

**Alzheimer's Disease: An Oblivious State over  
Time**

**Name: Hridoy Ibn Quayum**

**ID: 1922170**

**E-mail: [hridoyibnquayum666@gmail.com](mailto:hridoyibnquayum666@gmail.com)**

**Phone Number: +8801717009323**

Alzheimer's disease has become a major public health problem though it was considered a rare condition when Dr. Alois Alzheimer discovered it for the first time in 1906. Around 50 million people are believed to be living with Alzheimer's disease where the most affected regions are the North America and Europe. This undertreated and under-recognized disease has drawn the attention as it has a significant effect on the increased life expectancy and the socioeconomic condition of the general population. Alzheimer's disease is such a brain disorder happening in elderly people which causes memory loss along with language problems and certain unpredictable behavior. The early-onset type AD is very rare where it occurs between a person's 30s and mid-60s. But the most occurring late-onset type AD symptoms appear in person's mid-60s. According to Alzheimer's Association in USA, one in ten Americans over the age of 65 and nearly one-third of those over 85 have Alzheimer's Disease.

Alzheimer's disease occurs due to the amyloid plaques and neurofibrillary tangles in brain as well as vascular damage from extensive plaque deposition. Because of these plaques and tangles, the loss of brain cells (neurons) occurs which are responsible to transmit messages and commands to different parts of the body from brain. The main component of the plaques which works as the causative agent for Alzheimer's pathology, tangles, cell loss and vascular damage is amyloid  $\beta$  protein (A $\beta$ P). This A $\beta$ P is a peptide product of the larger amyloid precursor protein (APP). A $\beta$ P works as neurotoxin which is responsible for neuronal death and neurofibrillary tangle formation directly or makes the neurons more sensitive to excitotoxic damage. Mutations or polymorphisms in APP, apolipoprotein (ApoE4), presenilin (PS-1) and Presenilin 2 (PS-2) cause excessive cerebral accumulation of the  $\beta$ -amyloid protein and subsequent neuronal and glial pathology in brain regions important for memory and cognition. These degenerative changes of neurotransmitter systems include alterations in the function of the monoaminergic neural systems that release glutamate, norepinephrine and serotonin as well as a few neuropeptide-containing system. Also, microglial (the immune cells of the central nervous system) dysfunction can be responsible for brain aging and AD as microglia of AD brain resembles significantly aging microglia. Besides, abnormal interactions with neocortical metal ions, especially zinc, copper and iron which stimulates the precipitation of  $\beta$ -amyloid causing the catalysis of H<sub>2</sub>O<sub>2</sub> production that mediates the toxicity.

Alzheimer's disease is a kind of dementia and progressive condition that gets worse over time. Memory loss is the key feature and the other symptoms appear gradually over months or years. Other main symptoms of AD are –

- Cognitive deficits
- Problems with recognition
- Problem with spatial awareness
- Problems with speaking, reading or writing
- Personality or behavior changes

Again, these symptoms can be categorized by the different stages of AD. With the gradual development of AD, the severity of symptoms also develops. AD can be divided into three stages. Those are –

Mild Alzheimer's Disease:

- Taking longer than usual to perform daily tasks
- Difficulty in handling money or paying the bills

- Keep wandering and getting lost
- Getting upset or angry more easily, hiding things or pacing

#### Moderate Alzheimer's Disease:

- Greater memory loss and confusion
- Difficulty in recognizing friends or family
- Inability to learn new things
- Difficulty in getting dressed
- Difficulty in coping with new situations
- Impulsive behavior
- Hallucinations, delusions and paranoia

#### Severe Alzheimer's Disease:

- Inability to communicate
- Dependency on others for care
- Unable to leave bed most or all of the time

To diagnose AD, there are several ways to follow. Friends and family play a vital role in this case as they may notice symptoms in a person before the person himself. Doctors usually ask for the symptoms, experiences and medical history from the family or caregivers. They also carry out some tests like –

- Cognitive and memory tests
- Neurological function tests
- Blood or urine tests
- CT scan or MRI scan of the brain
- Genetic testing

There is no specific treatment to cure Alzheimer's disease completely as it is impossible to reverse the brain cells. So, the treatments of AD are mainly to reduce the symptoms and improve the condition of the patients. There are several types of treatment like psychosocial treatment and pharmacotherapy. The psychosocial treatment includes the environmental manipulation, family support and prevention of other medical comorbidities. Remaining in home for long time, daily reminders, prominent clocks, calendars are significantly important to improve patient's condition. Pharmacological choices are also available for the treatment. The available pharmacotherapy includes cognitive enhancers to treat cognitive deficit and as mood stabilizers, antipsychotics, antidepressants and hypnotics. The renowned cholinesterase inhibitors used in cognitive disturbance are Donepezil, Tacrine, Galantamine, Rivastigmine. There are other treatments like Estrogen replacement therapy (ERT) for women, Nonsteroidal anti-inflammatory drugs (NSAIDS) to slow the progress of AD, use of antioxidant agents like Selegiline and Vitamin E are also available.

Though age, genetics and family history work as the risk factors for AD, there are other antecedent risk factors that increase the risk of having AD. These factors are – cardiovascular disease, smoking, hypertension, type-II diabetes, obesity, traumatic brain injury. On the other hand, protective factors like education, leisure activity, Mediterranean diet and physical activity can reduce the risk of having AD.

Alzheimer's disease is among the top leading disease because of the rapid growth of AD patients around the world. In the U.S., an estimated 5.5 million people of all ages have AD of which around 5.3 million are 65 and older and 200,000 are younger and have early-onset AD. About two-thirds of Americans with AD are women which equals to 3.3 million women and 2 million men. AD and dementia are most common in Western Europe include North America and least common in Sub-Saharan Africa. African-Americans are about twice as likely to have AD as whites. Hispanics are about 1.5 times as likely to have AD as whites.

Alzheimer's disease is the sixth-leading cause of death in the U.S. killing more people than breast cancer and prostate cancer combined. Since 2000, deaths from AD have increased by 89 percent while those from heart disease have decreased. Typical life expectancy after an Alzheimer's diagnosis is three to ten years.

Alzheimer's disease has drawn the attention of scientists as it is rapidly growing around the world especially in western world. Though it seems like an inevitable disease to the senior citizens, there is no direct medications for the treatment. As a result, there is a huge economic impact. In 2016, 15.9 million family and friends provided 18.2 billion hours of unpaid assistance, a contribution to the nation valued at \$230.1 billion. The global cost of AD is estimated to be \$605 billion which is equivalent to one percent of the entire world's gross domestic product. As there is no cure for AD, so people should be concern about the prevention of AD. Healthy diet, leisure activity like listening music, brain games, various physical activity help the neurons to be healthy and prevent from death. Also, a balanced life helps to reduce other disease like, diabetes, heart disease, hypertension which trigger AD. So, people should be more aware about their day-to-day life to avoid this dangerous consequence in future.

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