
Research on the Alzheimer's Disease and Dementia's Causes and Outcomes

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[Abstract] Alzheimer's disease is one of the most common diseases diagnosed and it is also a cause of dementia. Data shows that over 46 million of the population around the world is living with dementia. Alzheimer's disease is not only caused by genes and there are external factors which can help be diagnosed and cured.

[Keyword] Alzheimer, Dementia, symptoms, cognitive factors, treatment

[Introduction]

Studies have shown that Alzheimer's disease is currently a common disease and by year 2050, 1 out of 85 people in the world will be diagnosed with Alzheimer's disease. Alzheimer's disease is one of the most common causes of dementia. However with so much research, the cause of Alzheimer's disease is still vague and the reason to why it progresses quickly is still unknown. Researchers believe that the only way to prevent Alzheimer's disease is the early detection and for the past 15 years, they have been able to detect it early enough. In 2011, a publication of new diagnostic criteria and guidelines for detecting Alzheimer's disease was announced which became a hot topic.

Alzheimer's disease is defined as a disease where "the neurons within the brain stops functioning, lose connection with other neurons and die. Alzheimer's disease is irreversible and progressive." Alzheimer's disease can be diagnosed with certain symptoms and will go through medical exams which include neurological, blood and brain imaging exams (CT, MRI, PET/CT of the head.)

[Alzheimer's Disease Symptoms]

According to the Alzheimer's Association's fact

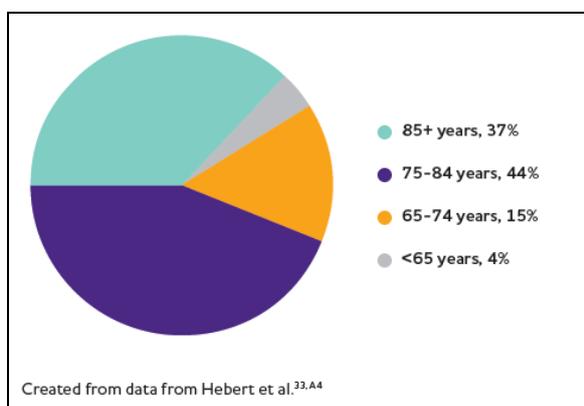
book, the common symptoms of Alzheimer's disease are as following.:

- Memory loss that disrupts daily life
- Challenges in planning or solving problems
- Difficulty completing familiar tasks at home, at work, or at leisure
- Confusion with time and places
- Trouble understanding visual images and spatial relationships
- New problems with words when speaking or writing
- Misplacing things and losing the ability to retrace steps
- Decreased or poor judgment
- Withdrawal from work or social activities
- Changes in mood and personality, including apathy and depression
- Increased anxiety, agitation and sleep disturbances.

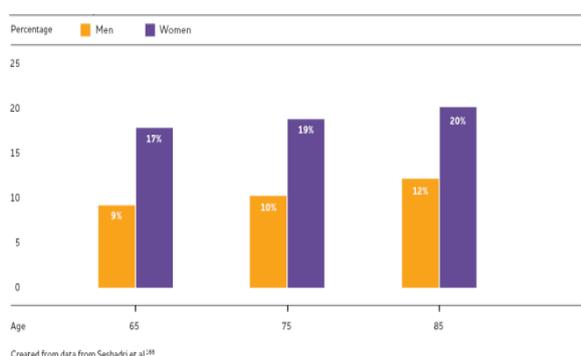
The symptoms above are a result of brain neurons' damage which eventually spreads to other parts of the brain. The pace of the symptoms showing depends on the person and as it gets severe, the more help they would need with their daily life activities from showering to eating and communicating.

[Factors of Alzheimer’s Disease]

In every disease and illness, there are causing factors to it and Alzheimer’s disease. Some of the causing factors are mild cognitive impairment (MCI), genetic abnormalities such as genetic mutations and Down syndrome. Aside from genetic and cognitive impairment, there are other factors that are combined which increase the risk of Alzheimer’s disease. The other factors are age (aged 65 or older), family history, and Apolipoprotein E (APOE)-e4 Gene. Some other factors that can be changed in order to reduce the risk are cardiovascular disease risk factors, education, social and cognitive engagement, and TBI.



[FIGURE 1] Ages of people with Alzheimer’s disease in America (2016)



[FIGURE 2] Estimated lifetime risk for Alzheimer’s, by Age and Sex (from Framingham Study)

[Dementia]

According to studies, Alzheimer’s disease is the most common cause of dementia. It takes up 60 to 80 percent of the cases of Dementia. Dementia is not classified as a specific disease but a severe mental disability which affects the daily life. Dementia is associated to the decline in memory or other thinking skills that affects daily activities.

Dementia is caused when there are damages caused to brain cells. People with dementia could possible go through problems with short-term memory, keeping track of money, paying bills, planning, preparing meals, and remembering appointments, etc.

While symptoms of dementia can vary greatly, at least two of the following core mental functions must be significantly impaired to be considered dementia:

- Memory
- Communication and language
- Ability to focus and pay attention
- Reasoning and judgment
- Visual perception

[FIGURE 3] List of symptoms that must be present to be classified as dementia.

1. Recent memory loss that affects daily life

- It's normal to forget meetings, names or telephone numbers occasionally and then remember them later.
- **A person with dementia might have trouble remembering recent events.**

2. Difficulty performing regular tasks

- It's normal to make a wrong turn occasionally while driving.
- **Someone with dementia might have regular difficulty driving a familiar route.**

3. Problems with language

- Many people have trouble finding the right words sometimes.
- **But someone with dementia might have difficulty following, or initiating a conversation.**

4. Disorientation of time and place

- It is normal to occasionally forget what day it is or where you are going
- **A person with dementia may be confused about the time of day, and what is appropriate for that time.**

5. Decreased or poor judgment

- Making a bad decision once in a while is normal.
- **A person with dementia might make bad decisions more frequently and start paying less attention to their physical appearance.**

6. Problems with abstract thinking

- It's normal to have difficulty balancing a budget
- **A person with dementia might completely forget what the numbers are and what needs to be done with them.**

7. Misplacing things

- Anyone can misplace their wallet or keys.
- **A person with dementia might repeatedly put things in inappropriate places.**

8. Changes in mood and behaviour

- Everyone becomes sad or moody from time to time.
- **A person with dementia can have rapid mood swings, from calm to tears to anger, for no apparent reason.**

9. Changes in personality

- People's personalities can change a little with age
- **A person with dementia might have problems in social situations they have previously been comfortable with.**

10. Loss of initiative

- It is normal for people to tire of housework, business activities or social obligations.
- **A person with dementia may no longer initiate things that they once enjoyed.**

[FIGURE] Ten warning signs of dementia given by Alzheimer's Australia.

and by 2050, the number will rise to 131.5 million.

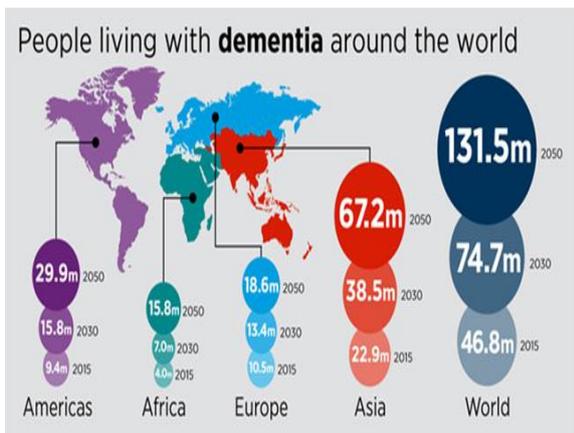
[Stages of Alzheimer's Disease]

Alzheimer's disease can be divided into four stages from pre-dementia, early stage, moderate, and advanced stage. In the pre-dementia stage, it is the pre-stage before the brain structure transformation begins and it takes approximately eight years to diagnose Alzheimer's disease. As the early symptoms are not that different from simple forgetfulness but as time passes it affects the daily activities. According to studies, an individual in the pre-dementia stage will slowly have trouble remembering recently learned facts and personality starts to changes little by little. It will then lead to communication problems making him/her have trouble remembering the topic of their conversation and also remembering words.

Following the pre-dementia is the early stage. In this stage, the symptoms are well shown enough to be diagnosed as Alzheimer's disease. Visible symptoms would be difficulties with language use, perception, movements and will have short-term memory loss. At this stage, they will still be able to perform daily activities but would need help with activities that are cognitively demanding.

The next stage is the moderate stage, when the patient starts to rely more on the caregiver or people around for help. It becomes even harder to communicate as speaking and writing ability declines. They are no longer able to perform complicated physical movements which are done on daily bases such as using utensils. At this stage, long-term memory starts to progress and the personality starts to change drastically followed by emotional instability. Research shows that one third of the Alzheimer's disease patients develop illusionary misidentifications.

The last stage would be the advanced stage. Communication skills are mostly lost and they



[FIGURE 4] Diagram of people with Dementia around the world (2015 source)

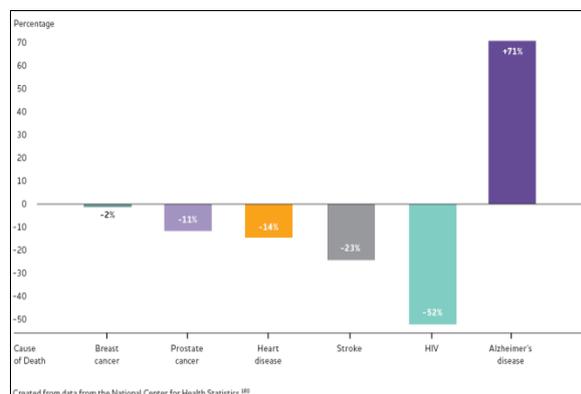
According to World Health Organization and Alzheimer's Disease International, over 46 million people around the world have dementia

become completely dependent as they are unable to eat, walk, and use the bathroom without assistance. As it gets serious, the patient will become susceptible to infections resulting in death.

[Treatment and Prevention]

As dementia is usually caused by Alzheimer’s disease, there is no cure or treatment that can slow down the progression but there are medications that can temporarily improve the symptoms. Some medications are used both for dementia and Alzheimer patients but sometimes might vary depending on the types and symptoms of dementia. There are also non-medication methods but more research is still needed to create more effective methods.

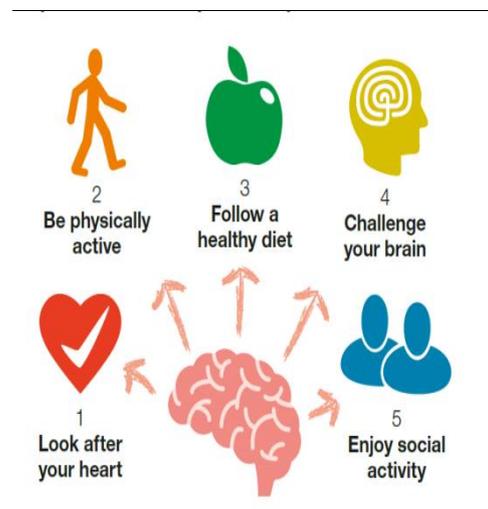
As mentioned previously about the cause that can’t be changed such as genetics or age there are also those that can be diagnosed and changed. In order to decrease the risk of being diagnosed with dementia, cautious examination and preventing actions must be taken which includes cardiovascular risk factors that related to the blood vessels in the brain by not smoking, keeping the normal blood pressure, cholesterol, blood sugar level, and also maintaining healthy weight. Physical exercise that is not to exaggerated and health diet is also a way of reducing the risk of dementia.



[FIGURE 5] Percentage changes in selected causes of death (all ages) between 2000 and 2013

[Conclusion]

As Alzheimer’s disease is irreversible and can’t be cured. Since it is impossible to be treated, it can only be looked out for and be prevented by being cautious about the factors that could possible lead to Alzheimer’s disease and dementia such as exercising and healthy diet. Additionally, in order to create better treatment systems, more volunteers are needed to study Alzheimer’s disease and dementia.



[FIGURE 6] Factors that can help reduce the risk of developing dementia



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