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## Dementia - Alzheimer's disease

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### Summary

- Alzheimer's disease is a physical disease of the brain with progressive damage to brain cells, which causes dementia.
- Alzheimer's disease is the most common form of dementia in Australia, accounting for about two thirds of cases.
- A number of factors contribute to development of the disease, including environmental, genetic and health factors.
- Understanding the risk factors for developing Alzheimer's disease can help you to make decisions about potential strategies for risk reduction.
- Diagnosis can be difficult, but an early visit to the doctor is critical.
- People with Alzheimer's disease differ in the patterns of problems they experience and in the speed with which their abilities deteriorate, as they move through the stages of Alzheimer's disease.
- Treatment can help with memory and thinking problems, depression and sleep disturbances, but there is no cure

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Alzheimer's disease is a physical disease of the brain with progressive damage to brain cells that causes dementia. Alzheimer's disease is the most common form of dementia in Australia, accounting for about two thirds of cases.

The brain degeneration that occurs in Alzheimer's disease affects memory, thinking skills, emotions, behaviour and mood. As a result, a person's ability to carry out daily activities becomes impaired. As the disease progresses, symptoms worsen.

### Symptoms of Alzheimer's disease

Alzheimer's disease typically starts slowly and the symptoms can be very subtle in the early stages. As the disease progresses, symptoms become more noticeable and interfere with daily life. The disease affects each person differently and the symptoms vary.

Common symptoms include:

- persistent and frequent memory loss, especially of recent events
- vagueness in everyday conversation
- being less able to plan, problem-solve, organise and think logically
- language difficulties such as finding the right word and understanding conversations
- apparent loss of enthusiasm for previously enjoyed activities
- taking longer to do routine tasks
- becoming disoriented, even in well-known places
- inability to process questions and instructions
- deterioration of social skills
- emotional unpredictability
- changes in behaviour, personality and mood.

Symptoms vary as the disease progresses and different areas of the brain are affected. A person's abilities may

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fluctuate from day to day, or even within the one day, and can become worse in times of stress, fatigue or ill health.

The stages of Alzheimer's disease progress from mild Alzheimer's disease (which can be so subtle that it might only be recognised in hindsight) to moderate Alzheimer's disease and then severe Alzheimer's disease. During severe Alzheimer's disease, people need continuous care. The rate of progression between these stages differs between people.

## **Causes of Alzheimer's disease**

Researchers are rapidly learning more about the chemical changes that damage brain cells in Alzheimer's disease. Apart from the few with familial Alzheimer's disease, it is not known why some people develop Alzheimer's disease and others do not. It is likely that a number of factors contribute to development of the disease, including environmental, genetic and health factors.

Alzheimer's disease is characterised by specific changes in the brain that include the formation of amyloid plaques (fibrous patches) and neurofibrillary tangles (strands of proteins). An abnormal build-up of a protein called beta-amyloid causes amyloid plaques to form outside the brain cells. Inside the brain cells, another protein called tau builds up and causes neurofibrillary tangles.

These protein accumulations disrupt messages within the brain because they damage connections between brain cells. The brain cells eventually die and brain volume shrinks. These brain changes occur gradually and actually begin many years (on average around 15 years) before the symptoms of Alzheimer's disease occur. The brain is able to compensate for the early damage, but eventually the damage becomes too great and brain function is affected.

## **Types of Alzheimer's disease**

Alzheimer's disease can strike adults of either sex. The vast majority of cases of Alzheimer's disease are not caused by known changes to specific genes – this type is called sporadic Alzheimer's disease. Familial Alzheimer's disease can be linked to changes in particular genes, but it is rare.

### **Sporadic Alzheimer's disease**

Sporadic Alzheimer's disease accounts for more than 90 per cent of cases. Most cases occur in people over the age of 65 and the cause is unknown. Having a close family member with the condition increases risk by a small amount.

Although there are no known genetic changes to specific genes, having one or two copies of a gene called apolipoprotein E4 (ApoE4) can increase your risk of contracting Alzheimer's, although this gene does not make it certain that you will contract Alzheimer's disease. Some people with ApoE4 never develop Alzheimer's disease.

### **Familial Alzheimer's disease**

Familial Alzheimer's disease accounts for less than five per cent of cases of Alzheimer's disease. This rare type of Alzheimer's disease is caused by changes in particular genes. The age of onset is earlier than for sporadic Alzheimer's disease, with symptoms often appearing when the person is between 40 and 60.

The genetic changes are to the genes presenilin 1, presenilin 2 and amyloid precursor protein (APP). The changes to these three genes cause an increase in the production of the protein beta-amyloid that is found in amyloid plaques.

Genetic testing can identify the presence of gene changes that cause familial Alzheimer's disease. This test can tell if a person has familial Alzheimer's, and if a child has inherited the changed gene from a parent and will develop

the disease in the future. The test cannot determine when the symptoms will begin, although usually the age of onset is similar to that of their parent.

### **Down syndrome and Alzheimer's disease**

People with Down syndrome have a third copy of chromosome 21, instead of the usual two copies. This genetic change causes a collection of characteristics, including intellectual disability and some common physical traits.

The APP gene that leads to the production of the beta-amyloid protein present in Alzheimer's plaques is located on chromosome 21. This means that people with Down syndrome make one and a half times the amount of APP and, as a consequence, more beta-amyloid. This appears to be the cause of the earlier appearance of the brain changes typical of Alzheimer's disease in people with Down syndrome.

### **Risk factors for Alzheimer's disease**

Understanding the risk factors for developing Alzheimer's disease can help you to make decisions about potential strategies for reducing your risk. Risk factors can be separated into a number of types.

#### **Age**

Age is a risk factor that cannot be controlled (also known as a non-modifiable risk factor). The incidence of Alzheimer's disease increases with age, with one in 30 Australians aged 70 to 74 years estimated to have Alzheimer's disease, one in eight aged 80 to 84 years and one in three aged 90 to 94 years.

#### **Genetics**

Genetics is another risk factor that cannot be controlled. The genetics of Alzheimer's disease is not fully understood, but there are genetic changes in familial Alzheimer's disease and Down syndrome, and susceptibility genes for sporadic Alzheimer's disease.

#### **Brain risk factors**

Brain risk factors that can be controlled include:

- mental activity – regularly challenging your brain with mentally stimulating activities through education, occupation or leisure is associated with lower risk of cognitive (how we think, including reasoning and memory) decline and dementia
- social activity – participating in social activities and being connected with your community, family and friends is associated with a lower risk of dementia.

#### **Body risk factors**

Body risk factors that can be controlled include:

- alcohol – too much alcohol can damage your brain and lead to an increased risk of developing dementia
- diet – the available evidence suggests a healthy diet can play a role in promoting brain health
- physical activity – regular physical exercise is associated with better brain function and reduced risk of cognitive decline and dementia.

#### **Heart risk factors**

Heart risk factors that can be controlled include:

- blood pressure – untreated high blood pressure is linked with an increased risk of developing Alzheimer's disease. Effective long-term treatment can reduce dementia risk
- body weight – obesity in midlife is linked with an increased risk of developing cognitive impairment and Alzheimer's disease
- cholesterol – a history of high cholesterol is associated with an increased risk of developing Alzheimer's disease
- diabetes – type 2 diabetes in midlife and later is associated with an increased risk of developing cognitive impairment and Alzheimer's disease
- smoking – is a risk factor for Alzheimer's disease and some studies have shown that a history of passive smoking may also increase risk.

## **Diagnosis of Alzheimer's**

Consulting a doctor at an early stage is critical. Only a doctor can diagnose Alzheimer's disease.

It is important to rule out the presence of other conditions that can mimic the symptoms of Alzheimer's disease, such as brain tumours, depression or some types of malnutrition. A complete medical assessment may identify a treatable condition and ensure that it is treated correctly, or it might confirm the presence of Alzheimer's disease.

The range of diagnostic tests used may include:

- medical history
- physical examination
- blood and urine tests
- memory, thinking and other tests for cognitive abilities (neuropsychological or cognitive tests)
- brain imaging
- psychiatric assessment.

## **Stages of Alzheimer's disease**

People with Alzheimer's disease differ in the patterns of problems they experience and in the speed with which their abilities deteriorate. Their abilities may change from day to day, or even within the same day. What is certain is that the person's abilities will deteriorate – sometimes rapidly over a few months, sometimes more slowly, over a number of years.

Some of the features of Alzheimer's disease are classified into three stages. It is important to remember that not all of these features will be present in every person, nor will every person go through every stage. But these stages are still a useful description of the progression of Alzheimer's disease.

At all stages of Alzheimer's disease, treatments and support services are available. Use these to make sure of the best possible quality of life for everyone affected by Alzheimer's disease.

### **Mild Alzheimer's disease**

Sometimes, this stage of Alzheimer's disease is only apparent in hindsight. At the time, it may be missed, or put down to old age or overwork. The onset of dementia is very gradual and it is often impossible to identify the exact time it began.

During the early phase of dementia, the person may:

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- appear more apathetic, with less sparkle
- lose interest in hobbies or activities
- be less willing to try new things
- be less able to adapt to change
- be slower to grasp complex ideas and take longer with routine jobs
- become more forgetful of details of recent events
- become confused or disoriented to time and place
- become lost if away from familiar surroundings
- be more likely to repeat themselves or lose the thread of their conversation
- be more irritable or upset if they fail at something
- have difficulty managing finances
- have difficulty shopping or preparing meals.

### **Moderate Alzheimer's disease**

At this stage, the person's problems are more apparent and disabling. A person with moderate Alzheimer's disease is not able to live independently and requires significant day-to-day support.

During the moderate phase of dementia, the person may:

- be very forgetful of current or recent events – memory of the distant past seems better, but some details may be forgotten or confused
- be confused regarding time and place
- become lost more easily
- forget names of family or friends, or confuse one family member with another
- forget saucepans and kettles on the stove or leave the gas lit
- be less able to perform simple calculations
- show poor judgement and make poor decisions
- wander around streets, perhaps at night, sometimes becoming lost
- behave inappropriately – for example, going outdoors in their nightwear
- see or hear things that are not there or become suspicious of others
- become very repetitive
- be neglectful of hygiene or eating
- be unable to choose appropriate clothing for the weather of occasion
- become angry, upset or distressed through frustration.

### **Severe Alzheimer's disease**

During this third stage of Alzheimer's disease, the person is severely disabled and needs continuous care for all daily activities. The person may:

- be unable to remember current or recent events, for example, forgetting that they have just had a meal or being unable to recall where they live
- be unable to recall important events or facts from their early life
- show confused recognition of friends and family
- fail to recognise everyday objects
- lose their ability to understand or use speech

- need help with eating, washing, bathing, brushing teeth, toileting and dressing
- be incontinent
- be disturbed at night
- be restless or fidgety
- call out frequently or become aggressive
- have difficulty walking and other movement problems such as rigidity.

Some abilities remain for people with Alzheimer's disease, although many are lost as the disease progresses. The person may still keep their sense of touch and hearing, and their ability to respond to emotion, even in the final stages.

Immobility will become permanent and, in the final stages, the person will be bedridden and unable to sit up independently. As a terminal illness, Alzheimer's disease progresses until the end of life, with extensive care required.

### **Treatment for Alzheimer's disease**

At this stage, there is no cure and no treatment that can stop the Alzheimer's disease progressing.

Medications are available that can help to stabilise or slow the decline in memory and thinking abilities for a time, such as cholinesterase inhibitors and memantine. Other medications are available that might help with secondary symptoms like depression, anxiety and sleep disturbances.

It is important to remember that all medications have side effects. People with Alzheimer's disease may take a number of medications and your doctor can help you to understand how the different medications might interact with each other.

Non-medication therapies, staying active and socially connected, as well as managing stress, can help people with Alzheimer's disease. Education and professional support are important for people with Alzheimer's disease and their families and carers.

### **Where to get help**

- Your doctor
- Your local council
- Your local community health centre
- National Dementia Helpline – Dementia Australia Tel. 1800 100 500
- Aged Care Assessment Services Tel. 1300 135 090
- My Aged Care Tel. 1800 200 422
- Cognitive Dementia and Memory Service (CDAMS) clinics Tel. 1300 135 090
- Carers Victoria Tel. 1800 242 636
- Commonwealth Respite and Carelink Centres Tel. 1800 052 222
- Dementia Behaviour Management Advisory Service (DBMAS) Tel. 1800 699 799 – for 24-hour telephone advice for carers and care workers

### **Things to remember**

- Alzheimer's disease is a physical disease of the brain with progressive damage to brain cells, which causes dementia.
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