

Alcohol Related Brain Injury and Wernicke-Korsakoff syndrome

This help sheet discusses the causes, symptoms and treatment of Alcohol Related Brain Injury and Wernicke-Korsakoff syndrome, as well as Wernicke's encephalopathy and Korsakoff's syndrome.

Alcohol related Brain Injury (ARBI) develops from consuming alcohol at risky levels regularly, over many years. The National Health and Medical Research Council recommends that to reduce the risk of all health problems related to alcohol, healthy adults should drink no more than 10 standard drinks a week and no more than four standard drinks on any one day.

The longer and more regularly someone consumes risky levels of alcohol, the more likely they are to develop ARBI. This condition may worsen with continued alcohol use.

Alcohol use can directly damage brain cells. This can lead to changes in the brain that affect physical and mental health. ARBI can negatively affect cognition (thinking skills) including:

- attention
- thinking speed
- learning new information
- remembering new information
- 'executive' cognitive functions like impulse control, inhibition, cognitive flexibility, reasoning, retaining information, problem-solving and insight
- mood, anxiety, motivation and social skills.

ARBI may be diagnosed when these changes become enough to cause significant distress or interfere with daily living. This can include managing finances and work. It can even include keeping up with friends and family, and looking after your health.

If ARBI is diagnosed, the person is usually considered to have a permanent acquired brain injury, which results in permanent physical, mental or cognitive disability.

Although the term ‘alcohol related dementia’ was once used, many doctors now prefer the terms:

- alcohol related brain injury
- alcohol related brain damage
- alcohol related brain impairment.

Treatment and progression

Symptoms usually develop gradually, but if the person stops drinking, the brain damage stops increasing and thinking abilities will not worsen.

Depending on the degree of damage, thinking and functioning usually improve when alcohol intake is reduced, and especially when it is stopped altogether. These improvements may continue many months after stopping alcohol use. ARBI usually involves some degree of permanent damage to the structure and function of the brain, that remains even after a long period without using alcohol.

Stopping alcohol use is the best treatment option, which usually requires support. Alcohol withdrawal can be dangerous, so it is recommended to speak to a doctor about stopping. It is also recommended that people with a supporting role (such as friends, family and others) know there is a plan for the person to stop drinking and learn how they can help.

If the person continues to drink alcohol at risky levels, brain damage and thinking difficulties are likely to get worse.

Thiamine deficiency and brain damage

Brain damage can occur in people consuming alcohol at risky levels due to thiamine deficiency. Low thiamine levels can lead to the death of brain cells.

Thiamine (vitamin B1) is important for health and is usually sourced from food.

Thiamine deficiency is common in people consuming risky levels of alcohol because:

- They may not eat enough to be healthy, because alcohol provides them with their energy needs.
- Alcohol disrupts thiamine processing in the body, meaning thiamine is not properly used or absorbed.

About Wernicke's encephalopathy, Korsakoff's syndrome and Wernicke-Korsakoff syndrome

Thiamine deficiency can lead to a condition called Wernicke's encephalopathy.

Wernicke's encephalopathy is commonly associated with brain damage and may develop into Korsakoff's syndrome, which is a chronic brain condition with severe memory and thinking impairments.

Wernicke's encephalopathy and Korsakoff's syndrome are both part of a spectrum called Wernicke-Korsakoff syndrome (WKS).

Symptoms may vary. It is possible for someone to develop Korsakoff's syndrome without having knowingly had Wernicke's encephalopathy.

Risky alcohol use is the most common cause of WKS and usually causes a permanent brain injury which would be classified as an ARBI.

Wernicke's encephalopathy

Wernicke's encephalopathy is an intense inflammation or swelling of the brain caused by a severe lack of thiamine.

It affects eye movement and vision, balance and coordination, and causes confusion.

The condition usually develops suddenly. There are common symptoms, although these are not always present, so diagnosis may be difficult. Not everyone may experience this condition in the same way, so it is important to be aware of key signs.

Typical symptoms include:

- jerky eye movements, paralysis of muscles moving the eyes or double vision
- loss of muscle coordination, poor balance, staggering or inability to walk
- confusion or memory impairment
- signs of malnutrition, including unplanned weight loss, fatigue, weakness and vitamin deficiency.

Treatment and progression

Treatment consists of high doses of thiamine. If treatment is carried out in time, most symptoms can be reversed to some degree. However, progression to Korsakoff's syndrome is common, because alcohol impairs thiamine processing in several ways.

Treatment should include support to stop drinking alcohol and start eating a balanced diet.

If left untreated, or not treated in time, permanent brain damage may result. In some cases, the person may die. Brain damage may occur, especially in deeper parts of the brain, followed by the ongoing symptoms of Korsakoff's syndrome. This condition results in severe memory impairment, meaning people are unable to learn, retain and retrieve new information. Memory function is often further complicated by changes in other thinking abilities common in ARBI that are important for memory function, such as attention, thinking speed, organisation and 'working memory' (a person's 'short term memory').

Korsakoff's syndrome

If Wernicke's encephalopathy is left untreated or not treated soon enough, Korsakoff's syndrome may follow. However, Korsakoff's syndrome is not always preceded by Wernicke's encephalopathy: in people who use alcohol at risky levels, Korsakoff's syndrome can develop on its own. This is partly because brain damage due to low thiamine can occur gradually and not just when people develop Wernicke's encephalopathy.

Korsakoff's syndrome usually develops gradually. The condition affects areas deep within the brain that support someone's ability to:

- form new memories
- learn new information.

Memories of the more distant past can be affected. Some people also experience changes to other cognitive functions.

Other symptoms can include:

- personality changes
- making up stories to fill gaps in memory (confabulation)
- seeing or hearing things that aren't there (hallucinations)
- lack of insight into the condition.

Treatment and progression

Treatment includes:

- abstaining from alcohol
- adopting a healthy diet
- taking vitamin supplements, including thiamine (ask a doctor for advice before taking thiamine).

If the person continues to drink alcohol at risky levels and has poor nutrition, the condition is likely to progress, with symptoms worsening over time.

If the person stops drinking alcohol, any improvement usually occurs within two years. Their health outlook will depend on how much brain damage had been caused when they stopped drinking alcohol.

Some symptoms (especially the loss of memory and thinking skills) may be permanent. People usually retain skills acquired before developing the condition, so with appropriate support, they are often able to manage. Some make no recovery and may need long-term care.

Alcohol abuse and the brain

Anyone who drinks risky amounts of alcohol over many years may develop these conditions, but most do not. It is not known why some people who consume alcohol at risky levels develop a brain injury or WKS. Diet and other lifestyle factors are likely to be important, as WKS is rare in people with a normal dietary intake of essential vitamins.

Most commonly these conditions affect men over the age of 45 with a long history of alcohol abuse, although men and women of any age can be affected.

Alcohol support

Support is available to help people who have problems with alcohol. Talk to your doctor for advice, referrals and support.

If you notice any changes to memory, thinking and behaviour, do not delay speaking with your doctor. An early diagnosis will enable you to start treatment and prevent symptoms worsening. In some people, early treatment may also improve overall health.

Other formal supports

To support their daily living, people with ARBI may be able to access formal supports such as social housing, the Disability Support Pension or Aged Pension, or the National Disability Insurance Scheme.

Additional reading and resources

- Dementia Australia library service
Visit: dementia.org.au/library
- Dementia Australia support services and programs
Visit: dementia.org.au/support
- Dementia Australia education
Visit: dementia.org.au/education
- Alcohol and Drug Foundation
Visit: adf.org.au
- Alcoholics Anonymous
Call: **1300 222 222**
Visit: aa.org.au
- Services Australia (Centrelink and other government payments including Disability Support Pension and Aged Pension)
Visit: servicesaustralia.gov.au
- National Disability Insurance Scheme
Call: **1800 800 110**
Visit: ndis.gov.au
- My Aged Care
Call: **1800 200 422**
Visit: myagedcare.gov.au

Further information

Dementia Australia offers support, information, education and counselling.

National Dementia Helpline: 1800 100 500

For language assistance: 131 450

Visit our website: dementia.org.au