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CDC BRAIN HEALTH INITIATIVE FOCUSES ON COGNITIVE RESEARCH

By NANCY ALDRICH

Anyone who has not yet heeded the public health message to get off the couch needs to know that there is another good reason to listen to the experts. Reducing cardiovascular risk factors and staying physically active may help preserve people's minds as well as their bodies. Furthermore, there may be other things they can do to preserve their cognitive health.

For years, people believed that a decline in mental abilities was an inevitable part of aging. That view is now proving to be incorrect. A reexamination of available research is focusing public health attention on lifestyle changes to help maintain cognitive performance. Although much more research is needed in this area, the good news is that such brain-healthy behaviors as controlling weight and blood pressure, staying physically active and being involved in the community are lifestyle changes that many people are already adopting for their physical and emotional health. "All the things that we know are bad for your heart turn out to be bad for your brain," said Marilyn S. Albert, director of the Division of Cognitive Neuroscience at Johns Hopkins University School of Medicine.

COGNITIVE HEALTH

Because there is no uniform definition of cognitive health, researchers are still struggling to describe all of its aspects. A recent literature review by the Cognitive and Emotional Health Project (CEHP), an initiative involving researchers from the National Institutes of Health (NIH) and several universities, used a positive approach to defining cognitive health. "We said cognitive health shouldn't just be the absence of disease, but rather the development and preservation of a multidimensional cognitive structure," said Hugh C. Hendrie, who chairs the CEHP Critical Analysis Committee.

"That structure allows elderly people to maintain social connectedness, an ongoing sense of purpose, and the ability to function independently and to permit functional recovery," explained Hendrie, a psychiatry professor at the Indiana University Center for Aging Research. The CEHP team published its review in *Alzheimer's and Dementia: The Journal of the Alzheimer's Association* (January 2006).

Cognitive impairment involves problems with memory, understanding or using words, and identifying objects. Cognitive decline can range from the normal changes associated with the aging brain, to mild cognitive impairment, to dementia. These are different conditions, not necessarily a progression of one disease. Many people retain their cognitive capabilities into very old age. Some age-related cognitive decline—slower information processing and mild memory impairment, for example—does occur.

Interestingly, autopsy examinations of older people who were not demented sometimes show brain pathology similar to Alzheimer's or other dementias. Why the same microscopic brain changes affect some people less than others is not yet understood. Some researchers believe that there is a cognitive reserve related to higher education, literacy, or involvement in social and leisure activities. For example, N. Scarmeas reported in the September 2004 issue of *Current Neurology and Neuroscience Reports* that this reserve appears to protect people against cognitive decline despite pathological changes associated with dementia. However, Albert noted it is also possible that education levels are tied to the fact that

mental stimulation is likely to be higher among people with more education. Therefore, staying mentally active throughout life may be a more important factor than being well educated.

Research by the National Institute on Aging indicated that more than 10 reversible conditions can cause or mimic cognitive impairment. These conditions are related to emotional distress, physical illness, medications, nutrition deficiencies, social and cultural restraints, or alcohol abuse. Some of these conditions can be treated.

MAINTAINING COGNITIVE HEALTH

“There is growing evidence that high blood pressure and diabetes are important factors that appear to increase the risk of later developing dementing disease. In addition, it appears that other related factors like inactivity (both physical and social), high cholesterol, and perhaps smoking may contribute to this risk as well,” explained David Thurman, a physician with the Centers for Disease Control and Prevention’s Health Care and Aging Studies Branch, Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion. Researchers also give credence to the importance of socialization and staying involved in the community, although more research is needed in that area.

“There is a great deal of evidence suggesting that physical activity and social engagement play a big role, along with diet as it relates to cardiovascular risk,” said James N. Laditka, director of research at the University of South Carolina Office for the Study of Aging. Those are the key elements of a draft of the Cognitive and Emotional Health Project review, which was presented at the June 2005 International Conference on Prevention of Dementia, sponsored by the Alzheimer’s Association, Laditka said.

There is also a “lot of evidence that risk factors that are involved in heart disease seem also to be the risk factors for cognitive decline,” said Hendrie of Indiana University. “So hypertension increases the probability of cognitive decline, and treatment of hypertension protects against getting cognitive decline.”

Hendrie suggested, “Of all the lifestyle factors that were analyzed in our review, perhaps the strongest evidence identified physical activity as a protective factor against cognitive decline.” But other scientists say that not enough data have been gathered at this point to make a definitive link.

The studies reviewed by CEHP also indicate a possible interaction between depression and psychosocial factors in cognitive decline, Hendrie said. Preventing or mitigating depression and stress through emotional supports or social networks seems to be protective against cognitive decline. He cautioned, however, “You could follow a healthy lifestyle and still get cognitive decline.”

Beyond consuming a diet that protects the heart—and possibly the brain—the link between good nutrition and cognition is so complex that no firm conclusions can be drawn in this area, scientists indicate. “Generally,” Laditka said, “a lifestyle and diet that promote heart health is probably the best that we can say about nutrition links.”

PUBLIC HEALTH’S ROLE

“This is a very good time for public health to start getting involved” in cognitive health, Thurman stated. “We are developing an increasing understanding of risk factors associated with some of these conditions that impair cognition, and we have a better understanding now of the magnitude of the problem,” especially with the aging of the boomer generation. “Equally important, there is growing evidence that there are opportunities for prevention,” he said.

“We are beginning to take the next steps, building on the research coming out of NIH and others, and moving what we know out into community practice. This is where we can make a difference in the everyday lives of Americans,” said Lynda A. Anderson, chief for the Health Care and Aging Studies Branch of the Centers for Disease Control and Prevention (CDC).

According to Laditka, “There is increasing evidence that the risk we typically think of in terms of heart disease and vascular risk factors that affect the blood vessels may in fact be risk factors for a deterioration of cognitive function, and maybe even for the brain diseases that are most commonly known—Alzheimer’s and vascular dementias.” He added, “It appears very strongly that lifestyle does make a difference.”

Researchers also can point to animal studies that identify the mechanisms by which lifestyle choices affect brain health. Animal studies, usually with mice, involve a controlled diet, an exercise schedule and stimulating activities.

MOTIVATING BOOMERS

What can be done to motivate the boomers to reduce their risk for cardiovascular disease, engage in regular physical activity and stay socially active? Clearly, these public health messages are not new, yet many people do not heed them. The American Society on Aging’s online health promotion module, *Live*

Well, Live Long, states, “Given the projected increase in the number of older adults in the coming years, and that 88% of adults age 65 or older have at least one chronic condition, physical inactivity is a public health issue, not just a personal problem.” This website (www.asaging.org/cdc/index.cfm), developed with CDC to educate professionals in aging about cognitive vitality, depression and other components of brain health, notes that by age 75, one in two women and one in three men get no physical activity at all.

The necessary frequency, intensity and duration of physical activity that may improve cognitive health are not entirely clear. However, cognitive functioning has been enhanced with aerobic activities, such as walking or bicycling, or a combination of aerobic and strength-training activities.

David Brown, senior behavioral scientist with CDC’s Division of Nutrition and Physical Activity, observed that public health programs can help older adults maintain physical activity by providing them with a variety of physical activity options to accommodate a wide range of interests and needs, helping them gain confidence in their ability to increase their physical activity and assisting them with safety concerns. He emphasized, “Such activities will need to be supported by community efforts to implement evidenced-based interventions that have effectively increased physical activity.”

Communities, Brown said, can conduct public-awareness campaigns, create or improve access to places for physical activity, and provide social support for physical activity within community settings. Furthermore, he said, strategies for individual behavior change should provide people with feedback and reinforcement about their approaches to physical activity.

Boomers also may be better motivated to maintain their health because they have active retirement plans or want to move into second or third careers. William Thies, vice president of medical and scientific affairs for the Alzheimer’s Association, stressed, “The only way you are going to be able to achieve these goals is if you maintain your cognitive health, and one of the great threats that is out there to this generation is that many of them will live long enough to be at risk for Alzheimer’s disease.” ♦

Nancy Aldrich is the editor of Aging Opportunities News, Silver Spring, Md. She wrote this article as part of the American Society on Aging’s Media Project with the Centers for Disease Control and Prevention. William F. Benson was the project manager and senior editor. A longer version of the piece, including a useful list of contacts and resources, is available at www.asaging.org/media/cdc.cfm.

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THE STATES OF AGING BRAINS

What distinguishes normal cognitive decline from mild impairment or dementia?

Scientists attribute the normal cognitive decline that comes with age to a decrease in brain size and changes in the way that neurons (nerve cells) function. This decline is not considered dementia and does not interfere with a person's ability to perform activities of daily living or to maintain social connections. Many older adults adapt or develop ways to compensate for these slight losses, thus maintaining their ability to function reasonably well in their daily routines and social lives.

Most studies suggest that some cognitive decline occurring in elders is specific to particular parts of the cognitive process, said Hugh C. Hendrie of the Indiana University Center for Aging Research. "Some parts of cognition, such as language, are left quite intact, while other parts, such as the ability to recall a list of words, decline a little bit, even in healthy elders," he noted. "In some areas of cognitive function, there is no difference at all between the old and young."

MILD IMPAIRMENT

Some people develop further cognitive and memory problems, called mild cognitive impairment (MCI), as neurons die. Those with MCI—which is three to four times more prevalent than Alzheimer's disease—have greater memory impairment for their age than their peers, yet certain skills, such as language, reasoning, problem solving and driving, may still be essentially intact. MCI does not interfere with elders' ability to perform daily activities, but may result in difficulties with such tasks as balancing a checkbook, organizing activities or making decisions. According to Hendrie, sequential neuropsychological testing can help determine whether a person has MCI: Those with MCI will show cognitive decline over time.

Although not all people with MCI also develop dementia, those who have this condition do have a higher risk for dementia than other adults. One study found that approximately 40% of people over age 65 who were diagnosed with mild cognitive impairment developed dementia within three years.

It is not until many nerve cells die that a person develops dementia. Not a single disease, dementia encompasses numerous brain disorders that affect intellectual and social function and interfere with activities of daily living. A diagnosis of dementia generally centers on the loss of two or more brain functions, such as memory, language, perception, reasoning or judgment.

Reversible causes of dementia include an accumulation of cerebrospinal fluid in the brain (normal-pressure hydrocephalus), thyroid dysfunction and certain vitamin deficiencies. Depression in older people can mimic cognitive decline. The Alzheimer's Association estimates that 4.5 million Americans have Alzheimer's disease and, based on census population projections, predicts that the number will reach 12 million to 16 million by 2050.

A 2004 report analyzing Medicare claims data, prepared by the Lewin Group for the Alzheimer's Association, showed that people with Alzheimer's account for 34% of Medicare spending, even though they constitute less than 13% of the population ages 65 and older. ❖

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RESEARCH HIGHLIGHTS

Following are some highlights from recent research about brain health in older adults:

- **Promoting active lifestyles that include walking** can protect cognitive function, according to a study by R. Abbott and research by J. Weuve published in the *Journal of the American Medical Association (JAMA)*, Sept. 22/29, 2004.
- **Obesity** may be associated with risk of Alzheimer's or other dementias (M. Kivipelto, *Archives of Neurology*, October 2005).
- **Social engagement** is tied to a reduction in cognitive decline, according to the Chicago Health and Aging Project, which is funded by the National Institute on Aging.
- **Higher household and community socioeconomic levels in early life** are associated with higher level of cognition in late life but not with risk of Alzheimer's or rate of cognitive decline, according to articles by R. S. Wilson published in *Experimental Aging Research*, October 2005, and *Neuroepidemiology*, June 2005.
- **A memory training program** called Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) was found in a clinical trial to have sustained benefits for at least five years (F. W. Unverzagt and coauthors, *JAMA*, Dec. 20, 2006).
- **Smoking significantly increases the risk** of mental decline and dementia, according to several recent studies, says a report from the National Institute of Neurological Disorders and Stroke. Smoking increases the risk for atherosclerosis (the buildup of plaque in arteries) and other forms of vascular disease, which may be related to increased risk for dementia. ❖

—Nancy Aldrich