

Diet and Alzheimer's Disease

PHYSICIANS COMMITTEE FOR RESPONSIBLE MEDICINE

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Alzheimer's disease (AD) is a neurodegenerative illness characterized by a gradual decline in memory and other cognitive and behavioral abilities, leading to occupational and social impairment.

The most common form of dementia in the United States, AD has a prevalence of about 8 to 10 percent in individuals aged 65 or older^{1, 2} and is characterized by the presence of neurofibrillary tangles, beta-amyloid plaques, and neuronal loss. These changes lead to a relative reduction of multiple neurotransmitters in specific areas of the brain, such as acetylcholine in the hippocampus. Although the exact cause of AD is unknown, links associated with genetics, lifestyle, and other factors have been found.

Genetics

AD is usually sporadic, but there are familial forms of early-onset disease linked to several genes, including amyloid precursor protein on chromosome 21, presenilin 1 on chromosome 14, and presenilin 2 on chromosome 1. Also, patients with trisomy 21 (Down's Syndrome) and those with increased number of APO E4 alleles on chromosome 19 have higher incidences of AD.

The disease occurs much more frequently at advanced ages. Other possible risk factors include low education level, history of head trauma, female gender, and cardiovascular disease. Aluminum exposure has also been proposed as a potential contributor.

Nutrition Research

Studies have shown that risk for AD is greater in people who consume diets high in cholesterol, saturated fats, and total calories and low in fiber, vegetables, and fruits.^{3,4,5} Such diets seem to play a role in the formation of beta-amyloid plaques and in causing oxidative damage to neurons.^{6,7,8,9} This is also supported by data demonstrating a decreased risk of AD with use of lipid-lowering medications^{10,11} and by preliminary findings in one study, which showed an increased incidence in dementia in heavy meat eaters compared with vegetarians.¹²

At the Ninth Annual Conference on Alzheimer's Disease and Related Disorders, Harvard researchers discussed the role that fruits and vegetables may play in AD. Jae Hee Kang, Sc.D., and colleagues evaluated approximately 13,000 participants in the Nurses Health Study. They calculated the women's intake of fruits and vegetables between 1984 and 1995 and correlated these values with performance on tests

of cognitive function conducted between 1995 and 2003, when the women were in their 70s. Women with the highest consumption of green leafy vegetables and cruciferous vegetables—both high in folate and antioxidants such as carotenoids and vitamin C—declined less than women who ate little of these vegetables.¹³

Increased homocysteine levels appear to be an independent risk factor for AD, in addition to being a risk factor for CNS vascular disease (another common cause of dementia).^{14,15} Although inherited forms exist, acquired hyperhomocysteinemia is usually the result of low levels of vitamin B12, vitamin B6, and folate, which are necessary for its metabolism. Good sources of folate include legumes, orange juice, asparagus, walnuts, and green leafy vegetables, such as spinach. Sources of B6 include whole grains, soy foods, peanuts, walnuts, bananas, and avocados. B12 is usually found in animal products; however, healthier alternatives include fortified cereals and soymilks or a multivitamin supplement.

Limiting total energy intake may also be of benefit. For example, certain populations in China and Japan have low average daily caloric intakes (1,600 to 2,000 cal/day) and lower incidence of AD compared to people in the United States and Western Europe (typically greater than 2,000 cal/day).¹⁶ A 2002 study of elderly Americans followed for a mean of four years found that, compared to those consuming the fewest calories, those consuming the most had an increased risk for AD.¹⁷

HRT Fails the Test

It was once thought that hormones administered after menopause would improve cognitive function, but studies have found otherwise. Researchers randomly assigned 120 patients with mild to moderate Alzheimer's disease to take low-dose estrogen, high-dose estrogen, or a placebo for 12 months. There was no significant difference in functional and cognitive outcomes in those who received estrogens and those who did not.¹⁸

The Archives of Neurology reported similar findings. Researchers administered equine estrogens to 120 women with AD for one year, but found no improvements in general cognition, memory, attention, or other measurements.¹⁹

Seeking Medical Attention

AD is definitively diagnosed by autopsy or brain biopsy revealing the pathologic hallmarks described earlier.

However, a probable diagnosis can be made based on the presence of some or all of the following clinical features:

- Gradual decline in memory (especially recent memory).
- Language difficulties ranging from naming impairment to mutism.
- Deficits in visual and motor spatial skills (i.e. impaired driving or dressing).
- Difficulty with executive functioning (i.e. judgment, reasoning, ability to plan and execute).
- Psychiatric and personality changes (i.e. paranoia, delusions, depression, visual hallucinations).

Caring for the Entire Family

As there may be some genetic susceptibility to developing AD, patients' family members may have a higher risk for developing the disease. In order to minimize this risk, they should also be encouraged to follow a diet low in fat and cholesterol and high in vitamins and antioxidants, as described above. Also, patients and their caregivers should be referred to the Alzheimer's Association (www.alz.org) for listings of support groups in their areas.

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