout one's lifetime may play a key role in reducing the risk of developing Alzheimer's disease and other types of dementia in later years. This evidence was strengthened by a recent British study of a group of patients (average age: 75 years) with Alzheimer's that had higher blood levels of homocysteine than members of the age-matched control group not afflicted with the disease. Those with higher blood levels of homocysteine were several times more likely to have the disease than those with lower blood homocysteine levels.

It is known that the strongest determinant of blood homocysteine levels (unless there is an overriding genetic defect of some major consequence) is one's nutritional status of folic acid, vitamin B_6 and vitamin B_{12}, as will be discussed below. These same B vitamins are also involved in the synthesis of important neurotransmitters that are required for cognition and other brain functions.

The average intake of folic acid is only about half of the 400 mcg that experts indicate should be taken daily for otherwise healthy individuals. A significant number of people over the age of 60 don't efficiently absorb vitamin B_{12} from food sources, due to age-related changes in their digestive tracts. As such, many authorities encourage consumers to ingest more dark green vegetables, beans and fortified grains to acquire more folic acid, and more fortified cereals to help acquire additional vitamin B_{12}. The *Tufts University Health & Nutrition Letter* also suggests that taking a daily multiple vitamin and mineral taken daily is another way to ensure that patients achieve a more optimal intake of these B vitamins, which may be a simple, but important measure to prevent changes in brain function related to the development of Alzheimer's and dementia.[1]

The notion that deterioration in mental capacities is a natural part of the aging process has been challenged by a number of recent research studies that indicate that vitamin and mineral status may be significant factors in modifying a person's risk of developing Alzheimer's and other types of cognitive impairment and dementia.

In March 1996, Dr. Riggs and associates published results from a study in *The American Journal of Clinical Nutrition*, that findings indicated that older individuals with low blood concentrations of vitamin B_{12}, B_6, and the B vitamin known as folic acid had the poorest scores of brain function measured by a battery of cognitive tests.[2]

In previous studies, clinical deficiencies of B vitamins have been implicated in brain-related disorders, including reversible dementia (vitamin B_{12} and possibly folate), depression (folate), and electrophysiological dysfunction, including convulsions (vitamin B_6).[3-5] In healthy older adults, blood levels of B vitamins usually considered to be in the normal range were associated with poorer scores on tests of delayed recall, abstract reasoning, and selective attention.[6,7] There is also good

evidence that deficiencies of folic acid and vitamins B_{12} and B_6 increase with age, and are common in older adults.[8,9]

Thus, there is growing support for the premise that optimal B vitamin status can prevent, slow or reverse the deterioration in memory and other mental capacities important to the quality of life of older individuals.

The "Normative Aging" study involved 70 male subjects, aged 54-81 years. It revealed that blood levels of vitamin B_{12} and folic acid appear to be related to cognitive performance in a different manner than vitamin B_6 blood levels. Low blood levels of vitamin B_{12} and folic acid were associated with deficits in spatial copying. Higher blood levels of vitamin B_6 were associated with better performance on two tests of memory.[2]

Another interesting finding was that nearly half of the subjects in this study had low blood levels of vitamin B_6 (<30 umol/L).[2,10] This is extremely important, because B vitamins are known to participate in brain chemistry and physiology. Vitamins B_{12} and folic acid are required as coenzymes in the synthesis of the neurotransmitters serotonin and the catecholamines (adrenaline, norepinephrine). They are also required for the production of S-adenosylme-thionine, which has antidepressant properties.[11-13] Vitamin B_{12} deficiency may also result in de-insulation of nerve fibers (demyelination), which produces a constellation of neurological symptoms.[5] Vitamin B_6 is a cofactor in the production of other brain chemicals (neurotransmitters), including dopamine, norepinephrine, serotonin, GABA, and taurine.[14]

Also, higher blood levels of homocysteine often result from subnormal intakes of folic acid, vitamin B_{12} and vitamin B_6. This is because these vitamins are required to recycle homocysteine to other amino acids such as methionine and cystathionine.[15] High blood levels of homocysteine are associated with increased risk of cardiovascular, cerebrovascular (narrowed arteries in the brain), and peripheral vascular disease (narrowed blood vessels in the arms, hands, legs and feet).[16] Narrowed arteries in the brain (cerebrovascular disease) have been shown to be associated with decrements in psychomotor speed and on tests measuring fluid and visual abilities.[17-21]

Such cognitive dysfunction, therefore, may stem from high levels of homocysteine. As previously stated, vitamins B_6, B_{12} and especially folic acid are key nutrients that prevent and reverse high blood levels of homocysteine.

In the Normative Aging study, subjects with high levels of homocysteine performed, on average, like patients with mild Alzheimer's. They also exhibited difficulty in copying the most complex spatial figures. For example, few subjects in the highest 25th percentile of homocysteine concentrations completed the cube (22 percent) and tapered box (17 percent) figure tests correctly. By comparison, these figures are mastered by 50 percent of school children by the age of 13 years. Subjects with the lowest blood homocysteine levels demonstrated the best results on these tests.[2]

Taken together, the body of evidence continues to support the contention that B vitamin nutritional status is crucial to the development and preservation of mental capacities throughout one's lifetime. The sad reality is that many midlife and older members of society have poor dietary intake and nutritional status of various B vitamins (vitamin B_6, folic acid, etc.). By all counts, it appears

that health practitioners should encourage patients to pay attention to foods that are rich sources of these, and to continue to emphasize the multitude of benefits available from the daily use of a well-formulated multiple vitamin and mineral supplement.

Finally, health practitioners should be aware that other nutritional supplements have also been shown to improve mental faculties and cognition in older subjects. These include huperzine A; CDP-choline; *bacopa monnieri*; dimethylaminoethanol (DMAE); ginkgo biloba; vitamins E and C; phosphatidylserine; and acetyl-L carnitine. Additional information on these brain nutrients and the physiological mechanisms through which they restore and/or preserve mental capacities will be discussed in future articles in this column. As nutrition and supplementation have been shown to influence the development and progression of Alzheimer's disease and age-related cognitive impairment (conditions that are expected to affect many millions of Americans as the Baby-Boomer generation heads into the over-50 age bracket), health practitioners should be well informed as to the evidence-based natural interventions that have been shown to prevent or improve these serious, and increasingly prevalent, threats to one's quality of life.

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