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How and Why Sex Differences Affect Your Health

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The Brain and Degenerative Diseases

Women and men think differently. There is nothing new or earth-shattering about that statement, but research has shown in recent years that the differences go beyond socialization and hormones. There are structural, biological variations between the brains of women and men that account for many differences. We can see them in everyday life, from how men and women relate to driving directions to the degree to which each sex remembers people’s faces.

This section provides an overview of sex differences in the brain, from how we relate to the world to degenerative brain disorders. Research is rapidly revealing the brain’s secrets, but we continue to have many more questions than answers about how the brain functions and the root causes of its disturbances and deteriorations.

Why Your Sex Matters

Structural Differences in the Brain

Basic scientific research indicates that males may have more neurons than females in the cerebral cortex, the gray matter that covers the majority of the brain’s surface. Although women have fewer neurons in the cerebral cortex, certain anatomical characteristics of female brains may allow for more connections among nerve cells. In addition, women generally have more gray matter overall. Men generally have more white matter (which transfers information between distant regions). This provides weight to the argument that women and men have equal intellectual capacities, although their brains may go about accomplishing tasks in different ways.

There is an emerging consensus among researchers that human evolution has created two different types of brains designed for equal intellectual performance. By pinpointing the respective intelligence centers of women’s and men’s brains, researchers have not only quashed questions...
about intelligence disparities, but are making discoveries that may aid research on dementia and other cognitive impairment diseases of the brain. Such discoveries might help explain why boys are more prone to mental retardation and learning problems than are girls. Some of the theories being explored are that male fetuses require maintenance of more nerve cells in the cerebral cortex than do female fetuses, or that early damage to the male developing brain can result in higher losses of needed neurons.

As the brain ages, the amount of tissue mass declines and the amount of fluid increases. This effect is less severe in women than it is in men, suggesting that women are somewhat less vulnerable to age-related changes in mental abilities. However, women are more prone to dementia than men. We do not yet know the reasons for these sex differences, but one theory is connected to the gray-white matter balance described above. Men have more neurons in the brain than women, but women’s fewer neurons handle a larger number of connections, so any time a woman loses a single neuron, she loses more connections than would a man who loses a single neuron. Dementia is discussed more later in this chapter.

Language Differences

Although men and women have been shown to process some language tasks similarly, there are significant sex differences in other aspects of language processing that scientists are beginning to explore more fully. For example, imaging studies of the living brain indicate that neurons on both sides of the brain in women may be activated when they are listening, while neurons on only one side of men’s brains may be activated. Men and women appear to process single words similarly, but in the interpretation of whole sentences, women use both sides of the brain while men use only one side. Additional research is needed to confirm this finding and determine what it means for how women and men use language.

Spatial Information Differences

Men and women process spatial information differently. For example, women appear to rely on landmarks to navigate their environment, whereas men tend to use compass directions.

In an imaging study, men were found to activate a distributed system of different brain regions on both sides of the brain while performing a spatial task. Women, however, activated these regions only on the right side of the brain.
Memory Differences

Some functions of memory appear to be different in males and females. Higher rates of blood flow in certain portions of the brain are associated with increased memory of verbal tasks in women, but not in men. Compared to men, women have been shown to be better at remembering faces.

The differences outlined here are useful for understanding and recognizing that conflicts between the sexes—between partners or spouses and among friends and siblings—are often not the result of intentional antagonism, but the fruit of basic biology. When women complain that men do not listen appropriately or do not remember certain things, a lack of concern or lack of interest may not be the culprit. The same could be said of a man’s frustration, whether real or imagined, over a woman’s driving habits. At a physical level, the brains of women and men are wired differently. While understanding these differences may not eliminate certain problems, it can foster more patience and acceptance.

What Are Degenerative Brain Disorders?

As some people age, it is normal to experience minor declines in memory and the ability to learn new and complex information. Major changes are not normal, however, and are often the sign of a degenerative condition that needs immediate medical attention.

Because women generally live longer than men, degenerative brain disorders—which typically strike later in life—are of serious concern to them. A recent major study, part of the Women’s Health Initiative (WHI) and reported in the Journal of the American Medical Association in 2003, showed that women age 65 and older taking combination hormone therapy (estrogen plus progestin) had twice the rate of dementia than women who did not take the medication. An estrogen–only phase of the WHI was stopped in June 2004 when data showed that women on estrogen-only therapy also had a slightly greater dementia risk. The WHI results indicate combination hormone therapy could cause an additional twenty-three cases of dementia per 10,000 women per year, while estrogen-only hormone therapy could trigger an additional twelve cases. The increase of dementia cases by estrogen-only therapy was not statistically significant, but even a small increase is cause for concern when evaluating a treatment being used to prevent disease in otherwise healthy individuals. Also, a European study has shown women who are obese throughout life are more likely to lose brain tissue, which is one of the first indications that a person will develop dementia. For these
reasons, women should monitor their health closely and discuss any concerns with their health care providers.

What Is Dementia?

Dementia is used to describe a decline in brain function. Changes in memory, personality, or behavior are frequent signs of dementia. Dementia makes it hard for a person to perform routine, daily tasks. A person with dementia may ask the same questions repeatedly or get lost in familiar places. This person often cannot follow directions; is disoriented about time, people, or places; and may neglect personal safety, hygiene, or nutrition.

Dementia is not a normal part of aging, and some forms of dementia can be improved with treatment. Some treatable conditions can cause dementia, including high fever, dehydration, vitamin deficiency, poor nutrition, bad reactions to medicines, thyroid problems, or a minor head injury. These conditions are serious and should be treated by a doctor as soon as possible. Sometimes dementia gets worse and cannot be cured.

Several disorders, including Huntington’s disease and Parkinson’s disease, are linked to dementia. The two most common causes of dementia are discussed below. Any persistent changes in memory, personality, or behavior should be checked out by a physician.

What Is Alzheimer’s Disease?

Alzheimer’s disease is the most common cause of dementia. There is currently no cure. Nearly half of all people over age 85 are estimated to have Alzheimer’s disease, and 10 percent over age 65 have it. It is the eighth leading cause of death for women in the United States, and several studies have shown that women are at higher risk for developing the disease than men.

Forgetfulness is a common first sign of Alzheimer’s. As the disease progresses, language, reasoning, and comprehension are affected, eventually to the point where people cannot take care of themselves. Individuals live an average of eight years after the onset of symptoms, but some live as long as 20 years or more.

The cause of Alzheimer’s is unknown, but the disease involves the development of plaques and tangles in the brain’s gray matter that interrupt the transmission of information within the brain. As a result, nerve cells in the brain eventually die, triggering the loss of functionality. The damage to the brain from Alzheimer’s appears to be more severe in women. However,
men with the disease have a higher risk of mortality related to the disease itself, such as the severity of dementia and episodes of delirium. Death among women with Alzheimer’s is often connected to malnutrition and the inability to perform the tasks of daily living.

**DIAGNOSIS**

Right now, Alzheimer’s can only be diagnosed definitively by examining the brain after death. Doctors can make a probable diagnosis of the disease, however, that is roughly 90 percent accurate, according to the National Institute on Aging.

**TREATMENT**

There are some drugs available to improve the brain’s functioning, but there is no evidence that they can slow the underlying progression of the disease. No prevention for the disease exists, but the Alzheimer’s Association recommends that people stay as physically and mentally active as possible.

Developing new treatments for Alzheimer’s disease is an active area of research, according to the National Institutes of Health. Scientists are testing a number of drugs to see if they prevent Alzheimer’s disease, slow the disease, or help reduce behavioral symptoms.

Medicines already used to help reduce the risk of heart disease may help lower the chances of developing Alzheimer’s disease as well or may slow its progression. Clinical trials of drugs known as statins, which lower cholesterol, have begun to determine if they might help slow down the progression of Alzheimer’s.

In other studies, scientists are tracking the health of Alzheimer’s patients to see if they exhibit any signs or conditions distinct from the general population that may give clues to the origins and progression of the disease. For example, research has shown that people with Alzheimer’s often have higher levels of the amino acid, homocysteine, in their blood. Folic acid and vitamins B6 and B12 can reduce levels of homocysteine in the blood, and scientists are looking to see whether these substances can also slow rates of mental decline.

**WHAT IS VASCULAR DEMENTIA?**

Vascular dementia, the second most common type of dementia after Alzheimer’s, occurs when the arteries that supply blood to the brain narrow or become blocked. Symptoms can strike quickly, often following a
stroke, but they also can develop gradually. These symptoms are similar to those of other forms of dementia, described above, making them hard to distinguish from signs of Alzheimer’s.

Risk factors for vascular dementia center on:

- advanced age (over age 65),
- high blood pressure (hypertension),
- heart disease, and
- diabetes.

Smoking, being overweight, having elevated cholesterol levels, and having a family history of heart problems can also increase your risk for stroke, which is a primary trigger of vascular dementia. Small or mini-strokes, which often go undetected, are a frequent cause of vascular dementia. The effect of these small strokes can very slight, but they can worsen over time. As more blood vessels in the brain are blocked, the mental decline associated with dementia can increase. Temporary loss of vision, speech, or strength or brief episodes of numbness are warning signs of small strokes and should be taken seriously.

Vascular dementia can affect an individual’s thinking, language, walking, bladder control, and vision. It commonly begins between ages 60 and 75 and affects men more often than women. Because they live longer, however, women need to be aware of the warning signs of vascular dementia as they age; some aspects of dementia can be prevented with appropriate medical treatment, such as reducing high blood pressure.

What Is Parkinson’s Disease?

Parkinson’s disease is the second most common degenerative brain disease after Alzheimer’s. Parkinson’s is a chronic, progressive disease that results from the death or injury of nerve cells (substantia nigra) in the midbrain. These cells allow the brain to communicate with itself and coordinate the body’s movement; without them, the body’s movement becomes somewhat unregulated.

As with other degenerative diseases, Parkinson’s symptoms can sometimes be mistaken as common signs of aging. There are four key symptoms of Parkinson’s:

- tremors (shaking of a leg or arm when it is at rest);
- slowed physical movement;
- stiffness or rigidity in the arms, legs, or trunk; and
- poor balance.
When two of these symptoms are present at the same time, especially if they occur more prominently on one side of the body than the other, Parkinson’s is the likely diagnosis. Initial symptoms are usually mild and begin on one side of the body and can spread to the other side of the body over time.

RISK FACTORS

There is a family history of Parkinson disease in 5–10 percent of patients. At any age, men are 1.5 times more likely than women to get Parkinson’s disease. It is not clear why men are affected more often, but some researchers believe men are exposed to environmental toxins more frequently that can trigger the disease.

TREATMENT AND MANAGEMENT

The progression of the disease varies from patient to patient. As symptoms worsen, patients often have trouble with routine tasks because of tremors and reduced mobility. As symptoms progress, it is important for patients to talk with their physicians, so that optimal treatment can be established. According to the National Parkinson’s Foundation, “the goal of treatment is not to abolish symptoms, but rather to help the patient manage their symptoms, function independently, and make the appropriate adjustments to a chronic illness. The illness will not go away, but management of its symptoms can be successful in reducing disability or other handicap.”

Although Parkinson’s affects more men, the gender gap may close in the future. Environmental exposures, such as exposure to pesticides, have been linked to Parkinson’s disease. Women now work in a wider variety of professions than ever—military service, for example—and their environmental exposure more closely parallels men’s exposure than it has in the past.

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