

# *Alzheimer's Disease: An Overview*

*1.5 Contact Hours*

*Presented by:*

***CEU Professor***<sup>®</sup>

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# **Alzheimer's Disease: An Overview**

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## **Objectives:**

At the completion of this course, the learner will be able to:

1. Define Alzheimer's disease and articulate its relation to dementia.
2. Describe the possible causes and risk factors for Alzheimer's disease.
3. List the procedures involved in competently diagnosing Alzheimer's disease.
4. Summarize the symptoms associated with each progressive stage of Alzheimer's disease.
5. Differentiate between treatments for cognitive and behavioral symptoms of Alzheimer's disease.

## ***Introduction***

Known by many as “the long goodbye,” Alzheimer's disease is increasing at an alarming rate in the United States. An estimated 5 million people in the US are now living with Alzheimer's, and someone is diagnosed with the disease every 72 seconds. Most individuals with Alzheimer's are age 65 or older, but at least 200,000 people under the age of 65 are also living with an early-onset form of the disease. By the year 2030, the number of individuals with Alzheimer's disease could approach 8 million; if scientists cannot find a way to cure or prevent Alzheimer's, this number could range between 11 million and 16 million by the year 2050.

Alzheimer's disease is costly and devastating in multiple ways. Not only does it rob the person affected by Alzheimer's of cognitive and behavioral abilities; it also steals physical and emotional strengths from the person's caregiver. Alzheimer's disease

creates direct and indirect costs to Medicare, Medicaid, and private businesses that total \$148 billion annually; the disease also creates out-of-pocket costs for families that exceed costs associated with all other major health problems.

Because of the multidimensional toll that Alzheimer's disease takes on individuals and families, it is important for health care professionals to thoroughly understand the nature of the disease, its possible causes and risk factors, how it is diagnosed, how it progresses over time, and what treatments are available. The aim of this course is to address all of these areas in such a way that health care professionals are sensitized to the gravity of Alzheimer's and are prepared to provide competent and compassionate services to those who are affected by the disease.

### ***What is Alzheimer's Disease?***

Alzheimer's disease is a progressive, degenerative disease of the brain that results in dementia. While the terms *Alzheimer's* and *dementia* are often used interchangeably, there is a distinct difference between them. Dementia is a broader term than Alzheimer's and refers to any brain syndrome resulting in problems in several areas:

- Memory (short- and/or long-term)
- Orientation (being aware of person, place, and time)
- Judgment (can be affected in one or more areas, such as financial, personal, or social)
- Language (communicating verbally, non-verbally, and/or through the written word)
- Executive Functioning (the ability to perform familiar tasks)

Alzheimer's disease is the most common form of dementia – in fact, almost two-thirds of dementia cases are due to Alzheimer's. However, many other diseases can cause dementia, such as stroke and other vascular problems, Parkinson's disease, Huntington's disease, Creutzfeldt-Jakob disease, and Wernicke-Korsakoff syndrome. Oftentimes, individuals are diagnosed with mixed dementia, which means that more than one disease process is creating the mosaic of symptoms indicative of dementia.

Sometimes symptoms that appear to be due to Alzheimer's or another dementia are actually due to reversible medical conditions. For example, depression in older adults can resemble Alzheimer's, as can nutritional deficiencies, drug interactions, urinary tract infections, or thyroid problems. These conditions are not types of dementia, but rather reversible problems that mimic Alzheimer's disease and other dementias.

### ***What Causes Alzheimer's Disease?***

Scientists are still trying to determine the exact cause or causes of Alzheimer's disease. In the meantime, it is helpful to understand the hallmarks of Alzheimer's – plaques and tangles – and the myriad risk factors that affect a person's likelihood of developing the disease.

#### Plaques and Tangles

Every person with Alzheimer's disease has a build-up of proteins in the brain. This build-up manifests in two ways:

- *Plaques* – deposits of the protein *beta-amyloid* that accumulate in the spaces between nerve cells
- *Tangles* – deposits of the protein *tau* that accumulate inside of nerve cells

Scientists are still investigating how plaques and tangles are related to Alzheimer's disease. One theory is that they interfere with nerve cells' ability to communicate with each other and, therefore, the cells cannot facilitate necessary processes for survival.

Autopsies have shown that most people develop some plaques and tangles as they age, but people with Alzheimer's develop far more than those who do not develop the disease. Additionally, plaques and tangles in individuals with Alzheimer's tend to develop in a predictable pattern, affecting parts of the brain that control memory before proliferating to other areas.

Even though plaques and tangles are hallmarks of Alzheimer's disease, scientists still do not know why some people develop an abundance of them compared to others. However, several risk factors for Alzheimer's disease have been uncovered.

### Age

Advancing age is the number one risk factor for developing Alzheimer's disease. One out of eight people over the age of 65 has Alzheimer's disease, and almost one out of every two people over the age of 85 has Alzheimer's. The probability of being diagnosed with Alzheimer's nearly doubles every five years after age 65.

### Family History

People who have a parent or sibling that developed Alzheimer's disease are two to three times more likely to develop the disease than those with no family history of Alzheimer's. If more than one close relative has been affected, the risk increases even more. Scientists have identified two kinds of genes that could explain this familial risk factor. The first kind is thought to be a "risk gene" that increases the likelihood of

developing Alzheimer's, but does not guarantee it. In addition to APOE-e4, scientists think there could be up to a dozen more risk genes yet to be discovered.

The second kind of gene is a "deterministic gene" and is much rarer than risk genes. Deterministic genes are only found in a few hundred extended families around the world; if a deterministic gene is inherited, the person will undoubtedly develop Alzheimer's, probably at a much earlier age.

### Lifestyle Factors

Although age and family history are out of our control, scientists have also identified several lifestyle factors that can influence a person's risk of developing Alzheimer's disease. A significant connection has been found between serious head injury and future development of Alzheimer's, so those who practice safety measures such as wearing seat belts, wearing helmets, and not engaging in activities where there is a high risk of falling are at an advantage.

Evidence is also mounting for the promotion of exercise and a healthy diet as ways of reducing Alzheimer's risk. Avoiding tobacco, limiting alcohol consumption, staying socially active, and engaging in intellectually stimulating activities have also been shown to have a protective effect against Alzheimer's disease and other dementias. Finally, a strong link has been discovered between heart health and brain health. Those who are free of heart disease or related conditions are at a lower risk of developing Alzheimer's than those who have cardiovascular problems.

### *How Alzheimer's Disease is Diagnosed*

There is no singular test that can prove a person has Alzheimer's disease, although imaging technology is rapidly becoming more powerful and precise. Still, a comprehensive, competent diagnostic workup by a skilled physician can pinpoint the cause of Alzheimer's-like symptoms with over 90 percent accuracy. Likewise, there is no particular kind of physician that specializes in Alzheimer's disease. Many people first seek help from their primary care physician, who may oversee the total diagnostic process or refer the individual to a specialist such as a neurologist, psychiatrist, or neuropsychologist. A proper diagnostic workup should include the following:

- Medical history
- Medication history (including current prescriptions)
- Mood evaluation
- Mental status exam
- Complete physical exam
- Appropriate laboratory tests (varies according to individual)
- Neurological exam
- Imaging procedures (varies according to individual)

The physician's goal is to explore every possible cause for the symptoms and to address any cause that is reversible or treatable. If a cause is not reversible or treatable, then the goal is to help the individual manage the symptoms through medical or non-medical interventions.

## *The Stages of Alzheimer's Disease*

Although each person with Alzheimer's disease is different, most individuals affected by Alzheimer's progress through a series of stages. Each stage is characterized by greater impairment and heightened behavioral issues. The following seven stages were developed by researchers and physicians to describe how a person's functioning changes over time, from a normally functioning adult to someone with severe, advanced Alzheimer's disease.

### Stage 1

In the first stage, the individual is not experiencing any problems with memory, orientation, language, judgment, or executive functioning. The person is a normally functioning adult.

### Stage 2

In the second stage, the individual might feel that he or she is experiencing some lapses in memory or some other cognitive problems; however, neither family nor friends are able to detect any changes in the individual. A medical exam would not reveal any problems either.

### Stage 3

In the third stage, family members and friends are able to recognize some mild changes in the person's memory, communication patterns, or behavior. A visit to the doctor might result in a diagnosis of early-stage Alzheimer's disease (when communicating with family members, physicians often consolidate the seven stages into early/middle/late or mild/moderate/severe). Common symptoms in this stage include:

- Problems producing people's names or the right words for objects

- Noticeable difficulty functioning in employment or social settings
- Forgetting material that has just been read
- Misplacing important objects with increasing frequency
- Decrease in planning or organizational skills

#### Stage 4

In the fourth stage, cognitive decline is more evident. The person may become more forgetful of recent events or about his or her own personal background. Other problems include impaired mathematical ability and a diminished ability to plan or execute complex tasks (e.g., throwing a party, managing finances). The person also is more prone to moodiness and social withdrawal.

#### Stage 5

In the fifth stage, the individual requires some assistance with daily tasks. Problems with memory and thinking are quite noticeable, and the person might exhibit symptoms such as:

- An inability to recall one's own contact information or key details about one's history (e.g., one's hometown or alma mater)
- Disorientation to time and/or place
- Decreased judgment and skills in regard to personal care (e.g., dressing, grooming)

Even though symptoms are worsening, people in this stage are usually still oriented to person (i.e., they know their own name and those of key family members) and can eat and use the bathroom without assistance.

## Stage 6

The sixth stage is often the most difficult for caregivers because it is characterized by personality and behavior changes. In addition, the person's memory continues to decline, and assistance is required for most daily activities. The most common symptoms associated with this stage include:

- Reduced awareness of one's surroundings and of recent events
- Problems recognizing one's spouse and other close family members (although faces are still distinguished between familiar and unfamiliar)
- Sundowning (i.e., increased restlessness and agitation in the late afternoon and evening)
- Difficulty using the bathroom independently
- Incontinence of bowel and bladder
- Suspiciousness (e.g., accusing one's spouse of having an affair)
- Repetitive behavior (verbal and/or nonverbal)
- Wandering

## Stage 7

In the seventh and final stage, individuals can no longer respond to their surrounding environment. They may be able to speak words or short phrases, but communication is extremely limited. Basic functions begin to shut down, such as motor coordination and the ability to swallow. Total care is required around the clock.

The average life expectancy of a person with Alzheimer's disease is eight years after the onset of symptoms, although life expectancy can range from three to twenty years depending on the age of onset and concurrent medical conditions. If an individual

with Alzheimer's does not die of a medical complication such as pneumonia or the flu, the person will die of Alzheimer's when all bodily systems fail.

### ***Treatments Available for Alzheimer's Disease***

Although there is currently no way to cure Alzheimer's or stop its progression, researchers are making encouraging advances in developing medications designed to halt Alzheimer's disease in its tracks. In the meantime, other medications and non-pharmacological treatments can promote symptom management. When physicians develop treatment plans, they often consider cognitive and behavioral symptoms separately.

#### **Cognitive Symptoms**

Cognitive symptoms include problems with thought processes such as memory, language, judgment, and orientation. Two kinds of medications have been approved by the U.S. Food and Drug Administration (FDA) for treatment of cognitive symptoms of Alzheimer's disease:

- *Cholinesterase inhibitors* increase the levels of *acetylcholine* in the brain, which plays a key role in memory and learning. Use of a cholinesterase inhibitor postpones the worsening of symptoms for 6-12 months in about half of the people who take it. The cholinesterase inhibitors most commonly prescribed for mild to moderate Alzheimer's disease include donepezil (Aricept®), rivastigmine (Exelon®), and galantamine (Razadyne®).

- Memantine (Namenda®) regulates *glutamate* in the brain, which plays a key role in the processing of information. This drug is used to treat moderate to severe Alzheimer's disease and may delay the worsening of symptoms in some people.

### Behavioral Symptoms

Behavioral symptoms – often the most challenging for caregivers – can include agitation, aggression, suspiciousness, delusions (i.e., false beliefs) hallucinations (i.e., false perceptions of sight, hearing, taste, touch, or smell), wandering, sundowning, sleep disturbances, and repetition. Although caregivers often take personally the behaviors exhibited toward them, it is important to remember that behavioral symptoms are just as much a result of damage to brain cells as are cognitive symptoms.

Sometimes, medications are useful in the management of behavioral symptoms. For instance, anti-anxiety medications have been used to treat agitation and aggression, while anti-psychotic medications have been used to address delusions and hallucinations. However, the risk of drug reactions and/or interactions runs high among older adults with Alzheimer's disease, so caution should be used when prescribing medications to deal with behavioral issues. A combination of pharmacologic and non-drug treatments often works best.

Non-drug treatments involve analyzing the behavior, identifying what may have triggered it, and then tailoring an intervention that either changes (a) the person's environment, or (b) the caregiver's reaction to the behavior. For example, excessive noise, heat, cold, or commotion can all exacerbate agitation in individuals with Alzheimer's disease. Simply creating a calmer environment can sometimes eliminate the problematic behavior. Likewise, when caregivers become angry in response to a difficult

behavior, this usually only upsets the person with Alzheimer's disease and increases the frequency of challenging situations. Reacting in a calm, controlled manner can extinguish the tension long enough to distract the individual with Alzheimer's to a more pleasant activity.

### ***Conclusion***

Alzheimer's disease is a harrowing condition caused by the deterioration of nerve cells in the brain, resulting in problems with memory, language, orientation, and other thought processes. It also diminishes an individual's ability to care for him- or herself and causes them to exhibit extremely challenging behaviors.

Ninety-five percent of what is known about Alzheimer's disease has been discovered in the last 15 years. This course covered the nature of Alzheimer's disease and how it relates to dementia, the possible causes and risk factors of the disease, the process of diagnosing Alzheimer's, the symptoms associated with each stage of Alzheimer's, and the various treatments available for the cognitive and behavioral symptoms of the disease. The more that health care professionals learn about Alzheimer's, the better prepared they will be to help individuals affected by the disease and the family members who care for them.

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